



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION I
2100 RENAISSANCE BLVD., SUITE 100
KING OF PRUSSIA, PA 19406-2713

August 8, 2016

Mr. Peter Sena
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 05000354/2016002**

Dear Mr. Sena:

On June 30, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Hope Creek Generating Station (HCGS). The enclosed inspection report documents the inspection results, which were discussed on July 7, 2016, with Mr. F. Kenneth Grover, Plant Manager of Hope Creek, and other members of your staff.

NRC Inspectors 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 inspectors documented two findings of very low safety significance (Green) in this report. Both of the findings involved a violation of NRC requirements. Further, inspectors documented a licensee-identified violation which was determined to be of Severity Level IV significance in this report. 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 NCVs 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 HCGS. In addition, if you disagree with the cross-cutting aspect assigned to any finding, 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 Regional Administrator, Region I, and the NRC Resident Inspector at HCGS.

P. Sena

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In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC's Public Document Room or from the Publicly Available Records component of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

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 05000354/2016002
w/Attachment: Supplementary Information

cc w/encl: Distribution via ListServ

P. Sena

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No. 50-354

License No. NPF-57

Report No. 05000354/2016002

Licensee: PSEG Nuclear LLC

Facility: Hope Creek Generating Station (HCGS)

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

Dates: April 1, 2016 through June 30, 2016

Inspectors: J. Hawkins, Senior Resident Inspector
S. Haney, Resident Inspector
M. Draxton, Project Engineer
R. Nimitz, Senior Health Physicist

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

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SUMMARY

Inspection Report 05000354/2016002; 04/01/2016 – 06/30/2016; Hope Creek Generating Station; Maintenance Effectiveness.

This report covered a three-month period of inspection by the resident inspectors and announced inspections performed by regional inspectors. The inspectors identified two NRC-identified findings of very low safety significance (Green), which were determined to be 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 the Cross-Cutting Areas," dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated February 4, 2015. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5.

Cornerstone: Public Radiation Safety

- Green. The inspectors identified a Green NCV of Title 10 of the *Code of Federal Regulations* (10 CFR) 50.65(a)(2) due to an inadequate maintenance rule (MR) monitoring of the effluent radiation monitoring system (RMS) and the reactor core isolation cooling (RCIC) system. Specifically, PSEG did not properly evaluate maintenance rule functional failures (MRFFs) for both systems in accordance with its Maintenance Rule Program (MRP). Consequently, unaccounted for maintenance preventable functional failures (MPFFs) in both the effluent RMS and RCIC systems caused each system to exceed their MR performance criteria, requiring (a)(1) evaluations. PSEG's corrective actions (CAs) include placing the effluent RMS system in (a)(1) monitoring status and establishing monitoring goals, evaluating the RCIC system for (a)(1) monitoring status, and performing procedure revisions of affected procedures.

The performance deficiency was determined to be more than minor in accordance with IMC 0612, Appendix B, "Issue Screening," dated September 7, 2012, because it was associated with both the Plant Facilities/Equipment and Instrumentation attribute of the Public Radiation Safety cornerstone (effluent RMS) and the Equipment Performance attribute of the Mitigating Systems cornerstone (RCIC). The inspectors determined that this finding was of very low safety significance (Green) using: IMC 0609, Appendix D, "Public Radiation Safety Significance Determination Process," dated February 12, 2008; and, Exhibit 2 of IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012. This finding was associated with a cross-cutting aspect of Human Performance, Consistent Process, which states that individuals use a consistent, systematic approach to make decisions. Specifically, PSEG did not properly evaluate the impact of equipment failures in the effluent RMS and RCIC system when making MRFF determinations. [H.13] (Section 1R12)

- Green. The inspectors identified a Green NCV of 10 CFR 50.65(b)(2) due to inadequate MRP monitoring of effluent RMS performance. Specifically, PSEG did not include the filtration, ventilation, and recirculation system (FRVS) ventilation stack radiation monitor within the scope of the MRP. PSEG's CAs include scoping the FRVS ventilation stack radiation monitor into the MRP, evaluating the component's historical performance, and placing the system in (a)(1) monitoring status.

The inspectors determined the performance deficiency was more than minor in accordance with IMC 0612, Appendix B, "Issue Screening," dated September 7, 2012, because it was associated with the Plant Facilities/Equipment and Instrumentation attribute of the Public Radiation Safety cornerstone, and adversely affected the cornerstone objective to ensure adequate protection of public health and safety from exposure to radioactive materials released into the public domain as a result of routine civilian nuclear reactor operation. This finding was associated with a cross-cutting aspect of Problem Identification and Resolution, Resolution, which states that licensees take effective CAs to address issues in a timely manner commensurate with their safety significance. Specifically, PSEG completed a MR focused area self-assessment in July 2014 that identified a potential deficiency in the scoping of systems used in Hope Creek emergency operating procedures (EOPs), but had not yet implemented the planned CAs. [P.3] (Section 1R12)

Other Findings

One violation of Severity Level (SL) IV significance that was identified by PSEG was reviewed by the inspectors. CAs taken or planned by PSEG were entered into PSEG's corrective action program (CAP). This violation and its corrective action tracking number are listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

HCGS began the inspection period at 100 percent of rated thermal power (RTP). On June 3, 2016, operators reduced power to approximately 60 percent to support planned turbine valve testing, condenser waterbox cleaning, and control rod sequence exchange. On June 5, 2016, operators reduced power to approximately 15 percent and removed the main turbine and generator from service to repair a turbine control valve drain line steam leak. Operators returned the unit to full RTP on June 8, 2016. The unit remained at or near full RTP for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01 – 2 samples)

.1 Readiness for Seasonal Extreme Weather Conditions

a. Inspection Scope

The inspectors performed a review of PSEG's readiness for the onset of seasonal high temperatures. The review focused on the safety auxiliaries cooling system (SACS) and the main control room (MCR) ventilation system. The inspectors reviewed the Updated Final Safety Analysis Report (UFSAR) and technical specifications (TSs) 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 verify that no unidentified issues existed that could challenge the operability of the systems during hot weather conditions. Documents reviewed for each section of this inspection report are listed in the Attachment.

b. Findings

No findings were identified.

.2 Summer Readiness of Offsite and Alternate Alternating Current (AC) Power Systems

a. Inspection Scope

The inspectors reviewed plant features and procedures for the operation and continued availability of the offsite and alternate AC power system to evaluate readiness of the systems prior to seasonal high grid loading. The inspectors reviewed PSEG's procedures affecting these areas and the communications protocols between the transmission system operator and PSEG. This review focused on changes to the established program and material condition of the offsite and alternate AC power equipment. The inspectors assessed whether PSEG established and implemented appropriate procedures and protocols to monitor and maintain availability and reliability of both the offsite AC power system and the onsite alternate AC power system. The

inspectors evaluated the material condition of the associated equipment by interviewing the responsible system manager, reviewing notifications (NOTFs) and open work orders (WOs), and walking down portions of the offsite and AC power systems including the 500 kilovolt (kV) and 220 kV switchyards.

b. Findings

No findings were identified.

1R04 Equipment Alignment

.1 Partial System Walkdowns (71111.04 – 3 samples)

a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- 'B' and 'D' emergency diesel generator (EDG) fuel oil storage and transfer system with 'A' EDG fuel oil storage tank level indications failed on April 26
- Control rod drive system and hydraulic control units during planned maintenance on the system during the week of May 9
- Electrical alignment with the AX501, AX502 transformers isolated on May 15

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, WOs, NOTFs and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have impacted system performance of their 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 May 31, the inspectors performed a complete system walkdown of the 'A' and 'C' station service water systems. The inspectors reviewed operating procedures, surveillance tests, drawings, equipment lineup procedures, and the UFSAR to verify the system was aligned to perform its required safety functions. The inspectors also reviewed electrical power availability and equipment cooling, support functionality, and operability of support systems. The inspectors performed field walkdowns of accessible portions of the systems to verify system components and support equipment

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. Additionally, the inspectors reviewed a sample of related condition reports and WOs to ensure PSEG appropriately evaluated and resolved any deficiencies.

b. Findings

No findings were identified.

1R05 Fire Protection

Resident Inspector Quarterly Walkdowns (71111.05Q - 6 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.

- FRH-II-442, Room 4408, equipment removal area during the week of April 11
- FRH-II-541, Room 5417, 'A' class 1E switchgear room during the week of April 25
- FRH-III-151, Room 1517, 'A' reactor recirculation pump (RRP) motor generator set room during the week of April 25
- FRH-II-421, Room 4202, control rod drive pumps room during the week of May 9
- FRH-II-422, Room 4208, 'B' residual heat removal (RHR) heat exchanger room during the week of June 20
- FRH-II-563, Room 5602, 'A' control area heating, ventilation, and air conditioning (HVAC) equipment room during the week of June 27

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – 1 sample)

Annual Review of Cables Located in Underground Bunkers/Manholes

a. Inspection Scope

The inspectors conducted an inspection of underground bunkers/manholes subject to flooding that contain cables whose failure could affect risk-significant equipment. The inspectors performed walkdowns of risk-significant areas, including the switchyard block

house cable vault and AX502 cable vault containing 13.8 kV cables feeding the AX502 transformer, to verify that the cables were not submerged in water, that cables and/or splices appeared intact, and to observe the condition of cable support structures. When applicable, the inspectors verified proper sump pump operation and verified level alarm circuits were set in accordance with station procedures and calculations to ensure that the cables will not be submerged. The inspectors also ensured that drainage was provided and functioning properly in areas where dewatering devices were not installed. For those cables found submerged in water, the inspectors verified that PSEG had conducted an operability evaluation for the cables and were implementing appropriate CAs.

b. Findings

No findings were identified.

1R11 Licensed Operator Regualification Program and Licensed Operator Performance

.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 May 10, which included a circulating water pump trip and high pressure coolant injection (HPCI) leak coincident with a loss of offsite power and the failure of select components to automatically start as required. The inspectors evaluated operator performance during the simulated event and verified completion of risk significant operator actions, including the use of abnormal operating procedures 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 a planned down power to support turbine valve testing, control rod sequence exchange, and main condenser waterbox cleaning on June 3. 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.

1R12 Maintenance Effectiveness (71111.12Q – 4 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, and MR basis documents to ensure that PSEG was identifying and properly evaluating performance problems within the scope of the MR. For each sample selected, the inspectors verified that the SSC was properly scoped into the MR 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 CAs 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 MR system boundaries.

- Review of south plant ventilation (SPV) stack radiation monitor low out of tolerance flow reading during a functional test on June 16, 2015
- Main turbine stop valve delayed scram signal during testing on December 18, 2015
- Review of reactor recirculation flow switches during the week of April 20, 2016 (Quality Control sample)
- Review of FRVS ventilation stack radiation monitor failures

b. Findings

.1 Inadequate Maintenance Rule Monitoring of Multiple Systems, including the Effluent Radiation Monitoring System and the Reactor Core Isolation Cooling System

Introduction. The inspectors identified a Green NCV of 10 CFR 50.65(a)(2) due to inadequate MR monitoring of multiple systems, including the effluent RMS and RCIC. Specifically, PSEG did not properly evaluate MRFFs for both systems in accordance with the MRP. Consequently, the inspectors determined that unaccounted for MPFFs in both the effluent RMS and RCIC systems caused each system to exceed its MR (a)(2) performance criteria, requiring (a)(1) evaluations.

