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

February 2, 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 – INTEGRATED INSPECTION REPORT 05000354/2015004

Dear Mr. Braun:

On December 31, 2015, 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 January 14, 2016, with Mr. Paul Davison, Site Vice President 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 one finding of very low safety significance (Green) in this report. This finding did not involve a violation of NRC requirements. Further, inspectors documented a licensee-identified violation which was determined to be of very low safety significance in this report. The NRC is treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the non-cited violation or the finding 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.

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 05000354/2015004
w/Attachment: Supplementary Information

cc w/encl: Distribution via ListServ

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 05000354/2015004
w/Attachment: Supplementary Information

cc w/encl: Distribution via ListServ

DISTRIBUTION: (via email)

DDorman, RA
DLew, DRA
RLorson, DRS
BSmith, DRS
MScott, DRP
JColaccino, DRP
FBower, DRP
RBarkley, DRP
EDiPaolo, DRS
CLally, DRP
MDraxton, DRP
JFuria, DRS
JNoggle, DRS
NEmbert, DRS
CHighley, DRP
CSantos, RI, OEDO
DJackson, DRS
JRogge, DRS
JHawkins, DRP, SRI
SHaney, RI
COtt, DRP, AA
RidsNrrPMHopeCreek Resource
RidsNrrDorlLpl1-2Resource
ROPreports Resource

DOC NAME: G:\DRP\BRANCH3\INSPECTION REPORTS\HOPE CREEK\15Q4\HC IR 2015004 FINAL.DOCX
ADAMS Accession No. **ML16033A381**

☑ SUNSI Review		☑ Non-Sensitive ☐ Sensitive		☑ Publicly Available ☐ Non-Publicly Available	
OFFICE	RI/DRP	RI/DRP	RI/DRP		
NAME	JHawkins/FLB for via email	MDraxton/ MSD	FBower/ FLB		
DATE	02/ 02/16	02/02/16	02/02/16		

OFFICIAL RECORD COPY

U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No.	50-354
License No.	NPF-57
Report No.	05000354/2015004
Licensee:	Public Service Enterprise Group (PSEG) Nuclear LLC
Facility:	Hope Creek Generating Station (HCGS)
Location:	P.O. Box 236 Hancocks Bridge, NJ 08038
Dates:	October 1, 2015 through December 31, 2015
Inspectors:	J. Hawkins, Senior Resident Inspector S. Haney, Resident Inspector E. DiPaolo, Senior Reactor Inspector N. Embert, Operations Engineer J. Furia, Senior Health Physicist R. Nimitz, Senior Health Physicist A. Patel, Oyster Creek Senior Resident Inspector R. Vadella, Reactor Engineer
Approved By:	Fred L. Bower, III, Chief Reactor Projects Branch 3 Division of Reactor Projects

TABLE OF CONTENTS

SUMMARY

IR 05000354/2015004; 10/01/2015 – 12/31/2015; Hope Creek Generating Station; Operability Determinations and Functionality Assessments.

This report covered a three-month period of inspection by the resident inspectors and announced inspections performed by regional inspectors. Inspectors identified one finding of very low safety significance (Green) and one licensee-identified violation which was determined to be of very low safety significance in this report. The licensee-identified violation was determined to be violation of NRC requirements. 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, "Components Within 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: Mitigating Systems

- Green. 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 functionality of the MCR during an 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 identifying a potential CAQ receive the appropriate screening by operators, engineering and management staff. PSEG also revised SBO procedures to ensure the proper electrical loads were included when required to be shed in the event of an SBO event. 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 the capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the potential existed for the analyzed MCR heat load to be exceeded, affecting the ability of the MCR to remain functional during an SBO event. 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 functionality of the MCR during an 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. In this case, PSEG did not properly classify or evaluate an identified CAQ per their procedures. [P.2] (Section 1R15)

Other Findings

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

REPORT DETAILS

Summary of Plant Status

The Hope Creek Generating Station began the inspection period starting up in Operational Condition 2 following an unplanned automatic reactor scram on September 28, 2015. The unit was synchronized to the grid on October 2, 2015. The unit was returned to 100 percent rated thermal power (RTP) on October 3, 2015. On November 3, 2015, operators reduced power to approximately 80 percent to support planned maintenance on the Red Lion offsite power line. Operators returned the unit to full RTP on November 11, 2015. On December 19, 2015, operators reduced power to approximately 60 percent to support planned turbine valve testing, control rod scram time testing, and control rod sequence exchange. Operators returned the unit to full power on December 20, 2015. 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 – 1 sample)

Readiness for Seasonal Extreme Weather Conditions

a. Inspection Scope

The inspectors reviewed PSEG's preparations for the onset of extremely low outside temperatures experienced the week of December 28, 2015. The inspectors reviewed the abnormal operating procedure, HC.OP-AB.MISC-0001, "Acts of Nature," for responding to adverse weather conditions. The inspectors walked down the emergency diesel generators (EDGs) and the switchyard to ensure compliance with PSEG's cold weather procedures. The inspectors also verified that operator actions defined in PSEG's adverse weather procedure maintained the readiness of essential systems. Documents reviewed for each section of this inspection report are listed in the Attachment.

b. Findings

No findings were identified.

1R04 Equipment Alignment

Partial System Walkdowns (71111.04 – 3 samples)

a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- 'D' station service water (SSW) pump during 'B' SSW pump planned maintenance on October 16
- Reactor core isolation cooling (RCIC) system on October 26
- Remote shutdown panel on December 5

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 updated final safety analysis report (UFSAR), technical specifications (TSs), work orders (WOs), notifications, 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.

1R05 Fire Protection

Resident Inspector Quarterly Walkdowns (71111.05Q - 4 samples)

a. Inspection Scope

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

- Review of compensatory measure fire watch for 1PS15 panel power supply failure on October 19
- Review of degraded structural steel fireproofing in ‘B’ EDG room on November 12
- Instrument and service air equipment mezzanine area the week of November 22
- Review of compensatory measures for fire water storage tank inspections during the week of November 30

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – 1 samples)

Internal Flooding Review

a. Inspection Scope

The inspectors reviewed the UFSAR, the site flooding analysis, and plant procedures to identify internal flooding susceptibilities for the site. The inspectors review focused on the EDG rooms. The inspectors' review verified the adequacy of equipment seals located below the flood line, floor and water penetration seals, and common drain lines. The inspectors also reviewed the CAP to determine if PSEG was identifying and correcting problems associated with both flood mitigation features and site procedures for responding to flooding.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program and Licensed Operator Performance

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

a. Inspection Scope

The inspectors observed licensed operator annual operating simulator exam on October 14, which included a reactor water cleanup pump trip, a safety auxiliaries cooling system (SACS) pump trip, a loss of coolant accident, an anticipated transient without scram, a control rod drive system flow control valve failure, and a high pressure coolant injection (HPCI) pump start failure. The inspectors evaluated operator performance during the simulated event and verified completion of risk significant operator actions, including the use of abnormal and emergency operating procedures. 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 control room supervisor. Additionally, the inspectors assessed the ability of the crew and training staff to identify and document crew performance problems.

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors observed and reviewed unit startup activities on September 30 and October 2. The inspectors observed infrequently performed test or evolution briefings,

pre-shift briefings, and reactivity control briefings to verify that the briefings met the criteria specified in PSEG's Operations Section Expectations Handbook and PSEG Administrative Procedure OP-AA-329, "Conduct of Infrequently Performed Tests and Evolutions," Revision 1. Additionally, the inspectors observed test performance to verify that procedure use, crew communications, and coordination of activities between work groups similarly met established expectations and standards.

b. Findings

No findings were identified.

