

Hope Creek 1 3Q/2016 Plant Inspection Findings

Initiating Events

Significance: G Sep 30, 2016

Identified By: Self-Revealing

Item Type: NCV Non-Cited Violation

Inadequate Procedure Adherence Resulted In a Loss of Shutdown Cooling

A self-revealing non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” occurred when PSEG did not follow procedure during the transition from Cold Shutdown to refueling operations while filling up the reactor pressure vessel (RPV) to support RPV head cooling in preparation for reactor disassembly. This resulted in an automatic isolation of the operating residual heat removal (RHR) pump while it was providing decay heat removal in shutdown cooling. PSEG has entered this issue into their corrective action program (CAP) in notification (NOTF) 20684861, and corrective actions included performing a root cause evaluation for the event, revising the operating procedures to provide clarity, and conducting training with all operators on the lessons learned from the event.

This issue was evaluated in accordance with IMC 0612, Appendix B, and determined to be more than minor since it was associated with the human performance attribute of the Initiating Events cornerstone and adversely affected its objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown, as well as power operations. The finding was evaluated using IMC 0609, Appendix G, “Shutdown Operations Significance Determination Process (SDP),” and per Attachment 1, Exhibit 2, required a Phase 2 risk evaluation which determined the safety significance of this performance deficiency to be in the mid E-8 range, or of very low safety significance (Green).

The inspectors determined this finding has a cross-cutting aspect in the area of Human Performance, Conservative Bias, in that the operator did not use decision-making practices that emphasized prudent choices over those that are simply allowable, and the operator’s proposed action was not determined to be safe prior to proceeding with the action. Specifically, the operator did not ensure his actions were safe prior to aligning and operating the feedwater system to fill the RPV during plant cooldown using an uncommon method.

Inspection Report# : [2016003](#) (*pdf*)

Mitigating Systems

Significance: W Sep 30, 2016

Identified By: Self-Revealing

Item Type: AV Apparent Violation

Inadequate Implementation of Adverse Condition Monitoring Actions for the High Pressure Coolant Injection System

A self-revealing preliminary White finding and apparent violation (AV) of Title 10 of the Code of Federal Regulations (CFR), Part 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” and Technical Specification (TS) 3.5.1.c, “Emergency Core Cooling Systems - High Pressure Coolant Injection (HPCI),” was

identified because PSEG did not detect and act upon an adverse trend of water intrusion into the HPCI oil system. Specifically, PSEG did not adequately implement procedure OP-AA-108-111, “Adverse Condition Monitoring (ACM) and Contingency Planning,” and the ACM HC 15-008 action to perform monthly HPCI turbine oil analysis for water contamination with known steam leakage by the Steam Admission Valve (FD-F001). Because these monthly oil samples were collected but were not analyzed for water content, PSEG did not identify significant moisture contamination in the HPCI oil system and thus take the necessary response actions. As a result, on August 6, 2016, the HPCI governor control valve (FV 4879) failed to stroke open as required due to moisture-induced corrosion that degraded its hydraulic actuator (EG-R). Consequently, PSEG violated TS 3.5.1.c because, based on failure of the FV-4879 and the EG-R to actuate on August 6, 2016, the NRC determined that the HPCI system was inoperable for a period greater than its technical specification (TS) allowed outage time of 14 days. PSEG’s immediate corrective actions included entering the issue into their Corrective Action Program (CAP) (NOTFs 20737383, 20738402 and 20738403); repairing the HPCI turbine insulation; replacing the HPCI EG-R; flushing the HPCI turbine oil system; and replenishing the system with new oil.