Description. *Effluent RMS:* During the performance of the SPV stack radiation monitor functional test on June 16, 2015, the mid/high range bypass flowpath of the radiation monitor could not achieve the flow specified in the surveillance. PSEG generated NOTF 20694030 and incorrectly concluded that it was not a MRFF because the mid/high range of the SPV radiation monitor is not required for the MR. However, the failure of the monitor to meet the acceptance criteria of the surveillance can affect isokinetic flow and the ability to take a representative sample of an effluent release through that ventilation stack in the mid/high range during accident conditions. Following inspector questions in

December 2015, PSEG determined the SPV radiation monitor surveillance test failure was a functional failure of the MR function to provide continuous collection of a representative sample of the radioactive particulate and iodine in the SPV for laboratory analysis. PSEG generated NOTF 20714121, and rescreened and classified NOTF 20694060 as a MRFF. Order 70182741 was subsequently created to perform a functional failure cause determination evaluation (FFCDE) to determine whether the failure was maintenance preventable.

During the performance of the north plant ventilation (NPV) stack radiation monitor functional test on November 25, 2015, the mid/high range bypass flowpath of the radiation monitor could not achieve the flow specified in the surveillance and NOTF 20709560 was initiated. PSEG evaluated NOTF 20709560 and concluded that the issue was a MRFF. Order 70182115 was created to perform a FFCDE for the radiation monitor failure, and concluded the failure was not maintenance preventable.

In February 2016, during the performance of the FFCDE of the SPV stack radiation monitor surveillance test failure under Order 70182741, PSEG determined that the NPV MRFF and the SPV MRFF were maintenance preventable. Both low out of tolerance flow readings were caused by a test procedure inadequacy. The flow controllers for the NPV, SPV, and FRVS ventilation stack radiation monitors were replaced by a configuration change in 2009. When the vendor's test procedure for the new instrument was reviewed, PSEG found that the time to wait before taking a flow reading was five minutes while the functional test procedures specified two minutes and thirty seconds. The procedures as written did not allow enough time for the flow controllers to settle before taking a flow reading. PSEG subsequently cancelled the previously completed NPV stack radiation monitor FFCDE under Order 70182115 and re-performed the evaluation to document a repeat MPFF. A single repeat MPFF in the effluent RMS exceeds the performance criteria of zero repeat MPFFs in a 36-month timeframe, and required an (a)(1) evaluation. PSEG performed an (a)(1) evaluation under Order 70184154 and subsequently placed the effluent RMS in (a)(1) status and established an (a)(1) action plan and monitoring goals.

RCIC: On April 2, 2016, PSEG documented in FFCDE 70185164 that NOTF 20720252, written for the F060 valve failing to close on March 6, 2016, had been re-screened as not a functional failure. PSEG justified this re-screening using guidance from ER-AA-310-1004, Maintenance Rule – Performance Monitoring, Attachment 3 – Examples that are not MRFFs. PSEG specifically cited example 3 which states, in part, that “unless a redundant component is modeled in the site PRA, if a train's function can be fulfilled for all challenges, a failure of a redundant component within a redundant train is not a Maintenance Rule Functional Failure. NOTE: Consideration must be given here to the diversity of the design (e.g., both redundant trains have redundant valves, but one is motor operated and the other is air operated).” On April 3, 2016, the inspectors reviewed PSEG's justification for re-screening the F060 valve failure to close as not a functional failure, and questioned whether or not the F060 valve failure could be considered “a failure of a redundant component within a redundant train.” PSEG confirmed on May 25, 2016, that their justification for this issue as not a functional failure was not adequate, documented this in NOTF 20731762, and re-opened the FFCDE which was completed on June 23, 2016, three and half months after the initial failure was documented in PSEG's CAP. The re-performed FFCDE confirmed the failure to be a MPFF.

The inspectors found that PSEG's MR program procedure, ER-AA-310-1004, requires that if a MR system exceeds the established MPFF performance criteria limit in a 36-month timeframe, then the system requires an (a)(1) evaluation be performed. The inspectors determined that the RCIC system exceeded its established MPFF performance criteria limit of 2 MPFFs in a 36-month timeframe. As of June 30, 2016, PSEG had not performed the required (a)(1) evaluation. As such, PSEG should have been monitoring the RCIC system against licensee-supplied goals as required by 10 CFR 50.65(a)(1) and PSEG procedure ER-AA-310, "Implementation of the Maintenance Rule." PSEG's (a)(1) evaluation was pending under Order 70187722 at the end of the inspection period.

Analysis. The inspectors determined that PSEG not properly evaluating MRFFs for both the effluent RMS and RCIC systems in accordance with the MRP was a performance deficiency that was within PSEG's ability to foresee and correct and should have been prevented. The performance deficiency was determined to be more than minor in accordance with IMC 0612, Appendix B, "Issue Screening," dated September 7, 2012, because it was associated with both the Plant Facilities/Equipment and Instrumentation attribute of the Public Radiation Safety cornerstone and the Equipment Performance attribute of the Mitigating Systems cornerstone. The performance deficiency was determined to adversely affect the cornerstone objective to ensure adequate protection of public health and safety from exposure to radioactive materials released into the public domain as a result of routine civilian nuclear reactor operation (i.e., the effluent RMS), and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of the RCIC system that responds to initiating events to prevent undesirable consequences. Specifically, the inspectors determined that the repeat MPFF in effluent RMS and the additional MPFF in the RCIC system demonstrated that the performance of both systems were not being effectively controlled through appropriate preventive maintenance, because the incorrect screenings resulted in exceedance of the system's performance criteria and system placement in (a)(1) status. In addition, example 7.d from IMC 0612, Appendix E, "Examples of Minor Issues," dated August 11, 2009, details that a performance deficiency can be more than minor if equipment performance problems were such that effective control of performance through appropriate preventive maintenance under (a)(2) could not be demonstrated.

The inspectors determined that this finding was of very low safety significance (Green) using IMC 0609, Appendix D, "Public Radiation Safety Significance Determination Process," dated February 12, 2008, and Exhibit 2 of IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012. The inspectors determined this to be a finding of very low safety significance (Green) for effluent RMS because 1) the finding was in the effluent release program; 2) was not a substantial failure to implement the effluent program; and, 3) the dose to the public did not exceed the 10 CFR 50, Appendix I criterion or 10 CFR 20.1301(e) limits. In the case of the RCIC system, the inspectors determined this to be of very low safety significance (Green) because the finding 1) was not a deficiency affecting the design or qualification of the RCIC system; 2) did not represent a loss of the system and/or function; 3) did not represent an actual loss of function of at least a single train for greater than its TS allowed outage time; and, 4) was not 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 was associated with a cross-cutting aspect of Human Performance, Consistent Process, which states that individuals use a consistent, systematic approach to make decisions. Specifically, PSEG did not properly evaluate the impact of equipment failures in the effluent RMS and RCIC system when making MRFF determinations. [H.13]

Enforcement. 10 CFR 50.65(a)(2) states, in part, that a monitoring program as specified in 10 CFR 50.65(a)(1) is not required where it has been demonstrated that the performance or condition of the system is being effectively controlled through the performance of appropriate preventive maintenance, such that the system remains capable of performing its intended function. Contrary to the above, PSEG did not demonstrate that performance of both the effluent RMS and the RCIC system were being effectively controlled through the performance of appropriate preventive maintenance when a repeat MPFF of the NPV stack radiation monitor occurred on November 25, 2015, and when the RCIC F060 valve failure caused a third system MPFF on April 2, 2016. Because PSEG did not properly evaluate the impact of a SPV stack radiation monitor surveillance failure and a RCIC F060 valve failure when performing MRFF determinations on June 15, 2015, and April 2, 2016, PSEG did not evaluate the RCIC system for (a)(1) monitoring status or place the effluent RMS under 10 CFR 50.65(a)(1) monitoring status for establishing goals and monitoring against the goals. PSEG's CAs include placing the effluent RMS in (a)(1) monitoring status, evaluating the RCIC system for (a)(1) monitoring status, and performing procedure revisions of all affected procedures. Because the finding was of very low safety significance (Green) and has been entered into PSEG's CAP (NOTF 20714121 and 20731762), this violation is being treated as an NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(NCV 05000354/2016002-01; Inadequate Maintenance Rule Monitoring of Multiple Systems, including the Effluent Radiation Monitoring System and the Reactor Core Isolation Cooling System)**

.2 Failure to Scope the Filtration, Recirculation, and Ventilation System Effluent Radiation Monitor in the Maintenance Rule

Introduction. The inspectors identified a Green NCV of 10 CFR 50.65(b)(2) due to inadequate MRP monitoring of effluent RMS performance. Specifically, PSEG did not include the FRVS ventilation stack radiation monitor within the scope of the MRP.

Description. The effluent RMS monitors plant release points to obtain an indication of radioactivity release rate. A radiation monitor installed in the FRVS ventilation stack monitors the radioactivity released to the environment during normal and accident conditions. The inspectors performed a review of the FRVS ventilation stack radiation monitor as it is in the scope of the MR as required by 10 CFR 50.65(b)(2) because it is used in the Hope Creek EOP, HC.OP-EO.ZZ-0103/4, "Reactor Building and Radioactive Release Control."

The inspectors identified that PSEG did not properly scope the FRVS ventilation stack radiation monitor in the MR, and was not monitoring its performance. PSEG generated NOTF 20711929, and made a scoping change request (Order 70182564) to add the FRVS ventilation stack radiation monitor as part of the monitored effluent RMS MR functions. PSEG performed a historical review of the FRVS ventilation stack radiation monitor performance (Order 70158523) and rescreened five equipment failures as MRFFs. Three of those MRFFs were determined to be maintenance preventable. The

newly evaluated MPFFs resulted in the effluent RMS exceeding the performance criteria of six MPFFs in a 36-month timeframe, and required an (a)(1) evaluation. PSEG performed an (a)(1) evaluation under Order 70186592 and subsequently placed the effluent RMS in (a)(1) monitoring status. PSEG should have been monitoring the effluent RMS system against licensee-supplied goals as required by 10 CFR 50.65(a)(1) and PSEG procedure, ER-AA-310, "Implementation of the Maintenance Rule." PSEG's CAs include properly scoping the FRVS ventilation stack radiation monitor within the MRP, performing a historical review of the FRVS ventilation stack radiation monitor performance, and placing the system in (a)(1) monitoring status.

