



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION I  
475 ALLENDALE ROAD  
KING OF PRUSSIA, PA 19406-1415**

November 12, 2009

Mr. Thomas P. Joyce  
President and Chief Nuclear Officer  
PSEG Nuclear LLC - N09  
P.O. Box 236  
Hancock's Bridge, NJ 08038

**SUBJECT: HOPE CREEK GENERATING STATION – NRC INTEGRATED INSPECTION  
REPORT 05000354/2009004**

Dear Mr. Joyce:

On September 30, 2009, the U.S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at the Hope Creek Generating Station. The enclosed inspection report documents the inspection results discussed on October 15, 2009, with Mr. J. Perry and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

The report documents one NRC-identified finding of very low safety significance (Green). This finding was determined to involve a violation of NRC requirements. Additionally, one licensee-identified violation that was determined to be of very low safety significance is also listed in this report. However, because of their very low safety significance and because they are entered into your corrective action program, the NRC is treating these findings as non-cited violations (NCVs) consistent with Section VI.A.1 of the NRC Enforcement Policy. If you contest any NCV in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Hope Creek Generating Station. In addition, if you disagree with the characterization of any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region I, and the NRC Resident Inspector at the Hope Creek Generating Station. The information you provide will be considered in accordance with Inspection Manual Chapter 0305.

T. Joyce

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Sincerely,

**/RA/**

Arthur L. Burritt, Chief  
Division of Reactor Projects  
Projects Branch 3

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

Enclosure: Inspection Report 05000354/2009004  
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Sincerely,

**/RA/**  
Arthur L. Burritt, Chief  
Division of Reactor Projects  
Projects Branch 3

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## U.S NUCLEAR REGULATORY COMMISSION

## REGION I

Docket No: 50-354

License No: NPF-57

Report No: 05000354/2009004

Licensee: PSEG Nuclear LLC (PSEG)

Facility: Hope Creek Generating Station

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

Dates: July 1, 2009 through September 30, 2009

Inspectors: B. Welling, Senior Resident Inspector  
A. Patel, Resident Inspector  
S. Pindale, Senior Reactor Inspector  
R. Moore, Reactor Engineer  
J. Furia, Senior Health Physicist  
K. Young, Senior Reactor Inspector  
T. O'Hara, Reactor Inspector  
M. Patel, Reactor Inspector

Approved By: Arthur L. Burritt, Chief  
Projects Branch 3  
Division of Reactor Projects

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## SUMMARY OF FINDINGS

IR 05000354/2009004; 07/01/2009 – 09/30/2009; Hope Creek Generating Station; Event Follow-up.

This report covers a three-month period of inspection by resident inspectors and announced inspections by regional reactor inspectors and a regional health physicist. One non-cited violation (NCV) was identified. The significance of most findings is indicated by their color (Green, White, Yellow, or Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). The cross-cutting aspect of a finding is determined using the guidance in IMC 0305, "Operating Reactor Assessment Program." Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

### **Cornerstone: Barrier Integrity**

- **Green.** The inspectors identified a non-cited violation of Technical Specification 3.6.3, "Primary Containment Isolation Valves," because PSEG did not properly secure the TIP system following a TIP system ST performed on May, 6, 2009; and the error was not identified until May 8, 2009. As a result between May 6 and 8, 2009, four TIP system containment isolation valves remained open without automatic closure capability for greater than the TS 3.6.3 allowed outage time (4 hours). In response to this discovery, operations promptly closed the valves to restore primary containment in accordance with TS 3.6.3, "Primary Containment Isolation Valves." PSEG entered this issue into their corrective action program and corrective actions included conducting a thorough extent of condition review related to the proper use of independent verification related to containment isolation valves and reactor engineering procedures.

This finding was more than minor because it was associated with the human performance attribute of the Barrier Integrity cornerstone and adversely affected the cornerstone objective to provide reasonable assurance that physical design barriers provided protection against radionuclide releases caused by accidents or events. Specifically, station personnel did not ensure that containment isolation valves of the TIP system were restored to their normal shut position after completion of a routine surveillance, which would have prevented fulfillment of the safety function for primary containment. The inspectors performed a Phase I Significance Determination Process (SDP) using IMC 0609, Appendix H, "Containment Integrity SDP," and determined that the finding was of very low risk significance because it would not contribute significantly to large early release frequency (LERF) because the TIP tubing penetrations were small lines (< 2 inches in diameter). The finding had a cross-cutting aspect in the area of human performance because PSEG did not provide a complete, accurate, and up-to-date procedure for operating the TIP system. Specifically, the procedure, TIP System Operation, did not contain steps for independent verification of the TIP containment isolation valves, contrary to a PSEG configuration control procedure. [H.2(c)] (Section 4OA3)

**Other Findings**

- One violation of very low safety significance that was identified by PSEG has been reviewed by the inspectors. Corrective actions taken or planned by PSEG have been entered into PSEG's corrective action program. This violation and its corrective actions tracking numbers are listed in Section 4OA7 of this report.

## REPORT DETAILS

### Summary of Plant Status

The Hope Creek Generating Station operated at or near full power for the duration of the inspection period with the following exceptions. On September 11, operators reduced power to approximately 76 percent for control rod scram time testing. The unit was restored to full power on September 13. Additionally, on September 16, operators reduced power to approximately 76 percent for planned turbine valve testing and maintenance. The unit was restored to full power on September 18.

#### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity, and Emergency Preparedness

##### 1R01 Adverse Weather Protection (71111.01 – 2 Samples)

##### .1 Evaluate Readiness for Impending Adverse Weather Conditions

###### a. Inspection Scope

The inspectors completed one adverse weather protection sample. The inspectors reviewed PSEG's preparations for thunderstorms and high winds that occurred on August 10 and 11, 2009. Specifically, the inspectors walked down station service water system and the emergency diesel generators (EDG) to ensure system availability. The inspectors verified that these adverse weather conditions did not adversely impact mitigating systems or increase the likelihood of an initiating event. Inspectors discussed readiness and availability with operations and work control personnel for adverse weather response. Documents reviewed are listed in the Attachment.

###### b. Findings

No findings of significance were identified.

##### .2 Evaluate Readiness to Cope with External Flooding

###### a. Inspection Scope

The inspectors completed one adverse weather protection sample. The inspectors reviewed PSEG's preparations for severe weather that posed a risk of flooding on September 25, 2009. Specifically, the inspectors walked down portions of the station service water system and its associated flood barriers. The inspectors verified that any degraded conditions that could have an adverse impact on safety related systems and components were reported in the corrective action program. The inspectors also monitored various plant parameters that could be affected by the potential flooding condition. The inspectors verified that the adverse weather conditions did not adversely impact mitigating systems or increase the likelihood of an initiating event. For those areas where operator actions are credited, inspectors verified that the procedures for

coping with flooding can reasonably be used to achieve the desired actions, including whether the flooding event could limit or preclude the required operator actions. Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment (71111.04 – 3 samples, 71111.04S – 1 sample)

.1 Partial Walkdown

a. Inspection Scope

The inspectors performed partial system walkdown inspection samples for the three systems listed below to verify the operability of redundant or diverse trains and components when safety equipment was unavailable. The inspectors completed walkdowns to determine whether there were discrepancies in the system's alignment that could impact the function of the system, and therefore, potentially increase risk. The inspectors reviewed applicable operating procedures, walked down system components, and verified that selected breakers, valves, and support equipment were in the correct position to support system operation. The inspectors also verified that PSEG had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the corrective action program. Documents reviewed are listed in the Attachment.

- B emergency diesel generator (EDG) during preventive and corrective maintenance on A EDG on July 27, 2009
- A, C, and D service water (SW) systems while B SW was out of service for unplanned SW strainer maintenance on July 28, 2009
- High pressure coolant injection (HPCI) while reactor core isolation cooling (RCIC) was out for planned maintenance on September 17, 2009

b. Findings

No findings of significance were identified.

