



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

April 25, 2016

Mr. Robert Braun
President and Chief Nuclear Officer
PSEG Nuclear LLC – N09
P.O. Box 236
Hancocks Bridge, NJ 08038

SUBJECT: HOPE CREEK GENERATING STATION UNIT 1- TRIENNIAL FIRE
PROTECTION INSPECTION REPORT 05000354/2016007

Dear Mr. Braun:

On April 1, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed a Triennial Fire Protection Inspection at the Hope Creek Generating Station (HCGS). The enclosed inspection report documents the inspection results, which were discussed on April 1, 2016, with Mr. Ken Grover, Plant Manager, and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations, and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed station personnel. The inspectors also reviewed mitigation strategies for addressing large fires and explosions.

Based on the results of this inspection, two findings of very low safety significance (Green) were identified. These findings were also determined to be violations of NRC requirements. However, because of their very low safety significance, and because they were entered into your corrective action program, the NRC is treating these findings as non-cited violations (NCV) consistent with Section 2.3.2 of the NRC Enforcement Policy. If you contest any NCV in this report, you should provide a written 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 D.C. 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement; and the NRC Resident Inspector at HCGS.

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 System (PARS) component of the NRC's document system, Agencywide Documents Access and Management System (ADAMS).

R. Braun

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Sincerely,

/RA/

John F. Rogge, Chief
Engineering Branch 3
Division of Reactor Safety

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

Enclosure: Inspection Report 05000354/2016007
w/Attachment: Supplemental Information

cc w/encl: Distribution via ListServ

R. Braun

- 2 -

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U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No: 50-354

License No: NPF-57

Report No: 05000354/2016007

Licensee: PSEG Nuclear, LLC (PSEG)

Facility: Hope Creek Generating Station (HCGS)

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

Dates: March 14 to April 1, 2016

Inspectors: J. Richmond, Senior Reactor Inspector (Team Leader)
Division of Reactor Safety (DRS)
W. Cook, Senior Reactor Analyst
K. Young, Senior Reactor Inspector
G. DiPaolo, Senior Reactor Inspector
T. O'Hara, Reactor Inspector

Observers: P. Smith, Fire Protection Engineer, Fire Research Branch
NRC Nuclear Regulatory Research
J. Humphreys, Nuclear Engineer, Department of
Environmental Protection, State of New Jersey

Approved by: John F. Rogge, Chief
Engineering Branch 3
Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000354/2016007; 03/14/2016 - 04/01/2016; Hope Creek Generating Station (HCGS); Triennial Fire Protection Inspection.

This report covered a two week on-site triennial fire protection team inspection by specialist inspectors. Two findings of very low significance were identified. These findings were determined to be non-cited violations. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process." The cross-cutting aspects associated with findings were determined using IMC 0310, "Components Within the Cross-Cutting Areas." Findings for which the significance determination process (SDP) does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

Cornerstone: Mitigating Systems

- Green. 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. (Section 1R05.05.1)

- Green. 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. (Section 1R05.05.2)

Other Findings

None.

REPORT DETAILS

Background

This report presents the results of a triennial fire protection inspection conducted in accordance with U.S. Nuclear Regulatory Commission (NRC) Inspection Procedure (IP) 71111.05T, "Fire Protection (Triennial)." The objective of the inspection was to assess whether PSEG Nuclear, LLC (PSEG) had implemented an adequate fire protection program (FPP) and whether post-fire safe shutdown capabilities had been established and were properly maintained at Hope Creek Generating Station (HCGS). The following fire areas and associated fire zones were selected for detailed review based on prior inspection results and risk insights from the HCGS Individual Plant Examination of External Events (IPEEE):

Fire Areas

- CD26 Control Equip Room Elevation (Elev.) 102 foot
- CD28 "D" Emergency Diesel Generator (EDG) Room Elev. 102 foot
- CD82 "A" EDG Switchgear & Control Rooms Elev. 130 foot
- RB2 Reactor Building South Elev. 102 foot

Inspection of these fire areas/zones fulfilled the inspection procedure requirement to inspect a minimum of three samples.

The inspection team evaluated PSEG's FPP against applicable requirements which included Technical Specifications, Operating License Condition 2.C.(7), NRC Safety Evaluation Reports, Title 10 of the *Code of Federal Regulations* (10 CFR) 50.48, 10 CFR 50 Appendix R, Branch Technical Position (BTP) Chemical Engineering Branch (CMEB) 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants," Revision 2, and Appendix A of BTP Auxiliary and Power Conversion Systems Branch 9.5-1. The team also reviewed related documents that included the Updated Final Safety Analysis Report (UFSAR), Section 9.5.1, "Fire Protection Program," UFSAR Appendix 9A, "Appendix R Comparison and Fire Hazards Analysis (FHA)," and post-fire safe shutdown analyses.

The team evaluated aspects of three mitigating strategies for responding to large fires and explosions, which are required by Operating License Condition 2.C.(16) and 10 CFR 50.54(hh)(2). The team also reviewed related documents that included Nuclear Energy Institute 06-12, "B.5.b Phases 2 & 3 Submittal Guidance," Revision 2 (ML070090060). Inspection of these strategies fulfills the inspection procedure requirement to inspect a minimum of one sample.

Specific documents reviewed by the team are listed in the attachment to this report.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R05 Fire Protection (IP 71111.05T)

.01 Protection of Safe Shutdown Capabilities

a. Inspection Scope

The team reviewed the FHA, post-fire safe shutdown analyses, and supporting drawings and documents to verify whether the safe shutdown capabilities were properly protected from fire damage. The team evaluated equipment and cable separation to determine whether the applicable separation requirements of BTP CMEB 9.5-1, Section III.G of 10 CFR Part 50 Appendix R, and the HCGS design and licensing bases were maintained for the credited safe shutdown equipment and their supporting power, control, and instrumentation cables. The team's review included an assessment of the adequacy of the selected systems for reactor pressure control, reactivity control, reactor coolant makeup, decay heat removal, process monitoring, and associated support system functions.

b. Findings

No findings were identified.

.02 Passive Fire Protection

a. Inspection Scope

The team walked down accessible portions of the selected fire areas to evaluate whether the material conditions of the fire area boundaries were adequate for the fire hazards in the area. The team compared the fire area boundaries, including walls, ceilings, floors, fire doors, fire dampers, penetration seals, electrical raceway and conduit fire barriers, and redundant equipment fire barriers and radiant energy heat barriers to design and licensing basis requirements, industry standards, and the HCGS FPP, as approved by the NRC, to identify any potential degradation or non-conformances.

The team reviewed selected engineering evaluations, installation and repair work orders, and qualification records for a sample of penetration seals to determine whether the fill material was properly installed and whether the as-left configuration satisfied design requirements for the intended fire rating. The team also reviewed similar records for selected fire protection wraps to verify whether the material and configuration was appropriate for the required fire rating and conformed to the engineering design.