Analysis. The inspectors determined that PSEG's inadequate scoping of the FRVS ventilation stack radiation monitor within the MRP was a performance deficiency that was reasonably within PSEG's ability to foresee and correct and should have been prevented. The performance deficiency was determined to be more than minor in accordance with IMC 0612, Appendix B, "Issue Screening," dated September 7, 2012, because it was associated with the Plant Facilities/Equipment and Instrumentation attribute of the Public Radiation Safety cornerstone, and adversely affected the cornerstone objective to ensure adequate protection of public health and safety from exposure to radioactive materials released into the public domain as a result of routine civilian nuclear reactor operation. Specifically, the inspectors determined that the previously unrecognized FRVS ventilation stack MPFFs demonstrated that the performance of the effluent RMS was not being effectively controlled through appropriate preventive maintenance, because the system performance criteria was exceeded and placed the system in (a)(1) monitoring status. In addition, example 7.d from IMC 0612, Appendix E, "Examples of Minor Issues," dated August 11, 2009, details that a performance deficiency can be more than minor if equipment performance problems were such that effective control of performance through appropriate preventive maintenance under (a)(2) could not be demonstrated. The inspectors determined that this finding was of very low safety significance (Green) using IMC 0609, Appendix D, "Public Radiation Safety Significance Determination Process," dated February 12, 2008, because: 1) the finding was in the effluent release program; 2) was not a substantial failure to implement the effluent program; and 3) the dose to the public did not exceed the 10 CFR Part 50, Appendix I criterion or 10 CFR 20.1301(e) limits.

The inspectors determined this finding was associated with a cross-cutting aspect of Problem Identification and Resolution, Resolution, which states that licensees take effective CAs to address issues in a timely manner commensurate with their safety significance. While the performance deficiency occurred more than three years ago, the performance characteristic has not been corrected or eliminated, and is therefore reflective of present performance. PSEG completed a MR focused area self-assessment in July 2014 under Order 70162305. This represented an opportunity for PSEG to identify the need to scope the FRVS ventilation stack radiation monitor in the MRP. Specifically, the self-assessment listed a deficiency that identified that Hope Creek was vulnerable to scoping violations because NRC Regulatory Guide 1.160, Revision 3 and NUMARC 93-01, Revision 4A had not been implemented at HCGS relative to scoping EOP equipment into the MRP. PSEG generated NOTF 20657563 to address the EOP standards deficiency in July 2014. The EOP scope plan was completed (Order 70167901-0010) in January 2015, however the long term CA planned to complete the EOP Scope Plan had not been completed at the end of the inspection period. [P.3]

Enforcement. 10 CFR 50.65 (b)(2) requires, in part, that the scope of the monitoring program specified in paragraph (a)(1) include non-safety-related SSCs that are relied upon to mitigate accidents or transients or are used in plant EOPs. The effluent RMS is a non-safety-related system used in Hope Creek EOP, HC.OP-EO.ZZ-0103/4, “Reactor Building and Radioactive Release Control.” Contrary to the above, PSEG did not include the FRVS ventilation stack radiation monitor within the scope of the monitoring program specified in 10 CFR 50.65 (a)(1). As a result, the preventive maintenance on the system was not assessed. PSEG’s CAs include scoping the FRVS ventilation stack radiation monitor into the MR, performing a historical review of the FRVS ventilation stack radiation monitor performance, and placing the system in (a)(1) monitoring status. Because the finding was of very low safety significance (Green) and has been entered into PSEG’s CAP (NOTF 20711929), this violation is being treated as an NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(NCV 05000354/2016002-02; Failure to Scope the Filtration, Recirculation, and Ventilation System Effluent Radiation Monitor in the Maintenance Rule)**

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 6 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.

- Risk assessment of missed RCIC remote shutdown panel transfer relay surveillance week of April 4
- Troubleshooting of ‘B’ MCR HVAC train (WO 60128727) week of April 4
- HPCI system planned maintenance on April 5
- ‘A’ RRP motor generator set corrective maintenance on April 26
- ‘D’ main steam isolation valve closure logic relay repair plan
- Protected equipment and risk assessment for ‘D’ EDG planned maintenance the week of June 13

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 6 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 lifted HPCI system injection valve control circuit lifted lead on March 28 (Order 70185549)
- 'B' MCR HVAC supply fan heater not cycling week of April 4 (NOTF 20725154)
- Remote shutdown panel missed surveillance week of April 4 (Order 70185270)
- Review of redundant instrumentation tubing required for safe shutdown located in fire area RB5 during the week of April 11 (70185414)
- Intermediate range monitor preamplifier nonconformance during the week of May 23 (Order 70186744)
- Review of Part 21 issued for micro switches installed in an RHR system motor operated valve during the week of June 5 (Order 70176631)

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 PSEG's evaluations to determine whether the components or systems were operable. The inspectors confirmed, where appropriate, compliance with bounding limitations associated with the evaluations. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled by PSEG.

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18 – 3 samples).1 Temporary Modificationsa. Inspection Scope

The inspectors reviewed the temporary modifications listed below to determine whether the modifications affected the safety functions of systems that are important to safety. The inspectors reviewed 10 CFR 50.59 documentation and post-modification testing results, and conducted field walkdowns of the modifications to verify that the temporary modifications did not degrade the design bases, licensing bases, and performance capability of the affected systems.

- Temporary modification to turbine control valve drain piping (Order 80117499)
- Temporary modification to the steam dryer stress analysis (Order 80116531)

b. Findings

No findings were identified.

.2 Permanent Modifications

a. Inspection Scope

The inspectors evaluated a modification to allow manual operation of dampers in the service water intake structure ventilation system implemented by design change package 80108126, "SWIS [service water intake structure] Damper Linkage Modification." The inspectors verified that the design bases, licensing bases, and performance capability of the affected systems and structures were not degraded by the modification. In addition, the inspectors reviewed modification documents associated with the upgrade and design change. The inspectors also reviewed revisions to the control room abnormal operating procedure and system operating procedure.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 – 8 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.

- RCIC F060 valve failed to open on March 8 (NOTF 20720252)
- Reactor vessel low level 'A' system main steam line isolation time response testing after replacement of a blown fuse on April 3 (Order 50170449)
- HPCI system injection valve failure to fully stroke troubleshooting on April 13 (Order 60128834)
- Repair of the EDG 'F' starting air receiver inlet check valve on June 1 (NOTF 20730561)
- 'F' fuel oil transfer pump replacement on June 3 (Order 60125556)
- Repair of the condensate transfer to 'A' RHR check valve (AP-V042) on June 7 (NOTF 20729011)
- 'B' station service water traveling water screen replacement on June 10 (Order 30195006)
- RCIC system auxiliary relay replacement on June 11 (Order 30195327)

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 4 samples)a. Inspection Scope

The inspectors observed performance of surveillance tests and/or reviewed test data of selected risk-significant SSCs 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 surveillance tests:

- HC.OP-ST.KJ-0003, 'C' EDG monthly surveillance test on April 4
- HC.OP-IS.BJ-0001, HPCI quarterly surveillance test on April 7 (IST)
- HC.OP-ST.ZZ-0003, Secondary containment integrity verification the week of April 16
- HC.OP-IS.BC-0004, 'D' RHR quarterly in-service test the week of April 19 (IST)

b. Findings

No findings were identified.

2. RADIATION SAFETY**Cornerstone: Public Radiation Safety**2RS7 Radiological Environmental Monitoring Program (REMP) (71124.07 – 3 samples)a. Inspection Scope

The inspectors reviewed the REMP to validate the effectiveness of the radioactive gaseous and liquid effluent release program and implementation of the Groundwater Protection Initiative (GPI). The inspectors used the requirements in 10 CFR 20; 40 CFR 190; 10 CFR 50, Appendix I; Hope Creek TSs; Offsite Dose Calculation Manual (ODCM); Nuclear Energy Institute 07-07; and procedures required by TSs as criteria for determining compliance.

Inspection Planning

The inspectors reviewed: Salem and Hope Creek Station's 2015 annual radiological environmental and effluent monitoring reports; REMP program audits; ODCM changes; land use census; UFSAR; and inter-laboratory comparison program results.

Site Inspection (1 sample)

The inspectors walked down various passive dosimeter and air and water sampling locations and reviewed associated calibration and maintenance records. The inspectors observed the sampling of various environmental media as specified in the ODCM and reviewed any anomalous environmental sampling events including assessment of any positive radioactivity results. The inspectors reviewed any changes to the ODCM. The inspectors verified the operability and calibration of the meteorological tower instruments and meteorological data readouts. The inspectors reviewed environmental sample laboratory analysis results, laboratory instrument measurement detection sensitivities, laboratory quality control program audit results, and the inter- and intra-laboratory comparison program results. The inspectors reviewed the groundwater monitoring program as it applies to selected potential leaking SSCs.

GPI Implementation (1 sample)

The inspectors reviewed: groundwater monitoring results; changes to the GPI program since the last inspection; anomalous results or missed groundwater samples; leakage or spill events including entries made into the decommissioning files (10 CFR50.75 (g)); evaluations of surface water discharges; and PSEG's evaluation of any positive groundwater sample results including appropriate stakeholder notifications and effluent reporting requirements.

Identification and Resolution of Problems (1 sample)

The inspectors evaluated whether problems associated with the REMP were identified at an appropriate threshold and properly addressed in PSEG's CAP.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES40A1 Performance Indicator (PI) Verification (71151)Reactor Coolant System (RCS) Specific Activity and RCS Leak Rate (2 samples)a. Inspection Scope

The inspectors reviewed PSEG's submittal for the RCS specific activity and RCS leak rate PI for the period of April 1, 2015, through March 31, 2016. To determine the accuracy of the PI data reported during those periods, the inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7. The inspectors also reviewed RCS sample analysis and control room logs of daily measurements of RCS leakage, and compared that information to the data reported by the PI.

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 that PSEG entered issues into the CAP at an appropriate threshold, gave adequate attention to timely CAs, 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 the 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 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, as required by Inspection Procedure 71152, “Problem Identification and Resolution,” to identify trends that might indicate the existence of more significant safety issues. In this review, the inspectors included repetitive or closely-related issues that may have been documented by PSEG outside of the CAP, such as trend reports, PIs, department and station performance improvement integrated matrices, system health reports, MR assessments, and maintenance or CAP backlogs. The inspection also reviewed PSEG’s CAP database for the fourth quarter of 2015, and the first and second quarters of 2016, to assess the notifications written as well as individual issues identified during the NRC’s daily condition report review (Section 4OA2.1).

b. Findings and Observations

Two findings were identified during this semi-annual trend review and are documented in Section 1R12 of this report. The inspectors determined that the other performance deficiencies associated with this trend review, which are discussed below, were of minor significance in accordance with IMC 0612, Appendix B.