.2 Complete Walkdown

a. Inspection Scope

The inspectors performed one complete walkdown inspection of accessible portions of A safety auxiliary cooling system (SACS). The inspectors used PSEG procedures and other documents listed in the Attachment to verify proper system alignment and functional capability. The inspectors independently verified the alignment and status of A SACS pump and valve electrical power, labeling, operator workarounds, hangers and supports and associated support systems. The walkdown also included evaluation of system piping and equipment to verify pipe hangers were in satisfactory condition, oil reservoir levels were normal, pump rooms and pipe chases were adequately ventilated, system parameters were within established ranges, and equipment deficiencies were

appropriately identified. The inspectors also verified alarm response procedures, abnormal operating procedures, and emergency operating procedures were sufficient for system operations.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05Q – 5 Samples; 71111.05A – 1 Sample)

.1 Fire Protection – Tours

a. Inspection Scope

The inspectors completed five quarterly fire protection inspection samples. The inspectors conducted tours of the areas listed below to assess the material condition and operational status of fire protection features. The inspectors verified that combustibles and ignition sources, were controlled in accordance with PSEG's administrative procedures; fire detection and suppression equipment was available for use; that passive fire barriers were maintained in good material condition; and that compensatory measures for out-of-service, degraded, or inoperable fire protection equipment were implemented in accordance with PSEG's fire plan. The five areas toured are listed below with their associated pre-fire plan designator. Other documents reviewed are listed in the Attachment.

- FRH-11-532, Lower Relay Room
- FRH-11-531, EDG Corridor
- FRH-11-531, Diesel Generator Rooms A,B,C,D
- FRH-11-551, Battery Rooms & Cable Chases
- FRH-11-541, Class 1E Switchgear Rooms

b. Findings

No findings of significance were identified.

.2 Fire Protection – Annual Drill Observation

a. Inspection Scope

The inspectors completed one annual fire drill observation inspection sample. The inspectors observed an unannounced fire drill conducted in the 125 Vdc equipment room in the auxiliary building (54' elevation, room 5103). The inspectors observed the drill to evaluate the readiness of the plant fire brigade to fight fires. The inspectors verified that PSEG staff identified deficiencies; openly discussed them in a self-critical manner at the drill debrief; and took appropriate corrective actions. Specific attributes evaluated were: proper wearing of turnout gear and self-contained breathing apparatus; proper use and layout of fire hoses; employment of appropriate fire fighting techniques; sufficient fire fighting equipment brought to the scene; effectiveness of fire brigade leader communications, command, and control; search for victims and propagation of the fire into other plant areas; smoke removal operations; utilization of pre-planned strategies; adherence to the pre-planned drill scenario; and drill objectives.

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures (71111.06 – 1 Sample)

.1 Underground Bunkers/Manholes Subject to Flooding

a. Inspection Scope

The inspectors completed one internal flooding area inspection sample. The inspectors evaluated the condition of safety-related cables located in underground manholes. Specifically, the inspectors examined photographic evidence of conditions of the A service water cables in manhole vault MH102 and MH103 and directly inspected conditions of the C service water cables in manhole vault MH102 and MH103. The inspectors observed the safety-related cables submerged in water and verified that PSEG conducted an adequate operability evaluation associated with the cables and identified appropriate corrective actions. The inspectors also verified the integrity of cables and splices and the condition of cable support structures.

b. Findings

See section 4OA7 of this report for a discussion of one licensee-identified violation related to this inspection area.

1R11 Licensed Operator Regualification Program (71111.11Q – 1 Sample)

.1 Regualification Activities Review By Resident Staff

a. Inspection Scope

The inspectors completed one quarterly licensed operator regualification program sample. The inspectors observed a licensed operator annual regualification simulator scenario on August 31, 2009, to assess operator performance and training effectiveness. The scenario involved a circulating water pump trip, drywell leakage resulting in a loss of coolant accident, and an event classification. The inspectors verified that control room staff correctly identified and declared emergency action levels in a timely manner. The inspectors assessed simulator fidelity and observed the simulator instructor's critique of operator performance. The inspectors also observed control room activities with emphasis on simulator identified areas for improvement. Finally, the inspectors reviewed applicable documents associated with licensed operator regualification as listed in the Attachment.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12Q – 2 Samples)

a. Inspection Scope

The inspectors completed two maintenance effectiveness inspection samples. The inspectors evaluated items such as: appropriate work practices; identifying and addressing common cause failures; scoping in accordance with 10 CFR 50.65(b) of the maintenance rule; characterizing reliability issues for performance; trending key parameters for condition monitoring; charging unavailability for performance; classification and reclassification in accordance with 10 CFR 50.65(a)(1) or (a)(2); and appropriateness of performance criteria for structures, systems, and components (SSCs)/functions classified as (a)(2) and/or appropriateness and adequacy of goals and corrective actions for SSCs/functions classified as (a)(1). Documents reviewed are listed in the Attachment.

- Condensate transfer and storage system
- A 4160 KV vital bus

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 5 Samples)

a. Inspection Scope

The inspectors completed five maintenance risk assessment and emergent work control inspection samples. The inspectors reviewed on-line risk management evaluations through direct observation and document reviews for the following five configurations:

- B and D residual heat removal (RHR) out of service on August 17, 2009;
- C EDG and C RHR pump out of service on September 1, 2009;
- B standby liquid control (SLC) and B EDG out of service on September 9, 2009;
- RCIC and Salem Unit 3 out of service on September 18, 2009; and
- A SW and A filtration recirculation and ventilation system on September 23, 2009.

The inspectors reviewed the applicable risk evaluations, work schedules and control room logs for these configurations to verify that concurrent planned and emergent maintenance and test activities did not adversely affect the plant risk already incurred with these configurations. PSEG's risk management actions were reviewed during shift turnover meetings, control room tours, and plant walkdowns. The inspectors also used PSEG's on-line risk monitor (Equipment Out-Of-Service Workstation) to gain insights into the risk associated with these plant configurations. Finally, the inspectors reviewed notifications documenting problems associated with risk assessments and emergent work evaluations. Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15 – 4 Samples)a. Inspection Scope

The inspectors completed four operability evaluation inspection samples. The inspectors reviewed the operability determinations for degraded or non-conforming conditions associated with:

- SW pump power supply cables submerged under water;
- HPCI system vortex calculation did not evaluate the worst-case design bases event (loss of offsite power/small break loss of coolant accident coincident with B EDG failure);
- B control room emergency filtration differential pressure low for five areas; and
- Failed open SACS valve, EG-HV-2290F, to B RHR room cooler.

The inspectors reviewed the technical adequacy of the operability determinations to ensure the conclusions were justified. The inspectors also walked down accessible equipment to corroborate the adequacy of PSEG's operability determinations. Additionally, the inspectors reviewed other PSEG identified safety-related equipment deficiencies during this report period and assessed the adequacy of their operability screenings. Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing (71111.19 – 6 Samples)a. Inspection Scope

The inspectors completed six post-maintenance testing inspection samples. The inspectors reviewed the post-maintenance tests for the maintenance listed below to verify that procedures and test activities ensured system operability and functional capability following completion of maintenance. The inspectors reviewed applicable test procedures to verify that they tested all safety functions potentially affected by the associated maintenance activities. The inspectors verified that for each potentially affected safety function the acceptance criteria stated in the procedure was consistent with the UFSAR and other design documentation. The inspectors also witnessed completion of the testing or reviewed the completed test results to verify satisfactory restoration of all safety functions affected by the maintenance activities. Documents reviewed are listed in the Attachment.

- B SW pump strainer motor thermal overload replacement
- A EDG testing following jacket water drain down and replacement
- C EDG governor replacement
- B SLC pump component and relief valve replacement
- Reactor core isolation cooling (RCIC) system preventative and corrective maintenance
- HPCI suppression pool level instrument replacement and calibration

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22 – 7 Samples)

a. Inspection Scope

The inspectors completed seven surveillance testing (ST) inspection samples. The inspectors witnessed performance of and/or reviewed test data for the risk-significant STs listed below to assess whether the SSCs tested satisfied TS, UFSAR, and procedure requirements. The inspectors verified that test acceptance criteria were clear, demonstrated operational readiness and were consistent with design documentation; that test instrumentation had current calibrations and the range and accuracy for the application; and that tests were performed, as written, with applicable prerequisites satisfied. Upon ST completion, the inspectors verified that equipment was returned to the status specified to perform its safety function. Documents reviewed are listed in the Attachment.

