



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION I
2100 RENAISSANCE BLVD., SUITE 100
KING OF PRUSSIA, PA 19406-2713

February 6, 2018

Mr. Peter P. Sena, III
President and Chief Nuclear Officer
PSEG Nuclear LLC - N09
P.O. Box 236
Hancocks Bridge, NJ 08038

**SUBJECT: HOPE CREEK GENERATING STATION UNIT 1 – INTEGRATED INSPECTION
REPORT 05000354/2017004**

Dear Mr. Sena:

On December 31, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Hope Creek Generating Station (HCGS). On January 17, 2018, the NRC inspectors discussed the results of this inspection with Mr. Eric Carr, Site Vice President, and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented two NRC-identified findings of very low safety significance (Green) in this report. Both of these findings involved violations of NRC requirements. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violations or significance of these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement; and the NRC Resident Inspector at HCGS. In addition, if you disagree with a cross-cutting aspect assignment or a finding not associated with a regulatory requirement 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 U. S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC, 20555-0001; with copies to the Regional Administrator, Region I, and the NRC Resident Inspector at HCGS.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and the NRC Public Document Room in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Fred L. Bower, III, Chief
Reactor Projects Branch 3
Division of Reactor Projects

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

Enclosure:
Inspection Report 05000354/2017004
w/Attachment: Supplementary Information

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REPORT 05000354/2017004 DATED FEBRUARY 6, 2018

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No. 50-354

License No. NPF-57

Report No. 05000354/2017004

Licensee: PSEG Nuclear LLC (PSEG)

Facility: Hope Creek Generating Station (HCGS)

Location: Hancocks Bridge, NJ 08038

Dates: October 1, 2017 through December 31, 2017

Inspectors: J. Hawkins, Senior Resident Inspector
S. Haney, Resident Inspector
J. DeBoer, Emergency Preparedness Inspector
J. Furia, Senior Health Physicist
P. Ott, Operations Engineer

Approved By: Fred L. Bower, III, Chief
Reactor Projects Branch 3
Division of Reactor Projects

Enclosure

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SUMMARY

Inspection Report (IR) 05000354/2017; 10/01/2017 – 12/31/2017; Hope Creek Generating Station; Problem Identification and Resolution.

This report covered a three-month period of inspection by resident inspectors and announced inspections performed by regional inspectors. The inspectors identified two NRC-identified findings of very low safety significance (Green), both of which were non-cited violations (NCVs). The significance of most findings is indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process (SDP)," dated April 29, 2015. Cross-cutting aspects are determined using IMC 0310, "Aspects Within Cross-Cutting Areas," dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated November 1, 2016. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6.

Cornerstone: Mitigating Systems

- Green. The inspectors identified a finding of very low safety significance (Green) and associated non-cited violation (NCV) of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," because PSEG did not ensure adequate separation was maintained between temporary scaffolding and safety related equipment per procedure MA-AA-796-024, Scaffold Installation, Inspection and Removal. Specifically, 12 instances of scaffolding installed in the plant were identified by the inspectors with inadequate clearance to safety related equipment specified in PSEG procedures and no corresponding engineering evaluations to support these deviations. PSEG's corrective actions (C/As) included entering all of these discrepancies into their corrective action program (CAP), conducting walk downs of all scaffolding near safety related equipment, and initiating an operations standing order to ensure all scaffolding is reviewed by operations prior to and during installation.

This issue was more than minor because it affected the protection against external factors (seismic) attribute of the mitigating systems cornerstone and its objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, 12 instances of scaffolding installed in the plant were identified by the inspectors with inadequate clearance to safety related equipment specified in PSEG procedures and no corresponding engineering evaluations to support these deviations. Additionally, this performance deficiency was similar to example 4.a in IMC 0612, Appendix E, "Examples of Minor Issues," issued August 11, 2009, which states that the issue of failing to appropriately evaluate scaffold installation as required by procedures is more than minor if the licensee routinely failed to perform engineering evaluations on similar issues, or if the later evaluation determined that safety related equipment was adversely affected. The issue was evaluated in accordance with IMC 0609, Appendix A, "The SDP for Findings At-Power," dated July 1, 2012, and determined to be of very low safety significance (Green) since it did not involve the loss or degradation of equipment or function specifically designed to mitigate a seismic event. This finding is related to the cross-cutting area of Human Performance, Field Presence, because PSEG managers did not ensure supervisory and management oversight of work activities, including contractors and supplemental personnel, such that nuclear safety is supported. Specifically, all of the scaffolding deficiencies that were identified by the inspectors had been in place for weeks without being noticed by PSEG personnel or supplemental workforce. [H.2] (Section 4OA2.2)

- Green. The inspectors identified a Green non-cited violation (NCV) of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix B, Criterion III, “Design Control,” because PSEG did not adequately provide for verifying or checking the adequacy of design by the performance of design reviews. Specifically, PSEG’s equivalent change package (ECP) 80112197, did not assure that the design change ECP 80119127 was adequately reviewed prior to approval, which led to the installation of a defective model A-416 speed switch (SS), and subsequent failure of the ‘D’ emergency diesel generator (EDG) to start. PSEG’s immediate C/As were to remove the new failed model 416 SS and reinstall the prior model 8 SS. Additionally, PSEG entered this issue into their CAP, performed a causal evaluation, and assigned C/As to address their design change process (DCP) gaps by revising procedures and conducting training.

This issue was more than minor because it was associated with the Design Control attribute of the Mitigating Systems cornerstone, and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). In accordance with IMC 0609.04, “Initial Characterization of Findings,” dated October 7, 2016, and Exhibit 2 of IMC 0609, Appendix A, “The SDP for Findings At-Power,” dated June 19, 2012, the inspectors determined that this finding is of very low safety significance (Green) because the performance deficiency was not a design or qualification deficiency, did not involve an actual loss of safety function, did not represent the actual loss of a safety function of a single train for greater than its technical specification (TS) allowed outage time, did not represent an actual loss of function of one or more non-TS trains of equipment designated as high safety-significant in PSEG’s maintenance rule program (MRP) for greater than 24 hours. This finding had a cross-cutting aspect in the area of Problem Identification and Resolution, operating experience (OE), because PSEG did not ensure that the organization systematically and effectively collect, evaluate, and implement relevant internal and external OE in a timely manner. Specifically, PSEG did not effectively collect or review previous Part 21 issues related to the new SS as part of the OE review in their DCP. [P.5] (Section 4OA2.3)

REPORT DETAILS

Summary of Plant Status

Hope Creek Generating Station (HCGS) began the inspection period at full rated thermal power (RTP) where it generally remained. On November 30, PSEG entered a Common Site (Salem and Hope Creek) Unusual Event (UE) Emergency Action Level (EAL) HU1.1, for a recorded 4.1 magnitude earthquake near Dover, Delaware (event notification (EN) number 53101). Operators implemented the abnormal operating procedures and continued to operate all three units onsite at 100 percent RTP with no equipment or structural issues identified related to the earthquake. PSEG exited the UE on November 30. There were no additional plant status changes of regulatory significance during the remainder of the inspection period.

1. REACTOR SAFETY**Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity**1R01 Adverse Weather Protection (71111.01 – 1 sample)Readiness for Seasonal Extreme Weather Conditionsa. Inspection Scope

The inspectors reviewed PSEG's readiness for the onset of seasonal cold temperatures during the week of November 13. The review focused on the Class 1E safety related batteries and associated battery rooms located in the auxiliary building. The inspectors reviewed the Updated Final Safety Analysis Report (UFSAR), TSs, control room logs, and the CAP to determine what temperatures or other seasonal weather could challenge these systems, and to ensure PSEG personnel had adequately prepared for these challenges. The inspectors reviewed station procedures, including PSEG's seasonal weather preparation procedure and applicable operating procedures. The inspectors performed walkdowns of the selected systems to ensure station personnel identified issues that could challenge the operability of the systems during cold weather conditions. Documents reviewed for each section of this IR are listed in the Attachment.

b. Findings

No findings were identified.

1R04 Equipment Alignment.1 Partial System Walkdown (71111.04Q – 3 samples)a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- Diesel driven fire pump (DDFP) during emergent repair of the motor driven fire pump (MDFP) and test valve due to a motor coupling failure and valve failure (0KCV-052; rams head) on October 3
- Reactor core isolation cooling (RCIC) system and pump room following the identification of scaffolding issues on October 25

- 'A' and 'B' EDGs and associated fuel oil systems following the recorded earthquake on November 30

The inspectors selected these systems based on their risk-significance relative to the reactor safety cornerstones at the time they were inspected. The inspectors reviewed applicable operating procedures, system diagrams, the UFSAR, TSs, work orders (WOs), notifications (NOTFs), and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have impacted the system's performance of its intended safety functions. The inspectors also performed field walkdowns of accessible portions of the systems to verify system components and support equipment were aligned correctly and were operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no deficiencies. The inspectors also reviewed whether PSEG staff had properly identified equipment issues and entered them into the CAP for resolution with the appropriate significance characterization.

b. Findings

No findings were identified.