EDG Speed Switch Performance

In April 2016, the inspectors documented a trend of ‘C’ EDG equipment failures since January 2014 (NRC Inspection Report 05000354/2016001; Section 4OA2.4). While the inspectors determined that an adverse trend in ‘C’ EDG minor equipment and performance issues reflected a larger programmatic deficiency in PSEG maintenance practices, equipment material condition or operation of the equipment did not exist. The inspectors documented minor performance deficiencies with the evaluation and CAs

associated with PSEG's causal evaluations, and documented one NCV (05000354/2016001-01) for the untimely correction of a condition adverse to quality associated with high vibrations on the 'C' EDG that led to a failure of a critical component, a jacket water flexible hose.

As part of this previous trend review, the inspectors summarized another event that occurred on August 4, 2015, when the 'C' EDG experienced a failure of the speed switch which, at the time, PSEG had determined failed due to a manufacturing defect. The control circuit of each emergency diesel contains an electronic speed switch. The speed switch circuitry consists of an engine mounted magnetic pickup sensor, a speed switch with four output contacts, and an analog and digital output signal feeding two local tachometers. The speed switch output contacts enable and disable select alarms and control key engine auxiliary components essential for engine and generator operation which activate functions at multiple different speeds. The analog and digital output of the speed switch is checked, and if necessary, calibrated every 24 months.

One of the CAs from this speed switch failure was to perform a failure analysis to validate PSEG's manufacturing defect apparent cause. Multiple failure analyses were performed by PSEG and outside vendors from the time of the failure in August 2015 until May 2016, when PSEG's final failure analysis found that the speed switch failed because of a broken wire on the output terminal of the voltage regulator base connection. PSEG found that this wire broke from vibration fatigue, and the failure analysis concluded that the speed switch had been subjected to erratic voltages due to the broken wire

The inspectors reviewed this event, numerous failure analysis reports and a detailed work history of the EDG speed switches. Multiple minor performance deficiencies, and an observation related to a potential adverse trend were documented by the inspectors during this review and are summarized below:

- 1) On March 6, 2014, PSEG performed calibration of the 'C' EDG speed switch under WO 30233784. An N3 NOTF 20642223 was initiated to document the 'C' EDG speed switch being found out-of-calibration. PSEG Nuclear Oversight conducted a CAP audit in May 2015, which determined that this out-of-calibration condition should have been documented in an N1 NOTF so that it could be properly screened by operations and addressed by engineering. This new NOTF, created by PSEG Nuclear Oversight, was screened by operations as operable because the speed switch had been calibrated back into the acceptable tolerance, but no action was taken by engineering to evaluate why the speed switch had been found out-of-calibration. The inspectors determined that not documenting the out-of-calibration condition in an N1 NOTF in March 2014 per MA-AA-716-009, "Use of Maintenance Procedures," and ER-AA-520, "Instrument Performance Trending," was a performance deficiency.
- 2) The inspectors reviewed PSEG procedure, ER-AA-520, "Instrument Performance Trending," Section 4.2, which requires that, "*once per operating cycle PSEG engineering will run a trend report on out-of-tolerance NOTFs.*" On June 27, 2016, the inspectors requested the last two trend reports generated and reviewed by engineering per procedure. PSEG responded to the inspectors by providing FASA 80112270 and NOTF 20672877 written on December 11, 2014, which documented that the procedure was not being implemented by PSEG Engineering. An action

from this NOTF was created to determine if ER-AA-520 could be eliminated from the engineering program. The inspectors found that this action was still outstanding in PSEG's CAP with a due date of August 1, 2016. The inspectors noted that PSEG has not performed the requirements of this active procedure while evaluating whether or not it could be eliminated. The inspectors determined that this was a performance deficiency.

- 3) While reviewing the EDG speed switch work history, the inspectors noted that a potential adverse trend existed with the 'C' EDG speed switch records, specifically, four of the last seven preventive maintenance records detailed equipment failures or out-of-tolerance conditions requiring re-calibration. When this observation was discussed with PSEG on July 6, 2016, PSEG acknowledged the 'C' EDG speed switch records indicated a higher number of equipment failures or out-of-tolerance conditions requiring re-calibration than on the other three EDGs. However, PSEG did not substantiate the inspector's concern that a potential adverse trend existed with the 'C' EDG speed switch. Following this meeting, the inspector's reviewed the EDG speed switch calibration records again, paying particular attention to the new style speed switches that have been installed since 2013 on all the EDGs. The inspectors noted higher drift rates on the 'C' and 'D' EDG speed switch calibrations as compared to the 'A' and 'B' EDG speed switch calibrations. PSEG subsequently documented the potential adverse trend related to the 'C' EDG speed switch in NOTF 20735254, and is currently in the process of evaluating the speed switch data for the 'D' EDG.

These performance deficiencies were determined to be of minor significance because no adverse consequence or equipment failure could be directly attributed to the performance deficiencies or the potential adverse trend.

MRP CAs and Implementation

In December 2015, the inspectors documented in NRC Inspection Report 05000354/2015004, Section 4OA2.2, Semi-Annual Trend Review, a review of the PSEG's MR implementation. This previous review summarized multiple inspector identified examples of PSEG not evaluating the impact of equipment failures on interfacing MR system functions, including:

Inspector identified missed cross system MRFFs		
Sept. 10, 2013	RCIC and HPCI Feedwater Sealing	NOTF 20619913
Feb. 12, 2014	Aux. Bldg. EDG Area Ventilation	NOTF 20639772
May 8, 2014	Main Steam Safety Relief Valves	NOTF 20650346
Sept. 10, 2015	1E 480 VAC	NOTF 20702217

Along with the items described above, this previous review in NRC Inspection Report 05000354/2015004 also discussed multiple examples of PSEG not evaluating the impact of equipment failures on interfacing MR system functions. These repetitive observations are related to deficiencies in implementing PSEG's interfacing MR system screening process per procedure ER-AA-310-1004, "Maintenance Rule – Performance Monitoring," Section 4.3.2.2, which states, "*When reviewing notifications consider impacts on interfacing systems and ensure that the system manager for impacted systems is engaged in the review process to ensure the function of all systems is*

understood. For example, breaker causing pump failure would require the system managers for both the breaker and affected pump to be engaged.”

PSEG’s immediate CAs for these missed opportunities were tracked in their CAP, resulting in the creation of a MR screening panel on November 2, 2015, that performed an independent, periodic review of all equipment failures identified in the CAP to ensure the appropriate MR system function screenings were being performed per station procedures. PSEG’s CAs also included performing training for all engineering personnel in December 2015 to reinforce MR screening expectations.

The MR panel was implemented by PSEG as a pilot program. On November 30, 2015, PSEG documented in their evaluation of the MR panel’s performance (70180114-0040) that the MR panel had been in place for a month with no documented missed MRFF screenings. When the inspectors reviewed PSEG’s actions in June 2016, they found that no additional actions to procedurally implement the MR panel had been taken by PSEG.

As a follow-up to these November 2015 CAs, the inspectors reviewed a number of equipment failures since December 1, 2015, focusing on PSEG’s MR panel screening of the issues to ensure that PSEG was appropriately implementing the MR process so as to accurately monitor the effectiveness of their MR systems. Again, the inspectors identified multiple examples of PSEG not properly evaluating the impact of equipment failures on interfacing MR systems and not properly implementing the MR process. Examples of both are provided in the table below:

Inspector Identified Missed cross system MRFFs		
May 6, 2016	125 VDC Breaker	NOTF 20727878
May 23, 2016	‘A’ RRP UPS Inverter Battery	NOTF 20726484
June 8, 2016	HPCI F006 valve Feedwater Sealing	NOTF 20723723 NOTF 20732149
Other Inspector Identified MR Issues		
Dec. 1, 2015	FRVS RMS	NOTF 20711929*
Feb. 11, 2016	SPV RMS	NOTF 20718427*
Mar. 3, 2016	Turbine Control Valve Limit Switch	NOTF 20720951
Apr. 20, 2016	MCR Chiller Program Timer (missed FFCDE)	NOTF 20726357
May 16, 2016	HPCI Overspeed Tappet Spring (improper justification – missed FF)	NOTF 20724102 NOTF 20731762
May 24, 2016	NPV RMS (missed tracking MPFF in Maintenance Rule Manager)	NOTF 20730471
May 25, 2016	RCIC F060 valve (improper justification – missed MRFF – maintenance rule performance criteria exceeded)	NOTF 20731762*

*Note: These issues involved MR violations that were documented in Section 1R12 of this report.

The inspectors determined that these examples constituted a programmatic performance deficiency in that PSEG was not following 10 CFR 50.65(a)(2). This programmatic performance deficiency demonstrates that PSEG was: 1) not adequately screening equipment failures across interfacing MR systems; and, 2) not adequately performing all the required MRFFs evaluations. This resulted in PSEG not properly

accounting for all of the MPFFs in the affected MR systems and not being able to accurately monitor the effectiveness of MR systems per (a)(2), or take the appropriate MR monitoring actions per (a)(1) whenever the (a)(2) performance criteria was exceeded.

PSEG's CAs for this programmatic performance deficiency included documenting the adverse MR performance trend in NOTF 20728649, and performing a CAP work group evaluation (WGE)(70186918). This WGE found that MR scoping issues were the result of program/process gaps related to latent errors in the existing MR functions, and that MR screening issues were the result of individual behavior shortfalls in procedural use and adherence. The WGE also determined that a contributing cause to the MR issues was that the current process requires a large number of MRFF screenings (~3,700 per year), which can lead to human performance errors, and that the current process does not require a peer or supervisor review of each screening. PSEG's planned CAs include: 1) presenting training on the MR reliability monitoring process to Hope Creek's plant engineering department; 2) benchmarking an industry peer that is successfully performing MR reliability monitoring to identify a process which reduces the number of screenings and ensures accurate MRFF determinations; and, 3) rescreening six months of NOTFs to ensure other MRFFs were not missed. At the completion of this review, the inspectors noted two additional items concerning MR deficiencies that remain open in PSEG's CAP:

- 1) On June 23, 2016, that PSEG documented NOTF 20733263 detailing 29 MR CAP screenings going overdue due to inadequate focus on the MR screening process.
- 2) NOTF 20716722, created by PSEG for both Salem and Hope Creek on January 21, 2016, to validate the NRC Salem inspectors' observations concerning MR performance criteria not being consistent with equipment unreliability and unavailability parameters used in the station's probabilistic risk analysis. (Reference the URI in NRC Inspection Report 05000272;311/2015008-01)

The programmatic deficiencies identified that did not result in components transitioning to a monitoring status were found to be minor in significance. The inspector identified performance deficiencies found during this review that were more than minor were dispositioned and documented in Section 1R12 of this report.

3. Annual Sample: Review of Adverse Trend in MCR Chiller Failures

a. Inspection Scope

The inspectors performed an in-depth review of PSEG's identified issues, evaluations, and CAs associated with the MCR chiller that were documented in their CAP over the last three years. Since January 2013, the MCR chillers have experienced numerous equipment failures and operating issues. The inspectors assessed PSEG's problem identification threshold, problem analysis, extent of condition reviews, compensatory actions, and the prioritization, timeliness, and effectiveness of CAs to determine whether PSEG staff were appropriately identifying, characterizing, and correcting problems associated with the MCR chillers, and whether the planned or completed CAs were appropriate and effective at preventing reoccurring equipment issues. The inspectors compared the actions taken to the guidance in PSEG's CAP and procedures.