This finding is more than minor because it adversely affected the equipment performance attribute of the Mitigating Systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, a loss of safety function occurred when elevated water concentration in the HPCI oil system corroded the EG-R, preventing the FV 4879 valve from opening and the HPCI system from starting/running. This resulted in HPCI system inoperability for greater than the 14 days allowed by TS. In accordance with IMC 0609.04, “Initial Characterization of Findings,” and Exhibit 2 of IMC 0609, Appendix A, “The Significance Determination Process for Findings At-Power,” the inspectors screened the finding for safety significance and determined that a detailed risk evaluation (DRE) was required based on the HPCI system being inoperable for greater than the TS allowed outage time of 14 days. The DRE was performed by a Region I senior reactor analyst (SRA) and concluded that the condition resulted in an increase in core damage frequency (CDF) of low E-6/yr., or of low-to-moderate safety significance (White). The SRA determined the increase in Large Early Release Frequency (LERF) was low E-7/yr., consistent with the significance determined for the internal and external event CDF.

This finding had a cross-cutting aspect in the area of Human Performance, Conservative Bias, because PSEG did not use decision-making practices that emphasize prudent choices over those that are simply allowable. In addition, PSEG did not take timely action to address degraded conditions commensurate with their safety significance.

Inspection Report# : [2016003](#) (*pdf*)

Significance:  Sep 30, 2016

Identified By: Self-Revealing

Item Type: NCV Non-Cited Violation

Inadequate Corrective Actions for Main Control Room Chiller Positioner Failure

A self-revealing non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion XVI, “Corrective Action,” was identified for PSEG’s inadequate corrective actions to address a condition adverse to quality (CAQ). Specifically, PSEG’s corrective actions to address a December 2013 failure of the ‘A’ main control room (MCR) chiller pressure control valve (PCV) positioner were inadequate and did not ensure that the component was appropriately managed in their shelf life program. As a result, PSEG restored the ‘A’ MCR chiller with a PCV positioner that exceeded its specified shelf life by 10 years, and ultimately failed due to its age. PSEG’s corrective actions included conducting an extensive extent of condition (EOC) of similar positioners installed at the site (both Salem and Hope Creek), reviewing the shelf life program, and documenting an operability evaluation (70189201) for the currently installed positioners until they can be replaced.

This finding is more than minor because it was associated with the equipment performance attribute of the mitigating systems cornerstone, and adversely affected the cornerstone objective to ensure the availability, reliability, and

capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The degraded positioners being installed in both MCR chillers affected the reliability and availability of the 'A' and 'B' MCR chillers, which provide cooling for the MCR, emergency switchgear rooms, and the safety auxiliaries cooling system pump rooms. Using Exhibit 2 of IMC 0609, Appendix A, the inspectors determined that this finding is of very low safety significance (Green) because, although the performance deficiency (PD) affected the design/qualification of the 'A' MCR chiller operability, it did not result in an actual loss of safety system function because the 'B' chiller was still available, and it did not represent a loss of function of one or more than one train for more than its TS allowed outage time or greater than 24 hrs. The 'B' MCR chiller remained available and the 'A' MCR chiller was restored to an operable status within 6 hours of failing.

This finding had a cross-cutting aspect in the area of Human Performance, Procedure Adherence, because PSEG did not follow the process and procedure that ensures the shelf life program for safety-related components is properly maintained. Specifically, PSEG did not ensure that the shelf life of the MCR chiller PCV positioners were adequately managed in the shelf life program by verifying the correct shelf life of 14 years was correctly assigned.

Inspection Report# : [2016003](#) (*pdf*)

Significance:  Apr 01, 2016

Identified By: NRC

Item Type: NCV Non-Cited Violation

Inadequate Testing of Emergency Diesel Generator Takeover Switches and Remote shutdown Panel transfer/Isolation Relays

The team identified a finding of very low safety significance, involving a non-cited violation of Hope Creek Operating License Condition 2.C.(7) for failure to implement and maintain in effect all provisions of the approved Fire Protection Program (FPP). Specifically, PSEG did not adequately test the Emergency Diesel Generator (EDG) emergency takeover switches and Remote Shutdown Panel (RSP) transfer/isolation relays to assure they were capable of performing their intended function, as described in the FPP. PSEG subsequently performed additional testing and a detailed operability evaluation, which concluded that the effected equipment would function as intended.