- D core spray (CS) pump in-service test on July 22, 2009
- A EDG in-service test on July 28, 2009
- D SACS pump in-service test on August 21, 2009
- Reactor building to torus vacuum breaker 18 month surveillance test on September 10, 2009
- Turbine stop and control valve quarterly testing on September 13, 2009
- Drywell leak detection sump monitoring system on September 17, 2009
- HPCI in-service test on September 23, 2009

b. Findings

No findings of significance were identified.

1EP6 Drill Evaluation (71114.06 – 1 Sample)

a. Inspection Scope

The inspectors completed one drill evaluation inspection sample. On September 15, 2009, the inspectors observed an emergency preparedness drill from the control room simulator, the technical support center (TSC) and the emergency offsite facility (EOF). The inspectors attended the drill debrief to verify that PSEG captured all identified drill performance deficiencies in their critique. The inspectors verified that emergency classification declarations and notifications were completed in accordance with 10 CFR 50.72, 10 CFR 50 Appendix E, and the Hope Creek emergency plan implementing procedures. The inspectors also reviewed Nuclear Energy Institute 99-02, "Regulatory Assessment Performance Indicator (PI) Guideline," Revision 5, and verified that PSEG correctly counted the drill's contribution to the NRC PI for drill and exercise performance.

b. Findings

No findings of significance were identified.

**2. RADIATION SAFETY**

Cornerstone: Occupational Radiation Safety

2OS1 Access Control to Radiologically Significant Areas (71121.01 – 6 samples)

a. Inspection Scope

The inspectors reviewed radiation work permits for airborne radioactivity areas with the potential for individual worker internal exposures of >50 mrem committed effective dose equivalent (20 DAC-hrs). For these selected airborne radioactive material areas, the inspectors verified barrier integrity and engineering controls performance.

The inspectors reviewed and assessed the adequacy of PSEG's internal dose assessment for any actual internal exposure greater than 50 mrem committed effective dose equivalent.

The inspectors examined PSEG's physical and programmatic controls for highly activated or contaminated materials (non-fuel) stored within spent fuel and other storage pools.

The inspectors discussed with the Radiation Protection Manager high dose rate-high radiation area, and very high radiation area controls and procedures. The inspectors focused on any procedural changes since the last inspection. The inspectors verified that any changes to PSEG procedures did not substantially reduce the effectiveness and level of worker protection.

The inspectors discussed with health physics supervisors the controls in place for special areas that have the potential to become very high radiation areas during certain plant operations. The inspectors determined if these plant operations required communication beforehand with the health physics group, so as to allow corresponding timely actions to properly post and control the radiation hazards. In cases where this communication was required, the inspectors verified it was completed.

The inspectors verified adequate posting and locking of all entrances to high dose rate-high radiation areas, and very high radiation areas.

The inspectors evaluated PSEG performance against the requirements contained in 10 CFR 20.1601, Technical Specifications 6.12, and Updated Final Safety Analysis Report (UFSAR) Chapter 12.

b. Findings

No findings of significance were identified.

## 2OS2 ALARA Planning and Controls (71121.02 - 5 samples)

### a. Inspection Scope

The inspectors obtained from PSEG a list of work activities ranked by actual/estimated exposure that were in progress or that were completed during the last outage and selected the three work activities of highest exposure significance (safety relief valve repair/replacement; drywell nozzle inspections; reactor reassembly).

The inspectors reviewed the ALARA work activity evaluations, exposure estimates, and exposure mitigation requirements. The inspectors verified that PSEG had established procedures and engineering and work controls that were based on sound radiation protection principles to achieve occupational exposures that were ALARA. The inspectors verified that PSEG had reasonably grouped the radiological work into work activities, based on historical precedence, industry norms, and/or special circumstances.

The inspectors compared the results achieved (dose rate reductions, person-rem used) with the intended dose established in PSEG's ALARA planning for these work activities. The inspectors reviewed the integration of ALARA requirements into work procedure and RWP documents. The inspectors compared the person-hour estimates provided by maintenance planning and other groups to the radiation protection group with the actual work activity time requirements and evaluated the accuracy of these time estimates. The inspectors evaluated PSEG performance against the requirements contained in 10 CFR 20.1101 and UFSAR Section 12.1.

### b. Findings

No findings of significance were identified.

## 2OS3 Radiation Monitoring Instrumentation and Protective Equipment (71121.03 - 1 sample)

### a. Inspection Scope

The inspectors verified the calibration, operability, and alarm setpoints of several types of instruments and equipment. Verification methods included: review of calibration documentation and observation of PSEG source check or calibrator exposed readings. The inspectors reviewed the detector measurement geometry, calibration method and appropriate selection of calibration sources to closely represent the actual measurement conditions in the plant. The inspectors also observed electronic and radiation calibration of these detectors and reviewed alarm set point determinations. The inspectors observed in-field source checks and evaluated what actions were taken when, during calibration or source checks, an instrument was found significantly out of calibration (>50%). The inspectors reviewed the possible consequences of instrument use since last successful calibration or source check for instruments that were determined to be out of calibration. The inspectors also reviewed out-of-calibration instrument information to verify they were entered into the corrective action program.

The inspectors evaluated PSEG performance against the requirements contained in 10 CFR 20.1501, 10 CFR 20.1703 and 10 CFR 20.1704.

### b. Findings

No findings of significance were identified.

**Cornerstone: Public Radiation Safety**

2PS3 Radiological Environmental Monitoring Program (REMP) and Radioactive Materials Control (71122.03 – 10 samples)

a. Inspection Scope

The inspectors reviewed the current Annual Environmental Monitoring Report, and PSEG assessment results, to verify that the REMP was implemented as required by TS and the Offsite Dose Calculation Manual (ODCM). The review included changes to the ODCM with respect to environmental monitoring, commitments in terms of sampling locations, monitoring and measurement frequencies, land use census, inter-laboratory comparison program, and analysis of data. The inspectors reviewed the ODCM to identify environmental monitoring stations. The inspectors reviewed: PSEG self-assessments and audits, licensee event reports, inter-laboratory comparison program results, and the UFSAR for information regarding the environmental monitoring program and meteorological monitoring instrumentation. The inspectors also reviewed the scope of PSEG's audit program to verify that it met the requirements of 10 CFR 20.1101(c).

The inspectors walked down the six air particulate and iodine sampling stations, two broad leaf vegetation stations and 37 direct reading monitoring stations. The inspectors verified that they were located as described in the ODCM and that the equipment material condition was acceptable.

The inspectors observed the collection and preparation of a variety of environmental samples (e.g., vegetation and ground and surface water). The inspectors verified that environmental sampling was representative of the release pathways specified in the ODCM and that sampling techniques were in accordance with procedures.

Based on direct observation and review of records, the inspectors verified that the meteorological instruments were operable, calibrated, and maintained in accordance with guidance contained in the UFSAR, NRC Safety Guide 23, and PSEG procedures.

The inspectors reviewed each event documented in the Annual Environmental Monitoring Report that involved a missed sample, inoperable sampler, lost TLD, or anomalous measurement for the cause and corrective actions. The inspectors also reviewed PSEG's assessment of any positive sample results.

The inspectors reviewed any significant changes made by PSEG to the ODCM due to changes to the land census or sampler station modifications since the last inspection. The inspectors also reviewed technical justifications for any changed sampling locations and verified that PSEG performed the reviews required to ensure that the changes did not affect its ability to monitor the impacts of radioactive effluent releases on the environment.

The inspectors reviewed the calibration and maintenance records for air samplers and composite water samplers. The inspectors reviewed PSEG's calibration records for the environmental sample radiation measurement instrumentation; PSEG's quality control charts for maintaining radiation measurement instrument status and actions taken for

degrading detector performance; the results of PSEG's interlaboratory comparison program to verify the adequacy of environmental sample analyses; PSEG's quality control evaluation of the interlaboratory comparison program and the corrective actions for any deficiencies; and quality assurance (QA) audit results of the program to determine whether PSEG met the TS/ODCM requirements. The inspectors verified that the appropriate detection sensitivities with respect to TS/ODCM were utilized for counting samples. The inspectors completed these activities via direct observation at the PSEG Maplewood Testing Laboratory.