The team also reviewed recent inspection and functional test records for fire dampers, and the inspection records for penetration seals and fire barriers, to verify whether the inspection and testing was adequately conducted, the acceptance criteria were met, and any potential performance degradation was identified. In addition, the team reviewed recent test results for the carbon dioxide (CO₂) and Halon fire damper functionality tests for the areas protected to verify whether the testing was adequately conducted, the acceptance criteria were met, and any potential performance degradation was identified.

b. Findings

No findings were identified.

.03 Active Fire Protection

a. Inspection Scope

The team evaluated manual and automatic fire suppression and detection systems in the selected fire areas to determine whether they were installed, tested, maintained, and operated in accordance with NRC requirements, National Fire Protection Association (NFPA) codes of record, and the HCGS FPP, as approved by the NRC. The team also assessed whether the suppression systems capabilities were adequate to control and/or extinguish fires associated with the hazards in the selected areas.

The team reviewed the as-built capability of the fire water supply system to verify whether the design and licensing basis and NFPA code of record requirements were satisfied, and to assess whether those capabilities were adequate for the hazards involved. The team reviewed the fire water system hydraulic analyses to assess the adequacy of a single fire water pump to supply the largest single hydraulic load on the fire water system plus concurrent fire hose usage. The team evaluated the fire pump performance tests to assess the adequacy of the test acceptance criteria for pump minimum discharge pressure at the required flow rate, to verify whether the criteria was adequate to ensure that the design basis and hydraulic analysis requirements were satisfied. The team also evaluated the underground fire loop flow tests to verify whether the tests adequately demonstrated that the flow distribution circuits were able to meet design basis requirements. In addition, the team reviewed recent pump and loop flow test results to verify whether the testing was adequately conducted, the acceptance criteria were met, and any potential performance degradation was identified.

The team reviewed initial discharge testing, design specifications, vendor requirements, modifications and engineering evaluations, and routine functional testing for the CO₂ and Halon suppression systems for the areas protected. The team walked down accessible portions of the CO₂ and Halon systems, including storage tanks and supply systems, to independently assess the material condition, operational lineup, and availability of the systems. The team also reviewed and walked down the associated fire fighting strategies and CO₂ and Halon system operating procedures.

The team walked down accessible portions of the detection and water suppression systems in the selected areas and major portions of the fire water supply system, including motor and diesel driven fire pumps and fire water storage tanks, interviewed system and program engineers, and reviewed selected notifications (NOTF) to independently assess the material condition of the systems and components. In addition, the team reviewed recent test results for the fire detection and suppression systems for the selected fire areas to verify whether the testing was adequately conducted, the acceptance criteria were met, and any potential performance degradation was identified.

The team assessed the fire brigade capabilities by reviewing training, qualification, and drill critique records. The team also reviewed PSEG's fire fighting strategies (i.e., pre fire plans) and smoke removal plans for the selected fire areas to determine if appropriate information was provided to fire brigade members and plant operators to identify safe shutdown equipment and instrumentation, and to facilitate suppression of a fire that could impact post-fire safe shutdown capability. The team independently inspected the fire brigade equipment, including personnel protective gear (e.g., turnout gear) and smoke removal equipment, to determine operational readiness for fire fighting. In addition, the team reviewed PSEG's fire brigade equipment inventory and inspection procedure and recent inspection and inventory results to verify whether adequate equipment was available, and whether any potential material deficiencies were identified.

b. Findings

No findings were identified.

.04 Protection from Damage from Fire Suppression Activities

a. Inspection Scope

The team performed document reviews and plant walkdowns to determine whether redundant trains of systems required for hot shutdown, located in the same or adjacent fire areas, were not subject to damage from fire suppression activities or from the rupture or inadvertent operation of fire suppression systems. Specifically, the team evaluated whether:

- A fire in one of the selected fire areas would not release smoke, heat, or hot gases that could cause unintended activation of suppression systems in adjacent fire areas which could potentially damage all redundant safe shutdown trains;
- A fire suppression system rupture, inadvertent actuation, or actuation due to a fire, in one of the selected fire areas, could not directly damage all redundant trains (e.g. sprinkler caused flooding of other than the locally affected train); and
- Adequate drainage was provided in areas protected by water suppression systems

b. Findings

No findings were identified.

.05 Alternative Shutdown Capability

a. Inspection Scope

The team reviewed the safe shutdown analysis, operating procedures, piping and instrumentation drawings (P&ID), electrical drawings, the UFSAR, and other supporting documents for the selected fire areas to verify whether PSEG had properly identified the systems and components necessary to achieve and maintain post-fire safe shutdown conditions. The team evaluated selected systems and components credited by the safe shutdown analysis for reactor pressure control, reactivity control, reactor coolant makeup, decay heat removal, process monitoring, and support system functions to assess the adequacy of PSEG's alternative shutdown methodology. The team also assessed whether alternative post-fire shutdown could be performed both with and without the availability of off-site power. The team walked down selected plant configurations to verify whether they were consistent with the assumptions and descriptions in the safe shutdown and fire hazards analyses. In addition, the team evaluated whether the systems and components credited for use during post-fire safe shutdown would remain free from fire damage.

The team reviewed the training program for licensed and non-licensed operators to verify whether it included alternative shutdown capability. The team also verified whether personnel required for post-fire safe shutdown, using either the normal or alternative shutdown methods, were trained and available on-site at all times, exclusive of those assigned as fire brigade members.

The team reviewed the adequacy of procedures utilized for post-fire shutdown and performed an independent walk through of procedure steps (i.e., a procedure tabletop) to assess the adequacy of implementation and human factors within the procedures. The team also evaluated the time required to perform specific actions to verify whether operators could reasonably be expected to perform those actions within sufficient time to maintain plant parameters within specified limits.

Specific procedures reviewed for normal and alternative post-fire shutdown included:

- HC.FP-EO.ZZ-0001, Fire and Medical Emergency Response Manual - Control Room Fire Response, Revision 12;
- HC.OP-AB.HVAC-0002, Control Room Environment, Revision 10;
- HC.OP-AB.FIRE-0001, Fire-Spurious Operations, Revision 1;
- HC.OP-IO.ZZ-0008, Shutdown from Outside Control Room, Revision 35; and
- HC.OP-AB.ZZ-0135, Station Blackout, or Loss of Offsite Power, or EDG Malfunction, Revision 41

The team reviewed selected operator manual actions to verify whether they had been properly reviewed and approved and whether the actions could be implemented in accordance with plant procedures in the time necessary to support the safe shutdown method for each fire area. The team also reviewed the periodic testing of the alternative shutdown transfer and isolation capability, and instrumentation and control functions, to evaluate whether the tests were adequate to ensure the functionality of the alternative shutdown capability.

b. Findings

.1 Inadequate Testing of Emergency Diesel Generator Takeover Switches and Remote Shutdown Panel Transfer/Isolation Relays

Introduction: The team identified a finding of very low safety significance (Green), involving a non-cited violation (NCV) of HCGS Operating License Condition 2.C.(7) for failure to implement and maintain in effect all provisions of the approved Fire Protection Program. Specifically, PSEG did not adequately test the EDG emergency takeover switches and RSP transfer/isolation relays to assure they were capable of performing their intended function, as described in the HCGS FPP (UFSAR 9.5.1 & Appendix 9A).