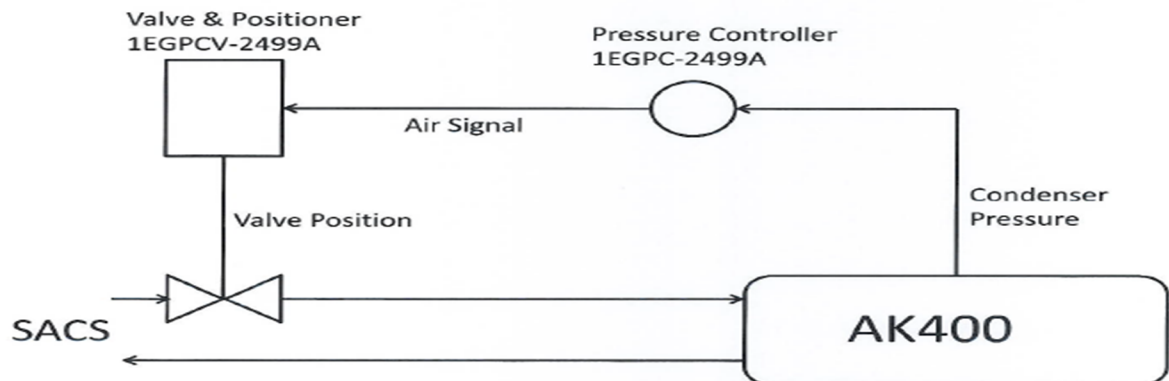
b. Findings and Observations

No findings were identified.

The inspectors reviewed all notifications and documents associated with the monitoring and CAs for all MCR chiller equipment and performance issues experienced by PSEG from January 1, 2013, through June 30, 2016. The inspectors reviewed multiple causal evaluations and documented NCVs associated with these events to determine whether an adverse trend in MCR chiller equipment and performance issues reflected a larger performance deficiency with PSEG operations, maintenance practices and/or equipment condition, and whether the CAs developed adequately addressed the causes to reasonably prevent recurrence.

Below is a brief summary of issues associated with the MCR chillers since January 2013.

Pressure Control Valve (PCV) Failures:



1. June 15, 2016 – ‘B’ MCR chiller became inoperable due to the SACS pressure control valve (PCV), EG-PCV-2499B, failing in the fully closed position (NOTF 20732364). PSEG isolated control air to the PCV which failed the PCV open, allowing operators to deem the chiller operable but in degraded status.
[Controller issue]
2. May 6, 2016 – ‘A’ MCR chiller tripped due to the SACS PCV, EG-PCV-2499A, opening late. PSEG replaced the failed PCV positioner and completed WGE 70186738 which determined that the failed positioner was only 2 years old, was previously replaced in April 2014, and that the only maintenance that involved the PCV was an actuator overhaul in February 2016. PSEG’s FFCDE and failure analysis are still pending.
[Positioner issue]
3. December 21, 2015 – ‘B’ MCR chiller tripped. PSEG determined that the controller was obsolete and that the maintenance procedure for calibration of the controller, HC.IC-DC.ZZ-0140, allowed the performance of a functional test instead of a calibration if the functional test was satisfactory. The completed FFCDE 70183243 for this determined the failure was due to inadequate calibration of the controller, a MPFF. (NOTF 20717854)
[Controller issue]

4. June 30, 2014 – The NRC inspectors documented an NCV associated with the ‘A’ MCR chiller which was manual tripped and declared inoperable (December 2013) due to a failure of the chiller PCV positioner internal relay diaphragm. The inspectors determined that this was an age-related failure of the positioner diaphragm and that PSEG was not appropriately tracking the shelf-life of the safety-related component.
[Positioner issue]

The inspectors also reviewed other CAP documents that were outside the time period of the review, but were referenced multiple times in the reviewed causal evaluations. In one of these causal evaluations, PSEG performed an apparent cause evaluation 70129670:

5. October 2011 – ‘A’ MCR chiller PCV, EG-PCV-2499A, failed open. PSEG determined that the PCV positioner had a missing roller bearing and ‘C’ clip causing the positioner to go out of calibration and the valve to fail open. This was determined to be an age-related failure in that the positioner had exceeded its recommended PCM template and vendor service life.
[Positioner issue]

Guide Vane Linkage Failures:

1. January 1, 2016 – ‘A’ MCR chiller experiencing excessive auto load recycles. No trips of the system have occurred yet due to the excessive cycling. NOTF 20680809 states MCR guide vane linkage was found loose and was determined to be the cause of the excessive cycling. WGE 70183631 determined that vibrations slowly loosened the set screws connecting the guide vane linkage due to inadequate implementation of HC.MD-GP.ZZ-0245. CAs included ensuring maintenance procedures were revised to apply Loctite on all guide vane linkages for safety-related chillers.
2. February 23, 2013 – ‘A’ MCR chiller manually tripped and declared inoperable due to a loose set screw on the vane control arm. PSEG determined improper application of Loctite to the set screw allowed the screw to loosen over time due to vibration. Apparent cause evaluation 70150995 CAs included revising maintenance procedure, HC.MD-GP.ZZ-0245, to include proper torque values and application of Loctite for guide vane bolts. The procedure was determined to be adequate and was not revised. FFCDE was completed and determined to be a MPFF.

Other Chiller Equipment Failures:

1. April 8, 2016 – ‘A’ MCR chiller failed to operate (NOTF 20723933). PSEG identified this issue as a MPFF. PSEG’s FFCDE 70185933 determined that the chiller program timer wire had disconnected due to vibrations.
2. March 28, 2015 – ‘B’ MCR chiller tripped due to a failure of the motor starter because retaining rings dislodged preventing contacts from working. Vibration induced failure was not ruled out by PSEG because no causal evaluation was ever completed and FFCDE 70175460 determined this was a MPFF.

3. February 15, 2013 – 2 separate NCVs -
- 'A' MCR chiller tripped (September 2012) due to improper tuning parameters as a result of failing to follow PSEG maintenance procedures.
 - 'A' MCR chiller trips (July 2011; June and July 2012) occurred due to a design deficiency and that PSEG took untimely CAs to resolve the design flaw.

As a result of this review, the inspectors determined that an adverse trend in MCR chiller equipment and performance issues reflecting a larger deficiency in PSEG operations, maintenance practices or equipment condition did not exist, however, the inspectors did determine that inadequate CAs (e.g., thread-locking agent not applied to set screws) associated with repeated MCR chiller guide vane linkage existed. This performance deficiency was determined to be minor in accordance with IMC 0612, Appendix B as the periods of inoperability were considerably less than the TS allowed outage time.

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

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 50.72 and 50.73. The inspectors reviewed PSEG's follow-up actions related to the events to assure that PSEG implemented appropriate CAs commensurate with their safety significance.

- Emergent downpower and removal of main turbine from service to repair a turbine control valve drain line steam leak on June 5

b. Findings

No findings were identified.

4OA5 Other Activities

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

During the week of May 23, 2016, the inspectors performed an onsite review of PSEG's records related to CAs taken in response to a SL IV NCV issued to Hope Creek (05000354/2015003-01, Inaccurate Information Provided to the NRC in License Amendment Request for Service Water Bay Watertight Doors). On October 23, 2015, the NRC issued a SL IV NCV of 10 CFR 50.9(a), "Completeness, and Accuracy of

Information,” for PSEG not providing accurate and complete information in a license amendment request regarding TS 3.7.3 “Flood Protection,” as described in NRC Inspection Report 05000354/2015003 (Agencywide Documents Access and Management System Accession Number ML15296A449). The objectives of the inspection were to determine that adequate CAs have been implemented for the SL IV NCV. The inspectors also interviewed staff personnel who participated in the CAP evaluation of the violation. The inspection criteria used during the inspection included the inspection guidance contained in Inspection Procedure 92702.

b. Findings and Observations

No findings were identified.

The inspectors concluded that PSEG staff completed a timely and adequate evaluation to identify the causes of the traditional enforcement violation. PSEG’s CAs include reinstatement of the Unit 2 watertight doors in the Technical Requirements Manual flood protection requirements. PSEG procedure LS-AA-117, “Written Communications,” requires that all license amendment requests and documents submitted to the NRC under oath and affirmation shall receive a Technical Verification Team review. The Technical Verification Team review consists of a page-by-page review of the subject document that identifies and validates all statements of fact, assumptions, data inputs, and calculations, which could alter the conclusions, reached in the document. Additionally, PSEG procedure LS-AA-125, “Corrective Action Program,” only allows closing a CA to the Work Management System and no other station tracking systems. Specifically, CAs tracking license amendment request actions are maintained in the CAP and cannot be closed out to the license amendment request tracking database.

The inspectors determined that PSEG adequately assessed the extent-of-condition of the violation. The inspectors concluded that PSEG’s actions were timely, appropriate, and sufficient to address the identified deficiency.

40A6 Meetings, Including Exit

On July 7, 2016, the inspectors presented the inspection results to Mr. F. Kenneth Grover, Plant Manager of Hope Creek, and other members of the Hope Creek 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.

40A7 Licensee-Identified Violations

The following SL IV violation was identified by PSEG and is a violation of NRC requirements which meet the criteria of the NRC Enforcement Policy for being dispositioned as a NCV:

- According to 10 CFR 50.74, each licensee shall notify the NRC within 30 days of a change in an operator’s or senior operator’s status including termination of any operator or senior operator. Contrary to this requirement, in NOTF 20727574, PSEG identified that Hope Creek staff did not notify the NRC of the resignation of a licensed reactor operator. The licensed reactor operator resigned on November 12, 2015, but PSEG did not notify the NRC of the change in status until May 9, 2016. This issue

meets the criteria for a SL IV violation because the May 9, 2016, notification did not result in increased inspection activities or cause the NRC to reconsider a regulatory position.