.2 Full System Walkdown (71111.04S – 1 sample)

a. Inspection Scope

During the week of November 6, the inspectors performed a complete system walkdown of accessible portions of the core spray system to verify the existing equipment lineup was correct. The inspectors reviewed operating procedures; surveillance tests (STs), drawings, equipment line-up check-off lists, and the UFSAR to verify the system was aligned to perform its required safety functions. The inspectors also reviewed electrical power availability, component lubrication and equipment cooling, hanger and support functionality, and operability of support systems. The inspectors performed field walkdowns of accessible portions of the systems to verify as-built system configuration matched plant documentation, and that system components and support equipment remained operable. The inspectors confirmed that systems and components were aligned correctly, free from interference from temporary services or isolation boundaries, environmentally qualified, and protected from external threats. The inspectors also examined the material condition of the components for degradation and observed operating parameters of equipment to verify that there were no deficiencies. For identified degradation, the inspectors confirmed the degradation was appropriately managed by the applicable aging management program. Additionally, the inspectors reviewed a sample of related NOTFs and WOs to ensure PSEG appropriately evaluated and resolved any deficiencies.

b. Findings

No findings were identified.

1R05 Fire ProtectionResident Inspector Quarterly Walkdowns (71111.05Q – 5 samples)a. Inspection Scope

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 PSEG controlled combustible materials and ignition sources in accordance with administrative procedures. The inspectors verified that fire protection and suppression equipment was available for use as specified in the area pre-fire plan, and passive fire barriers were maintained in good material condition. The inspectors also verified that station personnel implemented compensatory measures for out of service, degraded, or inoperable fire protection equipment, as applicable, in accordance with procedures.

- Review of compensatory actions and hourly fire watches required due to the failure of multiple reactor building fire zone detection capability during system testing on October 3
- FRH-II-714, Fire Water Pump House, DDFP and MDFP on October 4
- FRH-II-531, Auxiliary Building, EDG rooms on October 24 and 25
- FRH-II-412, Reactor Building, RCIC pump and turbine room, residual heat removal (RHR) pump and heat exchanger (HX) rooms and electrical equipment room on November 2
- FRH-II-414, Reactor Building, core spray pump rooms, clean rad waste – dirty rad waste pumps and sumps room on November 5

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – 1 sample)Internal Flooding Reviewa. Inspection Scope

The inspectors reviewed the UFSAR, the site flooding analysis, and plant procedures to identify internal flooding susceptibilities for the site. The inspectors review focused on the mechanical penetration area to RHR sump. It verified the adequacy of equipment seals located below the flood line, floor and water penetration seals, watertight door seals, common drain lines and sumps, sump pumps, level alarms, control circuits, and temporary or removable flood barriers. It assessed the adequacy of operator actions that PSEG had identified as necessary to cope with flooding in this area and also reviewed the CAP to determine if PSEG was identifying and correcting problems associated with both flood mitigation features and site procedures for responding to flooding.

b. Findings

No findings were identified.

1R07 Heat Sink Performance (711111.07A – 1 sample)

a. Inspection Scope

The inspectors reviewed the 'B' RHR HX to determine its readiness and availability to perform its safety functions. The inspectors reviewed the design basis for the component. The inspectors reviewed the results of tests performed to validate flow through the HX. The inspectors discussed HXs maintenance history with PSEG engineering staff. The inspectors reviewed a sample of NOTFs for the past 3 years related to this system to ensure that PSEG appropriately identified, characterized, and corrected problems related to this component's performance.

b. Findings

No findings were identified.

1R11 Licensed Operator Regualification Program (71111.11 – 3 samples)

.1 Quarterly Review of Licensed Operator Regualification Testing and Training
(71111.11Q – 1 sample)

a. Inspection Scope

The inspectors observed licensed operator simulator training on October 4, which included the response to a recirculation flow unit failure coincident with an EHC leak, an anticipated transient without scram (ATWS), a standby liquid control (SLC) system failure to inject, a control rod drive (CRD) pump trip, and an emergency operating procedure (EOP) failure. The inspectors evaluated operator performance during the simulated event and verified completion of risk significant operator actions, including the use of abnormal and EOPs. The inspectors assessed the clarity and effectiveness of communications, implementation of actions in response to alarms and degrading plant conditions, and the oversight and direction provided by the control room supervisor. The inspectors verified the accuracy and timeliness of the emergency classification made by the shift manager and the TS action statements entered by the shift technical advisor. Additionally, the inspectors assessed the ability of the crew and training staff to identify and document crew performance problems.

b. Findings

No findings were identified.

.2 Quarterly Review of Licensed Operator Performance in the Main Control Room
(71111.11Q – 1 sample)

a. Inspection Scope

The inspectors observed and reviewed unplanned review of main control room annunciators, alarms, and performance of abnormal operating procedures to address the earthquake on November 30, and a planned reduction in power to approximately 94 percent to support planned control rod pattern adjustments on December 20. The inspectors observed reactivity manipulations to verify that procedure use and crew communications met established expectations and standards. The inspectors observed pre-job briefings to verify that the briefings met the criteria specified in

OP-AA-101-111-1004, "Operations Standards," Revision 7, and HU-AA-1211, "Pre-Job Briefings," Revision 13. Additionally, the inspectors observed licensed operator performance to verify that procedure use, crew communications, and coordination of activities between work groups similarly met established expectations and standards.

b. Findings

No findings were identified.

.3 Annual Review (71111.11A – 1 sample)

a. Inspection Scope

On November 20, 2017, NRC region-based inspectors conducted an in-office review of results of the PSEG-administered annual operating tests for 2017, for HCGS operators. The inspection assessed whether Pass/Fail rates were consistent with the guidance of IMC 0609, Appendix I, "Operator Requalification Human Performance Significance Determination Process (SDP)." The review verified that the failure rate (individual or crew) did not exceed 20 percent.

- None of the 50 operators failed any section of the Annual Exam. The overall individual failure rate was 0.0 percent;
- None of the 17 crews failed the simulator test. The crew failure rate was 0.0 percent

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12Q – 2 samples)

a. Inspection Scope

The inspectors reviewed the samples listed below to assess the effectiveness of maintenance activities on structure, system, and component (SSC) performance and reliability. The inspectors reviewed system health reports, CAP documents, maintenance WOs, MRP basis documents to ensure that PSEG was identifying and properly evaluating performance problems within the scope of the MRP. For each sample selected, the inspectors verified that the SSC was properly scoped into the MRP in accordance with 10 CFR 50.65 and verified that the (a)(2) performance criteria established by PSEG staff was reasonable. As applicable, for SSCs classified as (a)(1), the inspectors assessed the adequacy of goals and C/As to return these SSCs to (a)(2). Additionally, the inspectors ensured that PSEG staff was identifying and addressing common cause failures that occurred within and across MRP system boundaries.

- Review of multiple leak detection Nuclear Measurement Analysis and Control (NUMAC) circuit card failures on October 17
- Review of the 'D' EDG relay failure on December 20

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 4 samples)

a. Inspection Scope

The inspectors reviewed station evaluation and management of plant risk for the maintenance and emergent work activities listed below to verify that PSEG performed the appropriate risk assessments prior to removing equipment for work. The inspectors selected these activities based on potential risk significance relative to the reactor safety cornerstones. As applicable for each activity, the inspectors verified that PSEG personnel performed risk assessments as required by 10 CFR 50.65(a)(4) and that the assessments were accurate and complete. When PSEG performed emergent work, the inspectors verified that operations personnel promptly assessed and managed plant risk. The inspectors reviewed the scope of maintenance work and discussed the results of the assessment with the station's probabilistic risk analyst to verify plant conditions were consistent with the risk assessment. The inspectors also reviewed the TS requirements and inspected portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid, and applicable requirements were met.

- Review of the risk assessment for the troubleshooting on the 'A' EHC discharge piping leak and elevated vibrations on November 8
- Review of the risk assessment and protected equipment for the repair of the RCIC oil duplex strainer leak on November 14
- Review of the risk assessment, protected equipment, and troubleshooting activities for the emergent repair of the 1BD411 250VDC Class 1E battery, cell 36, on November 15
- Review of the risk assessment for the unexpected increase in drywell well floor drain leakage on December 30

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 3 samples)

a. Inspection Scope

The inspectors reviewed operability determinations for the following degraded or non-conforming conditions based on the risk significance of the associated components and systems:

- Review of the FLEX 480V EDG failure to start after completing the yearly preventive maintenance (PM), including sampling and changing the oil, on September 26
- Review of the 'B' EDG relay wiring issue discovered during planned maintenance on October 4
- Review of 'D' EDG operability during a jacket water system outage on October 25

The inspectors evaluated the technical adequacy of the operability determinations to assess whether TS operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the TSs and UFSAR to PSEGs evaluations to determine whether the components or

systems were operable. The inspectors confirmed, where appropriate, compliance with bounding limitations associated with the evaluations.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 – 6 samples)

a. Inspection Scope

The inspectors reviewed the post-maintenance tests for the maintenance activities listed below to verify that procedures and test activities adequately tested the safety functions that may have been affected by the maintenance activity, that the acceptance criteria in the procedure were consistent with the information in the applicable licensing basis and/or design basis documents, and that the test results were properly reviewed and accepted and problems were appropriately documented. The inspectors also walked down the affected job site, observed the pre-job brief and post-job critique where possible, confirmed work site cleanliness was maintained, and witnessed the test or reviewed test data to verify quality control hold point were performed and checked, and that results adequately demonstrated restoration of the affected safety functions.