.3 Licensed Operator Requalification Program (71111.11A – 1 sample)

a. Inspection Scope

On November 17, one NRC region-based inspector conducted an in-office review of results of licensee-administered annual operating tests for 2015, for HCGS operators. The biennial requalification written examination was not administered in 2015. The inspection assessed whether Pass/Fail rates were consistent with the guidance of NRC Manual Chapter 0609, Appendix I, and "Operator Requalification Human Performance Significance Determination Process (SDP)". The review verified that the failure rate (individual or crew) did not exceed 20%.

- 1 out of 47 operators failed at least one section of the Annual Exam. The overall individual failure rate was 2.2%.
- 0 out of 19 crews failed the simulator test. The crew failure rate was 0%.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12Q – 2 samples)

a. Inspection Scope

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

- Review of effluent radiation monitor system (RMS) scoping

- Review of the 'A' fuel pool cooling pump after significant oil loss was discovered on October 5

b. Findings

No findings were identified.

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

a. Inspection Scope

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

- SACS heat exchanger relief valve maintenance due to a missed past operability evaluation on October 14
- 5023 New Freedom offsite line planned maintenance on October 22
- 00-K-107 Service Air compressor unplanned maintenance following a trip on November 16
- 'C' SSW pump and HPCI planned maintenance on December 3

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 4 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 'C' residual heat removal (RHR) flow transmitter equalizing valve mis-positioning on August 31
- Review of the SBO calculations as a result of NOTF 20702550 on September 14
- Review of the SACS heat exchanger relief valve maintenance due to a missed past operability evaluation on October 14
- Review of the overdue environmental qualification preventive maintenance for six conduit seals housing HPCI and RCIC temperature switches on December 11

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, such as in the case of operator workarounds (OWAs), the inspectors determined whether the measures in place would function as intended and were properly controlled by PSEG. Based on the review of the selected OWAs listed above, the inspectors verified that PSEG identified OWAs at an appropriate threshold and addressed them in a manner that effectively managed OWA-related adverse effects on operators and SSCs.

b. Findings

Introduction: The inspectors identified a finding because PSEG did not follow procedures to ensure that an identified CAQ was adequately evaluated, documented, and corrected. Specifically, PSEG identified a CAQ associated with an SBO design calculation used to justify the 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 functionality of the MCR during an SBO event and required PSEG to complete a detailed TE to prove functionality was maintained.

Description: An SBO event assumes that the initiating event is a loss of offsite power to the site. All sites are required to have procedures and equipment to ensure the satisfactory performance of necessary decay heat removal systems are maintained for the required SBO duration. Hope Creek's SBO analysis documents the ability of the site to cope with a four hour SBO, with subsequent restoration of offsite power, with the reactor core remaining covered.

PSEG design calculation, H-1-GK-MDC-0735, Electrical Heat Load during an SBO Event (CALC-0735), calculated the amount of heat dissipated by electrical equipment in dominant areas of concern (DACs) during an SBO event. HC.DE-PS.ZZ-0041, Hope Creek SBO Program, Section 5.2.7, Hope Creek SBO Effects of Loss of Ventilation, states that equipment located in DAC "condition 1" rooms are considered to be of low concern with respect to elevated temperature effects and will likely require no specific actions to assure functionality for a four hour SBO. Condition 1 is defined by a steady-state temperature of 120 degrees Fahrenheit. PSEG defines the MCR (Room 5110) as a condition 1 room and states that NUMARC 87-00, Section 2.7.2 assures functionality of equipment in condition 1 rooms if the room temperature is less than or equal to 120 degrees Fahrenheit. The electrical heat loads from CALC-0735 are the design input for PSEG design calculation, H-1-GK-MDC-0734, Loss of Ventilation during SBO (CALC-0734), which determines the maximum steady state room air temperatures in the DACs, that includes the MCR.

During a daily review of NOTFs conducted on September 14, the inspectors noted that NOTF 20702550 documented PSEG design engineering's identification of a design calculation error in CALC-0735. This error involved an unaccounted electrical load of 2,520 watts that was incorrectly not included in the MCR heat load total (22,778.7 watts).

Prior to the identification of the error, CALC-0734 determined the maximum steady state MCR temperature to be 118.8 degrees Fahrenheit. This calculated value was less than 120 degrees Fahrenheit that assures functionality of the SBO equipment located in the DACs per NUMARC 87-00, Section 2.7.2 guidance.

The inspectors observed that PSEG operators screened NOTF 20702550 on September 14 as an operable but degraded or non-conforming condition requiring an operability evaluation (OPEVAL) or TE. NOTF 20701091 was created for the performance of the OPEVAL. The inspectors found that operations re-screened the issue on September 17, 2015, as functional with 'no condition adverse to quality' and characterized the issue as a 'calculation and procedure issue with no effect on current plant conditions.

On September 17, 2015, engineering also reviewed the NOTF and considered the issue a CC-AA-11 non-conformance as deficiency in characteristic, documentation, or procedure that renders the quality of a SSC or activity unacceptable or indeterminate. Therefore the inspectors considered this issue a CAQ in accordance with LS-AA-120 Section 2.2 that defines a CAQ, in part, as deficiencies and non-conformances associated with SSCs and conditions that impact regulated events such as SBO. The inspectors noted that by September 25, 2015, PSEG's Management Review Committee (MRC) and Station Ownership Committee (SOC) had both reviewed the initial NOTF, cancelled the assigned OPEVAL, and failed to create an action to perform the required evaluation of the non-conforming condition or an action to review functionality of the MCR during an SBO event.

On September 25, 2015, the inspectors met with PSEG regulatory assurance and engineering personnel to discuss the non-conforming condition and questioned why no evaluation or review of past operability of the issue had been performed per PSEG procedure, OP-AA-108-115, Operability Determinations and Functionality Assessments. Due to the inspectors' questions, PSEG initiated NOTF 20704285 documenting the inspector's concerns, and on September 28, 2015, PSEG returned the original NOTF to SOC, citing the need for a documented basis for current and past operability and initiated a TE (70180302). On October 19, 2015, PSEG engineering recognized additional errors in CALC-0735, and calculated the revised MCR heat load total as 25,298.7 watts.

PSEG's TE (70180302), completed on October 22, 2015, 38 days after the CAQ was identified, determined that using the revised heat load of 25,298.7 watts, which included the unaccounted for electrical load of 2,520 watts, in CALC-0734 yielded a maximum steady-state temperature of 122.4 degrees Fahrenheit in the MCR. This result being above 120 degrees Fahrenheit validated the initial CAQ and the potential to impact the functionality of the MCR during an SBO event.

The TE also used newly assumed '*realistic pre-event temperatures*' (or less conservative initial temperatures than were previously used with the design basis calculations) for the MCR and surrounding areas to acquire additional margin in the design calculation. These temperatures were taken by PSEG from other design calculations used for the MCR cooling and ventilation design. Utilizing these temperatures as an input to CALC-0734, PSEG determined that the real MCR temperature would only get as high as 116 degrees Fahrenheit, or 4 degrees below the maximum acceptable room temperature to assure current functionality.