This finding was more than minor because it was similar to example 3.k of Inspection Manual Chapter (IMC) 0612, Appendix E, "Examples of Minor Issues," and was associated with the Protection Against External Factors (e.g., fire) attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability and reliability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage).

The team performed a Phase 1 Significance Determination Process (SDP) screening, in accordance with IMC 0609, Appendix F, "Fire Protection SDP." This issue screened to very low safety significance (Green) because it did not affect the ability to reach and maintain a stable hot shutdown condition. The finding did not have a cross-cutting aspect because it was a legacy issue and was not considered to be indicative of current licensee performance.

Inspection Report# : [2016007](#) (*pdf*)

Significance:  Apr 01, 2016

Identified By: NRC

Item Type: NCV Non-Cited Violation

Inadequate Testing of Remote Shutdown Panel RCIC Flow Control Circuit

The team identified a finding of very low safety significance, involving a non-cited violation of Hope Creek Technical Specification (TS) Surveillance Requirement (SR) 4.3.7.4.2, "Remote Shutdown System Instrumentation and Controls." Specifically, PSEG did not adequately test all components of the Reactor Core Isolation Cooling (RCIC) flow control circuit on the RSP to demonstrate operability.

This finding was more than minor because it was similar to example 3.k of Inspection Manual Chapter (IMC) 0612, Appendix E, and was associated with the procedure quality attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of the RCIC system. The inspectors evaluated this finding using IMC 0609.04, "Initial Characterization of Findings," and IMC 0609, Appendix A, Exhibit 2, "Mitigating Systems Screening Questions." This issue was determined to be of very low safety significance (Green) because it did not represent an actual loss of function of a single train mitigating system for greater than its TS Allowed Outage Time. The finding did not have a cross-cutting aspect because it was a legacy issue and was not considered indicative of current licensee performance.

Inspection Report# : [2016007](#) (pdf)

Significance:  Mar 30, 2016

Identified By: Self-Revealing

Item Type: NCV Non-Cited Violation

Untimely Correction of a Condition Adverse to Quality (CAQ) Associated with High Vibrations on the 'C' Emergency Diesel Generator

A self-revealing finding of very low safety significance (Green) and associated NCV of Title 10 of the Code of Federal Regulations (10 CFR) Part 50, Appendix B, Criterion XVI, "Corrective Action," were identified when PSEG did not correct a condition adverse to quality (CAQ). Specifically, despite identifying a potential CAQ on November 3, 2014, associated with high vibrations on the 'C' emergency diesel generator (EDG) jacket water (JW) braided flexible hose during a system walkdown, no notification (NOTF) was generated, no evaluation of the high vibration condition was conducted, and the CAQ was not promptly corrected as required by the corrective action program (CAP). Subsequently, during a monthly surveillance run conducted on January 4, 2016, the 'C' EDG was declared inoperable when a large JW leak developed in the aforementioned braided flexible hose. PSEG's corrective actions included replacing the failed flexible hose and performing extent of condition walkdowns on the other EDG's JW piping structural supports. PSEG also conducted simple troubleshooting on the piping and support structures of all the EDGs, and plans to initiate a vibration monitoring program of the EDGs and EDG support systems.

The inspectors determined that the finding was more than minor because it was associated with the Equipment Performance attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective of ensuring the reliability of systems that respond to initiating events to prevent undesirable consequences. Specifically, not correcting the high vibrations on the JW piping resulted in an unplanned shutdown of the diesel, inoperability and unavailability when the leak worsened to a point where PSEG determined that the EDG could not meet its 24-hour mission time. In accordance with IMC 0609.04, "Initial Characterization of Findings," dated June 19, 2012, and Exhibit 2 of IMC 0609, Appendix A, "The SDP for Findings At-Power," dated June 19, 2012, the inspectors determined that this finding is of very low safety significance (Green) because the performance deficiency was not a design or qualification deficiency, did not involve an actual loss of safety function, did not represent the actual loss of a safety function of a single train for greater than its technical specification (TS) allowed outage time, and did not represent an actual loss of function of one or more non-TS trains of equipment designated as high safety-significant in PSEG's maintenance rule program for greater than 24 hours.