- PM on the 'A' EDG replacing protective relays (order 50197816) on October 1
- Planned maintenance, repair and retest of the BC-HV-F016A, the 'A' RHR outboard containment spray valve (order 30250324), on October 2
- Corrective maintenance on the 'A' EHC pump discharge piping due to a cracked piping nipple near the relief valve (order 60136554) on October 19
- Corrective maintenance on the RCIC lube oil duplex strainer (order 50197899) on November 15
- Corrective maintenance replacing the failed 'D' EDG RMA relay (order 60137234) on November 21
- Corrective maintenance on the 'C' reactor building ventilation system exhaust fan (order 60137258) on December 5

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 4 samples)

a. Inspection Scope

The inspectors observed performance of STs and/or reviewed test data of selected risk-significant SSC(s) to assess whether test results satisfied TSs, the UFSAR, and PSEG procedure requirements. The inspectors verified that test acceptance criteria were clear, tests demonstrated operational readiness and were consistent with design documentation, test instrumentation had current calibrations and the range and accuracy for the application, tests were performed as written, and applicable test prerequisites were satisfied. Upon test completion, the inspectors considered whether the test results supported that equipment was capable of performing the required safety functions. The inspectors reviewed the following STs:

- High pressure coolant injection (HPCI) system valves inservice test (IST) on October 11
- 'D' RHR pump ST on October 24
- 'A' SLC system ST on November 29
- 'A' safety auxiliaries cooling system ST on December 6

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP4 Emergency Action Level and Emergency Plan Changes (71114.04 – 1 Sample)

a. Inspection Scope

PSEG implemented various changes to the Hope Creek EALs, Emergency Plan, and Implementing Procedures. PSEG had determined that, in accordance with 10 CFR 50.54(q)(3), any change made to the EALs, Emergency Plan, and its lower-tier implementing procedures, had not resulted in any reduction in effectiveness of the Plan, and that the revised Plan continued to meet the standards in 50.47(b) and the requirements of 10 CFR Part 50 Appendix E.

The inspectors performed an in-office review of all EAL and Emergency Plan changes submitted by PSEG as required by 10 CFR 50.54(q)(5), including the changes to lower-tier emergency plan implementing procedures, to evaluate for any potential reductions in effectiveness of the Emergency Plan. This review by the inspectors was not documented in an NRC Safety Evaluation Report and does not constitute formal NRC approval of the changes. Therefore, these changes remain subject to future NRC inspection in their entirety. The requirements in 10 CFR 50.54(q) were used as reference criteria. The specific documents reviewed during this inspection are listed in the Attachment.

b. Findings

No findings were identified.

1EP6 Drill Evaluation (71114.06 – 2 samples)

Emergency Preparedness Training Observations

a. Inspection Scope

The inspectors observed simulator training evolutions for licensed operators on October 4, and October 11, which required emergency plan implementation by an operations crew. PSEG planned these evolutions to be evaluated and included in performance indicator (PI) data regarding drill and exercise performance. The inspectors observed event classification and notification activities performed by the crew. The inspectors also attended the post-evolution critique for the scenario. The focus of the inspectors' activities was to note any weaknesses and deficiencies in the crew's performance and ensure that PSEG evaluators noted the same issues and entered them into the CAP.

b. Findings

No findings were identified.

2. **RADIATION SAFETY**

Cornerstones: Occupational and Public Radiation Safety

2RS8 Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation (71124.08 - 6 samples)

a. Inspection Scope

The inspectors verified the effectiveness of PSEG's programs for processing, handling, storage, and transportation of radioactive material. The inspectors used the requirements of 49 *Code of Federal Regulations* (CFR) 170-177, 10 CFR Part 20, 61, and 71, applicable industry standards, Regulatory Guides, and procedures required by TSs as criteria for determining compliance.

Inspection Planning

The inspectors conducted an in-office review of the solid radioactive waste system description in the UFSAR, the process control program, and the recent radiological effluent release report for information on the types, amounts, and processing of radioactive waste disposed. The inspectors reviewed the scope of quality assurance audits performed for this area since the last inspection.

Radioactive Material Storage (1 sample)

The inspectors observed radioactive waste container storage areas and verified the postings and controls and that PSEG had established a process for monitoring the impact of long-term storage of the waste.

Radioactive Waste System Walkdown (1 sample)

The inspectors walked down the following:

- Accessible portions of liquid and solid radioactive waste processing systems to verify current system alignment and material condition
- Abandoned in place radioactive waste processing equipment to review the controls in place to ensure protection of personnel
- Changes made to the radioactive waste processing systems since the last inspection
- Processes for mixing and transferring radioactive waste resin and/or sludge discharges into shipping/disposal containers
- Current methods and procedures for dewatering waste

Waste Characterization and Classification (1 sample)

The inspectors identified radioactive waste streams and reviewed radiochemical sample analysis results to support radioactive waste characterization. The inspectors reviewed the use of scaling factors and calculations to account for difficult-to-measure radionuclides.

Shipment Preparation (1 sample)

The inspectors reviewed the records of shipment packaging, surveying, labeling, marking, placarding, vehicle checks, emergency instructions, disposal manifest, shipping papers provided to the driver, and PSEG verification of shipment readiness.

Shipping Records (1 sample)

The inspectors reviewed selected non-excepted package shipment records.

Problem Identification and Resolution (1 sample)

The inspectors assessed whether problems associated with radioactive waste processing, handling, storage, and transportation were identified at an appropriate threshold and properly addressed in PSEG's CAP.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

Safety System Functional Failures (1 sample)

a. Inspection Scope

The inspectors sampled PSEG's submittals for the Safety System Functional Failures PI for HCGS for the period of October 1, 2016, through September 30, 2017. To determine the accuracy of the PI data reported during those periods, inspectors used definitions and guidance contained in Nuclear Energy Institute (NEI) Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, and NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 10 CFR 50.73." The inspectors reviewed PSEG's operator narrative logs, operability assessments, MRP records, maintenance WOs, NOTFs, event reports, and NRC integrated IRs to validate the accuracy of the submittals.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152 – 2 samples)

.1 Routine Review of Problem Identification and Resolution Activities

a. Inspection Scope

As required by Inspection Procedure 71152, "Problem Identification and Resolution," the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify PSEG entered issues into their CAP at an appropriate threshold, gave adequate attention to timely C/As, and identified and addressed adverse trends. In order to assist with the identification of repetitive equipment failures and specific human

performance issues for follow-up, the inspectors performed a daily screening of items entered into their CAP and periodically attended condition report screening meetings. The inspectors also confirmed, on a sampling basis, that, as applicable, for identified defects and non-conformances, PSEG performed an evaluation in accordance with 10 CFR Part 21.

b. Findings

No findings were identified.

.2 Semi-Annual Trend Review

a. Inspection Scope

The inspectors performed a semi-annual review of site issues to identify trends that might indicate the existence of more significant safety concerns. As part of this review, the inspectors included repetitive or closely-related issues documented by PSEG in trend reports, site PIs, major equipment problem lists, system health reports, MRP assessments, and maintenance or CAP backlogs. The inspectors also reviewed PSEG's CAP database for the first and second quarters of 2016 to assess NOTFs written in various subject areas (equipment problems, human performance issues, etc.), as well as individual issues identified during the NRC's daily condition report review and plant status walk downs (Section 40A2.1). The inspectors reviewed the PSEG quarterly trend reports for 2017, conducted under LS-AA-125, to verify that PSEG personnel were appropriately evaluating and trending adverse conditions in accordance with applicable procedures.

b. Observations

CAP Evaluations

NRC IR 2016004, Section 40A2.2, Semi-Annual Trend Review, documented historical CAP evaluations performed each year since 2013. Because of the continuing implementation of the industry's efficiency initiatives through the NEI's "Delivering the Nuclear Promise" (DNP) effort to improve the effectiveness of issue resolution within the CAP, namely CAP-01 for the improvement of screening efficiencies and CAP-02 (NEI 16-07, "Improving the Effectiveness of Issue Resolution to Enhance Safety and Efficiency," ADAMS Accession Number: ML17152A233) for standardization of CAP language and investigation, the inspectors compared the 2017 CAP evaluation numbers to the historical data documented in IR 2016004 (see below):

HCGS's CAP Evaluations					
	2013	2014	2015	2016	2017
RCEs	7	0	2	1	3*
ACEs	76	41	34	27	16
CCEs	18	15	14	4	2
WGEs	191	121	149	74	28
Totals:	292	177	199	106	49
Note *: Two of the 2017 RCEs were revisions to the one 2016 RCE due to 95001 inspection and the other RCE was related to an industry training issue.					