As noted previously, PSEG's procedure, LS-AA-120, Issue Identification and Screening Process, Section 2.2 defines CAQ as, in part, as deficiencies and non-conformances associated with SSCs and conditions that impact regulated events such as SBO. The inspectors determined that PSEG failed to adequately evaluate, document, and correct the identified CAQ until the inspectors questioned the site's classification and evaluation of the issue. 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 also revised SBO procedures to ensure the proper electrical loads were included when required to be shed in the event of an SBO event. PSEG documented the issue in the CAP as NOTF 20704285.

Analysis. The failure to follow PSEG procedures, LS-AA-120 and OP-AA-108-115, to adequately evaluate, document, and correct a CAQ associated with an SBO design calculation used to justify main control room MCR heat load during a loss of ventilation was a performance deficiency that was reasonably within PSEG's ability to foresee and correct and which should have been prevented. The issue was evaluated in accordance with IMC 0612, Appendix B, and determined to be more than minor, and therefore a finding, since it was associated with the human performance attribute of the Mitigating Systems cornerstone and adversely affected its objective to ensure capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the calculation error resulted in the main control room temperatures exceeding the functionality temperature limit of the installed equipment until additional calculations could be completed. 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 functionality of an 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 an 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 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, PSEG did not ensure that this issue of concern was properly classified, prioritized, and evaluated according to its safety significance, and operability and reportability determinations were not developed, when appropriate. (P.2)

Enforcement: SBO analysis for the MCR in not safety-related and no violation of regulatory requirements occurred. PSEG documented the issue in the CAP as NOTF 20704285. Because this finding does not involve a violation and has very low safety significance, it is identified as a finding. **(FIN 05000354/2015004-01, Failure to Follow CAP Procedures to Ensure Functionality of the Main Control Room during a Station Blackout)**

1R19 Post-Maintenance Testing (71111.19 – 4 samples)

a. Inspection Scope

The inspectors reviewed the post-maintenance tests for the maintenance activities listed below to verify that procedures and test activities ensured system operability and functional capability. The inspectors reviewed the test procedure to verify that the procedure adequately tested the safety functions that may have been affected by the maintenance activity, that the acceptance criteria in the procedure was consistent with the information in the applicable licensing basis and/or design basis documents, and that the procedure had been properly reviewed and approved. The inspectors also witnessed the test or reviewed test data to verify that the test results adequately demonstrated restoration of the affected safety functions.

- Filtration, recirculation, and ventilation system vent RMS flow control loop malfunction on October 15 (Order 60126154)
- 'B' SSW pump and motor replacement on October 24 (Orders 30104990 and 30137509),
- 'C' residual heat removal pump minimum flow check valve following valve disassembly on November 20 (Order 60127049)
- 00-K-107 service air compressor reassembly and testing on December 5 (Order 30259246)

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 3 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 operability test on August 4
- HC.OP-IS.EG-0001, 'A' SACS pump inservice test on October 30
- HC.OP-IS.BC-0102, RHR subsystem 'B' valves inservice test on November 14

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation (71114.06 – 1 sample)

Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors evaluated the conduct of a routine PSEG emergency drill on December 15 to identify any weaknesses and deficiencies in the classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in the simulator, technical support center, and emergency operations facility to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. The inspectors also attended the drill critique to compare inspector observations with those identified by PSEG staff in order to evaluate PSEG's critique and to verify whether the PSEG staff was properly identifying weaknesses and entering them into the CAP.

b. Findings

No findings were identified.

2. RADIATION SAFETY

Cornerstones: Occupational and Public Radiation Safety

2RS8 Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation (71124.08 – 1 sample)

a. Inspection Scope

The inspectors verified the effectiveness of PSEG – Hope Creek's programs for processing, handling, storage, and transportation of radioactive material. The inspectors used the requirements of 49 CFR 170 through 177; 10 CFR 20, 37, 61, and 71; applicable industry standards; regulatory guides, and procedures required by TSs as criteria for determining compliance.

Inspection Planning

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

Radioactive Material Storage

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

Radioactive Waste System Walk-down

The inspectors walked down the following items and areas:

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

Waste Characterization and Classification

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

Shipment Preparation

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

Shipping Records

The inspectors reviewed selected non-excepted package shipment records.

Identification and Resolution of Problems

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

b. Findings

One finding was identified by the licensee, as described in Section 4OA7.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification (71151 – 3 samples)

.1 Safety System Functional Failures

a. Inspection Scope

The inspectors sampled PSEG's submittals for the Safety System Functional Failures PI for Hope Creek for the period of January 1, 2015, through December 31, 2015. To determine the accuracy of the PI data reported during those periods, inspectors used definitions and guidance contained in Nuclear Energy Institute (NEI) Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, and NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 10 CFR 50.73." The inspectors reviewed PSEG's operator narrative logs, operability assessments, maintenance rule records, maintenance WOs, condition reports, event reports and NRC integrated inspection reports to validate the accuracy of the submittals.

b. Findings

No findings were identified.

.2 Occupational Exposure Control Effectiveness

a. Inspection Scope

During the weeks of November 2, and December 14, 2015, the inspectors sampled PSEG submittals for the occupational radiological occurrences PI for the fourth quarter 2014 through the third quarter 2015. The inspectors used PI definitions and guidance contained in the NEI Document 99-02, Revision 7, to determine the accuracy of the PI data reported. The inspectors reviewed PSEG's assessment of the PI for occupational radiation safety to determine if the related data was adequately assessed and reported. The inspector reviewed electronic personal dosimetry accumulated dose alarms, dose reports, and dose assignments for any intakes that occurred during the time period reviewed to determine if there were any unreported PI occurrences. The inspectors also conducted walk-downs of various locked high and very high radiation area entrances to determine the adequacy of the controls in place for these areas.

b. Findings

No Findings were identified.

.3 Radiological Effluent TS/ODCM Radiological Effluent Occurrences

a. Inspection Scope

During the weeks of November 2 and December 14, 2015, the inspectors sampled PSEG submittals for the radiological effluent TS/ODCM radiological effluent occurrences PI for the fourth quarter 2014 through the third quarter 2015. The inspectors used PI definitions and guidance contained in the NEI Document 99-02, Revision 7, to determine if the PI data was reported properly. The inspectors reviewed the public dose

assessments (gaseous and liquid) for the PI for public radiation safety to determine if related data was accurately calculated and reported.

The inspectors reviewed PSEG's issue report database and selected individual reports generated since this indicator was last reviewed to identify any potential occurrences such as unmonitored, uncontrolled, or improperly calculated effluent releases that may have impacted offsite dose. The inspectors reviewed gaseous and liquid effluent summary data and the results of associated offsite dose calculations to determine if indicator results were accurately reported. Included in this review were PSEG calculations and public dose projections associated with effluent releases from the Turbine Building Roof Turbine Lube Oil vents.

b. Findings

No Findings were identified.

4OA2 Problem Identification and Resolution (71152 – 3 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 corrective actions, 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 Part 21.

b. Findings

No findings were identified.

.2 Semi-Annual Trend Review

a. Inspection Scope

The inspectors performed a semi-annual review of site issues, 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, maintenance rule assessments, and maintenance or CAP backlogs. The inspection also reviewed PSEG's CAP database for the third and fourth quarters of 2015 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

No findings were identified.

The inspectors determined that any performance deficiencies associated with the trends discussed below were either captured in previous findings (as noted below), or were of minor significance in accordance with IMC 0612, Appendix B.