ATTACHMENT: SUPPLEMENTARY INFORMATION

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

P. Davison, Site Vice President
 K. Grover, Plant Manager
 C. Aung, Secondary Chemist
 M. Biggs, Maintenance Rule Program Coordinator
 P. Buzzard, PSEG LTS Lab
 R. Cary, Environmental Coordinator
 E. Casulli, Hope Creek Operations Director
 T. Cachaza, Salem Regulatory Assurance
 L. Clark, Instrument Supervisor
 M. Connolly, Instrument and Controls Technician
 B. Daly, Manager, Integrated Tritium Management
 D. Denelsbeck, RP Support Supervisor
 P. Duke, Licensing Manager
 M. Eisenmann, PSEG Laboratory and Testing Service (LTS) Lab
 F. Grenier, RP Supervisor, Dosimetry
 M. Hassler, Salem Radiation Protection Manager
 A. Kraus, Manager, Nuclear Environmental Affairs
 T. MacEwen, Hope Creek Regulatory Assurance
 S. Markos, Salem Engineering Manager
 A. Ochoa, Hope Creek Regulatory Assurance
 J. Palombo, Lead Assessor, Salem
 M. Phillips, Regulatory Compliance Assurance
 R. Rattigan, Online Work Manager
 K. Swing, System Engineer
 J. Vidreiro, PSEG LTS Lab
 D. Yilgic, Lead Engineer Quality Control Chemistry
 G. Zeiger, Hope Creek Chemistry Supervisor

Others

G. Palmer, Senior Scientist, Arcadis
 M. Millinor, Chemstaff, Consultant
 D. Wahl, Chemstaff, Consultant
 J. Vouglitois, Nuclear Engineer, NJ Department of Environmental Protection,
 Bureau of Nuclear Engineering

LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATEDOpened/Closed

05000354/2016002-01	NCV	Inadequate Maintenance Rule Monitoring of Multiple Systems, including the Effluent Radiation Monitoring System and the Reactor Core Isolation Cooling System (Section 1R12)
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05000354/2016002-02 NCV Failure to Scope the Filtration, Recirculation, and Ventilation System Effluent Radiation Monitor in the Maintenance Rule (Section 1R12)

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures

HC.OP-AB.BOP-0004, Grid Disturbances, Revision 24
 HC.OP-AB.ZZ-0136, Loss of 24 VAC Inverter, Revision 24
 HC.OP-GP.ZZ-0003, Station Preparations for Winter Conditions, Revision 29
 WC-AA-107, Seasonal Readiness, Revision 14

Notifications

20687266	20688334	20698801	20704305	20704321	20705653
20707095	20710769	20711096	20726251	20726484	20726913
20726921	20732364	20732769	20732819	20733018	

Maintenance Orders/Work Orders

30233455	30236406	60092591	60097601	60104126	60112815
60112948	60114177	60115861	60125943	70180609	70186419
80107747	80110867				

Other Documents

2016 Hope Creek Summer Readiness Affirmation Certification Letter, dated May 1, 2016
 Hope Creek Maintenance Plan 172818, 24 Month PM for Panel 1B-C-157
 Hope Creek Operations Narrative Logs dated April 26, 2016

Section 1R04: Equipment Alignment

Procedures

HC.OP-AR.ZZ-0015, Overhear Annunciator Window Box E1, Revision 28
 HC.OP-AR.ZZ-0029, CRIDS Computer Points Book 10 D5555 Thru TMSAITIN_BAD, Revision 23
 HC.OP-SO.JE-0001, Diesel Fuel Oil Storage and Transfer System Operation, Revision 16
 HC.OP-SO.NA-0001, 7.2 kV System Operation, Revision 11
 HC.OP-SO.MH-0001, 500 kV System Operation, Revision 27
 HC.OP-SO.PB-0001, 4.16 kV System Operation, Revision 29
 HC.OP-ST.ZZ-0001, Power Distribution Lineup – Weekly, Revision 36
 OP-HC-108-115-1001, Operability Assessment and Equipment Control Program, Revision 32
 HC.MD-PM.BF-0005, Hydraulic Control Unit Scram & Directional Valve P.M., Revision 9

Notifications (*NRC-identified)

20454533	20693664	20699390	20701204	20701338	20702310
20705472	20707898	20711225	20711701	20723954	20724134
20724621	20725067	20726844	20728823	20728849	20728850
20728851	20728852	20728864	20728872	20728879	20728938
20729052	20729545	20729548	20729634	20730148	20730518

20730559 20730675 20730676 20731153 20731154 20731155
20731703*

Maintenance Orders/Work Orders

60128829
70108191

Drawings

E-0002-1, Sheet 1, Single Line Meter & Relay Diagram Power System, Revision 13
E-0002-1, Sheet 2, Single Line Meter & Relay Diagram Power System, Revision 10
M-10-1, Sheet 1, Service Water, Revision 55
M-10-1, Sheet 2, Service Water, Revision 44
J-4046-0, Control Rod Drive Hydraulic System Control Rod Drive Water Flow, Sheet 1,
Revision 7
J-46-0, Logic Diagram Control Rod Drive Hydraulic Index Sheet, Sheet 1, Revision 8
M-47-1, Control Rod Drive Hydraulic – Part B, Sheet 1, Revision 28

Miscellaneous

SC-JE-0051-1, Diesel Fuel Oil Storage Tank A Level, Revision 3j
GE SIL No. 678, Susceptibility of Original Directional Control Valve Cap Screw N170P23012C6
to Stress Corrosion Cracking, November 2015
OpE Note, Susceptibility of Some BWR Directional Control Valve Cap Screws to Stress
Corrosion Cracking, April 2016

Section 1R05: Fire Protection

Procedures

CC-AA-201, Plant Barrier Control Program, Revision 5
HC.IC-CC.BB-0003, Nuclear Boiler – Division 2 Channel B21-N691B Reactor Vessel Level
Trips 1, 2, 8 (CS, RHR, ADS, RCIC), Revision 20
HC.IC-CC.BB-0035, Nuclear Boiler – Division 1 Channel B21-N678A High Reactor Pressure,
Revision 19
HC.OP-SO.JE-0001, Diesel Fuel Oil Storage and Transfer System Operation, Revision 32
HC.OP-SO.NQ-0002, Operation of Non-vital Uninterruptible Power Supplies, Revision 10
HC.OP-ST.SH-0001, Accident Monitoring Instrumentation Channel Check – Monthly,
Revision 35
FRH-II-421, CRW Pumps Area and MCC Area, Elev. 77', Revision 3
FRH-II-434, MCC Area, Elev. 102', Revision 3
FRH-II-442, Inert Gases Compressor Rooms, FRVS Re-circulating Unit Area, Steam Vent &
Equipment Area, Elev. 132', Revision 4
FRH-II-541, Hope Creek Pre-Fire Plan – Class 1E Switchgear Rooms Elev. 130'-0", Revision 7
FRH-III-151, Hope Creek Pre-Fire Plan – Turbine Building Elev. 137'-0", Revision 4

Notifications

20664120 20687266 20688334 20698801 20704305 20704321
20705653 20707095 20710769 20711096 20720733 20723332
20723954 20724331 20725228 20726251 20726484 20726913
20726921

Maintenance Orders/Work Orders

30233455 50184940 60097601 60125943 60128726 70104823
70180609 70185414 70185491 70186419 80106378

Drawings

M-42-1, Sheet 1, Nuclear Boiler Vessel Instrumentation, Revision 38

Miscellaneous

10855-J-825(Q), Technical Specification for Control Systems Instrument Installation Procedures for the HCGS, Revision 8

H-1-ZZ-FEE-1803, Separation Barrier Control Aid for Hope Creek, Revision 0

Hope Creek Maintenance Plan 172818, 24 Month PM for Panel 1B-C-157

Hope Creek Operations Narrative Logs dated April 26, 2016

VTD 431856, Hope Creek Safe Shutdown Analysis, Revision 1

Section 1R06: Flood Protection Measures

Procedures

ER-AA-3003, Cable Condition Monitoring and Aging Management Program, Revision 2

HC.OP-AR.ZZ-0015, Overhead Annunciator Window Box E1, Revision 28

Notifications

20727926 20728872 20728938 20729940

Maintenance Orders/Work Orders

30178969 30227729 30228289 70115795 70187258

Drawings

DWG 248405-1760, HCGS Power and Control Duct Plan, Revision 12

Miscellaneous

DEH 120117, TE 80106344-0230, Repair Plan for AX501 13KV Flex Conduits

TCCP 4HT-16-005, Disconnect and Install Cable End Cap for H1NA-1A-X-502

Section 1R11: Licensed Operator Regualification Program

Procedures

HC.OP-SO.AE-0001, Feedwater System Operation, Revision 72

HC.OP-SO.BB-0002, Reactor Recirculation System Operation, Revision 102

HC.OP-SO.DA-0001, Circulating Water System Operation, Revision 62

HC.OP-SO.SF-0001, Reactor Manual Control System Operation, Revision 32

HC.RE-FM.ZZ-0001, Guidelines for Control Rod Movement, Revision 23

OP-AB-300-1001, Implementation Requirements, Revision 6

OP-AB-300-1003, BWR Reactivity Maneuver Guidance, Revision 12

HC.OP-EO.ZZ-0101, Reactor Pressure Vessel Control, Revision 13

HC.OP-EO.ZZ-103/4-FC, Secondary Containment Control, Revision 10

HC.OP-EO.ZZ-0202, Emergency Depressurization, Revision 9

HC.OP-AB.IC-0003, Reactor Protection System, Revision 4

HC.OP-IO.ZZ-0006, Power Changes During Operation, Revision 58

Notifications

20730585 20730594 20731818 20731831

Miscellaneous

SG-752 on May 10, 2016, involving a CW PP Trip, HPCI Steam Leak, LOP w/ an EDG Failure, LOCA

Section 1R12: Maintenance EffectivenessProcedures

EP-HC-111-103, Section R – Abnormal Rad Levels/Rad Effluent, Revision 0
 EP-HC-111-130, Hope Creek Event Classification Guide Wall Chart (All Modes), Revision 1
 ER-AA-310-1001, Maintenance Rule – Scoping, Revision 6
 ER-AA-310-1001-F1, Maintenance Rule Scoping Change Request Form, Revision 0
 ER-AA-310-1005, Maintenance Rule – Dispositioning Between (a)(1) and (a)(2), Revision 10
 ER-AA-310-1005-F1, (a)(1) Evaluation Form, Revision 2
 ER-HC-310-1009, Hope Creek Generating Station Maintenance Rule Scoping, Revision 11
 HC.OP-EO.ZZ-103/4-CONV, Secondary Containment Control Conversion Document,
 Revision 7
 HC.OP-EO.ZZ-103/4-FC, Secondary Containment Control, Revision 10
 HC.EP-EP.ZZ-0301, Shift Radiation Protection Technician Response, Revision 8
 HC.IC-CC.SB-0009, RPS - Division 1 & 2 Channel C71-N006A & C71-N006E Turbine Main
 Stop Valve Position Switches, Revision 17
 HC.IC-DC.ZZ-0329, Turbine Steam Control Valves Limit Switch Adjustment, Revision 13
 HC.OP-FT.AC-0005, Turbine Overspeed Protection System Operability Test – Quarterly,
 Revision 13
 HC.OP-ST.AC-0002, Turbine Valve Testing – Quarterly, Revision 49
 HC.RP-ST.ZZ-0004, Gaseous Effluent Surveillance, Revision 42
 HC.RP-TI.SP-0002, Operation of the FRVS Skid, Revision 27
 HC.RP-TI.SP-0018, Sampling of the North Plant Vent Skid, Revision 9
 HC.RP-TI.SP-0022, Sampling of the South Plant Vent Skid, Revision 8
 LS-AA-115-1004, Manual for Processing OE4 Documents (Daily Summary OE, IER4, Other),
 Revision 0
 LS-HC-1000-1001, Hope Creek Generating Station Surveillance Frequency Control Program
 List of Surveillance Frequencies, Revision 7