The inspectors observed several locations where PSEG monitors potentially contaminated material leaving the radiologically controlled area (RCA) and inspected the methods used for control, survey, and release from these areas, including observing the performance of personnel surveying and releasing material for unrestricted use. The inspectors verified that the work was performed in accordance with plant procedures.

The inspectors verified that the radiation monitoring instrumentation used was appropriate for the radiation types present and was calibrated with appropriate radiation sources. The inspectors reviewed PSEG's criteria for the survey and release of potentially contaminated material; verified that there was guidance on how to respond to an alarm that indicates the presence of licensed radioactive material; and reviewed PSEG's equipment to ensure the radiation detection sensitivities were consistent with the NRC guidance contained in IE Circular 81-07 and IE Information Notice 85-92 for surface contamination and HPPOS-221 for volumetrically contaminated material. The inspectors also reviewed PSEG's procedures and records to verify that the radiation detection instrumentation was used at its typical sensitivity level based on appropriate counting parameters, and that PSEG had not established a "release limit" by altering the instrument's typical sensitivity through such methods as raising the energy discriminator level or locating the instrument in a high radiation background area.

The inspectors reviewed PSEG's LERs, Special Reports, and audits related to the radiological environmental monitoring program performed since the last inspection. The inspectors verified that identified problems were entered into the corrective action program for resolution. The inspectors also reviewed corrective actions affecting environmental sampling, sample analysis, or meteorological monitoring instrumentation.

The inspectors evaluated PSEG's performance in these areas against the requirements contained in 10 CFR 50.36, 10 CFR 50, Appendix I, and Technical Specification 6.9.1.7.

b. Findings

No findings of significance were identified.

4. **OTHER ACTIVITIES**

4OA1 Performance Indicator Verification (71151 - 1 sample)

a. Inspection Scope

The inspectors reviewed PSEG's submittals for the safety system functional failure (SSFF) performance indicator. The inspectors verified the accuracy and completeness of reported SSFFs during the period of July 1, 2008, through June 30, 2009, using guidance contained in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5. The inspectors reviewed all PSEG licensee event reports issued during the referenced time frame to independently verify that SSFFs were correctly reflected in the performance indicator data.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (71152 - 3 samples)

.1 Review of Items Entered into the Corrective Action Program:

As required by Inspection Procedure 71152, Identification and Resolution of Problems, and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed a daily screening of all items entered into PSEG's corrective action program. This was accomplished by reviewing the description of each new notification and attending daily management review committee meetings.

.2 Annual Sample: Review of Containment Integrated Leak Rate Testing

a. Inspection Scope

The inspectors reviewed PSEG's actions taken to resolve the condition reported via notification 20397894. This notification identified a potential conflict between containment leak rate testing criteria used in the 1994 containment integrated leak rate test (CILRT) and the required systems to be monitored by PSEG's Leakage Reduction Program. PSEG discovered and identified this conflict during preparations for a CILRT in the Spring of 2009.

b. Findings and Observations

No findings of significance were identified.

Upon discovery of this condition, PSEG performed an apparent cause evaluation that determined the 1994 CILRT procedure incorrectly included leakage from the quality controlled/non-quality controlled leakage interface (Q/Non-Q interface) of the control rod drive system (CRD) as part of the leakage reduction program during the CILRT.

Further research by PSEG determined that only the scram discharge portion of the CRD system was to be included in the Leakage Reduction Program. PSEG determined that the previous (erroneous) procedure was conservatively over-estimating the leakage from systems outside of the primary containment, which had the potential to adversely affect the results of past CILRTs. However, because the previous CILRTs met the required leak rate, with margin, there was no adverse effect upon containment performance.

The inspectors determined that PSEG had conducted CILRTs in 1986 (preoperational), 1989 and 1994, and verified that those tests met the leak rate criteria, with margin, despite the conservative over-estimation of the leak rate of the Q/Non-Q interface for the CRD system.

In preparation for the 2009 CILRT PSEG prepared a new procedure that corrected the previous error. Additionally, the new procedure made changes to account for the alternate source term change to the technical specifications, which was implemented in 2003. In April 2009, PSEG completed a CILRT with the new procedure for the revised technical specifications that demonstrated that the containment would meet the required leak rate, with margin.

During review of this issue, the inspectors observed that when PSEG implemented the new CILRT procedure in 2009, a commitment that was added to the original procedure in response to an NRC Notice of Violation (Inspection Report No. 50-354/94-09), was not carried forward in the revised procedure. PSEG initiated notification 20427525 on August 11, 2009, to address this issue.

The inspectors determined that PSEG had performed a complete and accurate identification of the problem in a timely manner commensurate with the issue's significance and ease of discovery.

.3 Annual Sample: Review of Safety-Related Inverter Failures

a. Inspection Scope

The inspectors selected several notifications as a problem identification and resolution (PI&R) sample for detailed follow-up review. The notifications identified failures of safety-related inverters from events that occurred between April 2008 and April 2009. The failures identified in the notifications included blown main fuses, failed power supplies, failed circuit cards, and failed cooling fans. The inspectors review focused on specific issues associated with the H1PN-1C-D-481 and H1PN-1C-D-482 inverters. However, issues associated with these inverters were applicable to other similar inverters installed at Hope Creek. PSEG determined that the most likely cause of the H1PN-1C-D-481 inverter failure on April 22, 2008, was a spurious misfiring of the silicone controlled rectifiers (SCRs) that caused the main inverter fuse (F101) to open and interrupt the inverter's circuit. PSEG also determined that subsequent failures of inverters during the reviewed period were caused by aging of the circuit cards and components within the inverters. Many of the inverter circuit cards and components had been in service since 1983.

The inspectors reviewed PSEG's problem identification threshold, cause analyses, extent of condition reviews, operability determinations, and the prioritization and timeliness of corrective actions to determine whether PSEG was appropriately identifying, characterizing, and correcting problems associated with these issues and whether the planned or completed corrective actions were appropriate to prevent recurrence. Additionally, the inspectors performed walkdowns of all safety-related inverters at HCGS in an attempt to identify abnormal conditions. The inspectors also discussed the identified issues and implemented corrective actions with cognizant plant personnel. Documents reviewed are listed in the Attachment.

b. Findings and Observations

No findings of significance were identified.

The inspectors determined that PSEG properly implemented their corrective action process for the above issues. The notification packages reviewed were complete and included cause evaluations, operability determinations and extent of condition and operating experience reviews. The corrective actions included changing out the power supply circuit cards and capacitor banks for all safety-related inverters and implementing a preventive maintenance program to change the power supply circuit cards on a periodic basis. The change out of inverter power supply cards and capacitor banks has started and will be completed during subsequent refueling and electrical bus outages. At the time of this inspection, the inspectors determined that those inverters that had new components installed have shown reliability improvements and that PSEG plans to continue to perform effectiveness reviews to ensure that the implemented corrective actions were effective. In addition the NRC recently approved a PSEG-requested TS change that extended the allowed outage time for an inoperable inverter from 8 to 24 hours and required pre-staged inverter circuit cards/components and maintenance procedures to facilitate the timely repair of an inverter if one fails.

.4 Annual Sample: EDG Rectifier Switch Failures

a. Inspection Scope

The inspectors reviewed PSEG's actions to investigate and identify the cause of the EDG rectifier switch failures that caused an overvoltage condition that rendered the B and D EDG inoperable on May 11 and 12, 2009. The inspectors reviewed PSEG procedures, vendor documents, notifications, orders, corrective actions, and root cause evaluations to understand the equipment functions and operational history, and to assess the identification, evaluation, and corrective actions associated with the switch failures. System engineers and other PSEG staff were interviewed to gain additional insights on the failures.

b. Findings & Observations

No findings of significance were identified.

The inspectors determined that PSEG appropriately identified degraded conditions associated with EDG rectifier switch failures and entered them into the corrective action program. PSEG's root cause investigation determined that the rectifier selector switches failed due to internal degradation of the switches. The switches exhibited cracking and internally created debris that caused high resistance across the contacts. The inspectors determined that the evaluations for the degraded conditions were thorough and included comprehensive extent of condition reviews. The inspectors reviewed PSEG's corrective actions to remove the rectifier switches from the circuitry and also reviewed the permanent modification and concluded that they adequately address the identified rectifier deficiencies.