Maintenance Rule Program Implementation

The inspectors have identified multiple examples of PSEG's failure to evaluate the impact of an equipment issue on interfacing systems, including:

- In September 2013, the inspectors identified that PSEG failed to evaluate the impact of a failure of a feedwater crosstie valve on the feedwater sealing functions for the reactor core isolation cooling system and HPCI system. This observation resulted in the creation of a new feedwater system maintenance rule function and subsequent maintenance preventable functional failure classification that would not have been otherwise counted. (NOTF 20619913)
- In May 2014, the inspectors identified that PSEG failed to evaluate safety relief valve setpoint failures under all applicable interfacing system functions. The condition was evaluated for the automatic depressurization system functions, but not for the main steam functions. (NOTF 20650346)
- In August 2015, the inspectors identified that PSEG failed to evaluate the loss of the 10B431 480VAC (alternating current) 1E motor control center (MCC) as a Maintenance Rule functional failure of the interfacing 1E 480VAC system. This is the third instance identified in three years of PSEG failing to evaluate the impact of equipment issues on interfacing systems. This observation resulted in the assignment of a maintenance preventable functional failure to the 480VAC 1E MCC system that would not have been otherwise counted. (NOTF 20702217)

Along with the items described above, during 2015, the inspectors and the NRC PI&R team inspectors observed multiple other examples of PSEG's failure to evaluate the impact of an equipment issue on interfacing systems. These repetitive observations related to deficiencies with PSEG's interfacing system maintenance rule screening resulted in PSEG creating a maintenance rule panel consisting of the maintenance rule program coordinator and engineers that performs an independent, periodic review of issues identified in the CAP to ensure all appropriate screenings are assigned. The inspectors determined that the corrective action implemented to address the issue was reasonable to resolve the identified deficiencies. The inspectors determined all the issues above screened to minor in accordance with IMC 0612, Appendix E, because the systems' preventive maintenance still demonstrated effective control of system equipment performance as provided in paragraph (a)(2) of the maintenance rule.

Locked High Radiation Area (LHRA) Controls

In the semi-annual trend in Section 4OA2.2 of the second quarter 2015 Hope Creek inspection report (IR 05000354/2015002), the inspectors documented a review of multiple instances of improperly secured LHRA doors. Subsequently, the inspectors documented a Green NCV in the third quarter 2015 Hope Creek inspection report (NCV

05000354/2015003-02) when a worker did not comply with a radiological barrier and posting, and entered a LHRA without proper authorization.

The inspectors reviewed a focused area self-assessment initiated to evaluate the LHRA control events (Order 70175974). The inspectors performed a review of the design change installed as a corrective action to address the equipment issues that resulted in improperly secured LHRA doors. The design change installed an alternate locking mechanism to address degraded door locks for LHRA doors. The inspectors performed walkdowns and challenged the LHRA barriers that have had the new alternate locking mechanisms installed. The inspectors reviewed and checked the storage and control measures in place for the alternate locking mechanisms that are maintained by the Radiation Protection department. The inspectors determined that the corrective actions implemented to address the issue were reasonable to resolve the identified deficiencies.

.3 Annual Follow-up Sample: Masterpact 480 Volt Circuit Breaker Trips

a. Inspection Scope

The inspectors performed an in-depth review of PSEG's identification, evaluation, and resolution regarding numerous sporadic trips of 480 volt safety-related Masterpact circuit breakers. Specifically, Hope Creek experienced 25 sporadic breaker trips immediately following breaker closure since the Masterpact breakers were installed in plant switchgear in 2004 as replacements for obsolete breakers. The Masterpact circuit breakers uses a micrologic trip unit to provide protection. The trip unit monitors breaker parameters and trips the breaker on overcurrent (short time and long time) and ground fault. The micrologic trip units also contain an internal advanced protection (AP) feature to protect the breaker and associated load in the event of a trip unit failure. For most of the sporadic trips following breaker closure events, the micrologic unit indicated the trip feature (overcurrent, ground fault, or AP that caused the breaker to trip. There were five trips that occurred and no trip feature was indicated. For all of these events, no abnormalities were found with the associated circuit. Following a failure on February 25, 2015, PSEG initiated an apparent cause evaluation (ACE) to determine the cause of the sporadic trips. The inspectors performed an in-depth review of PSEG's ACE and corrective actions associated with the issue documented in Order 70174219.

The inspectors assessed PSEG's problem identification threshold, causal analysis, extent of condition reviews, and the prioritization and timeliness of corrective actions to determine whether PSEG was appropriately identifying, characterizing, and correcting problems associated with these issues and whether the planned or completed corrective actions were appropriate. The inspectors compared the actions taken to the requirements of PSEG's CAP and 10 CFR 50, Appendix B. In addition, the inspectors reviewed documentation associated with this issue, interviewed engineering and maintenance personnel, and information related to testing performed by outside vendors.

b. Findings and Observations

No findings of significance were identified.

To determine the cause of the sporadic trips, PSEG assembled a complex troubleshooting team to analyze the failures. Twelve potential causes were identified. The majority of the potential causes were either ruled out or partially ruled out by the complex troubleshooting. The ACE concluded that the most probable cause was inadequate protection of the breakers' micrologic trip unit against excessive electro-magnetic interference (EMI) in the vicinity of the circuit breakers. PSEG came to this conclusion because 17 of the spurious trips occurred within the same two circuit breaker cubicles locations on all eight Class 1E 480 volt unit substations. The circuit breaker cubicles are physically located in close proximity to 4kV/480V transformers and the affected circuit breakers power induction motors with large starting currents. Based on this, the inspectors concluded that PSEG's most probable apparent cause of sporadic breaker trips being excessive EMI was reasonable. PSEG's corrective actions included working with an outside vendor and the circuit breaker supplier to perform an in-plant EMI survey to confirm that excessive EMI occurs during breaker closure at the breaker cubicles involved and to develop repairs or modifications to protect against the EMI.

In April 2015, PSEG received the results of the in-plant EMI survey from an outside vendor. The report concluded that the EMI profile in the area of the breaker cubicles associated with sporadic circuit breaker trips was elevated upon circuit breaker closure, however, the levels did not exceed the levels which the circuit breakers were qualified to. The outside vendor recommended that additional transient testing of the breakers and micrologic trip units be performed under full load and during dynamic conditions including breaker closure. Additional testing was performed by the circuit breaker supplier on circuit breakers and micrologic trip units which had experienced sporadic trips. However, no sporadic trips could be recreated during the testing.

Based on the results of the testing, PSEG revisited complex troubleshooting of the problem. All possible failure mechanisms were refuted with the exception of a possible flaw in the digital software of the Masterpact micrologic trip units. At the time of the inspection, PSEG was planning on having an outside vendor perform an independent validation of the complex troubleshooting that PSEG completed to verify that there were no other potential failure mechanisms. PSEG then planned to perform a review of the micrologic trip unit software.

The inspectors noted that the original due date for completing corrective actions was June 19, 2015. At the time of the inspection, the due date, which had been extended four times, was January 19, 2016. Due to the complexity of problem, PSEG has had to work with outside vendors which has contributed to the delays in implementing corrective actions. However, the inspectors concluded that PSEG could have taken actions to address other potential causes other than EMI (i.e., potential micrologic software flaw) in parallel with additional testing following the discovery that the EMI levels at the effected breaker cubicles did not exceed the levels that the circuit breakers were qualified to.