Notifications (*NRC-identified)

20483887	20484142	20654858	20663066	20688841	20693100
20694030	20706724	20709560	20710917	20711743	20711929*
20712694	20714121*	20714332	20714727	20714903	20715188
20720951*	20722063	20722506	20726155	20726251	20726484
20726485	20726862	20726913	20726921	20727050	20727058

Maintenance Orders/Work Orders

30118712	50162571	50179731	60129065	70173238	70182115
70182741	70183288	70184154	70185149	70185274	70185988

Drawings

M-26-1, Sheet 2, Radiological Monitoring System, Revision 35
 PN1-C71-1020-0006, Sheet 10, Elementary Diagram Reactor Protection System, Revision 15
 PN1-C71-1020-0006, Sheet 13, Elementary Diagram Reactor Protection System, Revision 18
 PN1-C71-1020-0006, Sheet 20, Elementary Diagram Reactor Protection System, Revision 14
 PN1-C71-1020-0006, Sheet 8, Elementary Diagram Reactor Protection System, Revision 15

Miscellaneous

OP-HC-108-115-1001, Form 1, Technical Specification Action Statement Log, 15-356, Main
 Turbine Stop and Control Valves, dated, December 18, 2015

Section 1R13: Maintenance Risk Assessments and Emergent Work ControlProcedures

HC.IC-TR.AB-0003, Main Steam – Division 3, Channel A2 MSIV Closure Trip Response Time Test (B21-F022C, D; B21-F028C, D), Revision 11
 LS-HC-1000-1001, Hope Creek Generating Station Surveillance Frequency Control Program List of Surveillance Frequencies, Revision 7
 OP-AA-101-112-1002, On-Line Risk Assessment, Revision 9
 OP-AA-106-101-1006, Operational and Technical Decision Making Process, Revision 8
 OP-HC-108-115-1002, Technical Specification Matrix, Revision 13
 OP-AA-108-116, Protected Equipment Program, Revision 11
 OP-HC-108-115-1001, Operability Assessment and Equipment Control Program, Revision 32
 ER-AA-600-1012, Risk Management Documentation, Revision 11
 ER-AA-600-1045, Risk Assessments of Missed or Deficient Surveillance, Revision 1
 HC.IC-CC.FC-0013, RCIC Turbine Steam – Division 2 Channel F-4158, S-4280 RCIC Pump Turbine Control (RSP), Revision 14
 HC.IC-DC.ZZ-0026, Westinghouse Verittrak Controller Card Model 75CB, Revision 7
 HC.MD-ST.GK-0002, Control Room Envelope In-Leakage Test, Revision 1
 HC.OP-ST.SV-0002, Remote Shutdown Control Operability – 18 Months RSP Transfer with ‘A’ Shutdown Cooling in Service, Revision 23

Notifications

20069737	20724066	20724102	20724726	20724727	20724729
20724783	20724855	20725058	20725154	20728033	

Maintenance Orders/Work Orders

50129071	50169965	60128727	60128727	70185358	70185635
80107161					

Miscellaneous

HCGS PRA Risk Evaluation Form for April 3, 2016, through April 9, 2016, Revision 1
 HCGS PRA Risk Evaluation Form for May 22, 2016, through May 29, 2016, Revision 0
 Fire Risk Management Area Log, dated April 4, 2016
 OTDM 16-003, dated May 16, 2016
 PN0-C71-4010-0005, Reactor Protection System, Revision 11
 Protected Equipment Log – ADS, dated April 4, 2016
 Protected Equipment Log – RCIC, dated April 4, 2016
 HC-SURV-012, Risk Assessment of Missed Surveillance – RCIC transfer relay TR-B117 at Remote Shutdown Panel, Revision 0
 Hope Creek Narrative Logs dated April 4, 2016
 Hope Creek Narrative Logs dated June 13, 2016
 VTD PM711Q-346, Electrical Schematic 90 kw Electric Air Handling Heater, Revision 5

Section 1R15: Operability Determinations and Functionality AssessmentsProcedures

ER-HC-310-1009, Hope Creek Generating Station Maintenance Rule Scoping, Revision 12
 ER-HC-380-1005, Hope Creek Specific Appendix J Program Information, Revision 2
 HC.OP-GP.ZZ-0009, Bypassing Interlocks for Maintenance Activities, Revision 11
 HC.OP-SO.AE-0001, Feedwater System Operation, Revision 72
 OP-AA-106-101-1001, Event Response Guidelines, Revision 15
 OP-AA-108-101-1002, Component Configuration Control, Revision 8

OP-AA-108-112, Definition and Measurement of Mispositioned Plant Components, Revision 4
 OP-HC-108-115-1001, Operability Assessment and Equipment Control Program, Revision 32
 OP-AA-108-115, Operability Determinations & Functionality Assessments, Revision 4
 CA-AA-203, Environmental Qualification Program, Revision 8
 CC-AA-201, Plant Barrier Control Program, Revision 5
 EQ-HC-036, Hope Creek Generating Station Environmental Qualification Binder for Rotork,
 Electric Motor Actuator Model(s) 11NA1 and 14NA1, Revision 1
 EQH-M001-C25, GE Voltage Preamplifier, EQ Binder, Revision 0
 FRH-II-442, Inert Gases Compressor Rooms, FRVS Re-circulating Unit Area, Steam Vent &
 Equipment Area, Elev. 132', Revision 4
 H-1-ZZ-FEE-1803, Separation Barrier Control Aid for Hope Creek, Revision 0
 HC.IC-CC.BB-0003, Nuclear Boiler – Division 2 Channel B21-N691B Reactor Vessel Level
 Trips 1, 2, 8 (CS, RHR, ADS, RCIC), Revision 20
 HC.IC-CC-BB-0035, Nuclear Boiler – Division 1 Channel B21-N678A High Reactor Pressure,
 Revision 19
 HC.IC-DC.ZZ-0026, Westinghouse Veritrak Controller Card Model 75CB, Revision 7
 HC.MD-ST.GK-0002, Control Room Envelope In-Leakage Test, Revision 1
 HC.OP-ST.BC-0009, Residual Heat Removal System RHR Heat Exchanger Flow Measurement
 – 18 Month, Revision 15
 HC.OP-ST.SH-0001, Accident Monitoring Instrumentation Channel Check – Monthly,
 Revision 35

Notifications (*NRC-identified)

20720733	20722147	20723402	20723723	20723902	20724066
20724331	20724331	20724726	20724727	20724727	20725154
20727648	20728881	20732149*			

Maintenance Orders/Work Orders

50129071	60066699	60114442	60128727	70104823	70169620
70176631	70185270	70185270	70185358	70185414	70185414
70185549	70185635	70186579	70186744		

Drawings

M-42-1, Nuclear Boiler Vessel Instrumentation, Sht. 1, Revision 38

Miscellaneous

10855-J-825(Q), Technical Specification for Control Systems Instrument Installation Procedures
 for the HCGS, Revision 8
 VTD 431856, Hope Creek Safe Shutdown Analysis, Revision 1
 VTD PM711Q-346, Electrical Schematic 90 kw Electric Air Handling Heater, Revision 5

Section 1R18: Plant Modifications

Procedures

ER-AA-310-1002, Maintenance Rule – SSC Risk Significance Determination, Revision 7
 ER-AA-310-1002-F1, Establishing Safety Significance of Maintenance Rule SSCs Form,
 Revision 0
 HC.OP-AB.HVAC-0001, HVAC, Revision 11
 HC.OP-SO.GQ-0001, Service Water Intake Structure Ventilation System Operation, Revision 10
 OP-HC-108-115-1001, Operability Assessment and Equipment Control Program, Revision 32
 LS-AA-120, Issue Identification and Screening Process, Revision 13
 LS-AA-125, Corrective Action Program, Revision 21

Notifications

20642218	20680269	20705417	20719494	20721587	20721588
20723434	20729848				

Maintenance Orders/Work Orders

60124645	60128408	60129549	70143662	70181220	80108126
80116531	80117499				

Drawings

M-95-0, Miscellaneous Structures and Yard Buildings Control Diagram, Revision 19

Miscellaneous

HC-MISC-008, Risk Assessment in Support of Maintenance Rule Risk Significance Determination for Service Water Intake Structure Ventilation, Revision 0
 F452/0943, Final Stress Assessment of Hope Creek Unit 1 Steam Dryer at 115% CLTP Conditions, October 2008, Report No. 08-21P, Revision 1
 F754/0006, Interim Report on Hope Creek's Steam Dryer Stresses at EPU Conditions
 F754/0015, Stress Re-Analysis of Hope Creek Dryer for EPU Conditions
 Report No. 15-06P, Stress Re-Evaluation of Hope Creek Unit 1 Steam Dryer at 115% CLTP, Revision 0

Section 1R19: Post-Maintenance Testing

Procedures

HC.OP-IS.BJ-0101, High Pressure Coolant Injection System Valves – Inservice Test, Revision 66
 HC.OP-IS.JE-0006, F Diesel Fuel Oil Transfer Pump – FP401 – Inservice Test, Revision 32
 ER-AA-310-1004, Maintenance Rule - Performance Monitoring, Revision 14
 ER-HC-310-1009, Hope Creek Generating Station – Maintenance Rule Scoping, Revision 12
 HC.IC-TR.SM-0003, NSSSS System A Logic A B21-N681A (B21-N684A) Main Steam Line Isolation Reactor Vessel Low Level, Revision 13
 HC.MD-PM.PJ-0001, 120 VDC Starter Preventive Maintenance, Revision 8
 HC.OP-IS.BC-0101, Residual Heat Removal Subsystem A Valves – In-service Test, Revision 35
 HC.OP-IS.BD-0101, Reactor Core Isolation Cooling System Valves – In-service Test, Revision 62
 HC.OP-LR.FC-1004, Containment Isolation Valve Water Leak Rate Test CIVS 1FCHV-F060 and 1FCV-010 Penetration P210: RCIC Barometric Condenser Vacuum Pump Discharge, Revision 2
 HC.OP-ST.KJ-0003, Emergency Diesel Generator 1CG400 Operability Test – Monthly, Revision 76

Notifications

20685392	20695867	20695867	20695961	20701963	20720252
20720252	20724112	20724112	20724133	20728992	20729011
20729015	20729016	20729084	20729097	20729113	20730390
20730561	20731040	20731140	20731141	20731170	20731171
20731243	20731244	20731245	20731246	20731247	20731248
20731521	20731689	20731706	20731725	20731762	20731785
20731808	20731826	20732210	20732211	20732263	

Maintenance Orders/Work Orders

30195006	30195327	30195327	30245522	50170449	50170449
50179634	50182080	50183600	50184278	60124524	60125556
60128834	60129628	70170768	70176639	70178126	70179969
70185164	70185579	70187156	70187261	80056818	