4OA3 Event Followup (71153 – 3 samples)

.1 (Closed) LER 05000354/2009-003, Traversing In-core Probe (TIP) Containment

## Isolation Valves Found Open

### a. Inspection Scope

On May 8, 2009, PSEG found four of the five traversing in-core probe (TIP) containment isolation valves open with the TIP system de-energized. When the TIP system is de-energized the normal position for these containment isolation valves is closed. PSEG determined through a prompt investigation that the TIP system was not properly de-energized following recent surveillance testing and that this left the TIP system detectors and their neutron sources inside the primary containment, and outside of their normal shielded stowage containers. In this configuration, the containment isolation valves were considered inoperable because they remained open and would not have shut upon receipt of an isolation signal because the TIP system was de-energized. This event was reported as a condition prohibited by TS.

The inspectors reviewed PSEG's licensee event report (LER), root cause evaluation, and supporting documentation and interviewed several members of station staff and management regarding the event. Documents reviewed are listed in the Attachment. One finding of significance is discussed below. This LER is closed.

### b. Findings

Introduction: The inspectors identified a Green, non-cited violation of Technical Specification 3.6.3, "Primary Containment Isolation Valves," because PSEG did not properly secure the TIP system following a surveillance test (ST) performed on May 6, 2009. The error was not identified until May 8, 2009 and, as a result, between May 6 and 8, 2009, four TIP system containment isolation valves remained open without automatic closure capability for greater than the TS 3.6.3 allowed outage time (4 hours).

Description: On May 8, 2009, an instrumentation and controls technician (I&C tech) performing an ST in the control room, noticed that the indicating lights for the containment isolation ball valves for four of the five TIP machines, that should have been shut, indicated that the valves were open with the system not in service. In response to this discovery, operations and reactor engineering personnel verified the as-found condition and then promptly closed the valves to restore primary containment in accordance with TS 3.6.3, "Primary Containment Isolation Valves."

The TIP system at Hope Creek consists of five independent neutron detection units. Each detection unit uses a motor-operated drive mechanism to insert and retract a neutron detection chamber into the reactor core through 3/8" stainless steel instrument tubes that penetrate the primary containment drywell and the reactor vessel. The TIP system is used by reactor engineers to provide indication of the axial neutron flux profile for the core and by instrumentation technicians to calibrate neutron detectors that provide reactor power indication to plant operators. The TIP machines have a primary containment auto isolation function that will retract the TIPS and close ball valves in the event of low reactor level during a loss of coolant accident.

PSEG's prompt investigation determined that the TIP machines were improperly secured by a reactor engineer on May 6, 2009, following a routine surveillance test on the TIP system. Therefore, between May 6 and May 8, 2009, the TIP system was de-energized and the valves would have remained open following an automatic isolation signal.

Leaving these valves open during an event would have prevented fulfillment of the safety function for primary containment.

PSEG completed a root cause analysis and identified two root causes for the event. First, PSEG concluded that a reactor engineer used inadequate human performance tools, including place-keeping, while performing TIP system operation per procedure HC.RE-SO.SE-0001, "Traversing In-core Probe System Operation." The reactor engineer apparently lost track of which steps he had completed and missed the key steps for properly securing the TIP machines. The second root cause was the failure of operations crews to properly monitor control boards such that they would identify that the isolation valves were not in the required position for the plant conditions. The indications for the isolation valve positions were readily available in the main control room and should have been identified during routine reviews of the control boards or during reviews for shift turnover.

The inspectors reviewed PSEG's root cause evaluation and concluded that it was deficient. Although the evaluation carefully evaluated human performance errors and safety culture aspects that contributed to the event, the evaluation did not fully examine whether procedure adequacy played a role in the event.

The inspectors identified through their review of the event that the TIP operation procedure used during the event, HC.RE-SO.SE-0001, "Traversing In-core Probe System Operation," did not contain steps for independent verification of the TIP containment isolation valve positions when the valves were restored to their normal position. This was contrary to PSEG administrative procedure OP-AA-108-101-1002, Component Configuration Control, Attachment 12, that specified that the TIP containment isolation valves required independent verification during manipulation to confirm that the valves were restored to their proper position. As a result the inspectors determined that this was the most significant cause of the failure to properly secure the TIP system after testing on May 6, 2009, and ultimately the violation of TS LCO 3.6.3 action statement. The inspectors observed that despite PSEG's oversight in identifying the inadequate procedure, the corrective action taken in response to the event included adding independent verification steps to the TIP system operating procedure. However, because PSEG did not identify the inadequate procedure as an important causal factor, the station missed opportunities to pursue extent of condition issues in this area. Specifically, the root cause evaluation process would have included steps to review the potential that there may be other procedures without proper independent verification of containment isolation valves or other deficient procedures controlled by the reactor engineering group. PSEG entered this issue into their corrective action program in notification 20430929. The corrective actions for this issue included conducting a thorough extent of condition review related to the proper use of independent verification related to containment isolation valves and reactor engineering procedures.

PSEG did not secure the TIP system in accordance with the system operating procedure and, as a result, four TIP system containment isolation valves were left open without automatic closure capability for greater than the TS 3.6.3, "Primary Containment Isolation Valves," allowed outage time (4 hours). The inspectors determined that this was a performance deficiency. In addition although a PSEG I&C tech identified the open containment isolation valves, in accordance with MC 0612, the inspectors considered this finding NRC-identified because the inspectors' review of this issue added significant value. Specifically, the inspectors identified a previously unknown weakness in PSEG's evaluation of the event, in that PSEG did not recognize that the lack of independent

verification in the TIP system procedure was contrary to a station configuration control procedure, and as a result, PSEG did not conduct a thorough extent of condition review related to this area.

**Analysis:** The inspectors determined that not securing the TIP system in accordance with the system operating procedure resulted in four of five TIP containment isolation valves being left open for a timeframe greater than allowed by Technical Specifications without automatic isolation capability was a performance deficiency. This performance deficiency was more than minor because it was associated with the human performance attribute of the Barrier Integrity cornerstone and adversely affected the cornerstone objective to provide reasonable assurance that physical design barriers provided protection against radionuclide releases caused by accidents or events. Specifically, not securing the TIP system after a routine surveillance in accordance with the system operating procedure would have prevented fulfillment of the safety function for primary containment. The inspectors performed a Phase I Significance Determination Process (SDP) screening of the finding in accordance with Inspection Manual Chapter (IMC) 0609, Attachment 0609.04, Table 4a, Barrier Integrity Cornerstone column. Because the finding involved an actual open pathway in the physical integrity of the reactor containment, the inspectors proceeded to IMC 0609, Appendix H, "Containment Integrity SDP." This finding was a "Type B finding" because there was no direct impact on core damage but a potential impact on large early release frequency (LERF). The inspectors used Table 4.1 and determined that the finding would not contribute to LERF because the TIP tubing penetrations were small lines (< 2 inches in diameter). Therefore, this finding screened as very low safety significance (Green) per Figure 4.1 of IMC 0609, Appendix H.

The finding had a cross-cutting aspect in the area of human performance because PSEG did not provide a complete, accurate, and up-to-date procedure for operating the TIP system. Specifically, the procedure, TIP System Operation, did not contain steps for independent verification of the TIP containment isolation valves, contrary to a PSEG configuration control procedure. [H.2(c)]

**Enforcement:** Hope Creek Generating Station TS Section 3.6.3, "Primary Containment Isolation Valves," states, in part, that the primary containment isolation valves in Table 3.6.3-1 shall be operable during Operational Conditions 1, 2, and 3. Further, with one or more of the valves in Table 3.6.3-1 inoperable, within four hours either restore the valve to operable status or isolate each affected penetration by use of at least one deactivated automatic valve secured in the isolated position or by use of at least one closed manual valve. Contrary to the above, from May 6 to May 8, 2009, with the plant in Operational Condition 1, the TIP guide tube isolation valves, SV-J004A-1, 3, 4, and 5, which are listed in TS Table 3.6.3-1, were inoperable and open, without use of a valve to isolate the affected penetration, for a period in excess of four hours. Because this finding was of very low safety significance and was entered into the corrective action program in notifications 20413812 and 20430929, this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy. **(NCV 05000354/2009004-001, Traversing In-Core Probe Containment Isolation Valves Found Open)**

- .2 (Closed) LER 05000354/2009-004, Multiple Control Rod Drifts Resulting in a Reactor Scram

On May 17, 2009, an automatic reactor scram occurred in response to a low reactor water level condition caused by multiple control rod drives (CRD) insertions. The multiple CRD insertions were caused by a previously-identified air leak on the scram air header piping for hydraulic control unit 22-11 that had not been entered into the corrective action program for repair.