The inspectors noted that of the CAP evaluation numbers provided above, over the last 3 years (2015 – 2017) while implementing the industry initiatives to CAP, the total number of CAP evaluations has reduced by approximately half each year (199 → 106 → 49) which, when compared to the industry, is expected. However, as evidenced in the summary below and in Section 4OA2.3 of this report, the inspectors continue to note multiple performance deficiencies in PSEG's issue screening, prioritization, and evaluation.

Issue Screening, Prioritization and Evaluation

On November 27, 2017, PSEG initiated NOTF 20782675 to address numerous issues that were identified concerning the inappropriate CAP screening of degraded or non-conforming conditions. Order 70197786 reviewed the issues and determined that the insufficient CAP screening by the station oversight committee (SOC) and management review committee (MRC) was caused by the changes in CAP resulting from the above-mentioned CAP-01 and CAP-02 DNP initiatives. PSEG implemented C/As for SOC and MRC training and monthly coaching to improve the site's CAP screening process.

The inspectors reviewed NOTF 20782675 and then selected other issues, listed below, as part of the semiannual trend review in order to assess the adequacy and appropriateness of PSEG's issue screening, prioritization, and evaluation per their CAP procedures. The inspectors found the following:

- 'B' Fuel Pool Cooling (FPC) Pump Motor and Breaker Failures

The inspectors noted that for multiple safety related pump trips, NOTFs 20767192 and 20771585, PSEG's CAP screening was not consistent with the potential significance of the issue. The inspectors also noted that no causal evaluation had been documented on either pump trip and that the tracking and documentation of the equipment failure analyses (FA) were untimely. Based on these observations, PSEG created an action (70197382) to re-review the FA results and replace both FPC pumps by the end of 2018 (NOTF 20777528).

- 'A' Electro-Hydraulic Control (EHC) Pump Discharge Piping Leaks

The inspectors noted that for multiple EHC pump discharge leaks, NOTF 20752046, 20752286, and 20777858, PSEG's CAP screening was not consistent with the potential significance of the issue. PSEG's causal evaluation recommended multiple C/As, including developing a pump replacement strategy and completing a design change to improve the piping supports. The inspectors noted that PSEG's inadequate screening, evaluation, and assignment of C/As associated with first EHC leak resulted in the same issue reoccurring and challenging the EHC system again. PSEG initiated NOTF 20755420 and 70192305 to address the inspector's concerns.

- Hope Creek Review of Salem Condition Adverse to Quality (CAQ)

On March 27, 2017, PSEG initiated an action for Hope Creek in order 70193032 (NOTF 20760234) to review Salem's causal evaluation (70191881) for the '1A' vital instrument bus inverter failure that occurred on January 26, 2017. The inspectors noted and questioned the timeliness of PSEG's assigned due date of August 30, 2018.

PSEG changed the required completion date to March 2018, prior to the spring refueling outage.

- Scaffolding Issues

The inspectors noted that for a previously identified scaffolding issue where the scaffolding was found to be in contact with safety related equipment (NOTF 20760139), PSEG had incorrectly screened the issue and had not performed a past operability review or technical evaluation. PSEG initiated NOTF 20779949 to address the concern.

The inspectors evaluated all of the issues above in accordance with the guidance in IMC 0612, Appendix B, "Issue Screening," and Appendix E, "Examples of Minor Issues," and determined the issues of concern were of minor significance because the inspectors did not identify any CAQ that were not appropriately corrected or scheduled for correction in a reasonable period of time as a result of the failure to implement the NOTF screening process appropriately. Consequently, these issues were not subject to enforcement action in accordance with the NRC's enforcement policy. However, the inspectors did identify one CAQ that was more than minor as discussed below.

c. Findings

Introduction. A finding of very low safety significance (Green) and associated NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was identified by the inspectors because PSEG did not ensure adequate separation was maintained between temporary scaffolding and safety related equipment per procedure MA-AA-796-024, Scaffold Installation, Inspection and Removal. Specifically, 12 instances of scaffolding installed in the plant were identified by the inspectors with inadequate clearance to safety related equipment specified in PSEG procedures and no corresponding engineering evaluations to support these deviations.

Description. Title 10 CFR Part 50 Appendix B, Criterion V, requires that activities affecting quality be prescribed by documented procedures and be accomplished in accordance with those procedures. When used in the plant, the design and installation of temporary scaffolding must be controlled to ensure that it is not installed too close to safety related equipment. During a seismic event, scaffolding installed too close to safety related equipment can come in contact with that equipment, causing damage to it, and affect its safety function.

PSEG procedures control the installation of temporary scaffold at Hope Creek by specifying a minimum separation between scaffolding and safety related equipment and by requiring an engineering evaluation in cases when the minimum separation cannot be met. Specifically, PSEG procedure MA-AA-716-025, "Scaffold Installation, Modification, and Removal Request Process," Section 4.5, describes the control of scaffolding in seismic and safety related areas, stating that scaffolding should be erected in accordance with MA-AA-796-024 (Step 4.5.2), and that scaffolds shall also be secured so as not to become gravity missiles or create physical impacts between scaffold and safety related SSCs during an earthquake (Step 4.5.5). MA-AA-796-024, Section 4.4 Clearance Requirements, states, for safety related areas, ensure scaffolding and bracing members have minimum clearances in accordance with Attachment 4, Safety Related Area Scaffold Bracing and Attachment Criteria (Step 4.4.3). Section 4.7 Post-Build Inspection, states that scaffolds shall be inspected using Attachment 7, Scaffold

Erection/Modification Inspection Checklist. Attachment 4 states that the minimum clearance may be reduced to 1/2 inch, and that clearances between scaffold members and safety related components is required, unless under special situations, reduce clearance to zero and Engineering approval for zero clearance is obtained prior to installation. Attachment 7 checklist has the qualified inspector verify that all scaffolds in safety related area piping clearance as per Attachment 4 and that seismic clearances are maintained as required.

On October 25, 2017, during a plant walk down of the RCIC pump and turbine room (room 4110), the inspectors identified that scaffold S02092 was built and approved for use with one of its horizontal supports in close proximity (less than 1/32 inch) to the RCIC pump casing. The inspectors questioned PSEG about this and they documented the inspectors' concern in NOTF 20779273 (SL3; CARC) stating that scaffold was erected on August 30, 2017, for installation of a smoke detector as part of the fire protection DCP project. PSEG delimited the individuals involved with the inspection and approval of the scaffolding, and immediately modified the scaffolding moving the support greater than 2 inches away from the pump casing.

The inspectors noted that during a seismic event, individual components could and are expected to move; the amount that a given component could move varies based on many variables including the rigidity of the component, the size and weight of the component, its elevation in the building, and mounting/support methods used. The inspectors found that no engineering evaluation had been obtained by PSEG for scaffold S02902, and the inspection performed by PSEG did not identify the proximity of the scaffolding to the RCIC pump casing.

Following the inspectors' identification of the RCIC scaffolding issue, the inspectors requested a list of all scaffolds constructed for the same fire protection DCP, approximately 75 of them, and performed multiple extent of conditions (EOCs) walk downs of selected scaffolds constructed in the reactor building near safety related equipment from this list on October 30, and November 1, 2017. During these walk downs the inspectors identified nine additional issues involving scaffolding and its proximity to safety related systems [emergency core cooling systems (ECCS): core spray, RHR and HPCI]. PSEG entered all of these discrepancies into their CAP under NOTF 20779949 (SL; CARC) and 20780960 (SL4; NCAP), and they were corrected and assessed by PSEG for any potential impacts to the operability or functionality of the systems. PSEG also conducted EOC walk downs of all scaffolding near safety related equipment and initiated another NOTF 20779985 (SL2; CAQ) on November 2, for additional reactor building scaffolds not being built in accordance with MA-AA-796-024. In this NOTF, PSEG stated that based on discussions with PSEG and contracted scaffold supervisors and workers, it was identified that cable trays and conduit were not considered safety related components.