Drawings

E-0011-1, Sheet 1, Single Line Meter & Relay Diagram 250V DC System – Unit 1, Revision 20
 E-6075-0, Sheet 3, Electrical Schematic Diagram High Pressure Coolant Injection Pump Discharge Valve F006, Revision 6
 M-55-1, Sheet 1, High Pressure Coolant Injection, Revision 40
 E-6084-0, Sheet 2, Electrical Schematic Diagram Reactor Core Isolation Cooling System Vacuum Pump Discharge Valve, Revision 4

Miscellaneous

OP-HC-108-115-1001, Form 1, Technical Specification Action Statement Log, 16-114, H1JE-1F-P-401 Pump – C Diesel F.O. Transfer, dated June 2, 2016

Section 1R22: Surveillance TestingProcedures

HC.OP-IS.BC-0004, DP202, D Residual Heat Removal Pump In-service Test, Revision 42
 HC.OP-IS.BJ-0001, HPCI Main and Booster Pump Set – 0p204 and 0p217 – In-service Test, Revision 64
 HC.OP-SO.BJ-0001, High Pressure Coolant Injection System Operation, Revision 48
 HC.OP-ST.GU-0002, Reactor Building Integrity Functional Test, Revision 15
 HC.OP-ST.KJ-0003, Emergency Diesel Generator 1CG400 Operability Test – Monthly, Revision 76
 HC.OP-ST.KJ-0003, Emergency Diesel Generator 1CG400 Operability Test – Monthly, Revision 76
 HC.OP-ST.ZZ-0003, Reactor Building/Secondary Containment Integrity Verification Monthly, Revision 16
 HC.OP-ST.ZZ-0003, Reactor Building/Secondary Containment Integrity Verification Monthly, Revision 16
 MA-AA-716-004, Revision 13
 HC.MD-CM.FD-0001, High Pressure Coolant Injection (HPCI) Steam Turbine Inspection and P.M., Revision 27
 ER-HC-310-1009, Hope Creek Generating Station – Maintenance Rule Scoping, Revision 12
 FP-HC-004, Actions for Inoperable Fire Protection – Hope Creek, Revision 4

Notifications

20703859	20721257	20723641	20724102	20724128	20724254
20724783	20724798	20724855	20724885	20725058	

Maintenance Orders/Work Orders

30139332	30244844	30295271	50169972	50182888	50183677
70028464	70055561	70062699	70183330	70185851	

Miscellaneous

CALC 11-0066, HCGS FRVS Drawdown and Long-term Post LOCA Reactor Building Temperature EPU, Revision 10

H-1-ZZ-MDC-1880, Post-LOCA EAB, LPZ, and CR Dose, Revision 0
Hope Creek Narrative Logs dated April 6, 2015, through April 6, 2015

Section 2RS7: Radiological Environmental Monitoring Program (REMP)

Procedures

AD-LTS-10, Laboratory and Testing Service (LTS) Quality Assurance Program, Revision 4
CY-AA-170-400, Radiological Ground water protection program, Revision 4
EN-AA-170-500, Meteorological Monitoring System Calibration and Maintenance (Metrological Tower), Revision 1
EN-AA-170-1000, Radiological Environmental Monitoring Program (REMP) and Meteorological Program (MET) Implementation, Revision 1
EN-AA-1001, REMP Vendor Dosimetry and Laboratory QA Program
EN-AA-170-4000, Radiological Groundwater Protection Program Implementation, Revision 0
EN-AA-170-4160, Station RGPP Controlled sample Points, Revision 0
EN-AA-170-4200, Disposal of Water from Excavation projects, Revision 0
EN-AA0170-4300, Investigative Process for Evaluation of Anomalous Tritium Data from On-site Wells, Revision 1
Instruction 1.1.9, Collection of Potable Water Samples, Revision 3
Instruction AQUACOLL-1.1.10, Collection of Aquatic samples, Revision 11
Instruction GMSA -1.1.11, Collection of Game samples, Revision 3
Instruction ESFCH -1.1.6, Pickup of Fish and Crab Samples, Revision 7
Instruction ESS-1.1.5, Collection of Sediment Samples, Revision 9
Instruction H2OSA-1.1.1, Collection of Water Samples, Revision 13
Instruction NASSV-1.2.2NS, Service of Low Volume Sampler, Revision 19
Instruction MLKCEN 0.3.1, Salem/Hope Creek Census of Milk Animals, Revision 6
Instruction MLKSA-1.1.2, Collection of Raw Milk samples, Revision 12
Instruction NRESCEN, Salem/Hope Creek Nearest Resident Census, Revision 5
Instruction SOLSA -1.1.3, Collection of Soil Samples, Revision 8
Instruction TLDSV-1.2.1, Installation of Area Monitoring Dosimeters in the Field, Revision 16
Instruction VEGECEN-0.3.2, Salem/Hope Creek Vegetable Garden Census, Revision 6
Instruction VG TSA-1.1.7, Collection of Vegetable, Vegetation and Fodder Crops, Revision 8
RP-AA-228, 10 CFR 50.75(g) and 10 CFR 50.72.30(d) Documentation, Revision 3

Miscellaneous

2016 Self-Assessment REMP Program Inspection
Calibration Data (Dry Gas Meters 61182898, 14522708, 2424590)
Calibration Data (Laminar Flow Element 16300942)
Chemistry, Radwaste, Effluent and Environmental Monitoring Audit Report, NOSA-SLM-16-04, May 11, 2016
Comparison of 2015 Atmospheric Dispersion Factors for Salem and Hope Creek, dated March 28, 2016
Corrective Action Documents (various Notifications)
GEL 2015 - Annual Quality Assurance Report (REMP)
Global Solutions Annual Testing, dated May 26, 2015
Ground Water Monitoring Data and RGPP Data
Hope Creek Nuclear Station Buried and Underground Piping Asset Management Plan, Revision 0
Milk Animal Survey dated December 2015
NEI-07-07, Structure, System, Component (SCC) Review for Turbine Roof Structure (Hope Creek)
Passive Environmental Dosimetry Calibration data

Residential Survey, dated December 22, 2015
 Salem and Hope Creek 2015 Annual Effluent Releases Reports
 Salem and Hope Creek Annual Radiological Environmental Monitoring Reports
 Salem/Hope Creek Part 61 Analysis Review, dated April 27, 2016
 Salem/Hope Creek Meteorological Program Status Report (2014, 2015)
 Salem/Hope Creek Metrological Tower Updated Vegetation Review, June 3, 2016
 Salem and Hope Creek Offsite Dose Calculation Manuals (ODCM)
 Salem Remedial Action Plan Progress Reports
 Teledyne Brown Environmental Service Annual Quality Assurance Report
 UFSAR Section 11.6, Offsite Radiological Monitoring Program
 Vegetable garden Survey dated August 2015

Section 40A1: Performance Indicator Verification

Procedures

LS-AA-2090, Monthly Data Elements for NRC Reactor Coolant System Activity, Revision 5
 LS-AA-2100, Monthly Data Elements for NRC Reactor Coolant System Leakage, Revision 6

Miscellaneous

Daily Dose Equivalent Iodine-131 Sample Data, April, 2015 – March, 2016
 Monthly Data Elements for NRC Reactor Coolant System Leakage Data Sheets, April, 2015 – March, 2016

Section 40A2: Problem Identification and Resolution

Procedures

ER-AA-520, Instrument Performance Trending, Revision 4
 HC.OP-SO.GJ-0001, A(B)K400 Control Area Chilled Water System Operation, Revision 60

Notifications

20642223	20672877	20686439	20686671	20713719	20713899
20714809	20715670	20730226	20732519		

Maintenance Orders/Work Orders

30204065	30233784	30285898	60127440	70129670	70150995
70162284	70175460	70179133	70183243	70183277	70186707
80102531	80102531	80112270			

Miscellaneous

Fairbanks Morse Engine Instrumentation Lab Test Report, Test# 1091 dated January 8, 2016
 HC.IC-DC.ZZ-0358, Dynalco Controls Universal Speed Switch & Speed Transmitter SST-2000 Series, Revision 0
 Hope Creek Engineering Spreadsheet of EDG Speed Switch Calibration Records dated June 28, 2016
 PM018Q-0646, SST-2000 Series Universal Speed Switch & Speed Transmitter Operator's Guide, Revision 2
 PSE-58463, Failure Analysis of Speed Switch Voltage Regulator Base dated June 6, 2016

Section 40A3: Follow-up of Events and Notices of Enforcement Discretion

Notifications

20728849	20728851	20728879	20729848	20730048	20730049
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20730596 20730597 20730604 20730727 20730939 20731235
20732028 20732066 20732129 20732131 20732132 20732171
20732858

Maintenance Orders/Work Orders
60124645

Section 40A5: Other Activities

Procedures

HC.OP-AB.MISC-0001, Acts of Nature, Revision 29
LS-AA-117, Written Communications, Revision 10
LS-AA-117-1002, Typical Licensing and Regulatory Affairs Correspondence
Concurrence Form, Revision 5
LS-AA-125, Corrective Action Program, Revision 18

Notifications (*NRC-identified)

20697920* 20707921

Maintenance Orders/Work Orders

70179040 70181427

Licensing and Design Basis Documents

HC TRM TR 3/4 7.3 Flood Protection, Revision 11
NRC Safety Evaluation Related to Amendment No. 196 to Hope Creek Generating Station,
Docket No. 50-354 (ML14108A399), Dated 12/18/14

LIST OF ACRONYMS

10 CFR	Title 10 of <i>The Code of Federal Regulations</i>
AC	alternating current
CA	corrective action
CAP	corrective action program
EDG	emergency diesel generator
EOP	emergency operating procedure
FFCDE	functional failure causal determination evaluation
FRVS	filtration, ventilation, and recirculation system
GPI	groundwater protection initiative
HCGS	Hope Creek Generating Station
HPCI	high pressure coolant injection
HVAC	heating, ventilation, and air conditioning
IMC	Inspection Manual Chapter
kV	kilovolt
MCR	main control room
MPFF	maintenance preventable functional failure
MR	maintenance rule
MRFF	maintenance rule functional failure
MRP	maintenance rule program
NCV	non-cited violation
NOTF	notification
NPV	north plant ventilation
NRC	Nuclear Regulatory Commission
ODCM	Offsite Dose Calculation Manual
PI	performance indicator
PSEG	Public Service Enterprise Group Nuclear, LLC
RCIC	reactor core isolation cooling
RCS	reactor coolant system
REMP	radiological environmental monitoring program
RHR	residual heat removal
RMS	radiation monitoring system
RRP	reactor recirculation pump
RTP	rated thermal power
SACS	safety auxiliaries cooling system
SL	severity level
SPV	south plant ventilation
SSC	structure, system, and component
TS	technical specifications
UFSAR	Updated Final Safety Analysis Report
WGE	work group evaluation
WO	work order