The inspectors responded to the site and verified that plant systems performed as designed following the transient and that operator response was consistent with plant procedures. The inspectors reviewed control board indications, plant logs, computer alarm data, and other post-transient records and data. The inspectors also reviewed PSEG's prompt investigation, technical evaluations, root cause evaluation and the information presented in the LER for this event. No new findings of significance were identified based upon this review.

The NRC previously documented one finding related to this event in section 4OA3 of NRC Inspection Report 05000354/2009003. This LER is closed.

.3 (Closed) LER 05000354/2009-005, Missed Emergency Diesel Generator Check

On May 26, 2009, at 0800, Hope Creek declared the A EDG inoperable for a design change to the EDG rectifier section. With the A EDG inoperable TS 3.8.1.1 action b required that surveillance requirement (SR) 4.8.1.1.1.a be performed within one hour of declaring the EDG inoperable and at least once every 8 hours thereafter. On May 26, 2009, at 0828, PSEG performed SR 4.8.1.1.1.a satisfactorily, to satisfy the one hour TS SR. The subsequent TS SR, that was required at least once every 8 hours thereafter, needed to be performed before 1628 on May 26, 2009. PSEG did not perform this SR within the time requirements. Operators identified that the SR was missed and immediately performed the testing at 2014 on May 26, 2009.

The inspectors reviewed the LER and associated root cause to verify that PSEG complied with all reporting requirements. No findings of significance were identified. However, the inspectors identified one minor violation of TS 3.8.1.1 action b, "Electrical Power Systems." The inspectors determined the finding was not more than minor because the surveillance was subsequently performed satisfactory. This failure to comply with TS 3.8.1.1 action b, "Electrical Power Systems," constituted a violation of minor significance that is not subject to enforcement action in accordance with the NRC's Enforcement Policy. This LER is closed.

4OA5 Other Activities

.1 Quarterly Resident Inspector Observations of Security Personnel and Activities

a. Inspection Scope

During the inspection period, the inspectors conducted observations of security force personnel and activities to ensure that the activities were consistent with PSEG security procedures and regulatory requirements related to nuclear plant security. These observations took place during both normal and off-normal plant working hours. These

quarterly resident inspector observations of security force personnel and activities did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status review and inspection activities.

b. Findings

No findings of significance were identified.

4OA6 Meetings, Including Exit

On October 15, 2009, the inspector presented inspection results to Mr. J. Perry and other members of his staff. PSEG acknowledged the findings. The inspectors asked PSEG whether any materials examined during the inspection were proprietary. No proprietary information was identified.

4OA7 Licensee-Identified Violations

The following violations of very low significance (Green) were identified by PSEG and are violations of NRC requirements that meet the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as non-cited violations.

- 10 CFR 50, Appendix B, Criterion III, "Design Control," requires, in part, that measures shall be established to assure that applicable regulatory requirements and the design basis, are correctly translated into specifications, drawings, procedures, and instructions. Contrary to the above, PSEG did not assure that the design basis for safety-related buried cables was correctly translated into specifications, drawings, procedures, and instructions. Specifically, PSEG did not maintain safety-related buried cables in an environment for which they were designed. The cables were found submerged. This was identified in PSEG's corrective action program as notification 20420237 to initiate review of the current manhole and cable monitoring programs, and to initiate long-term corrective actions. This finding is of very low safety significance (Green) because it did not represent an actual loss of safety function or contribute to external event core damage sequences.

ATTACHMENT: SUPPLEMENTAL INFORMATION

**SUPPLEMENTAL INFORMATION****KEY POINTS OF CONTACT**Licensee Personnel

J. Perry, Hope Creek Site Vice President  
 L. Wagner, Hope Creek Plant Manager  
 B. Booth, Operations Director  
 R. Canziani, Maintenance Director  
 E. Casulli, Shift Operations Superintendent  
 K. Chambliss, Work Week Manager  
 P. Duca, Senior Engineer, Regulatory Assurance  
 M. Gaffney, Regulatory Assurance Manager  
 K. Knaide, Engineering Director  
 W. Kopchick, Plant Engineering Manager  
 A. Oliveri, NDE Services Superintendent  
 J. Perry, Plant Manager  
 H. Trimble, Radiation Protection Manager

**LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**Opened/Closed

05000354/2009004-001	NCV	Traversing In-Core Probe Containment Isolation Valves Found Open (Section 4OA3.1)
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Closed

05000354/2009-003-00	LER	Traversing In-Core Probe Containment Isolation Valves Found Open (Section 4OA3.1)
05000354/2009-004-00	LER	Multiple Control Rod Drifts Resulting in a Reactor Scram (Section 4OA3.2)
05000354/2009-005-00	LER	Missed Emergency Diesel Generator Check (Section 4OA3.3)

## LIST OF DOCUMENTS REVIEWED

In addition to the documents identified in the body of this report, the inspectors reviewed the following documents and records:

Hope Creek Generating Station (HCGS) Updated Final Safety Analysis Report  
Technical Specification Action Statement Log (SH.OP-AP.ZZ-108)  
HCGS NCO Narrative Logs  
HCGS Plant Status Reports  
Weekly Reactor Engineering Guidance to Hope Creek Operations  
Hope Creek Operations Night Orders and Temporary Standing Orders

### **Section 1R01: Adverse Weather Protection**

#### Procedures

HC.OP-AB.BOP-0004(Q), Grid Disturbances, Revision 16  
OP-AA-108-107-1001, Electric System Emergency Operations and Electrical Systems Operator Interface, Revision 3  
OP-AA-108-111-1001, Severe Weather and Natural Disaster Guidelines, Revision 4  
HC.OP-AB.MISC-0001(Q), Acts of Nature, Revision 13  
OP-AA-101-112-1002, On-Line Risk Assessment, Revision 3  
WC-AA-101, On-Line Work Management Process, Revision 16

### **Section 1R04: Equipment Alignment**

#### Procedures

HC.OP-SO.KJ-0001, Emergency Diesel Generators Operation, Revision 47  
HC.OP-SO.EA-0001, Service Water System Operation, Revision 34  
HC.OP-ST.BJ-0001, HPCI System Piping and Flow Path Verification – Monthly, Revision 14  
HC.OP-IS.EG-0102, Safety Auxiliaries Cooling System – Subsystem B In-Service Test, Revision 46

#### Calculations

EG-0046, STACS Operation, Revision 7

#### Drawings

M-10-1, Service Water System, Revision 52  
M-55-1, High Pressure Coolant Injection, Revision 39  
M-56-1, HPCI Pump Turbine, Revision 32  
M-11-1, HCGS Safety Auxiliaries Cooling Reactor Building, Revision 40

### **Section 1R05: Fire Protection**

#### Procedures

NC.FP-AP.ZZ-0005, Fire Protection Surveillance and Periodic Test Program, Revision 16  
NC.FP-AP.ZZ-0009, Fire Protection Training Program, Revision 7  
FP-AA-011, Control of Transient Combustible Material, Revision 2  
HC.FP-SV.ZZ-0026, Flood and Fire Barrier Penetration Seal Inspection, Revision 5