Analysis. The inspectors determined that the PSEG not following their procedures for scaffold installation and inspection did not ensure adequate separation was maintained between temporary scaffolding and safety related equipment was a performance deficiency. Specifically, the seismic scaffold that was installed within close proximity to the RCIC pump, without an engineering basis and contrary to MA-AA-796-024, was a performance deficiency within PSEG's ability to foresee and correct, and should have been prevented. Specifically, several scaffolds were installed in close proximity to safety related equipment. This included installations where scaffolding poles were in contact with safety related components, such as the RCIC turbine and multiple ECCS electrical conduits and piping. This performance deficiency was considered more than minor

because it affected the protection against external factors (seismic) attribute of the mitigating systems cornerstone and its objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, 12 instances of scaffolding installed in the plant were identified by the inspectors with inadequate clearance to safety related equipment specified in PSEG procedures and no corresponding engineering evaluations to support these deviations. Additionally, this performance deficiency was similar to example 4.a in IMC 0612, Appendix E, "Examples of Minor Issues," which states that the issue of failing to appropriately evaluate scaffold installation as required by procedures is more than minor if the licensee routinely failed to perform engineering evaluations on similar issues, or if the later evaluation determined that safety related equipment was adversely affected. The issue was evaluated in accordance with IMC 0609, Appendix A, "The SDP for Findings At-Power" and determined to be of very low safety significance (Green) since it did not involve the loss or degradation of equipment or function specifically designed to mitigate a seismic event.

This finding is related to the cross-cutting area of Human Performance, Field Presence, because PSEG managers did not ensure supervisory and management oversight of work activities, including contractors and supplemental personnel, such that nuclear safety is supported. Specifically, all of the scaffolding deficiencies that were identified by the inspectors had been in place for weeks without being noticed by PSEG personnel or supplemental workforce. [H.2]

Enforcement. Title 10 CFR Part 50, Appendix B, Criterion V, requires, in part, that activities affecting quality shall be prescribed by documented procedures and shall be accomplished in accordance with those procedures. PSEG procedure, MA-AA-796-024, "Scaffold Installation, Inspection and Removal," Section 4.4 "Clearance Requirements," states, For safety related areas, ensure scaffolding and bracing members have minimum clearances in accordance with Attachment 4, "Safety Related Area Scaffold Bracing and Attachment Criteria." Contrary to this requirement, between October 25 and November 1, 2017, the inspectors identified that scaffolding activities affecting quality at HCGS were inadequately accomplished in accordance with documented procedures. Specifically, PSEG personnel installed scaffold without the separation required from safety related equipment and did not request engineering evaluations for these scaffolds as required by procedures. The installation of this temporary scaffold in the vicinity of safety related equipment has the potential to adversely affect that equipment's performance during a seismic event because it was installed with insufficient standoff distance. After the issues were identified by the inspectors, PSEG performed independent EOC walkdowns of all scaffolding in the reactor building, and all identified discrepancies were corrected or evaluated as adequate. Because this violation is of very low safety significance (Green) and PSEG entered this into their CAP as NOTFs 20779273, 20779949, 20779985, and 20780960, this violation is being treated as an NCV consistent with Section 2.3.2 of the NRC Enforcement Policy.

(NCV 05000354/2017004-01, Scaffold Installed with Insufficient Separation from Safety Related Equipment)

.3 Annual Sample: Review of the 'D' Emergency Diesel Generator Speed Switch Failure on June 25, 2017

a. Inspection Scope

The inspectors reviewed PSEG's ECP and parts-change processes used by PSEG during the material selection for the replacement of the EDG SSs following multiple failures due to design control and design engineering issues. This included an assessment of the information that was used to make the determinations for the implementation of their procedures and processes for item equivalency evaluations, material selection, and configuration changes. The inspectors also assessed PSEG's identification, evaluation, and C/As associated with the 'D' EDG SS failure on June 25, 2017, and PSEG's causal evaluation performed under apparent cause evaluation (ACE) 70196346. The inspectors assessed PSEG's problem identification threshold, technical and cause analyses, OE and trend reviews, vendor oversight, and the prioritization and timeliness of C/As to evaluate whether PSEG was appropriately identifying, characterizing, and correcting problems associated with the EDG SSs and whether the planned and/or completed C/As were appropriate. The inspectors compared the actions taken in accordance with the requirements of PSEG's procurement and maintenance procedures, PSEG's CAP, 10 CFR Part 50, Appendix B, HCGS TSs, and the MRP.

b. Findings

Introduction. The inspectors identified a Green NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," because PSEG did not adequately provide for verifying or checking the adequacy of design by the performance of design reviews. Specifically, PSEG's ECP 80112197, did not assure that the design change ECP 80119127 was adequately reviewed prior to approval, which led to the installation of a defective model A-416 SS, and subsequent failure of the 'D' EDG to start.

Description. On June 25, 2017, the 'D' EDG failed to start during its monthly operability test. PSEG determined that this failure was the result of a failed, newly installed, A-416 model SS, which had been installed as an equivalent component or 'like-for-like' replacement for the previously installed A-8 and A-1 model SSs. PSEG's immediate C/As included replacing the failed SS with an A-8 model SS, re-performing the monthly operability test, sending the failed SS out for FA, and banning all other model A-416 switches from being installed into the other EDGs until the cause of the failure was known.

On September 1, 2017, PSEG received the FA (PSE-46858) from the vendor which determined that the new A-416 model SS design, specifically a surface mounted capacitor on the output of the switch, was susceptible to inductive kickback (EFT) produced by the existing EDG circuitry (the air start relay (ASR) installed in series with the SS). The A-416 model SSs are supplied and qualified by ESI, which is a 10 CFR Part 50, Appendix B, vendor and supplier of these components. ESI contracted AMS, a third party vendor, to perform the electromagnetic interference/radio frequency interference (EMI/RFI) qualification testing of the A-416 model SS.

On November 16, 2017, PSEG's ACE (70196346) determined that the apparent cause of the SS failure was that the vendor's A-416 model SS design was susceptible to inductive kickback, specifically the 200 V capacitors installed on the output contacts of

the SS. PSEG's C/A was to review the Part 21 report (10CFR21-0118) issued by ESI following the Hope Creek SS failure on October 25, 2017.

The inspectors reviewed PSEG's procedures, approved ECP 80119127, vendor testing and design reports, and causal evaluations completed for the SS failure. With respect to the causal evaluation, the inspectors found that PSEG's ACE:

With respect to PSEG's design and equivalent change process performed for the replacement of the EDG SSs, the inspectors found that PSEG's ECP:

- was approved by PSEG for implementation prior to the receipt and review of the vendor EMI/RFI qualification testing results [ECP approved December 21, 2017, EMI/RFI report received by PSEG on March 2, 2017]
- did not verify that the EMI/RFI report was conducted in accordance with industry testing standards [CC-AA-102, Section 4.1.6, obtain and validate critical vendor information]
- did not question or verify that the EMI/RFI qualification testing had been re-performed by the vendor on the SS after it was modified adding larger capacitors following the Part 21 (10CFR21-0113) issued on October 23, 2015
- did not review previous Part 21 issues related to the new component as part of the OE review [CC-AA-103-1001, CC-AA-102, and LS-AA-115]
- determined that the evaluation of the failure modes and effects was not applicable because of the similarities and equivalency of the old and new SS designs even though procedures do not allow that evaluation to be N/A'd [CC-AA-102, Section 4.1.12 and Att. 12]
- did not test the SS control ports that control unsuppressed inductive loads to + or - 2kVpp [CC-AA-102, Section 4.1.37 refers to CC-AA-103-1005, Att. 3, and EPRI / IEEE standard]

Following the inspector's questions and observations above, PSEG initiated NOTF 20784079 on December 29, 2017, and revised their ACE 70196346. Based on this information, the inspectors determined that it was reasonable to assume that PSEG's DCP should have adequately reviewed and independently validated the vendor's EMI/RFI testing results. PSEG also should have questioned these testing results, the industry and PSEG procedural standards that were not met and the previous OE involving deficiencies with the SS that resulted in a 2015 10 CFR Part 21 notification. The inspectors determined that this represented a performance deficiency. PSEG entered this into their CAP in NOTFs 20782707 and 20784079.

Analysis. PSEG not adequately verifying or checking the adequacy of design by the performance of design reviews or by the performance of a suitable testing program was a performance deficiency within their ability to foresee and correct, and which should have been prevented. Specifically, PSEG's ECP 80112197, did not assure that the design change was adequately reviewed prior to approval, which led to the installation of a defective A-416 model SS, and subsequent failure of the 'D' EDG. This performance deficiency was more than minor because it was associated with the Design Control attribute of the Mitigating Systems cornerstone, and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). In accordance with IMC 0609.04, "Initial Characterization of Findings," dated October 7, 2016, and Exhibit 2 of IMC 0609, Appendix A, "The SDP for Findings At-Power," dated June 19, 2012, the inspectors determined that this finding is of very low safety

significance (Green) because the performance deficiency was not a design or qualification deficiency, did not involve an actual loss of safety function, did not represent the actual loss of a safety function of a single train for greater than its TS allowed outage time, did not represent an actual loss of function of one or more non-TS trains of equipment designated as high safety-significant in PSEG's MRP for greater than 24 hours.