This finding had a cross-cutting aspect in the area of Problem Identification and Resolution, Identification, because PSEG did not implement the CAP with a low threshold for identifying issues and did not identify issues completely, accurately and in a timely manner in accordance with the CAP. Specifically, the issue of high vibrations on the 'C' EDG JW braided flexible hose was identified by PSEG, but was not placed into CAP, leading to the issue not being properly documented or evaluated to ensure the cause of the high vibrations was addressed in a timely manner.

Inspection Report# : [2016001](#) (pdf)

Significance:  Dec 31, 2015

Identified By: NRC

Item Type: FIN Finding

Failure to Follow Procedures Ensuring Functionality of the MCR during the SBO

The inspectors identified a Green finding because PSEG did not follow procedures to ensure that an identified condition adverse to quality (CAQ) was adequately evaluated, documented, and corrected. Specifically, PSEG identified a CAQ associated with a station blackout (SBO) design calculation used to justify the main control room (MCR) heat load during a loss of ventilation, but failed to adequately evaluate, document and correct the CAQ. This CAQ challenged the reasonable assurance of operability and functionality of the MCR during a SBO event and required PSEG to complete a detailed technical evaluation (TE) to prove functionality was maintained. PSEG's corrective actions included performing a detailed TE to ensure MCR temperatures during an SBO would not have exceeded a functionality limit, and initiating actions to ensure issues identified a potential CAQ get the appropriate screening by operators, engineering and management staff. PSEG documented the issue in the corrective action program (CAP) as Notification (NOTF) 20704285.

This finding was more than minor because it was associated with the human performance attribute of the Mitigating Systems cornerstone and adversely affected its objective to ensure availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Additionally, the finding was similar to IMC 0612, Appendix E, examples j and k, in that, a design engineering calculation error resulted in a condition where there was a reasonable doubt of operability of a structure, system, or component (SSC). The finding was screened for significance in accordance with IMC 0609, Appendix A, "Significance Determination Process (SDP) for Findings-at-Power," issued June 2, 2012. The finding screened as very low safety significance (Green) using Exhibit 2 for Mitigating Systems Screening Questions, because the finding is a deficiency affecting the design or qualification of a mitigating SSC, but the affected SSC maintains its operability and/or functionality. Specifically, the design calculation error was a CAQ that challenged the reasonable assurance of operability of the MCR during a SBO event and required a TE to prove functionality of the MCR during an SBO event was maintained.

The inspectors determined this finding has a cross-cutting aspect in the area of Problem Identification and Resolution (PI&R), Evaluation, in that PSEG did not thoroughly evaluate the issue to ensure that resolutions address causes and extent of conditions, commensurate with its safety significance. Specifically, issues of concern need to be properly classified, prioritized, and evaluated according to their safety significance, and operability and reportability determinations are developed, when appropriate.

Inspection Report# : [2015004](#) (*pdf*)

Significance:  Oct 23, 2015

Identified By: NRC

Item Type: NCV Non-Cited Violation

Failure to Establish Appropriate Acceptance Criteria for RHR and Core Spray Pump Start Times during Simulated LOCA/LOP Testing

The team identified a finding of very low safety significance involving a non-cited violation of Title 10 of the Code of Federal Regulations (10 CFR) Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," because PSEG did not establish appropriate acceptance criteria for the time allowed for starting the residual heat removal (RHR) and core spray pumps during simulated loss-of-coolant accident/loss-of-offsite power (LOCA/LOP) conditions in the 18-month integrated emergency diesel generator (EDG) surveillance test (ST) for the vital 4KV buses. Specifically, the ST acceptance criteria failed to confirm that the pumps started in accordance with the design basis loading sequence described in the design analyses and Updated Final Safety Analysis Report Table 8.3-1. PSEG's short-term corrective actions included reviewing LOCA/LOP test results and plant historical data to confirm current operability of the RHR and core spray pumps, and initiating corrective action notifications to determine the appropriate ST acceptance criteria and to trend pump start times.