Notifications

20432567

Other Documents

FRH-11-551, Battery Rooms & Cable Chases, Revision 6

FRH-11-541, Class 1E Switchgear Rooms, Revision 7

FRH-11-512, Battery Rooms, Revision 5

FRH-11-532, Lower Control Equipment Room, Revision 6

FRH-11-531, Diesel Generator Rooms, Revision 8

S2UAD092309, Hope Creek Room 5103 Unannounced Drill, 9/23/09

**Section 1R06: Flood Protection Measures**

Procedures

HC.OP-SO.EA-0001, Service Water System Operation, Revision 34

Drawings

M-10-1, Service Water System, Revision 52

Notifications

20420237

20423751

Orders

60078254

70099153

70066275

**Section 1R11: Licensed Operator Regualification Program**

Procedures

HC.OP-AB.ZZ-0001, Transient Plant Conditions, Revision 19

HC.OP-AB.RPV-0004, Reactor Level Control, Revision 7

HC.OP-AB.ZZ-0000, Reactor Scram, Revision 3

Other Documents

Hope Creek Generating Station Emergency Classification Guide

Simulator Scenario Guide SG-657

**Section 1R12: Maintenance Effectiveness**

Procedures

ER-AA-310, Implementation of the Maintenance Rule, Revision 7

ER-AA-310-1001, Maintenance Rule – Scoping, Revision 4

ER-AA-310-1003, Maintenance Rule – Performance Criteria Selection, Revision 4

ER-AA-310-1004, Maintenance Rule – Performance Monitoring, Revision 7

ER-AA-310-1005, Maintenance Rule – Dispositioning between (a)(1) and (a)(2), Revision 6

HC.OP-EO.ZZ-0101A, ATWS – RPV Control, Revision 3

HC.OP-SO.AP-0001, Condensate Storage and Transfer System Operation, Revision 32

Notifications \*(NRC-identified)

20422137\*    20431761\*    20429057    20330712    20321570    20124558  
 20258849

Orders

60068976    70072347    70099722

Other Documents

Hope Creek Maintenance Rule Status & Projections, September 3, 2009  
 SHIP System Summary Report, 2<sup>nd</sup> Quarter 2009  
 Quarterly Ship Report – 4.16 KVAC (Class 1E), 2<sup>nd</sup> Quarter 2009

**Section 1R13: Maintenance Risk Assessments and Emergent Work Control**

Procedures

OP-AA-101-112-1002, On-Line Risk Assessment, Revision 2  
 WC-AA-101, On-Line Work Management Process, Revision 16

Notifications (\*NRC-identified)

20430389\*

**Section 1R15: Operability Evaluations**

Procedures

OP-AA-108-115, Operability Determinations, Revision 1  
 HC.OP-IS.EG-0102, Safety Auxiliaries Cooling System – Subsystem B In-Service Test,  
 Revision 46  
 HC.OP-ST.GK-0002, Control Room Emergency Filtration System Isolation/Actuation Functional  
 Test – 18 Months, Revision 9

Calculation

AP-0004, Condensate Storage Tank Level Set Points – EPU, Revision 7  
 E-5.1, HC Class 1E 250Vdc Station Battery & Charger Sizing, Revision 7  
 SC-AP-0003, Condensate Storage Tank Low Level to RCIC, Revision 7  
 SC-AP-0001, Cond Stg Low Level Switch to HPCI & Tank 135,000 Gal Reserve, Revision 6

Drawings

M-11-1, HCGS Safety Auxiliaries Cooling Reactor Building, Revision 40  
 A-11183-P, 500,000 Gallon Condensate Storage Tank, 1/23/88

Notifications (NRC-identified)

20419627*	20424052*	20419623*	20429030
20395653	20420237	20425943	

Orders

80099042	70092792	60078254
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Other Documents

HC-09-115, Fail Open EG-HV-2290 (Notification 20429030), Revision 0  
 H-1-BJ-MDC-0928, BWROG/DC Methodology Results – 1BJ-HV-F004, Revision 1  
 H-1-BJ-MDC-0928, BWROG/DC Methodology Results – 1BJ-HV-F042, Revision 3  
 10855-D3.38, Design, Installation and Test Specification for HPCI, Revision 9

**Section 1R19: Post-Maintenance Testing**

Procedures

HC.OP-IS.BD-0001, Reactor Core Isolation Cooling Pump-OP203 – In-service Test, Revision 44  
HC.OP-ST.BD-0001, RCIC Piping and Flow Path Verification – Monthly, Revision 9  
HC.IC-FT.BB-0074, HPCI A Rosemount Trip Units, Revision 4  
HC.OP-IS.BH-0004, Standby Liquid Control Pump – In-service Test, Revision 3  
HC.OP-IS.BH-0002, Standby Liquid Control pump – In-service Test, Revision 43  
HC.OP-ST.KJ-0003, Emergency Diesel Generator 1CG400 Operability Test, Revision 66  
HC.OP-ST.KJ-0016, EDG 1CG400, 24 Hour Operability Run and Hot Restart Test, Revision 29

Calculation

SC-KJ-0185-1, Diesel Generator A-D Lube Oil Temperature and Jacket Water Temperature, Revision 4

Notifications

20431245  
20430830

Orders

50124189  
50123693  
60079803

Other Documents

DE-CB.BD-0075Q, Reactor Core Isolation Cooling System, Revision 0

**Section 1R22: Surveillance Testing**

Procedures

HC.MD-ST.GS-0002, Reactor Building to Torus Vacuum Relief Valve 18 Month Testing, Revision 7  
HC.OP-ST.AC-0002, Turbine Valve Testing – Quarterly, Revision 43  
HC.IC-FT.SK-0016, Radiation Monitoring – Channel D, Revision 18

Completed Surveillance

HC.OP-ST.KJ-0001, EDG 1AG400 Operability Test – Monthly, 7/28/2009  
HC.OP-IS.EG-0004, D SACS Pump – DP210 – In-service Test, 8/21/09  
HC.OP-IS.BJ-0001, HPCI Main and Booster Pump Set – In-service Test, 9/23/2009  
HC.MD-ST.GS-0002, Reactor Building to Torus Vacuum Relief Valve 18 Month Testing, 9/10/09  
HC.OP-LR.GS-0006, Containment Isolation Valve Type C Leak Rate Test, 9/10/09  
HC.OP-ST.AC-0002, Turbine Valve Testing – Quarterly, 9/16/09  
HC.OP-IS.BE-0002, B & D Core Spray Pumps – In-service Test, 7/22/09

Notifications (\*NRC-identified)

20433036*	20433023*	20432934*
20430611	20428849	

Orders

50112738	50098890	50123968
50123610	50124405	

Other Documents

10855-M-150(Q), Technical Specification for Primary Containment Vacuum Relief Valve Assemblies, Revision 4

**Section 1EP6: Drill Evaluation**

Procedures

Hope Creek Event Classification Guide

Notifications

20431415

Other Documents

Hope Creek – Evaluated Drill Scenario, 9/15/09

Hope Creek – Evaluated Drill Major Event Timeline, 9/15/09

**Section 2PS3: Radiological Environmental Monitoring Program ( REMP) and Radioactive Materials Control**

Procedures:

RP-AA-503, Unconditional Release Survey Method, Revision 3

NC.CH-RC.ZZ-2525, Gamma Spectroscopy Analysis Using CAL, Revision 4

Notifications:

2008 Annual Radiological Environmental Operating Report, January 1 to December 31, 2008  
Environmental Supply Company, Inc., Dry Gas Meter Calibration Reports  
Maplewood Testing Services Mechanical Division Environmental/Radiological Group  
Quality Assurance/Control Plan

Maplewood Testing Services Mechanical Division Environmental Group Work Instructions:

TLDSV-1.2.1, Installation of Thermoluminescent Dosimeters

ENCAL-3.5.3, Multi Point Energy/Shape Calibration

GVISSAMP-3.5.1, Gammavision Spectrum Acquisition and Analysis

3PT-G-3.5.4A, System QC Using a 500ML Marinelli Three Nuclide Check Source

Meteorological Tower Quarterly Calibrations, July 2009 & August 2009

Salem/Hope Creek Met Data Recovery, July 2008 – June 2009

Salem and hope Creek 2008 Land Use Census

Bicron NE SAM-9 Calibration records, Serial No. 103, 105, 118, 122

Daily Gamma Control Charts – Detectors 3003, 286a, 41TP, 42TP, 43TP & 44TP (January – July 2009)

Packard Liquid Scintillation Counter Model 2500TR, 2009 Control Charts

Packard Liquid Scintillation Counter Model 3100TR, 2009 Control Charts

Tennelec Series 5XLB Gas Proportional Counter 2009 Control Charts

Orders:

70089372; 10248521; 10256322; 10235970; 10212268; 10227944; 10225999; 10216855

**Section 2OS1: Access Control to Radiologically Significant Areas**

Procedures

Procedure RP-AA-460, Controls for High and Very High Radiation Areas, Revision 13