This finding had a cross-cutting aspect in the area of Problem Identification and Resolution, OE, because PSEG did not ensure that the organization systematically and effectively collect, evaluate, and implement relevant internal and external OE in a timely manner. Specifically, PSEG did not effectively collect or review previous Part 21 issues related to the new SS as part of the OE review in their DCP. [P.5]

Enforcement. Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control, requires in part, that measures shall provide for verifying or checking the adequacy of design by the performance of design reviews or by the performance of a suitable testing program. PSEG procedures CC-AA-102, Design Input and Configuration Change Impact Screening, and CC-AA-103, Configuration Change Control for Permanent Physical Plant Changes, control their DCP.

Contrary to the above, from December 21, 2016, through June 25, 2017, PSEG did not adequately provide for verifying or checking the adequacy of design by the performance of design reviews or the performance of a suitable testing program. Specifically, PSEG's ECP 80112197, which was conducted and approved in accordance with PSEG procedures CC-AA-102 and CC-AA-103, did not assure that the design change was adequately reviewed prior to its approval, which led to the installation of a defective A-416 model SS, and subsequent failure of the 'D' EDG. Additionally the EMI/RFI testing was inadequate or incomplete because the SS was not tested in accordance with PSEG's procedures or the EPRI / IEEE testing standards. PSEG's immediate C/As were to remove the new failed model 416 SS and reinstall the prior model 8 SS. Additionally, PSEG entered this issue into their CAP, performed a causal evaluation, and assigned C/As to address their DCP gaps by revising procedures and conducting training. Because this violation was of very low safety significance (Green), and PSEG entered this issue into its CAP as NOTFs 20782707 and 20784079, this violation is being treated as a NCV, consistent with Section 2.3.2.a of the Enforcement Policy. **(NCV 05000354/2017004-02, Inadequate Design Control of Emergency Diesel Generator Speed Switch)**

4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153 – 1 sample)

.1 Plant Events

a. Inspection Scope

For the plant events listed below, the inspectors reviewed and/or observed plant parameters, reviewed personnel performance, and evaluated performance of mitigating systems. The inspectors communicated the plant events to appropriate regional personnel, and compared the event details with criteria contained in IMC 0309, "Reactive Inspection Decision Basis for Reactors," for consideration of potential reactive inspection activities. As applicable, the inspectors verified that PSEG made appropriate emergency classification assessments and properly reported the event in accordance with 10 CFR Parts 50.72 and 50.73. The inspectors reviewed PSEGs follow-up actions related to the

events to assure that PSEG implemented appropriate C/As commensurate with their safety significance.

- UE due to recorded earthquake on November 30 (EN number 53101).

b. Findings

No findings were identified.

4OA5 Other Inspection

.1 Institute of Nuclear Power Operations Report Review

a. Inspection Scope

The inspectors reviewed the final report for the Institute of Nuclear Power Operations (INPO) plant assessment of HCGS conducted in 2017. The inspectors evaluated this report to ensure that NRC perspectives of PSEG performance were consistent with any issues identified during the assessment. The inspectors also reviewed this report to determine whether INPO identified any significant safety issues that required further NRC follow-up.

b. Findings

No findings were identified.

.2 Inspection Procedure 92702, "Follow Up on Traditional Enforcement Actions Including Violations, Deviations, Confirmatory Action Letters, Confirmatory Orders, and Alternate Dispute Resolution Confirmatory Orders"

a. Inspection Scope

Inspectors performed a follow up inspection in accordance with Inspection Procedure 92702, "Follow-up on Traditional Enforcement Actions Including Violations, Deviations, Confirmatory Action Letters, Confirmatory Orders, and Alternative Dispute Resolution Confirmatory Orders" to assess PSEG's evaluation and corrective actions taken in response to a Severity Level III Notice of Violation EA-16-251 (ML17122A282) issued to PSEG on May 3, 2017. The violation was associated with PSEG's failure to not properly implement a procedure for a surveillance activity of safety related equipment, which ultimately led to a dual recirculation pump trip, alternate rod insertion initiation, and a reactor scram.

The inspectors reviewed the RCE report titled "2015 reactor recirculation control system (RRCS) Automatic Actuation," Revision 5 and associated C/A to verify the following:

- To determine that adequate C/As have been implemented
- To verify that the root causes of these enforcement actions have been identified,
- To verify that generic implications have been addressed, and
- To verify that the licensee's programs and practices have been appropriately enhanced

The inspectors also reviewed approximately 25 C/As that resulted from the RCE to verify completion. Some of the C/As included procedure revisions and enhancements; re-screening of work activities for risk; training and development of lessons learned; and gap analysis and benchmarking of work activity risk management. During the inspection, inspectors interviewed key personnel to verify that C/As were implemented and lessons learned were communicated within the organization.

The inspectors reviewed the RCE, C/A documents, and supporting documents, and conducted interviews to verify that appropriate C/As were taken immediately following the event and NRC enforcement action.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

On January 17, 2018, the inspectors presented the inspection results to Mr. Eric Carr, Hope Creek Site Vice President, and other members of the PSEG staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report. PSEG management acknowledged and did not dispute the findings.

ATTACHMENT: SUPPLEMENTARY INFORMATION

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

E. Carr, Site Vice President
 E. Casulli, Plant Manager
 S. Barr, Emergency Preparedness Manager
 D. Bedford, System Engineer
 P. Breidenbach, Operations Training
 B. Burns, Radiation Protection Q-Technician
 J. Flores, Design Engineer
 T. Gingerich, System Engineer
 A. Hak, System Engineer
 R. Heathwaite, Chemistry
 J. Krall, Reactor Engineering Manager
 G. Klekos, Radiation Protection Nuclear Technical Supervisor
 T. MacEwen, Regulatory Assurance Principal Engineer
 D. Mannai, Senior Director Regulatory Operations
 A. Ochoa, Regulatory Affairs
 J. Priest, Nuclear Shift Operations Manager
 M. Richers, Design Engineering Manager
 N. Rock, System Engineer
 M. Shaffer, Operations Training Manager
 K. Torres, Programs Supervisor
 H. Trimble, Radiation Protection Manager

LIST OF ITEMS OPENED, CLOSED AND DISCUSSEDOpen and Closed

05000354/2017004-01	NCV	Scaffold Installed with Insufficient Separation from Safety Related Equipment (Section 4OA2.2)
05000354/2017004-02	NCV	Inadequate Design Control of Emergency Diesel Generator Speed Switch (Section 4OA2.3)

Closed

05000354/2017010-01	VIO	Failure to Follow Surveillance and Test Procedure Results in Reactor Scram (Section 4OA5.2)
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LIST OF DOCUMENTS REVIEWED

* Indicates NRC-identified

Section 1R01: Adverse Weather Protection

Procedures

ER-AA-230-1004, Failure Analysis Tracking and Reporting, Revision 1
 HC.MD-ST.PK-0001, 125 Volt Weekly Battery Surveillance, Revision 29
 HC.MD-ST.PK-0002, 125 Volt Quarterly Battery Surveillance, Revision 41
 HC.OP-AB.MISC-0001, Acts of Nature, Revision 31
 HC.OP-AB.MISC-0001, Acts of Nature, Revision 31
 HC.OP-GP.ZZ-0003, Station Preparations for Winter Conditions, Revision 31
 OP-AA-108-111-1001, Severe Weather and Natural Disaster Guidelines, Revision 15
 SH.FP-TI.FP-0001, Freeze Prevention and Winter Readiness of Fire Protection Systems,
 Revision 5
 WC-AA-107, Seasonal Readiness, Revision 14

Notifications

20750154	20759200	20759433	20759433	20777922	20780178
20780508	20780781	20780930	20780931	20781829	20782178
20782178*	20782212	20782212	20782601		

Maintenance Orders/Work Orders

60137200	70197607	70197617	70197783	70197783	80121410
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Other Documents

C&D Technologies Battery Inspection Report - LCU-27 Battery: PZ00617 Container – Damaged
 (RMA 17198), dated December 15, 2017

Section 1R04: Equipment Alignment

Procedures

FP-HC-004, Actions for Inoperable Fire Protection – Hope Creek Station, Revision 4
 HC.FP-ST.KC-0006, Fire Pump Capacity Test, Revision 12
 MA-AA-716-024, Use of Personnel Platforms, Revision 5
 MA-AA-716-025, Scaffold Installation, Modification, and Removal Request Process, Revision 13
 MA-AA-796-024, Scaffold Installation, Inspection and Removal, Revision 17
 TQ-AA-210-1100, Analysis Process Activities, Revision 4

Notifications

20776182	20776182	20776184	20776184	20779273*	20779949*
20779985	20780960*				

Maintenance Orders/Work Orders

70152874	70165045	70197393	80121375	80121406
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Other Documents

Calculation 6H4-1374, Evaluation of Scaffolding, dated December 1991
 HC Operations Standing Order 2017-23, Scaffold Inspection Requirements Pre and Post
 Erection, dated November 3, 2017