Order 70174319 contained an action item to revise the apparent cause if testing, the EMI survey, or vendor recommended actions determined that EMI was not the cause of the breaker trips. However, the inspectors noted that there were no items in the CAP to schedule or track actions to further investigate the potential digital software flaw. The inspectors noted that Operations was tracking the issue on the Operations Concerns List which appeared to be driving the actions to address the potential flaw. PSEG entered

the issue into the CAP as NOTF 20711720 to formally track, direct actions, and to initiate corrective actions within the CAP as a result of the inspectors' observation.

Based on the information described above, the inspectors did not identify any findings of significance. However, the inspectors briefed PSEG on two observations: 1) PSEG's corrective actions were not timely and could have pursued other potential causes in parallel; and, 2) PSEG's CAP did not have any actions to further investigate the identified potential digital software flaw with the breakers. While neither of these observations were determined to be more than minor by the inspectors, PSEG entered them both of the inspector's observations into the CAP as NOTF 20711720.

.4 Annual Follow-up Sample: Review of Root Cause Evaluation Procedure Implementation

a. Inspection Scope

The inspectors performed an in-depth review of PSEG's root cause evaluations for a loss of shutdown cooling that occurred on April 11, 2015 (70175589), and a redundant reactivity control system (RRCS) automatic actuation that resulted in a reactor scram on September 28, 2015 (70180315). This review by the inspectors was the direct result of observations made during the recent NRC PI&R team inspection conducted in February 2015 (See IR 05000354/2015008).

The inspectors assessed PSEG's problem identification threshold, problem analysis, extent of condition reviews, compensatory actions, and the prioritization and timeliness of PSEG's corrective actions to determine whether PSEG was appropriately identifying, characterizing, and correcting problems associated with these two issues and whether the planned or completed corrective actions were appropriate. The inspectors compared the actions taken to the requirements of PSEG's CAP and 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action" and 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings."

b. Findings and Observations

No findings were identified.

The inspectors reviewed previous observations made by the NRC PI&R team in February 2015, that three out of six RCEs over the last two years had problems with the implementation of the RCE procedure, the implementation of corrective actions, and the ability of PSEG to follow through on corrective actions taken to prevent the reoccurrence of significant conditions adverse to quality. Along with the information reviewed above, the inspectors reviewed PSEG's RCE Manual, LS-AA-125-1001, to ensure PSEG was following the established processes in their procedure for a consistent outcome.

The inspectors observed station challenge meetings and MRC review meetings to assess PSEG's ability to appropriately challenge the RCE conclusions and accurately assign corrective actions to the root and contributing causes. The inspectors noted that PSEG implemented a knowledgeable 'Devil's Advocate' during all of these meetings who effectively challenged the quality of the reviewed RCE products. The inspectors also noted that PSEG appropriately diversified each of the RCE teams, utilizing a multidisciplinary team to conduct the RCEs.

For both RCEs performed, the inspectors concluded that PSEG appropriately implemented the RCE procedure and addressed the root and contributing causes with appropriate corrective actions.

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

- An unplanned automatic reactor scram on September 28, 2015

b. Findings

No findings were identified.

4OA6 Meetings, including Exit

On January 16, 2016, the inspectors presented the inspection results to Mr. P. Davison, Site Vice President, 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.

4OA7 Licensee-Identified Violations

The following violation of very low safety significance (Green) was identified by the licensee and is a violation of NRC requirements which meet the criteria of the NRC Enforcement Policy, for being dispositioned as a non-cited violation:

- From 2010 to 2014, Hope Creek made a total of 12 shipments of radioactive waste for disposal, four of which contained a category 1 quantity of radioactive material, and eight which contained a category 2 quantity of radioactive material of concern. PSEG did not implement a transportation security plan for these shipments in violation of the requirements of 10 CFR 71.5, "Transportation of Licensed Material," and 49 CFR 172, Subpart I, "Safety and Security Plans." This performance deficiency adversely affected the Public Radiation Safety cornerstone attribute of Program and Process based on inadequate procedures associated with the transportation of radioactive material. The finding was determined to be of very low safety significance (Green) because Hope Creek

had an issue involving transportation of radioactive material, but it did not involve: (1) a radiation limit that was exceeded; (2) a breach of package during transport; (3) a certificate of compliance issue; (4) a low level burial ground non-conformance; or (5) a failure to make notifications or provide emergency information. This issue was documented in the PSEG's CAP as NOTF 20674767. Corrective actions included issuance of new procedure RP-AA-600-1009, revision of procedure LS-AA-1020, "Implementation of Significant Rules and Orders," Revision 1, and contracting with a vendor to receive regular, prompt notifications of potentially applicable rule changes in the Federal Register.

ATTACHMENT: SUPPLEMENTARY INFORMATION

SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

P. Davison, Site Vice President
E. Carr, Plant Manager
D. Bartlett, Engineering Branch Manager Electrical and Instrumentation and Controls
P. Bellard, IST Program Engineer
H. Berrick, Regulatory Assurance Learning Programs Specialist
C. Bersak, CAP Programs Specialist
M. Biggs, Maintenance Rule Program Coordinator
L. Clark, Instrument Supervisor
A. Contino, System Engineer
B. Daly, Manager, Nuclear Environmental Affairs, Sustainability
S. Dennis, Hope Creek Operations Training
G. Klekos, Radioactive Materials Shipper
P. Koppel, Maintenance Engineer
A. Kraus, Manager, Environmental Affairs
T. MacEwen, Regulatory Assurance
J. Priest, Nuclear Shift Operations Manager
P. Quick, Emergency Preparedness Program Manager
L. Sinclair, Emergency Preparedness Technical Specialist
J. Thompson, Procurement Engineer
K. Thompson, Radiological Engineer
K. Timko, System Engineer
H. Trimble, Radiation Protection Manager
C. Wend, Manager, Radiological Technical Support
J. Russel, Chemistry staff
D. Wahl, Chemistry staff

Others

J. Vouglitois, Nuclear Engineer, NJ Department of Environmental Protection, Bureau of Nuclear Engineering

LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATED

Opened/Closed

05000354/2015004-01	FIN	Failure to Follow CAP Procedures to Ensure Functionality of the Main Control Room during a Station Blackout (Section 1R15)

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures
HC.OP-AB.MISC-0001, Acts of Nature, Revision 28
OP-AA-108-111-1001, Severe Weather and Natural Disaster Guidelines, Revision 13

Notifications
20689082

Section 1R04: Equipment Alignment

Procedures
HC.OP-SO.EA-0001, Service Water System Operation, Revision 39
HC.OP-ST.BD-0001, RCIC Piping and Flow Path Verification – Monthly, Revision 14
HC.OP-ST.EA-0001, Service Water Flow Path Verification – Monthly, Revision 11
HC.OP-ST.SV-0001, Remote Shutdown Monitoring Instrumentation Channel Check – Monthly, Revision 26

Notifications
20706937

Drawings
C-0931-0, Containment Vessel Requirements Suppression Chamber Penetrations Plans, Sections & Details, Revision 18
J-J1301-1, Reactor Bldg Area 13 Plan at EL. 54'-0"
M-10-1, Sheet 1, Service Water, Revision 55
M-10-1, Sheet 2, Service Water, Revision 44
M-49-1, Sheet 1, Reactor Core Isolation Cooling, Revision 18
M-50-1, Sheet 1, RCIC Pump Turbine, Revision 19