Description: The UFSAR Section 9.5.1.6 stated that the FPP complied with NRC BTP CMEB 9.5-1. Section C.5.b(1)(a) of BTP CMEB 9.5-1 required fire protection features to limit fire damage so that one train of systems necessary to achieve and maintain hot shutdown was free of fire damage. For certain fire scenarios, PSEG credited alternative shutdown station normal-emergency switches and transfer/isolation relays to ensure one train of safe shutdown equipment remained free of fire damage. UFSAR Appendix 9A, "Comparison of HCGS to NRC Generic Letter 81-12," Item 1.h stated that surveillance requirements were provided for isolation and control switches on the alternative shutdown station at specified test intervals.

During the review of operational and functional testing of alternative shutdown isolation and control functions, the team identified two examples where testing was not performed as described in the UFSAR, as follows:

- For fires in certain areas (e.g., cable spreading room or control equipment room), HC.OP-IO.ZZ 0008 required operators to transfer EDG control to a diesel remote control panel located in a 4 kV switchgear room (i.e., alternative shutdown station) using the EDG normal-emergency takeover switch on the remote panel. With the takeover switch in the emergency position, the EDG's control circuitry at the remote control panel was isolated from the associated circuitry in the control room, control equipment room, and cable spreading room to prevent fire damage from adversely affecting the operator's ability to control an EDG at the remote panel. PSEG's preventive maintenance task to verify an EDG's remote control function (e.g., manual starting and loading) was performed using HC.OP-SO.KJ-0001, "Emergency Diesel Generators Operation."

However, that procedure allowed operators to choose between a remote control permissive feature located in the control room (e.g., dual control between control room and remote control panel) or transfer control using the normal-emergency takeover switch (e.g., control room circuitry isolated). In addition, the procedure did not require operators to record the method of remote control that had been selected. Based on interviews with PSEG staff, the team concluded that PSEG's periodic testing had failed to demonstrate whether the normal-emergency takeover switches had functioned to (1) transfer control from the control room to the remote panel, and (2) isolated potentially fire damaged circuits from the remote panel, as described in the UFSAR. PSEG entered this issue into their corrective action program (CAP) as NOTFs 20722147, 20723341, and 20723902.

- The team determined that surveillance tests HC.OP-ST.SV-0001 through HC.OP-ST.SV-0006 adequately demonstrated that safe shutdown equipment could be controlled from the RSP, with the exception of the Reactor Core Isolation Cooling (RCIC) system (see finding in 1R05.05.2 below). In addition, those tests also verified control room alarms were received when the RSP normal-emergency transfer switches were placed in the emergency position. However, the team identified that the tests did not verify whether the RSP transfer/isolation relays (which were actuated by the transfer switches) actually isolated the control room circuitry, to prevent any adverse affect due to potential fire damage. As a result, the team concluded that PSEG had not adequately verified or demonstrated the isolation functions of the RSP transfer/isolation relays, as described in the UFSAR. PSEG entered this issue into their CAP as NOTFs 20723341 and 20723902.

In response to these issues, PSEG performed a combination of immediate testing and a detailed operability evaluation. On March 31, 2016, PSEG completed testing of the RSP RCIC flow controller which verified proper operation of the transfer and isolation functions. On April 1, 2016, PSEG completed testing of the "B" and "D" EDG normal-emergency takeover switches which verified proper operation for the EDGs credited for safe shutdown from outside the control room. On April 4, 2016, PSEG completed Operability Evaluation 16-004 which concluded there was reasonable assurance that the RSP transfer/isolation relays could perform their isolation function. The team reviewed PSEG's evaluation and concluded it provided a reasonable basis for operability.

Analysis: The team determined that PSEG's failure to verify that safe shutdown equipment would remain free of fire damage and function as intended was a performance deficiency. Specifically, PSEG failed to verify or demonstrate that the EDG normal-emergency takeover switches and the RSP transfer/isolation relays would perform their intended functions. 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," which determined that calculation errors would be more than minor if, as a result of the errors, there was reasonable doubt of the operability of the component. For this issue, the team had a reasonable doubt as to whether equipment controlled from the alternative shutdown stations could perform their intended functions and remain unaffected by fire damage. In addition, this issue 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. Specifically, the test procedures, for the EDG remote control stations and the RSP, were established more than three years ago and the team determined that PSEG had not had a reasonable opportunity to identify the issue within a recent time period.

Enforcement: HCGS License Condition 2.C.(7), in part, required PSEG to implement and maintain in effect all provisions of the approved fire protection program as described in the UFSAR and as approved by the NRC. UFSAR Appendix 9A stated that surveillance requirements for the isolation and control switches on the safe shutdown system would be performed to verify equipment functions from the alternative shutdown station at specified test intervals.

Contrary to the above, from 1986 until present, PSEG had not established and performed testing which was sufficient to verify the transfer or isolation functions of the EDG normal-emergency takeover switches, or the isolation function of the RSP transfer/isolation relays. The NRC is treating this violation as an NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy, because this finding was of very low safety significance and was entered into PSEG's CAP (NOTF's 20723902, 20723341, and 20722147). **(NCV 05000354/2016007-01, Inadequate Testing of Emergency Diesel Generator Takeover Switches and Remote Shutdown Panel Transfer/Isolation Relays)**

.2 Inadequate Testing of the Remote Shutdown Panel RCIC Flow Control Circuit

Introduction: The team identified a finding of very low safety significance (Green), involving an NCV of HCGS 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 RCIC flow control circuit (i.e., 1FC-FIC-4158) on the RSP to demonstrate operability.

Description: During the review of operational and functional testing of alternative shutdown control functions, the team determined that PSEG had not appropriately tested the RCIC flow control circuit (i.e., 1FC-FIC-4158) in the RSP, as required by TS. TS SR 4.3.7.4.2 required PSEG to test the RSP control switches and control circuits to demonstrate operability by verifying the equipment would perform their intended functions. TS Table 3.3.7.4-2, "Remote Shutdown Systems Controls," identified RCIC controller 1FC-FIC-4158 as a control circuit that was required to be tested in accordance with TS SR 4.3.7.4.2. PSEG performed the required testing on 1FC-FIC-4158 utilizing procedure HC.IC-CC.FC-0013, "RCIC Turbine Steam-Division 2 Channel F-4158, S-4280 RCIC Pump Turbine Control (RSP)."