Section 1R05: Fire Protection**Procedures**

CC-AA-10, Configuration Control Process Description, Revision 2
 CC-AA-102, Design Input and Configuration Change Impact Screening, Revision 29
 CC-AA-103, Configuration Change Control for Permanent Physical Plant Changes, Revision 17
 CC-AA-103-1001, Implementation of Configuration Changes, Revision 11
 CC-AA-103-1005, Evaluating and Mitigating Electrically Induced Noise in Instrumentation and Control Circuits, Revision 2
 CC-AA-107, Configuration Change Acceptance Testing Criteria, Revision 14
 FP-HC-004, Actions for Inoperable Fire Protection – Hope Creek Station, Revision 4
 HC.FP-ST.KC-0006, Fire Pump Capacity Test, Revision 12
 HC.OP-ST.KJ-0004, Emergency Diesel Generator 1DG400 Operability Test – Monthly, Revision 76
 HU-AA-1212, Technical Task Risk / Rigor Assessment, Pre-Job Brief, Independent Third Part Review, and Post-Job Brief, Revision 9
 LS-AA-115, Operating Experience Program, Revision 16
 LS-AA-125, Corrective Action Program, Revision 24
 MA-AA-716-004, Conduct of Troubleshooting, Revision 14
 MA-AA-716-024, Use of Personnel Platforms, Revision 5
 MA-AA-716-025, Scaffold Installation, Modification, and Removal Request Process, Revision 13
 MA-AA-796-024, Scaffold Installation, Inspection and Removal, Revision 17
 TQ-AA-210-1100, Analysis Process Activities, Revision 4

Notifications

20736860	20769459	20770141	20770143	20770471	20774827
20774827	20776182	20776184	20776632	20779096	20779273*
20779949*	20779985	20780960*	20782707		

Maintenance Orders/Work Orders

30310821	60133359	60133359	70152874	70165045	70194810
70195037	70196346	70197393	80119127	80121375	80121406

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Procedures

HC.DE-PS.ZZ-0021, Hope Creek Penetration Seal Program, Revision 0
HC.FP-SV.ZZ-0026, Flood and Fire Barrier Penetration Seal Inspection, Revision 7
MA-AA-734-469, Installation and Repair of Penetration Seals, Revision 0

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20207020 20351361 20374443 20504573 20564617 20779767

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A-4646-1, Reactor Building Unit 1 Floor Plan – El. 162'-0", 178'-6", Revision 9
A-4644-1, Reactor Building Unit 1 Floor Plan – El. 132'-0", Revision 17
A-4645-1, Reactor Building Unit 1 Floor Plan – El. 145'-0", Revision 10

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30270341 30270341 50142911 50157831 50170921 70041876
70122332 70122332 70126692 70141042

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D7.5, Hope Creek Generating Station Environmental Design Criteria, Revision 24
FRH-II-461, FRVS Rooms, MCC Area, Recombiner Areas, Spent Fuel Pool & Gamma Scan
Detector Area Elevation 162'-0", Revision 3
Calculation 11-0069, Flood Levels for El. 167' & 178' in Reactor Building, Revision 5
H-1-AB-MEE-1941, EPU Evaluation of Hazards (Pipe Break/Floods) Calculations, Revision 1
VTD 430066, EPU TR T1002 – Line Break Flooding Evaluation, Revision 1

Section 1R07: Heat Sink Performance

Procedures

HC.MD-PM.BC-0001, Residual Heat Removal Heat Exchanger Inspection, Revision 6
HC.OP-ST.BC-0009, Residual Heat Removal System RHR Heat Exchanger Flow
Measurement – 18 Month, Revision 14
HC.OP-ST.BC-0009, Residual Heat Removal System RHR Heat Exchanger Flow
Measurement – 18 Month, Revision 15

Calculations

BC-0056, RHR Hydraulic Analysis, Revision 5
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M-51-1, Sheet 1, Residual Heat Removal, Revision 45

Notifications

20480716
20578020
20624012

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50136006	50149053	50149054	60090119	60090915	60115528
70002240	70145707	70159510	80004430	80102559	80102582

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HC.OP-AB.BOP-0003, Turbine Hydraulic Pressure, Revision 4
 HC.OP-AB.ZZ-0001, Transient Plant Conditions, Revision 34
 HC.OP-EO.ZZ-0101, Reactor Pressure Vessel Control, Revision 14
 HC.OP-EO.ZZ-0101A, ATWS-RPV Control, Revision 6
 HC.OP-EO.ZZ-0301, Bypassing MSIV Isolation Interlocks, Revision 10
 HC.OP-EO.ZZ-0311, Defeating Primary Containment Instrument Gas Isolation Interlocks, Revision 7
 HC.OP-EO.ZZ-0319, Restoring Instrument Air in an Emergency, Revision 4
 HC.OP-EO.ZZ-0320, Defeating ARI and RPS Interlocks, Revision 6
 HC.OP-EO.ZZ-0322, Core Spray Injection Valve Override, Revision 3
 HC.OP-SO.BF-0001, CRD Hydraulic System Operation, Revision 34
 HC.OP-SO.CH-0001, Main Turbine Control Oil (EHC) System Operation, Revision 49
 HC.RE-AB.ZZ-0001, Transient Plant Conditions, Revision 5
 HC.RE-IO.ZZ-0001, Core Operations Guidelines, Revision 52

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HC.IC-CC.SK-0011, NSSSS - Division 3 Steam Leak Detection Temperature Monitor
 1SKXR-11498, Revision 6
 HC.OP-DL.ZZ-0026, Surveillance Log, Revision 156
 HC.OP-GP.ZZ-0011, Placing Selected Instruments in the Tripped Condition, Revision 3
 MA-AA-716-210-1001, Performance Centered Maintenance (PCM Templates), Revision 12

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20651503	20651951	20773712	20773926	20777039
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Section 1R13: Maintenance Risk Assessments and Emergent Work ControlProcedures

CC-AA-320-011, Transient Loads, Revision 1
 ER-AA-1001, Component Classification, Revision 5
 ER-AA-230-1004, Failure Analysis Tracking and Reporting, Revision 1
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 HC.MD-ST.PK-0002, 125 Volt Quarterly Battery Surveillance, Revision 41
 HC.OP-AB.BOP-0003, Turbine Hydraulic Pressure, Revision 4
 HC.OP-AB.CONT-0006, Drywell Leakage, Revision 8
 HC.OP-AB.ZZ-0103, Uncoupled Control Rod, Revision 3
 HC.OP-IS.BD-0001, Reactor Core Isolation Cooling Pump-OP203 – Inservice Test, Revision 61
 HC.OP-IS.EA-0102, Service Water Subsystem B Valves – Inservice Test, Revision 59
 HC.OP-SO.BD-0001, Reactor Core Isolation Cooling System Operation, Revision 44
 MA-AA-716-232-1004, Failure Analysis Tracking and Reporting, Revision 3
 SM-AA-4028, Material Repair Process, Revision 8

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20749424	20752046	20752286	20755420	20760234	20777526
20777528	20777715	20777837	20777858	20778541	20779442
20779600*	20779618	20779825	20779994*	20780048	20780178
20780797	20780798	20780977*	20781749	20782178	20782212
20782601	20784155				

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50197899	60124783	60132540	60135314	60136554	60136719
60136887	60137200	70191431	70191881	70193032	70195077
70197036	70197382	70197617	70197783	70197831	80121410

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 Schulz Electric Failure Analysis, 75HP Spent Fuel Pool Cooling Pump Motor Failure Memo, dated October 9, 2017

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 CC-AA-102, Design Input and Configuration Change Impact Screening, Revision 29
 CC-AA-103, Configuration Change Control for Permanent Physical Plant Changes, Revision 17
 CC-AA-103-1001, Implementation of Configuration Changes, Revision 11
 CC-AA-103-1005, Evaluating and Mitigating Electrically Induced Noise in Instrumentation and Control Circuits, Revision 2
 CC-AA-107, Configuration Change Acceptance Testing Criteria, Revision 14
 HC.OP-SO.KJ-0001, Emergency Diesel Generators Operation, Revision 74
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 HC.OP-ST.KJ-0004, Emergency Diesel Generator 1DG400 Operability Test – Monthly, Revision 76

HU-AA-1212, Technical Task Risk / Rigor Assessment, Pre-Job Brief, Independent Third Part Review, and Post-Job Brief, Revision 9
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20770143	20770471	20774827	20774827	20776104	20779096
20779165	20779445*	20782707			

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70194810	70195037	70196346	70196402	70197242	80113940
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HC.OP-AB.BOP-0002, Main Turbine, Revision 16

HC.OP-AB.BOP-0003, Turbine Hydraulic Pressure, Revision 4

HC.OP-AB.CONT-0003, Reactor Building, Revision 7

HC.OP-GP.ZZ-0004, Reactor Coolant System Pressure Isolation Valve Leakage
Determination, Revision 7