Section 1R05: Fire Protection

Procedures
ER-AA-2002, System Health Indicator Program, Revision 14
ER-AA-2030, Conduct of Plant Engineering Manual, Revision 12
FP-AA-015, Compensatory Measure Firewatch Program, Revision 6
FP-HC-004, Actions for Inoperable Fire Protection – Hope Creek Station, Revision 3
FRH-II-531, Hope Creek Pre Fire Plan Diesel Generator Rooms, Revision 8
FRH-III-141, Hope Creek Pre-Fire Plan, Turbine Building Elevation 123' (Room 1401 Mezzanine Air Equipment Area), Revision 4
HC.OP-AB.COMP-00001, Instrument and/or Service Air, Revision 7
LS-AA-120, Issue Identification and Screening Process, Revision 13
LS-AA-125, Corrective Action Program, Revision 21
MA-AA-716-230, Predictive Maintenance Program, Revision 8
MA-AA-716-230-1001, Oil Analysis Interpretation Guideline, Revision 11
MA-AA-716-230-1010, Fluid Leak Management Program, Revision 3
OP-AA-102-102, General Area Checks and Operator Field Rounds, Revision 8
OP-AA-108-111, Adverse Contingency Monitoring and Contingency Planning, Revision 11
WC-AA-106, Work Screening and Processing, Revision 17

Notifications (*NRC-identified)

20670595	20676716	20690665	20701189	20702555	20705323
20705525	20706887	20707835	20710548	20712663	20712672
20712674	20712690	20712729	20710293*		

Maintenance Orders/Work Orders

30186636	30197172	30197310	30259173	30259246	30264931
70172400	70174237	70182267			

Miscellaneous

H-C-KC-MSE-0825, 10CFR50.59 Review and Safety Evaluation – Use of Salem Fire Suppression Water System as a Backup to Hope Creek, Revision 0
S-C-FP-MSE-0824, 10CFR50.59 Review and Safety Evaluation – Use of Hope Creek Fire Suppression Water System as a Backup to Salem, Revision 0

Section 1R06: Flood Protection Measures

Drawings

M-5003, Fire Protection and Detection Plan El. 102'-0", Revision 20
M-97-0, Bldg. & Equip. Drains – Aux. Bldg. Control & Diesel Areas Oily, Normal & Chemical Waste Systems, Revision 16
P-2703-1, Piping Area Drawing Aux. Bldg. Area 27 Plan at El. 102'-0", Revision 3
P-2803-1, Piping Area Drawing Aux. Bldg. Area 28 Plan at El. 102'-0", Revision 3

Miscellaneous

Calculation Number 19-0018, Max. Flood Levels in Control/DG Areas, Revision 8
HC-PRA-012, Internal Flood Evaluation Summary and Notebook, Revision 2
HC-PRA-017, Internal Flood Walkdown Notebook, Revision 0

Section 1R11: Licensed Operator Requalification Program

Procedures

HC.MD-PM.ZZ-0010, Control Panel Preventive Maintenance, Revision 15
HC.OP-AB.ZZ-0003, Reactor Scram, Revision 3
HC.OP-IO.ZZ-0003, Startup from Cold Shutdown to Rated Power, Revision 108
MA-AA-716-012, Post Maintenance Testing, Revision 20
MA-AA-716-232-1004, Failure Analysis Tracking and Reporting, Revision 2
TQ-AA-106-0305, Licensed Operator Requalification Training Examination Administration Job Aid, Revision 5

Notifications

20711484	20497914	20698801	20704488

Maintenance Orders/Work Orders

30233455	60097601	60125943	70083956	70180697	80115116

Other Documents

ESG-074, RWCU Pump Trip/SACS Pump Trip/LOCA/ATWS/CRD FCV Failure/HPCI Start Failure, Revision 12
Hope Creek Maintenance Plan 172818
Hope Creek Narrative Logs dated September 30 through October 2, 2015
PCM Template for Low Voltage Circuit Breakers, Revision 3

PN1-B31-1030-0024, Sht. 11 & 20
PN1-B31-P003-0215, Sht. 4
PSE-25953, Failure Analysis of a Protective Relay / Fuses dated 28 December 2015

Section 1R12: Maintenance Effectiveness

Procedures
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-HC-310-1009, Hope Creek Generating Station Maintenance Rule Scoping, Revision 11
HC.EP-EP.ZZ-0301, Shift Radiation Protection Technician Response, Revision 8
HC.OP-EO.ZZ-103/4-CONV, Secondary Containment Control Conversion, Revision 7
HC.OP-EO.ZZ-103/4-FC, Secondary Containment Control, Revision 10

Notifications (*NRC identified)

20639414	20654858	20663066	20693100	20694030	20695651
20699246	20704699	20706724	20709560	20710917	20711743
20712694	20714332	20711929*	20714121*		

Maintenance Orders/Work Orders
60125228 70182741

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Procedures
ER-AA-2002, System Health Indicator Program, Revision 14
ER-AA-2030, Conduct of Plant Engineering Manual, Revision 12
ER-HC-321-1011, Testing of Hope Creek ASME Class 1, 2, 3 Safety Relief Valves, Revision 4
FRH-III-141, Hope Creek Pre-Fire Plan, Turbine Building Elevation 123' (Room 1401 Mezzanine Air Equipment Area), Revision 4
HC.MD-GP.ZZ-0085, Safety/Relief Valve Leak Testing and Setpoint Adjustments, Revision 12
HC.OP-AB.BOP-0004, Grid Disturbances, Revision 24
HC.OP-AB.COMP-00001, Instrument and/or Service Air, Revision 7
HC.OP-AB.COOL-0001, Station Service Water, Revision 21
HC.OP-AB.COOL-0002, Safety/Turbine Auxiliaries Cooling System, Revision 8
HC.OP-AR.MH-0004, Switchyard Control House Local Panel XA-12, Revision 4
HC.OP-IS.BJ-0001, HPCI Main and Booster Pump Set – 0P204 and 0P217 – Inservice Test, Revision 64
HC.OP-SO.EA-0001, Service Water System Operation, Revision 39
HC.OP-SO.EG-0001 Safety and Turbine Auxiliaries Cooling Water System, Revision 54
LS-AA-120, Issue Identification and Screening Process, Revision 13
LS-AA-125, Corrective Action Program, Revision 21
MA-AA-716-230, Predictive Maintenance Program, Revision 8
MA-AA-716-230-1001, Oil Analysis Interpretation Guideline, Revision 11
MA-AA-716-230-1010, Fluid Leak Management Program, Revision 3
OP-AA-102-102, General Area Checks and Operator Field Rounds, Revision 8
OP-AA-108-111, Adverse Contingency Monitoring and Contingency Planning, Revision 11
OP-AA-108-115, Operability Determinations & Functionality Assessments, Revision 4
WC-AA-106, Work Screening and Processing, Revision 17

Notifications

20670595	20676716	20681254	20685208	20686020	20690665
20691433	20701189	20702555	20705472	20705653	20706118
20707034	20707835	20709840	20710548	20712199	20712211
20712663	20712672	20712674	20712690	20712729	

Maintenance Orders/Work Orders

30115803	3025917	30259246	30278309	50177227	50179391
50180060	60117364	70115816	70142153	70172400	70174237
70174553	70175648	70177231	70179753	70182267	

Miscellaneous

Calculation EA-0001, Station Service Water System Hydraulic Model, Revision 6
Calculation EG-0048, Eval of SACS System Capability following Design Basis Earthquake, Revision 2
HCGS PRA Risk Eval Form for November 29, 2015, through December 5, 2015, Revision 0
VTD 322848, Test Reports for 24 VSN SSWS Pump – S/N UG04950246-05, Revision 1