Procedure HC.IC-CC.FC-0013 directed technicians to install jumpers across two normally open contacts (1H-1J and 1L-1M) on the RSP transfer/isolation relay TR-B117. The function of the relay, in part, was to disconnect the control room RCIC flow controller from the RCIC governor and connect the RSP RCIC flow controller in its place. The two normally open relay contacts close when the RSP normal-emergency transfer switch was placed in the emergency position to energize relay TR-B117, thus aligning 1FC-FIC-4158 to the RCIC system governor. The team identified that HC.IC-CC.FC-0013 did not contain any steps to verify that the RSP transfer/isolation relay contacts actually closed to complete the logic circuit.

Subsequently, PSEG determined that there was no other test which performed the functionally checks and concluded that proper testing of the relay contacts had not been performed since original plant startup testing. On March 30, 2016, PSEG entered the issue into their CAP as NOTF 20723901, and declared the Remote Shutdown System inoperable. On March 31, 2016, PSEG performed testing which satisfactorily demonstrated functionality of the untested relay contacts and declared the Remote Shutdown System operable.

Analysis: The team determined that PSEG's failure to verify the RCIC flow control circuit on the RSP would function as intended was a performance deficiency. Specifically, PSEG failed to verify or demonstrate that the RSP transfer/isolation relay would transfer control from the control room to the RSP, as required by TS. PSEG subsequently performed additional testing which demonstrated that the RCIC flow controller would function as designed from the RSP.

This finding was more than minor because it was similar to example 3.k of IMC 0612, Appendix E because the condition resulted in a reasonable doubt of operability because the required TS SR had never been performed. In addition, this issue 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. Specifically, the test procedure for the RSP RCIC flow control circuit was established more than three years ago and the team determined that PSEG had not had a reasonable opportunity identify the issue within a recent time period.

Enforcement: TS SR 4.3.7.4.2 required PSEG to demonstrate that remote shutdown control switches and control circuits were operable by verifying their capability to perform their intended functions. TS Table 3.3.7.4-2, "Remote Shutdown Systems Controls," in part, listed the RCIC flow control circuit 1FC-FIC-4158 as a required circuit to be tested, in accordance with TS SR 4.3.7.4.2.

Contrary to the above, from 1986 until March 31, 2016, PSEG had not verified the capability of the RCIC flow controller transfer/isolation relay to perform its intended function to allow control of RCIC from the RSP. The NRC is treating this violation as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy, because the finding was of very low safety significance and was entered into PSEG's CAP (NOTF 20723901). **(NCV 05000354/2016007-02, Inadequate Testing of Remote Shutdown Panel RCIC Flow Control Circuit)**

.06 Circuit Analysis

a. Inspection Scope

The team reviewed PSEG's post-fire safe shutdown analysis for the selected fire areas to determine whether it appropriately identified the structures, systems, and components important to achieving and maintaining safe shutdown. Additionally, the team evaluated PSEG's analysis to verify whether necessary electrical circuits were properly protected and whether circuits that could adversely impact safe shutdown due to hot shorts or shorts to ground were identified, evaluated, and dispositioned to ensure spurious actuations would not prevent safe shutdown.

The team's review considered fire and cable attributes, cable routing, potential undesirable consequences and common power supply/bus concerns. Specific items included the credibility of the fire threat, cable insulation attributes, cable failure modes, and actuations resulting in flow diversion or loss of coolant events.

The team also reviewed cable raceway drawings and/or cable routing databases for a sample of components required for post-fire safe shutdown to verify whether the cables were routed as described in the safe-shutdown analysis. In addition, the team reviewed equipment important to safe shutdown, but not part of the success path, to verify whether PSEG had taken appropriate actions in accordance with the design and licensing basis and NRC Regulatory Guide 1.189, Revision 2.

Circuit analysis was performed for the following components:

- BB-HV-F001 & BB-HV-F002, Reactor Vessel Head Vent Valves
- BB-PSL-7853A, Reactor Pressure Indicator
- BC-AP202, "A" Residual Heat Removal (RHR) Pump
- BC-FI-4435, RSP Flow Indication
- BD-HV-F010, RCIC Suction Valve from Condensate Storage Tank (CST)
- FC-HV-F059, RCIC Steam Exhaust Isolation Valve
- FC-HV-F062, RCIC Vacuum Breaker Isolation Valve
- FC-HV-F084, RCIC Vacuum Breaker Isolation Valve

The team reviewed a sample of circuit breaker coordination studies to ensure equipment needed to conduct post-fire safe shutdown activities would not be impacted due to a lack of coordination that could result in a common power supply or common bus concern.

The team assessed the transfer of control from the control room to the alternative shutdown locations to verify whether it would be affected by fire-induced circuit faults (e.g., by the provision of separate fuses and power supplies for alternative shutdown control circuits).

b. Findings

No findings were identified.

.07 Communications

a. Inspection Scope

The team reviewed safe shutdown procedures, the safe shutdown analysis, and associated documents to verify whether an adequate method of communications would be available to plant operators following a fire. Specifically, the team evaluated whether plant telephones, page systems, and portable radios would be available for use and were properly maintained. During this review, the team considered the effects of ambient noise levels, clarity of reception, reliability, and coverage patterns. The team inspected selected emergency storage lockers to independently verify whether portable communication equipment was available for the fire brigade and plant operators. In addition, the team evaluated whether radio or phone repeaters, transmitters, and power supplies would be reasonably unaffected by a fire.

b. Findings

No findings were identified.

.08 Emergency Lighting

a. Inspection Scope

The team walked down the emergency lights in the selected fire areas to independently evaluate the placement and coverage areas of the lights. The team assessed whether the lights provided adequate illumination on local equipment and instrumentation required for post-fire safe shutdown, to ensure local operations could be reliably performed under expected post-fire conditions. Emergency light placement was also evaluated to determine adequate illumination of local area access and egress pathways.

The team verified whether the emergency light batteries were rated for at least an eight-hour capacity. Preventive maintenance procedures, the vendor manual, completed surveillance tests, and battery replacement practices were also reviewed to evaluate whether the emergency lighting had been maintained in a manner that would ensure reliable operation.

b. Findings

No findings were identified.

.09 Cold Shutdown Repairs

a. Inspection Scope

The team reviewed PSEG's dedicated repair procedures, for components which might be damaged by fire and were required to achieve post-fire cold shutdown. The team evaluated selected cold shutdown repairs to determine whether they could be achieved within the time frames assumed in the design and licensing bases. In addition, the team verified whether the necessary repair equipment, tools, and materials (e.g., temporary power supply for remote operation of the safety relief valves) were available and accessible on site.

b. Findings

No findings were identified.

.10 Compensatory Measures

a. Inspection Scope

The team verified whether compensatory measures were in place for out-of-service, degraded, or inoperable fire protection and post-fire safe shutdown equipment, systems, or features (e.g., detection and suppression systems and equipment, passive fire barriers, pumps, valves, or electrical devices providing safe shutdown functions or capabilities).

The team evaluated whether the short term compensatory measures adequately compensated for the degraded function or feature until appropriate corrective action could be taken and whether PSEG was effective in returning the equipment to service in a reasonable period of time.