The team determined that the failure to specify adequate acceptance limits for the design basis assigned start times for the RHR and core spray pumps during LOCA/LOP conditions in the 18-month integrated EDG ST procedure was a performance deficiency. The performance deficiency was more than minor because it was associated with the procedure quality attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The team evaluated the finding in accordance with IMC 0609, Appendix A, The Significance Determination Process (SDP) for Findings at Power, Exhibit 2 – Mitigating Systems Screening Questions, and determined that the finding was of very low safety significance (Green) because the finding was a design deficiency that did not result in the loss of operability or functionality. The team determined that this finding has a cross-cutting aspect in Human Performance, Documentation, in that PSEG failed to maintain accurate test acceptance documentation to aid plant staff in the identification of equipment performance that was outside the acceptable limits of design.

Inspection Report# : [2015007](#) (*pdf*)

Significance:  Oct 23, 2015

Identified By: NRC

Item Type: NCV Non-Cited Violation

Inadequate Work Order Instructions and Drawings Resulting in Improper Installation of a Safety-Related SW Valve

The team identified a finding of very low safety significance involving a non-cited violation of Title 10 of the Code of Federal Regulations (10 CFR) Part 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” because PSEG did not provide adequate work order instructions for the reinstallation of service water (SW) pump discharge isolation valve EAHV-2198C following planned valve maintenance in October 2013. Specifically, the inadequate work order instructions contributed directly to maintenance technicians installing the valve in the opposite orientation compared to the intended orientation. PSEG entered this issue into their corrective action program. In addition, PSEG’s corrective actions included completing several associated technical evaluations, calculations, operability determinations, and motor-operated valve performance tests.

The team determined that the failure to provide adequate work order instructions for the installation of safety-related SW valve 2198C was a performance deficiency. The team determined that this performance deficiency was more than minor in accordance with IMC 0612, “Power Reactor Inspection Report,” Appendix B, because it was associated with the procedure quality attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems (SW) that respond to initiating events to prevent undesirable consequences. Additionally, the team determined that it was more than minor in accordance with IMC 0612, Appendix E, Example 3j, because PSEG’s associated operability and technical evaluations did not adequately consider the worst case conditions, resulting in a potential underestimation of the maximum required opening torque and in a condition where there was a reasonable doubt on the operability of the ‘C’ SW train. The team evaluated the finding in accordance with IMC 0609, Appendix A, The Significance Determination Process (SDP) for Findings at Power, Exhibit 2 - Mitigating Systems Screening Questions, and determined that the finding was of very low safety significance (Green) because the finding was a deficiency that affected the design and qualification of safety-related SW valve 2198C but did not result in the loss of operability or functionality. The team determined that this finding has a cross-cutting aspect in Human Performance, Documentation, in that PSEG failed to ensure that design documentation and work packages were complete, thorough, accurate, and current.

Inspection Report# : [2015007](#) (*pdf*)

Barrier Integrity

Emergency Preparedness

Occupational Radiation Safety

Public Radiation Safety

Significance:  Jun 30, 2016

Identified By: NRC

Item Type: NCV Non-Cited Violation

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

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 to properly evaluate the impact of equipment failures in the effluent RMS and RCIC system when making MRFF determinations.

Inspection Report# : [2016002](#) (*pdf*)

Significance:  Jun 30, 2016

Identified By: NRC

Item Type: NCV Non-Cited Violation

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

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.

Inspection Report# : [2016002](#) (*pdf*)

Security

Although the Security Cornerstone is included in the Reactor Oversight Process assessment program, the Commission has decided that specific information related to findings and performance indicators pertaining to the Security Cornerstone will not be publicly available to ensure that security information is not provided to a possible adversary. Other than the fact that a finding or performance indicator is Green or Greater-Than-Green, security related information will not be displayed on the public web page. Therefore, the [cover letters](#) to security inspection reports may be viewed.

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Miscellaneous

Last modified : December 08, 2016