HC.OP-IS.BD-0001, Reactor Core Isolation Cooling Pump - OP203 – Inservice Test,
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20485330*	20489902	20491354	20491412	20491473	20492364
20497746	20498130	20499251	20503494	20629298	20679214
20679795	20749424	20768932	20769879	20773654	20776590
20776763	20777837	20779824	20779825	20780542	20780797
20780799	20781093	20781410	20781411	20781749	

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30250324	30312658	30314282	50197816	50197899	60092504
60136554	60136554	60137258	60137343	70118203	70118243
70120133					

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HC.IC-FT.BB-0074, HPCI A Rosemount Trip Units, Revision 5

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Revision 67

HC.OP-IS.EG-0101, Safety Auxiliaries Cooling System Subsystem A Valves Inservice Test,
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20777770

20782937

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30219145	50142331	50142333	50184773	50185122	50185375
50188938	50197299	50198064	50198132	50199596	60113238

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Section 1EP6: Drill Evaluation

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HC.OP-AB.CONT-0002, Primary Containment, Revision 13

HC.OP-AB.COOL-0001, Station Service Water, Revision 21

HC.OP-AB.RPV-0004, Reactor Level Control, Revision 11

HC.OP-AB.ZZ-0001, Transient Plant Conditions, Revision 34

HC.OP-AB.ZZ-0135, Station Blackout/Loss Offsite Power/Diesel Generator Malfunction,
Revision 43

HC.OP-AB.ZZ-0150, 125 VDC Malfunction, Revision 7

Section 2RS8: Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation

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RP-AA-600, Radioactive Material/Waste Shipments, Revision 14

RP-AA-600-1006, Shipment of Category 1 Quantities of Radioactive Material or Waste
(Category 1 RAM-QC), Revision 8

RP-AA-602, Packaging of Radioactive Material Shipments, Revision 16

RP-AA-602-1001, Packaging of Radioactive Material/Waste Shipments, Revision 9

RP-AA-605, 10CFR61 Program, Revision 1

RP-AA-605-1001, Evaluation of 10CFR61 Sample Results, Revision 1

RW-AA-100, Process Control Program for Radioactive Wastes, Revision 10

Assurance of Quality

NUPIC/Talen Energy Audit No. 23931, NUPIC Joint Audit of Energy Solutions

CHWMEG, Inc. facility Review of Toxco Materials

Philotechnics, Ltd Service Provider Audit of Babcock Services

Rad Waste Check-in Self-Assessment for 2017 NRC inspection

10CFR61 Scaling Factors

Teledyne Brown Engineering Reports of Analysis for: A CUPS; Bead Resin; Dry Active Waste;
And, Powdex Resin

Training

Energy Solutions Load Securing for Radioactive Material Training

Energy Solutions Radioactive Waste Packaging, Transportation and Disposal Training

WMG RC-102 Use of WMG Programs and Regulatory Interfaces

EnergySolutions Air Transport of Radioactive Materials (IATA/DOT) Training

Salem/Hope Creek Lesson Plan NRP9902RMATC-02, NRC Bulletin 79-19 and
49CFR172 Subpart H Required Periodic Training

Shipments

HC16-050; HC17-039; HC17-042; HC17-059; HC17-094

Notifications

20563394	20777325	20777326	20777769	20777824	20777826
20777828	20777829	20777830			

Section 40A1: Performance Indicator Verification

Procedures

LS-AA-2001, Collecting and Reporting of NRC Performance Indicator Data, Revision 11
 LS-AA-2080, Monthly Data Elements for NRC Safety System Functional Failures, Revision 5

Notifications

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 20761954

Maintenance Orders/Work Orders

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 70188824

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Procedures

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 CC-AA-102, Design Input and Configuration Change Impact Screening, Revision 29
 CC-AA-103, Configuration Change Control for Permanent Physical Plant Changes, Revision 17
 CC-AA-103-1001, Implementation of Configuration Changes, Revision 11
 CC-AA-103-1005, Evaluating and Mitigating Electrically Induced Noise in Instrumentation and Control Circuits, Revision 2
 CC-AA-107, Configuration Change Acceptance Testing Criteria, Revision 14
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 HC.OP-ST.KJ-0004, Emergency Diesel Generator 1DG400 Operability Test – Monthly, Revision 76
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 LS-AA-125, Corrective Action Program, Revision 24
 MA-AA-716-004, Conduct of Troubleshooting, Revision 14
 MA-AA-716-024, Use of Personnel Platforms, Revision 5

MA-AA-716-025, Scaffold Installation, Modification, and Removal Request Process, Revision 13
 MA-AA-716-232-1004, Failure Analysis Tracking and Reporting, Revision 3
 MA-AA-796-024, Scaffold Installation, Inspection and Removal, Revision 17
 SM-AA-4028, Material Repair Process, Revision 8
 TQ-AA-210-1100, Analysis Process Activities, Revision 4

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20736860	20749424	20752046	20752286	20755420	20760234
20769459	20770141	20770143	20770471	20774827	20774827
20777526	20777528	20777715	20777837	20777858	20778541
20779096	20779273*	20779442	20779600*	20779618	20779825
20779949*	20779985	20779994*	20780048	20780797	20780798
20780960*	20780977*	20781749	20782707	20784155	

Maintenance Orders/Work Orders

30310821	50197899	60124783	60132540	60133359	60133359
60135314	60136554	60136719	60136887	70152874	70165045
70191431	70191881	70193032	70194810	70195037	70195077
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80121375	80121406				

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Section 4OA3: Follow-up of Events and Notices of Enforcement DiscretionProcedures

CC-HC-5001-1001, Post Transient Long Term Seismic Evaluation, Revision 1
 EP-HC-111-F5, NRC Data Sheet and Completion Reference, Revision 0
 EP-HC-111-F6, Primary Communicator Log, Revision 22
 ER-AA-310-101, Conduct Monitoring of Structures, Revision 0
 HC.IC-CC.SG-0002, Channel Calibration Seismic Instrumentation OSG-VY-7868 Triaxial
 Seismic Switch System, Revision 9
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 NC.EP-EP.ZZ-0101, Actions Required at Unaffected Station, Revision 7
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Maintenance Orders/Work Orders

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Section 4OA5: Other ActivitiesProcedures

ER-AA-450, Implementation of the technical specification surveillance frequency control
 program, Revision 2
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 HC.IC-CC.SA-0001(Q), Redundant Reactivity Control System-Division 1 Channel A,
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 B21-N403B, N402B, ATWS recirculation pump trip-Revision 17
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 HC.IC-FT.SA-0002(Q), Redundant Reactivity Control System-Division 2 Channel A,
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 HC.IC-FT.SA-0003(Q), Redundant Reactivity Control System-Division 1 Channel B,
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 change process, Revision 0
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 WC-AA-105, work activity risk management, Revision 5

Notifications

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Maintenance Orders/Work Orders

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Salem Hope Creek 2016 CT-1, SOER-10-2 Case Studies Training Material

Surveillance Test Interval (STI) Evaluation Form Number HC-16-001, Change RRCS functional test from monthly to 18 month performance, Revision 0

LIST OF ACRONYMS

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
ACE	apparent cause evaluation
ADAMS	Agencywide Documents Access and Management System
ASR	air start relay
ATWS	anticipated transient without scram
C/A	corrective action
CAP	Corrective Action Program
CAQ	condition adverse to quality
CARC	condition adverse to regulatory compliance
CFR	Code of Federal Regulations
CRD	control rod drive
DCP	design change process
DDFP	diesel driven fire pump
DNP	delivering the nuclear promise
EAL	Emergency Action Level
ECP	equivalent change package
ECCS	emergency core cooling system
EDG	emergency diesel generator
EFT	electrical fast transient
EHC	electrohydraulic control
EMI	electromagnetic interference
EN	event notification
EOC	extent of condition
EOP	emergency operating procedure
FA	failure analysis
FPC	fuel pool cooling
HCGS	Hope Creek Generating Station
HPCI	high pressure coolant injection
HX	heat exchanger
IMC	Inspection Manual Chapter
INPO	Institute of Nuclear Power Operations
IR	inspection report
IST	inservice test
kV	kilovolt
LER	Licensee Event Report
MDFP	motor driven fire pump

MRC	management review committee
MRP	maintenance rule program
NCAP	non-corrective action program
NCV	non-cited violation
NEI	Nuclear Energy Institute
NOTF	notification
NRC	Nuclear Regulatory Commission
NUMAC	Nuclear Measurement Analysis and Control
OE	operating experience
PI	performance indicator
PM	preventive maintenance
PSEG	Public Service Enterprise Group Nuclear LLC
RCE	root cause evaluation
RCIC	reactor core isolation cooling
RFI	radio frequency interference
RHR	residual heat removal
RRCS	reactor recirculation control system
RTP	rated thermal power
SDP	significance determination process
SL	significance level
SLC	standby liquid control
SOC	screening oversight committee
SS	speed switch
SSC	structure, system, and component
ST	surveillance test
TS	technical specification
UE	unusual event
UFSAR	Updated Final Safety Analysis Report
V	volt
WO	work order