The team noted that for the selected fire areas which were designated as 10 CFR 50 Appendix R, Section III.G.2 areas, there were no compensatory measures in the form of operator manual actions.

b. Findings

No findings were identified.

.11 Review and Documentation of FPP Changes

a. Inspection Scope

The team reviewed recent changes to the approved fire protection program to assess whether those changes had an adverse effect on the ability to safely shutdown.

b. Findings

No findings were identified.

.12 Control of Transient Combustibles and Ignition Sources

a. Inspection Scope

The team reviewed PSEG's procedures and programs for the control of ignition sources and transient combustibles to assess their effectiveness in preventing fires and in controlling combustible loading within limits established in the FHA. A sample of hot work and transient combustible control permits were reviewed to assess the adequacy of PSEG's fire protection program administrative controls. The team performed plant walkdowns to independently verify whether transient combustibles and ignition sources were being properly controlled in accordance with the administrative controls.

b. Findings

No findings were identified.

.13 Large Fires and Explosions Mitigation Strategies

a. Inspection Scope

The team reviewed three mitigation strategies intended to maintain or restore core cooling, containment integrity, and spent fuel pool cooling capabilities under the circumstances associated with the loss of large areas of the plant due to large fires or explosions. The team assessed whether PSEG continued to meet the requirements of License Condition 2.C.(16) and 10 CFR 50.54(hh)(2). The reviewed strategies included:

- Spent Fuel Pool – External Makeup
- RCIC System Operation with Complete Loss of AC & DC Power
- Remote Operation of Safety Relief Valves with Reactor Pressure Vessel Injection

The team's review included: a detailed assessment of the procedural guidance; a walkdown of the strategies with a trained operator to assess the feasibility of the strategy and operator familiarity; maintenance and surveillance testing for the selected strategy equipment; and an independent inventory check of selected strategy equipment, materials, and tools to ensure the appropriateness of equipment storage and availability. The team also evaluated the adequacy of corrective actions associated with issues identified during previous inspections in this area.

b. Findings

No findings were identified.

4. **OTHER ACTIVITIES**

4OA2 Identification and Resolution of Problems (IP 71152)

a. Inspection Scope

The team reviewed a sample of notifications associated with the fire protection program, post-fire safe shutdown issues, and mitigation strategy issues to determine whether PSEG was appropriately identifying, characterizing, and correcting problems associated with these areas and whether the planned or completed corrective actions were appropriate. The notifications reviewed are listed in the attachment.

b. Findings

No findings were identified.

4OA6 Meetings, including Exit

The team presented the inspection results to Mr. Ken Grover, Plant Manager, and other members of PSEG's staff on April 1, 2016. The team verified that this report does not contain proprietary information.

SUPPLEMENTAL INFORMATION
KEY POINTS OF CONTACT

Licensee Personnel

M. Adair, Fire Protection Engineer
R. Black, Fire Marshall
P. Breidenbach, Simulator Instructor
J. Carlin, Fire Protection Superintendent
M. Connolly, Instrumentation and Controls Supervisor
M. Khan, Electrical Design Engineer
S. Kopsick, Operations
T. MacEwen, Regulatory Assurance Engineer
M. Marandola, Fire Protection System Engineer
C. Minarich, Senior Reactor Operator
A. Ochoa, Regulatory Assurance Engineer
M. Reeser, Fire Protection Engineer
S. Savar, Safe Shutdown Engineer
M. Shaffer, Operations Training Manager
D. Shumaker, PSEG Fire Protection Engineer
A. Tramontana, Manager Engineering Programs
Z. Van Ness, Design Engineer

NRC Personnel

J. Hawkins, Senior Resident Inspector, Hope Creek
S. Haney, Resident Inspector, Hope Creek

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None.

Opened and Closed

05000345/2016007-01	NCV	Inadequate Testing of Emergency Diesel Generator Takeover Switches and Remote Shutdown Panel Transfer/Isolation Relays (Section 1R05.05.1)
05000345/2016007-02	NCV	Inadequate Testing of the Remote Shutdown Panel RCIC Flow Control Circuit (Section 1R05.05.2)

Closed

None.

LIST OF DOCUMENTS REVIEWED

Fire Protection Licensing and Design Basis Documents

51-9126574-000, Safe Shutdown Analysis Report, Revision 0
A-0-ZZ-EDS-0227, Specification, Class 1E 600 Volt Power Cable, Revision 2
NRC Safety Evaluation Report NUREG 1048 Supplement 2, dated 8/85
UFSAR Appendix 9A, Appendix R Comparison, Revision 20
UFSAR Section 8.3, Onsite Power System, Revision 21
UFSAR Section 9.5.1, Fire Protection Program, Revision 21

Calculations, Analysis, and Engineering Evaluations

0030-00A3-007-001, Multiple Spurious Operation (MSO) Compliance Report, Revision 0
11-0028, Reactor Building Flood Calculations for Elev. 102, Revision 4
19-0018, Maximum Flood Levels in Control/Diesel Generator Areas, Revision 7
51-9225621-000, Radio Communications Upgrade Study & Radio Coverage Maps, Revision 0
70014041, Fire Wrap Non-Segregated Bus Duct Fire Wrap, Revision 0
70062724, Evaluate UFSAR Fire Wrap Description, Revision 0
70159647, Operating Experience Review Applicability Review Response, Revision 1
80106915, MOV Weak Link Determination to Support MSO, Revision 10
DCP-80110322, FLEX Electrical Connections, Revision 4
E-26, Breaker to Fuse & Fuse Coordination for Appendix R, Revision 0
E-7.4, Class 1E 4 kV System Protective Relay Settings, Revision 6
E-7.7, Class 1E 480V System Protecting Relaying, Revision 7
E-7.9, 125V DC & 250V DC Class 1E Systems, Revision 4
EVAL-H-QB-00001, Emergency Light Unit Maintenance Rule (a)1 Evaluation, dated 7/16/15
GE-NE-0000-0045-9466-R0, Appendix R Fire Protection Analysis for SCD-033, dated 12/05
HC-PRA-104, Fire Probabilistic Risk-Assessment Summary & Quantification Notebook,
Revision 2
H-I-KC-FEE-1583, Diesel Generator Room Non-Segregated Bus Duct Fire Wrap, Revision 0
Individual Plant Examination of External Events (IPEEE), dated 7/97
KC-0035, Hydraulic Calculations for NRC B5b Security Order, Revision 0
Technical Evaluation 80100490, Evaluation of Feasibility and Reliability of Operator Manual
Actions following a Fire Event in Either Fire Area RB1 or RB2, Revision 2