Section 1R15: Operability Determinations and Functionality Assessments

Procedures

CC-AA-11, Nonconforming Materials, Parts, or Components, Revision 5
ER-AA-310-1004, Maintenance Rule – Performance Monitoring, Revision 14
HC.DE-PS.ZZ-0041, Hope Creek Station Blackout Program, Revision 3
HC.OP-AB.ZZ-0135, Station Blackout / Loss of Offsite Power / Diesel Generator Malfunction, Revision 40
HC.OP-FT.ZZ-0001, Emergency Area Cooling System (EACS) Room Coolers Functional Test – 18 Months, Revision 11
HC.OP-IS.BC-0002, CP202, C Residual Heat Removal Pump In-Service Test, Revision 43
HC.OP-SO.EA-0001, Service Water System operation, Revision 39
LS-AA-120, Issue Identification and Screening Process, Revision 13
OP-AA-108-115, Operability Determinations & Functionality Assessments, Revision 4

Notifications

20701377	20701395	20702550	20703642	20703941	20703948
20704285	20704447	20710683	20711033	20712812	20712849

Maintenance Orders/Work Orders

30123359	30177373	30214856	30238054	50177743	60124525
70180037	70180302	70180456	70180601	70182394	70182700

Drawings

Calculation E-6.1, Revision 12
H-1-GK-MDC-0734, Loss of Ventilation during Station Blackout, Revision 3
H-1-GK-MDC-0735, Electrical Heat Load during the Station Blackout Event, Revision 2
M-51-1, Sheet 2, Residual Heat Removal, Revision 43

Miscellaneous

OP-HC-108-115-1001, Form 1, Technical Specification Action Statement Log, 15-262, H1BC-1C-P-202 'C' Residual Heat Removal (RHR) Pump, dated September 2, 2015
OP-HC-108-115-1001, Form 1, Technical Specification Action Statement Log, 15-285, B Core Spray Loop, dated September 24, 2015

OP-HC-108-115-1001, Form 1, Technical Specification Action Statement Log, 15-286, H1BC-1B-P-202 H1BC-1D-P-202 'B & D' Residual Heat Removal (RHR) Pumps, dated September 24, 2015
VTD 327173, Qualification Report on United Electric Temperature Switch (B402), Revision 1
VTD PM780AQ-0199, Acton Environmental Test Report, Revision 6

Section 1R19: Post-Maintenance Testing

Procedures
HC.IC-SC.SP-0002, Process Radiation Monitoring – Non Divisional Monitor H1SP-1SPRY-4811 Filtration Recirculation Ventilation Sample Flow System, Revision 31
HC.IC-SC.SP-0025, Process Radiation Monitoring – Non Divisional Monitor H1SP-1SPRY-4811 Filtration Recirculation Ventilation System Vent (WRGM), Revision 31
HC.MD-GP.ZZ-0237, General Instructions for Disassembly, Inspection, and Reassembly of Anchor Darling Testable Check Valves, Revision 5
HC.OP-IS.BC-0003, BP202, 'B' Residual Heat Removal Pump Inservice Test, Revision 48
HC.OP-IS.BC-0102, Residual Heat Removal Subsystem 'B' Valves – Inservice Test, Revision 43
HC.OP-IS.BC-0103, Residual Heat Removal Subsystem C Valves – Inservice Test, Revision 29
HC.OP-IS.EA-0002, B Service Water Pump – BP502 – Inservice Test, Revision 61
MA-AA-716-008, Foreign Material Exclusion Program, Revision 8
MA-AA-716-012, Post Maintenance Testing, Revision 20
MA-AA-734-002, General Instructions for Disassembly, Inspection & Reassembly of Check Valves, Revision 1

Notifications

20672012	20706227	20706724	20707029	20707289	20709447
20710441	20711033	20711671			

Maintenance Orders/Work Orders

30104990	30123359	30137509	50165163	50176817	50177700
50178431	50179071	50179156	60124525	60126154	60126926
60127049	70041235	70172122	80077844	80081469	

Drawings
M-51-1, P&ID Residual Heat Removal, Revision 47

Section 1R22: Surveillance Testing

Procedures
HC.MD-GP.ZZ-0237, General Instructions for Disassembly, Inspection, and Reassembly of Anchor Darling Testable Check Valves, Revision 5
HC.OP-IS.BC-0003, BP202, 'B' Residual Heat Removal Pump Inservice Test, Revision 48
HC.OP-IS.BC-0102, Residual Heat Removal Subsystem 'B' Valves – Inservice Test, Revision 43
HC.OP-IS.EG-0001, A SACS Pump – AP210 – Inservice Test, Revision 40
HC.OP-ST.KJ-0003, Emergency Diesel Generator 1CG400 Operability Test – Monthly, Revision 76
MA-AA-716-008, Foreign Material Exclusion Program, Revision 8
MA-AA-734-002, General Instructions for Disassembly, Inspection & Reassembly of Check Valves, Revision 1

Notifications

20646523	20672012	20698460	20698577	20698606	20698941
20699027	20699521	20699989	20702217	20704921	20704923
20709447	20710441				

Maintenance Orders/Work Orders

30123359	50174603	50176817	50177155	50178077	50178431
50179156	50179393	60126926	70041235	70165411	70172122
70179009	70179133	70179342	80077844	80081469	

Drawings

M-51-1, P&ID Residual Heat Removal, Revision 47

Section 1EP6: Drill Evaluation

Procedures

EP-AA-125-1002, NRC Drill and Exercise Performance (DEP) Indicator Guidance, Revision 4
EP-HC-111-F2, Declaration of Alert, Revision 2
EP-HC-111-F3, Declaration of Site Area Emergency, Revision 3
EP-HC-111-F4, Declaration of General Emergency, Revision 2
EP-HC-111-F6, Primary Communicator Log, Revision 13
EP-HC-111-F8, Secondary Communicator Log, Revision 3
NC.EP-EP.ZZ-0404, Protective Action Recommendations (PARS) Upgrades, Revision 5

Notifications (*NRC-identified)

20713379	20713545	20713846	20713863	20714656	20714758
20715510	20714553*				

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

Procedures

LS-AA-1020, Implementation of Significant Rules and Orders, Revision 1
RP-AA-100, Process Control Program for Radioactive Wastes, Revision 10
RP-AA-600, Radioactive Material Waste Shipments, Revision 14
RP-AA-600-1006, Shipment of Category 1 Quantities of Radioactive Material or Waste (Category 1 RAMQC), Revision 7
RP-AA-602, Packaging of Radioactive Material Shipments, Revision 16
RP-AA-602-1001, Packaging of Radioactive Material/Waste Shipments, Revision 9
RP-AA-605, 10CFR61 Program, Revision 1
RP-AA-605-1001, Evaluation of 10CFR61 Sample Results, Revision 1

Notifications:

20655917 20695192

Audits:

Hope Creek Check-In Self-Assessment 80114767
NOSA-HPC-14-04, General Requirements for Shipments
Nuclear Utilities Procurement Issues Council Audit 23201, Energy Solutions Mega Audit

10CFR61 Scaling Factors:
A-CUPS; WSPS; B-Condensate demineralizer Bead Resin; Bead Resin, Dry Active Waste (DAW)

Training:
NRP00MATTSHC, Chem-Nuclear 79-19
NRP9902RMATC, RAM Shipping (79-19)