Procedure RP-AA-463, High Radiation Area Key Controls, Revision 1

**Section 2OS2: ALARA Planning and Controls**Other Documents

ALARA Plans 2009-24; 2009-17; 2009-15

**Section 4OA2: Identification and Resolution of Problems**Procedures

HC.RA-AP.ZZ-0008(Q), Primary Containment Integrated Leak Rate Test, Revision 2

HC.RA-AP.ZZ-0004(Q), Primary Containment Integrated Leak Rate Test, Revision 0

HC.MD-PM.PN-0001(Q), 20 KVA Inverter, Revision 4

HC.MD-CM.PN-0001(Q), 20 KVA Inverter Troubleshooting and Repair, Revision 14

HC.MD-PM.PN-0003(Q), 20 KVA Inverter Preventive Maintenance, Revision 8

HC.OP-AB.ZZ-0136(Q), Loss of 120 VAC Inverter, Revision 12

HC.OP-AR.ZZ-0014(Q), Overhead Annunciator Window Box D3, Revision 25

HC.OP-SO.PN0001(Q), 120 VAC Electrical Distribution, Revision 21

LS-AA-120, Issue Identification and Screening Process, Revision 8

LS-AA-125, Corrective Action Program Procedure, Revision 12

LS-AA-125-1033, Apparent Cause Evaluation Manual, Revision 9

Drawings

PSEG Dwg. M-47-1(Q)-21, Sheet 1 of 2; Hope Creek Generating Station, Control Rod Hydraulic – Part B

D9743001, One Line Diagram 20 KVA UPS, Revision 8

D-9743-21, Schematic Rectifier/Auctioneer, Revision 3

E-0006-1(Q), Sh. 1, Single Line Meter & Relay Dia. 4.16 KV Class 1E Power System, Revision 6

E-0009-1(Q), Sh. 1, Single Line Meter & Relay Diagram 125V. DC System, Revision 23

E-0012-1(Q), Shs. 1 – 5, Single Line Meter & Relay Diagrams 120 VAC Inst. and Misc. Systems

E-0018-1(Q), Sh. 1, Single Line Meter & Relay Dia. 480 Volt Class 1E Unit Substations, Revision 33

J-0650-1, Panel Arrangement 10C650- Main Vertical Boards-Legends, Revision 14

Notifications (\*NRC-identified)

20397894	20427525*	20366748	20366755	20371297	20371315
20371864	20371949	20376171	20376239	20379705	20399131
20399610	20399631	20410294	20425910	20426593	20411470
20342789	20411387	20414018			

System Health Reports

3<sup>rd</sup> Quarter 2008

2<sup>nd</sup> Quarter 2009

Orders

30167947	30177938	60077422	70055566	70080090	70084495
70085747	70087121	80084777	80089525	70097866	80098699
60082832	30158799	60082950			

Other Documents

Technical Evaluation - Standby Diesel Generators B and D Overvoltage Impact  
PSE-4175, Failure Analysis of 2 Rectifier Assembly Selector Switches for Hope Creek PSEG,  
dated May 20, 2009

Root Cause Investigation Report, "2 hour shutdown LCO entered due to an unacceptable  
voltage regulator response that rendered the B & D EDG inoperable, Revision 7

50.59 Screen or Evaluation

50.59 Applicability Review for HC.RA-AP.ZZ-0004(Q), Revision 0, 4/6/09; Primary Containment  
Integrated Leak Rate Test, completed on 3/30/09

FSAR

HCGS-USFAR, page 6.2-89 & 90, Revision 9, 6/13/98

Technical Specifications

HCGS Technical Specification, Procedures & Programs, 6.8.4. a. and b., page 6-16,  
Amendment No. 149 (effective 1/29/04)

HCGS Technical Specification, Procedures & Programs, 6.8.4. a. and b., page 6-16,  
Amendment No. 97 (effective 3/21/97)

HCGS Technical Specification, Primary Containment Leakage, 3.6.1.2. e., page ¾ 6-2,  
Amendment No. 174

HCGS Technical Specification, Primary Containment Leakage, 3.4.6.1., page ¾ 6-1, Bases,  
May 19, 2003

Program Documents

HC.RA-AP.ZZ-0051(Q), Revision 4, 4/8/03; Leakage Reduction Program

Other Documents

NRC Letter Dated June 15, 1994: Salem and Hope Creek Resident Inspection Nos.  
50-272/94-11; 50-311/94-11; 50-354/94-09

PSEG Letter NLR-N94116, 6/18/94; Reply to Notices of Violation Inspection  
Report No. 50-354/94-09, Hope Creek Generating Station Facility  
Operating License NPF-57, Docket No. 50-254

NRC Letter Dated October 31, 1994, Response to Your Letter Dated July 18,  
1994 Regarding NRC Inspection Report 50-354/94-09

PSEG Letter LR-NO2-0002/LCR H02-01, 6/28/02; Request For Change to Technical  
Specifications Relaxation of Secondary Containment Operability Requirements and  
Elimination of FRVS Recirculation Charcoal Filters, Hope Creek Generating Station  
Facility Operating License NPF-57 Docket No. 50-354

PSEG Letter LR-NO2-0417/LCR H02-01, 1/18/03; Hope Creek Generating Station Request For  
Additional Information Regarding Relaxation of Secondary Containment Operability  
Requirements and Elimination of FRVS Recirculation Charcoal Filters, Facility Operating  
License NPF-57 Docket No. 50-354

HCGS PCM Templates, Inverters  $\geq$  5 kVA, 1/21/2002

HCGS Technical Specification, Section 3/4.8.3

HCGS UFSAR, Section 8

Circuit Card Replacement Spread Sheet, Printed 8/27/2009

LER 2008-002, Blown Fuse One Emergency Diesel Generator Inoperable Causes Loss of  
Control Room Filtration Loss of Safety Function, 4/22/2008

Letter Dated 12/18/2008, HCGS – Issuance of Amendment RE: Technical Specification  
Requirements for Inoperable Inverters

PE154(Q)-33.7, Cyberex Inc., (Vendor Manual) Installation-Operation-Servicing 1E 20 KVA 1  
Phase Uninterruptible Power Supply and Common Transfer Switch, Revision 9  
10855-E-154(Q), Technical Specification – Instrument Alternating Current Power Supply for  
HCGS, Revision 9

**Section 40A3: Event Followup**

Procedures

LS-AA-1400, Event Reporting Guidelines 10 CFR 50.72 and 10 CFR 50.73, Revision 3

Orders

30164922

70076866

Notifications (\*NRC-identified)

20430929\*

20415621

20416830

Other Documents

LER 05000354/2009-003, Traversing In-core Probe Containment Isolation Valves Found Open

LER 05000354/2009-004, Multiple Control Rod Drifts Resulting in a Reactor Scram

LER 05000354/2009-005, Missed Emergency Diesel Generator Check

**LIST OF ACRONYMS**

ALARA	As Low As Reasonably Achievable
ASME	American Society of Mechanical Engineers
BWRVIP	Boiling Water Reactor Vessel Internals Project
CILRT	Containment Integrated Leak Rate Test
CRD	Control Rod Drive System
DMW	Dissimilar Metal Weld
EDG	Emergency Diesel Generator
EPRI	Electric Power Research Institute
HCGS	Hope Creek Generating Station
IGSCC	Inter Granular Stress Corrosion Cracking
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Inspection Report
ISI	In Service Inspection
ISLOCA	Interfacing System Loss of Coolant Accident
kVA	Kilovolt Amperes
LER	Licensee Event Report
LERF	Large Early Release Frequency
LOCA	Loss of Coolant Accident
LPCI	Low Pressure Coolant Injection
MR	Maintenance Rule
NCV	Non-cited Violation
NDE	Non-Destructive Examination
NRC	Nuclear Regulatory Commission
PI&R	Problem Identification and Resolution
PMT	Post-Maintenance Testing
PSEG	Public Service Enterprise Group
PT	Penetrant Testing
RT	Radiographic Testing
SCR	Silicon Controlled Rectifier
SDP	Significance Determination Process
TIP	Traversing In-Core Probe
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
UT	Ultrasonic Testing
VT	Visual Testing