Drawings and Wiring Diagrams

A-0866-0, Penetration Seals Details Fire & Air, Revision 18
E-0002-1-13, Sht. 1, Single Line Meter & Relay Diagram, Power System, Revision 13
E-0006-1-10, Sht. 2, 4 kV Single Line Meter & Relay Diagram, Revision 10
E-0006-1-12, Sht. 1, 4 kV Single Line Meter & Relay Diagram, Revision 12
E-0009-1-13, Sht. 4, 125V DC Single Line Meter & Relay Diagram, Revision 13
E-0009-1-22, Sht. 5, 125V DC Single Line Meter & Relay Diagram, Revision 22
E-0009-1-26, Sht. 1, 125V DC Single Line Meter & Relay Diagram, Revision 26
E-0009-1-28, Sht. 3, 125V DC Single Line Meter & Relay Diagram, Revision 28
E-0009-1-30, Sht. 2, 125V DC Single Line Meter & Relay Diagram, Revision 30
E-0011-1-20, Sht. 1, 250V DC Single Line Meter & Relay Diagram, Revision 20

E-0011-1-20, Sht. 2, 250V DC Single Line Meter & Relay Diagram, Revision 20
E-0018-1-36, Sht. 1, 480V Single Line Meter & Relay Diagram, Revision 36
E-0018-1-40, Sht. 2, 480V Single Line Meter & Relay Diagram, Revision 40
E-0217-0, Shts. 5 and 6, 4 kV Circuit Breaker Control Safety Auxiliaries Cooling Pump,
Revision 5
E-2037-0, Sht. 1, Reactor Head Vent MOV Cable Block Diagram, Revision 1
E-2084-0, Sht. 1, RCIC Pump Suction from CST Cable Block Diagram, Revision 2
E-2084-0, Sht. 3, RCIC Pump Suction from CST Cable Block Diagram, Revision 2
E-2085-0, Sht. 4, RCIC Vacuum Breaker Isolation Valves Cable Block Diagram, Revision 3
E-2441-0, RHR Pumps 1AP202, 1CP202, 1DP202 Cable Block Diagram, Revision 2
E-2627-0, Vibration Monitoring for Portable Read-Out Cable Block Diagram, Revision 3
E-6037-0, Sht. 1, Reactor Head Vent MOV Electrical Schematic, Revision 2
E-6084-0, Sht. 1, RCIC Pump Suction from CST Valve Electrical Schematic, Revision 4
E-6084-0, Sht. 3, RCIC Pump Suction from CST Valve Electrical Schematic, Revision 4
E-6084-0, Sht. 7, RCIC Main Steam Supply Valve Electrical Schematic, Revision 10
E-6085-0, Sht. 4, RCIC Vacuum Breaker Isolation Valves Electrical Schematic, Revision 4
E-6108-0, Sht. 1, RHR System Suction Outboard Isolation Valve Electrical Schematic,
Revision 11
E-6108-0, Sht. 3, RHR Shutdown Cooling Outboard Isolation Electrical Schematic, Revision 10
E-6441-0, Sht. 1, 4 kV Circuit Breaker Control Schematic for RHR Pumps, Revision 6
E-6441-0, Sht. 2, 4 kV Circuit Breaker Control Schematic for RHR Pumps, Revision 7
J-0399-0, Sht. 15, Remote Shutdown Panel List of Devices, Revision 10
J-0399-0, Sht. 3, Remote Shutdown Control Panel Instrument and Control Section, Revision 9
J-4042-0, Sht. 6, Reactor Pressure Loop Diagram, Revision 5
J-4049-0, Sht. 2 RCIC Pump Turbine Control, Revision 7
J-4051-0-4, Sht. 3, RHR Remote Shutdown Panel Indicators Loop Diagram, Revision 4
M-5114, Fire Area Boundaries - Elev. 102 foot, Revision 4
M-5115, Fire Area Boundaries - Elev. 120 and 132 foot, Revision 2
M-5116, Fire Area Boundaries - Elev. 137 to 150 foot, Revision 5
M-5122, Fire Area Boundaries - Miscellaneous, Revision 4

Piping and Instrumentation Diagrams

M-41-1-01, Sht. 3, Nuclear Boiler, Revision 1
M-41-1-29, Sht. 2, Nuclear Boiler, Revision 29
M-41-1-39, Sht. 1, Nuclear Boiler, Revision 39
M-42-1-21, Sht. 2, Nuclear Boiler Instrumentation, Revision 21
M-42-1-38, Sht. 1, Nuclear Boiler Instrumentation, Revision 38
M-49-1-30, Sht. 1, Reactor Core Isolation Cooling System, Revision 30
M-51-1-44, Sht. 2, Residual Heat Removal System, Revision 44
M-51-1-50, Sht. 1, Residual Heat Removal System, Revision 50

Large Fires and Explosions Mitigation Strategies Documents

30249806, 24 Month Preventive Maintenance/Portable Generator
30249806, 24 Month Preventive Maintenance/Portable Rectifier
30290733, Quarterly B.5.b Equipment Preventive Maintenance
HC.OP-AM.TSC-0014, RCIC System Operation with Complete Loss of AC & DC Power, Revision 8
HC.OP-AM.TSC-0020, Spent Fuel Pool – External Makeup, Revision 5
HC.OP-AM.TSC-0024, Safety Relief Valve Remote Operation with Reactor Injection, Revision 8
HC.OP-AM.TSC-1000, Extensive Damage Mitigation Guideline (EDMG) Initial Response, Revision 2
HC.OP-AM.TSC-1001, EDMG Initial Damage Assessment, Revision 1
NC.FP-PM.ZZ-0007, Firefighting and Rescue Equipment Inventory, Revision 8
SH.OP-AM.TSC-0001, Supplemental Severe Accident Management Guidelines, Revision 10
SH.OP-AM.TSC-0002, Remote Response Center Operations, Revision 2

Fire Protection Evaluations of Modifications and Design Changes

4ECC-3638, Identification of Information Notice 92-18 Concerns, Revision 0
DCP-80109924, Replace Overspeed Switch on Diesel Driven Fire Pump, Revision 2
DCP-80111299, Main Transformer Thermal Detector Replacement, Revision 0
DCP-80115625, Fire Door Replacement Equivalent Change, Revision 0
DCP-80115748, Fire Damper Fusible Link Setpoint Change, Revision 0
DCR-80109589, Correct the smoke detector locations, Revision 0
NUTS-80032525, Fixed Combustible Loading Revision to FHA, Revision 0

Quality Assurance Audits and Self Assessments

CISA Report 70119904-0010, MSO Evaluations, dated 6/12/12
FASA Report 70137398-0020, Fire Protection Focused Area Self-Assessment, dated 12/3/12
Nuclear Oversight NOS-80107152-0010, Combined Hope Creek & Salem Stations Fire Protection Audit Report, dated 10/3/12

System Health Reports

125V DC (Class 1E), 4th Quarter 2015
250V DC (Class 1E), 4th Quarter 2015
4 kV (Class 1E & Non-1E), 3rd Quarter 2015
4 kV (Class 1E & Non-1E), 4th Quarter 2015
480V AC (Class 1E) MCC Power, 4th Quarter 2015
480V AC (Class 1E) Substation Power, 3rd Quarter 2015
480V AC (Class 1E) Substation Power, 4th Quarter 2015