Shipments:
15-004; 15-077; 15-134; 15-135; 15-16

Section 4OA1: Performance Indicator Verification

Procedures
LS-AA-2001, Collecting and Reporting of NRC Performance Indicator Data, Revision 11
LS-AA-2080, Monthly Data Elements for NRC SSFFs, Revision 5

Documents
Hope Creek Offsite Dose Calculation Manual
Personnel Radiation Dose Records and Calculations
Corrective Action Documents (various Notifications)

Miscellaneous
LER 05000354/2015-001-00 and -01, Conditions Prohibited by Technical Specifications Due to Core Spray Inoperabilities dated May 29, and June 30, 2015
LER 05000354/2015-002-00, Operations with a Potential to Drain the Reactor Vessel (OPDRV) Without Secondary Containment dated June 10, 2015
LER 05000354/2015-003-00, Conditions Prohibited by Technical Specifications Due to Low Pressure ECCS Inoperabilities dated July 6, 2015
LER 05000354/2015-004-00 and -01, As-Found Values for Safety Relief Valve Lift Set Points Exceed Technical Specification Allowable Limit dated June 30, and August 26, 2015
LER 05000354/2015-005-00, Reactor Scram due to Invalid RRCS Actuation dated January 5, 2016

Section 4OA2: Problem Identification and Resolution

Procedures
ER-AA-2002, System Health Indicator Program, Revision 14
ER-AA-2030, Conduct of Plant Engineering Manual, Revision 12
ER-AA-310-1004, Maintenance Rule – Performance Monitoring, Revision 14
FRH-III-141, Hope Creek Pre-Fire Plan, Turbine Building Elevation 123' (Room 1401 Mezzanine Air Equipment Area), Revision 4
HC.MD-CM.PH-0001, 480 Volt MCC Starter Maintenance, Revision 9
HC.MD-PM.ZZ-0007, Missile Resistant and Watertight Doors P.M., Revision 11
HC.OP-AB.COMP-00001, Instrument and/or Service Air, Revision 7
HC.OP-AB.RPV-0009, Shutdown Cooling, Revision 11
HC.OP-SO.BC-0002, Decay Heat Removal Operation, Revision 33
HU-AA-1211, Pre-Job Briefings, Revision 12
LS-AA-115-1003-F2, OPEX Response, Revision 0
LS-AA-119-1001, Fatigue Management, Revision 4
LS-AA-120, Issue Identification and Screening Process, Revision 13
LS-AA-125, Corrective Action Program, Revision 20

LS-AA-125, Corrective Action Program, Revision 21
LS-AA-125, Corrective Action Program, Revision 21
LS-AA-125-1001, Root Cause Evaluation Manual, Revision 9
LS-AA-125-1005, Coding and Analysis Manual, Revision 7
MA-AA-716-210-1005, Predefine Change Processing, Revision 6
MA-AA-716-230, Predictive Maintenance Program, Revision 8
MA-AA-716-230-1001, Oil Analysis Interpretation Guideline, Revision 11
MA-AA-716-230-1010, Fluid Leak Management Program, Revision 3
OP-AA-101-111, Roles and Responsibilities of On-Shift Personnel, Revision 5
OP-AA-102-102, General Area Checks and Operator Field Rounds, Revision 8
OP-AA-106-101, Significant Event Reporting, Revision 10
OP-AA-106-101-1001, Event Response Guidelines, Revision 15
OP-AA-108-111, Adverse Contingency Monitoring and Contingency Planning, Revision 11
OU-AA-101-1006, Outage Management Risk and Impact Assessment, Revision 2
PIA-009, USA Fleet Trending Guide, Revision 3
SY-AA-102-202, Testing for Cause and Post Event, Revision 17
WC-AA-106, Work Screening and Processing, Revision 17

Notifications (*NRC-identified)

20624670	20640696	20666644	20670595	20676716	20679810
20680565	20682502	20682982	20683720	20684833	20684833
20684861	20684861	20684891	20685468	20686094	20686099
20686562	20689791	20690665	20693591	20694576	20695392
20695433	20696092	20696092	20696845	20698578	20698713
20699521	20701189	20701814	20702217	20702555	20703871
20703941	20704549	20704923	20705460	20707835	20710222
20710548	20710665	20710942	20711909	20712663	20712672
20712674	20712690	20712729	20714121	20711720*	

Maintenance Orders/Work Orders

30259173	30259246	60123177	70040435	70060872	70160516
70162269	70167500	70170527	70170535	70172037	70172037
70172400	70172811	70174237	70175889	70175974	70176141
70176937	70176937	70176937	70177017	70177017	70177880
70179133	70179342	70180096	70181428	70182192	70182267
80095620	80113526	80113526	80113996	80114188	80114279
80115148	80115315				

Miscellaneous

10 CFR Part 21 Notification 2005-39-00, Potentially Defective Micrologic Trip Units
Nuclear Logistics, Incorporated Root Cause Analysis Report RCA-042-351023474-1, October 2015
Report Number HOP150401RO-F, Final Report of AMS Testing of Masterpact Breakers with Installed Square D Micrologic Trip Units for Hope Creek Nuclear Generating Station, April 2015
Vendor Technical Manual 327133, Masterpact NT/NW Universal Power Circuit Breaker,
PSEG List of Deferred Breaker PMs from 2015
PSEG List of Failed Breakers in 2014
Hope Creek Main Control Room Door Reader Transaction History dated April 11, 2015 October 2003

Hope Creek Operations Narrative Logs dated April 11, 2015
Hope Creek Narrative Logs from August 3 through August 6, 2015
Hope Creek January – Sept 2015 Trend Report
E-0019-1, 480 Volt MCC Tabulation Class 1E – Aux Building – O/G Area 10B411, 421, 431
and 441
LTAM H-13-0084, MCC Remaining Bucket Replacement dated November 14, 2013

LIST OF ACRONYMS

10 CFR	Title 10 of *The Code of Federal Regulations*
AC	alternating current
ACE	apparent cause evaluation
ADAMS	Agencywide Documents Access and Management System
ALARA	As Low As is Reasonably Achievable
AP	advanced protection
CAP	corrective action program
CAQ	condition adverse to quality
CFR	*Code of Federal Regulations*
DAC	dominant areas of concern
DAW	dry active waste
EDG	emergency diesel generator
EMI	electro-magnetic interference
HCGS	Hope Creek Generating Station
HPCI	high pressure coolant injection
IMC	Inspection Manual Chapter
IR	inspection report
LER	licensee event report
LHRA	locked high radiation area
MCC	motor control center
MCR	main control room
MRC	Management Review Committee (PSEG)
NCV	non-cited violation
NEI	Nuclear Energy Institute
NOTF	notification
NRC	Nuclear Regulatory Commission
OPEVAL	operability evaluation
OWA	operator workarounds
PCP	process control program
PI	performance Indicators
PI&R	problem identification and resolution
PSEG	Public Service Enterprise Group Nuclear, LLC
QA	quality assurance
RCIC	reactor core isolation cooling
RHR	residual heat removal
RMS	radiation monitoring system
RRCS	redundant reactivity control system
RTP	rated thermal power
SACS	safety auxiliaries cooling system
SBO	station blackout
SDP	significance determination process
SOC	Station Ownership Committee
SSC	structure, system, or component
SSW	station service water
TE	technical evaluation
TS	technical specifications
UFSAR	Updated Final Safety Analysis Report
WO	work order(s)