Procedures

CC-AA-102, Design Input and Configuration Change Impact Screening, Revision 26
 CC-AA-102-1001, Design Inputs and Impact Screening Implementation, Revision 11
 CC-AA-209, Fire Protection Program Configuration Change Review, Revision 3
 CC-AA-211, Fire Protection Program, Revision 5
 CC-AA-211, Fire Protection Program, Revision 5
 FP-AA-002, Fire Protection Impairment Program, Revision 3
 FP-AA-008, Fire Protection for Hot Work, Revision 8
 FP-AA-011, Control of Transient Combustible Material, Revision 4
 FP-AA-014, Fire Protection Training Program, Revision 3
 FP-HC-004, Actions for Inoperable Fire Protection, Revision 4
 HC.IC-CC.FC-0013, RCIC Turbine Control (Remote Shutdown Panel), Revision 14
 HC.MD-CM.PG-0002, Low Voltage Breaker Overhaul & Repair (AKR-75), Revision 5
 HC.MD-PM.PB-0001, 4 kV Breaker Cleaning & P.M., Revision 29
 HC.MD-ST.PB-0007, 18 Month Primary Containment Penetration Overcurrent Protective Device Channel Calibration & Integrated System Functional Test. Revision 9
 NC.DE-PS.ZZ-0001, Programmatic Standard Fire Protection, Revision 3

Operations Procedures

CC-HC-102-1001, Time Critical Operator Action Validation, Revision 0
 HC.FP-EO.ZZ-0001, Fire & Medical Emergency Response - Control Room Fire, Revision 12
 HC.OP-AB.FIRE-0001, Fire-Spurious Operations, Revision 1
 HC.OP-AB.HVAC-000, Control Room Environment, Revision 10
 HC.OP-AB.ZZ-0001, Transient Plant Conditions, Revision 3
 HC.OP-AB.ZZ-0135, Station Blackout, or Loss of Offsite Power, or EDG Malfunction, Revision 41
 HC.OP-AR.QK-0001, 10C671 Fire Protection Panel Alarm Summary, Revision 25
 HC.OP-AR.QK-0002, 10C671 Fire Protection Panel Alarm Response, Revision 22
 HC.OP-EO.ZZ-0101, Reactor & Pressure Vessel Control, Revision 12
 HC.OP-IO.ZZ-0002, Preparation for Plant Startup, Revision 67
 HC.OP-IO.ZZ-0003, Startup from Cold Shutdown to Rated Power, Revision 108
 HC.OP-IO.ZZ-0008, Shutdown from Outside the Control Room, Revision 35
 HC.OP-SO-KJ-0001, Emergency Diesel Generators Operation, Revision 72
 HC.OP-ST.SV-0001, Remote Shutdown Monitoring Instrumentation Channel Check, Revision 26
 HC.OP-ST.SV-0002, Remote Shutdown Control Operability - 18 Months RSP Transfer with "A" Shutdown Cooling in Service, Revision 23
 HC.OP-ST.SV-0004, Remote Shutdown Control Operability - 18 Months RSP Transfer with No Shutdown Cooling in Service, Revision 10
 OP-AA-101-111, Roles and Responsibilities of On-Shift Personnel, Revision 7
 OP-HC-102-106, Master List of Time Critical and Time Sensitive Operator Activities, Revision 0

Operator Safe Shutdown Training

Job Performance Measure (JPM) BD002, Place RCIC in Service from the RSP and
Establish Injection to the Reactor Vessel, Revision 4
SG-627, Simulator Scenario Guide, Control Room Evacuation/RSP Operations, Revision 5

Fire Fighting Strategies (i.e., Pre-Fire Plans)

FRH-II-431, Reactor Building MCC Area Elev. 102, Revision 3
FRH-II-432, Reactor Building SACS Heat Exchanger & Pump Room Elev. 102, Revision 3
FRH-II-435, Reactor Building RCIC Area Elev. 102, Revision 4
FRH-II-436, Reactor Building Equipment Airlock Area Elev. 102, Revision 3
FRH-II-531, Diesel Generator Rooms Elev. 102, Revision 8
FRH-II-532, Lower Control Equipment Room Elev. 102, Revision 6

Fire Brigade Drills and Critiques

Crew 1, Announced Drill, performed 2/9/15, 4/22/15, 7/20/15, and 10/14/15
Crew 1, Unannounced Drill, performed 12/21/15
Crew 2, Announced Drill, performed 4/8/15, 7/6/15, and 12/15/15
Crew 2, Unannounced Drill, performed 9/23/15
Crew 2, Back Shift Drill, performed 1/12/15
Crew 3, Announced Drill, performed 3/12/15, 5/19/15, and 9/2/15
Crew 3, Unannounced Drill, performed 11/16/15
Crew 3, Back Shift Drill, performed 6/8/15 and 9/25/15
Crew 4, Announced Drill, performed 2/8/15, 4/30/15, and 7/8/15
Crew 4, Unannounced Drill, performed 8/11/15
Crew 4, Back Shift Drill, performed 11/9/15
Crew 5, Announced Drill, performed 5/12/15, and 10/16/15
Crew 5, Unannounced Drill, performed 1/28/15
Crew 5, Back Shift Drill, performed 8/12/15

Transient Combustible Permits and Evaluations

HTC-16-AB2-001
HTC-16-CD10-001
HTC-16-CD2-001
HTC-16-CD74-001
HTC-16-CO35-001
HTC-RB1-16-RB2-001

Hot Work and Ignition Source Permits

HC-16024
HC-16026
HC-16028

Completed Tests and Surveillances

50161815, performed 4/3/15
 50162004, performed 5/1/25
 50162005, performed 4/11/15
 50162362, performed 4/22/15
 50162762, performed 4/12/15
 50181272, performed 12/6/15
 HC.FP-PT.KC-004, Fire Water System Flush, performed 6/18/14 & 6/14/15
 HC.FP-PT.QK-029, Smoke Detector Functional Test, performed 6/18/14, 6/27/15, and 12/13/15
 HC.FP-SO.KC-001, Fire Water Suppression Systems Operation, 9/3/14, 6/1/14, and 9/3/14
 HC.FP-ST.KC-002, Electric Motor Driven Fire Pump Operability Test, performed 7/27/15
 HC.FP-ST.KC-004, Fire Water System Flush & Operability Test, performed 6/18/14
 HC.FP-ST.KC-009, Diesel Driven Fire Pump Operability Test, performed 5/5/15
 HC.FP-ST.KC-009, Electric Motor Driven Fire Pump Operability Test, 7/27/15
 HC.FP-ST.KC-016, CO₂ Systems Operability & Partial Discharge Test, performed 5/4/15
 HC.FP-ST.KC-016, Pre-Action Sprinkler System Functional Test, performed 5/4/15 and 6/30/14
 HC.FP-ST.KC-021, CO₂ Systems Operability & Partial Discharge Test, performed 5/4/15
 HC.FP-ST.KC-024, Fire Hose Station Flow Test, performed 7/5/00, 2/21/15, and 8/19/15
 HC.FP-ST.KC-024, Fire Water System Flush, performed 6/18/14
 HC.FP-ST.KC-025, Fire Hose Station Hydrostatic Test, performed 4/5/11 and 7/30/15
 HC.FP-ST.QK-029, Fire Detector Functional Test, performed 3/27/15, 4/5/15, and 10/11/15
 HC.FP-SV.KC-022, Fire Hose Station Visual Inspection, performed 11/25/15 and 12/30/15
 HC.FP-SV.KC-023, Fire Hose Station Detailed Inspection, performed 5/29/14 and 6/18/14
 HC.FP-SV.ZZ-002, Diesel Driven Fire Pump Operability Test, performed 7/27/15
 HC.FP-SV.ZZ-026, Fire Penetration Seal Inspection, performed 6/18/14, 6/26/14, and 10/9/14
 HC.FP-SV.ZZ-027, Fire Door Inspection & Test, performed 6/18/14, 4/7/15, and 6/18/15
 HC.FP-SV.ZZ-028, Fire Damper Inspection, performed 1/2/13, 9/30/13, 6/26/14, and 10/29/14
 HC.FP-SV.ZZ-055, Structural Steel Fire Proofing Inspection, performed 8/26/213 and 6/18/14
 HC.FP-SV.ZZ-056, Fire Barrier Inspection, performed 5/12/15
 HC.OP-ST.SV-0001, Remote Shutdown Monitoring Instrumentation Channel Check-Monthly, performed 12/6/15
 HC.OP-ST.SV-0002, Remote Shutdown Control Operability-18 Months, performed 4/7/15
 HC.OP-ST.SV-0003, Remote Shutdown Control Operability RSP Transfer with "B" Shutdown Cooling in Service, performed 5/3/15
 HC.OP-ST.SV-0004, Remote Shutdown Control Operability-18 Months RSP Transfer with No Shutdown Cooling in Service, performed 4/22/15
 HC.OP-ST.SV-0005, Remote Shutdown Control Operability-18 Months Testing BB-HV-F031B, performed 4/11/15
 HC.OP-ST.SV-0006, A & C Channel Remote Shutdown Control Operability RSP-18 Months RSP Transfer-18 Month, performed 4/3/15
 PSWR 6774, Penetration Seal F-4301-012 Rework, dated 2/6/13
 PSWR 7788, Penetration Seal S-3504-002 Rework, date 1/12/2015
 PSWR 7788, Penetration Seal S-5304-002 Rework, dated 1/12/15
 PSWR 7789, Penetration Seal S-5303-008 Rework, dated 1/13/15

Notifications and Corrective Action Documents (* denotes NRC identified during this inspection)

980402308	20626240	20721215	20723338*
20442958	20641444	20721967*	20723341*
20461361	20649523	20721968*	20723342*
20462609	20661278	20722075*	20723357*
20472020	20663745	20722077*	20723358*
20574325	20697844	20722078*	20723362*
20580241	20702085	20722147*	20723901*
20580385	20709173	20722157*	20723902*
20583011	20709174	20722174*	20724128*
20586633	20709184	20722405*	20724758*
20595748	20709442	20722532*	70014041
20596927	20717457	20723308*	70122102
20600217	20718384	20723310*	70169606
20600222	20719311	20723332	
20624625	20720911*	20723332	

Work Orders:

30158832	30257892	50158757	70143136
30180295	30266225	50161446	70162367
30193232	30268635	50167927	
30206566	30284370	50168355	
30215235	50156909	60128725	

Miscellaneous Documents:

Fire Protection Impairment Tracking Log, dated 3/15/16
 HCN 13-015, Updated Final Safety Analysis Change Notice to Appendix 9A, Appendix R
 Comparison, 4/11/14
 NRC Generic Letter 86-10, Implementation of Fire Protection Requirements, dated 4/24/86
 NRC Information Notice 2014-10, Potential Circuit Failure-Induced Secondary Fires or
 Equipment Damage, dated 9/16/14
 Operability Evaluation 16-004, RSP Surveillance Non-Conformance, 4/4/16
 PSEG Letter to NRC, Fire Protection Program Technical Specification Deletion, dated 5/13/86
 PSEG Vendor Document 432213 (001), Hughes Associates, Inc., Hope Creek Manual Action
 Feasibility Assessment, dated 3/19/14
 Safe Shutdown Equipment Details, BB-HV-F001, Reactor Head Vent, Printed 3/16/16
 Safe Shutdown Equipment Details, BB-HV-F002, Reactor Head Vent, Printed 3/16/16
 Safe Shutdown Equipment Details, BB-PSL-7853A, Reactor Pressure Indicator, Printed 3/11/16
 Safe Shutdown Equipment Details, BC-AP202, RHR Pump A, Printed 3/11/16
 Safe Shutdown Equipment Details, BC-FI-4435, RSP Flow Indication, Printed 3/11/16
 Safe Shutdown Equipment Details, BD-HV-F010, RCIC, Printed 3/11/16

Safe Shutdown Equipment Details, FC-HV-F0062, RCIC Vacuum Breaker Isolation Valve,
Printed 3/11/16

Safe Shutdown Equipment Details, FC-HV-F059, RCIC Exhaust Steam Line Isolation Valve,
Printed 3/11/16

Terry Steam Turbine Company Letter, RCIC Turbines Water Start-up and Slug Capability
Guarantee, dated 6/18/79

Troubleshooting Log 16-056, Verify Continuity of B and D EDG Emergency Take-Over Switch
Contacts, 4/1/16

LIST OF ACRONYMS

AC	Alternating Current
ADAMS	Agencywide Documents Access and Management System
BTP	[NRC] Branch Technical Position
CFR	Code of Federal Regulations
CMEB	[NRC] Chemical Engineering Branch
CO ₂	Carbon Dioxide
CST	Condensate Storage Tank
DC	Direct Current
EDG	Emergency Diesel Generator
EDMG	Extensive Damage Mitigation Guideline
Elev.	Elevation
FHA	Fire Hazards Analysis
FPP	Fire Protection Program
HCGS	Hope Creek Generating Station
IMC	[NRC] Inspection Manual Chapter
IN	[NRC] Information Notice
IP	[NRC] Inspection Procedure
IPEEE	Individual Plant Examination of External Events
IR	[NRC] Inspection Report
kV	Kilovolt
MOV	Motor Operated Valve
MSO	Multiple Spurious Operation
NCV	Non-Cited Violation
NFPA	National Fire Protection Association
NOTF	Notification
NRC	Nuclear Regulatory Commission
P&ID	Piping and Instrumentation Drawing
PARS	Publicly Available Records System
PSEG	PSEG Nuclear, LLC
RCIC	Reactor Core Isolation Cooling
RHR	Residual Heat Removal
RSP	Remote Shutdown Panel
SDP	[NRC] Significance Determination Process
SR	Surveillance Requirement
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
V	Volts