



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION I  
475 ALLENDALE ROAD  
KING OF PRUSSIA, PENNSYLVANIA 19406-1415

May 19, 2010

Thomas P. Joyce  
President and Chief Nuclear Officer  
PSEG Nuclear LLC  
P. O. Box 236  
Hancocks Bridge, NJ 08038

SUBJECT: HOPE CREEK GENERATING STATION - NRC TRIENNIAL FIRE  
PROTECTION INSPECTION REPORT 05000354/2010007

Dear Mr. Joyce:

On April 8, 2010, the U.S. Nuclear Regulatory Commission (NRC) completed a Triennial Fire Protection Inspection at Hope Creek Generating Station. The inspectors also reviewed mitigation strategies for addressing large fires and explosions. The enclosed inspection report documents the inspection results, which were discussed on April 8, 2010, with Mr. John F. Perry 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 personnel.

Based on the results of this inspection, no findings of significance were identified.

In accordance with Title 10 of the Code of Federal Regulations Part 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 Public Document Room or from the Publicly Available Records (PARS) component of the NRC's document system (ADAMS).

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Sincerely,

A handwritten signature in black ink, appearing to read "John F. Rogge".

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

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

Enclosure: Inspection Report No. 05000354/2010007  
w/Attachment: Supplemental Information

cc w/encl: Distribution via ListServ

May 19, 2010

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Sincerely,  
*/RA/*  
John F. Rogge, Chief  
Engineering Branch 3  
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**SUNSI Review Complete: JFR (Reviewer's Initials)** ADAMS: ML101390490

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DATE	5/13/10	5/19/10	5/14/10				

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T. P. Joyce

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No.: 50-354

License No.: NPF-57

Report No.: 05000354/2010007

Licensee: Public Service Enterprise Group Nuclear LLC

Facility: Hope Creek Nuclear Generating Station

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

Dates: March 22 – April 8, 2010

Inspectors: L. Scholl, Senior Reactor Inspector, Division of Reactor Safety (DRS)  
(Team Leader)  
R. Fuhrmeister, Senior Reactor Inspector, DRS  
J. Rady, Reactor Inspector, DRS  
A. Rao, Project Engineer, Division of Reactor Projects (DRP)

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

Enclosure

## SUMMARY OF FINDINGS

IR 05000354/2010007; 03/22/2010 – 04/08/2010; Public Service Enterprise Group Nuclear LLC; Hope Creek Nuclear Generating Station: Triennial Fire Protection Team Inspection.

The report covered a two-week triennial fire protection team inspection by Region I specialist inspectors. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Rev. 4, dated December 2006.

### **Cornerstone: Mitigating Systems**

No findings of significance were identified.

### Other Findings

A violation of very low safety significance, which was identified by the licensee, was reviewed by the inspectors. This violation and corrective actions taken by the licensee are listed in Section 4OA7 of this report.

## REPORT DETAILS

### Background

This report presents the results of a triennial fire protection inspection conducted in accordance with NRC Inspection Procedure (IP) 71111.05T, "Fire Protection." The objective of the inspection was to assess whether PSEG Nuclear, LLC, has implemented an adequate fire protection program and that post-fire safe shutdown capabilities have been established and are being properly maintained at the Hope Creek Nuclear Generating Station. The following fire areas (FAs) were selected for detailed review based on risk insights from the Hope Creek Nuclear Generating Station Individual Plant Examination (IPE)/Individual Plant Examination of External Events (IPEEE):

- FA RB-1
- FA CD-26
- FA CD-29
- FA CD-62

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

The inspection team evaluated the licensee's fire protection program (FPP) against applicable requirements which included plant Technical Specifications, Operating License Condition 2.C.(7), NRC Safety Evaluations, 10 CFR 50.48, and 10 CFR 50 Appendix R. The team also reviewed related documents that included the Updated Final Safety Analysis Report (UFSAR), Sections 9.5.1, Fire Protection Program and Appendix 9A, Appendix R Comparison. These sections include the fire hazards analysis (FHA) and the post-fire safe shutdown analysis.

The team also evaluated licensee mitigating strategies for addressing large fires and explosions as required by Operating License Condition 2.C.(16).

Specific documents reviewed by the team are listed in the attachment.

Enclosure

## 1. REACTOR SAFETY

### Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

#### 1R05 Fire Protection (IP 71111.05T)

#### .01 Post-Fire Safe Shutdown From Outside Main Control Room (Alternative Shutdown) and Normal Shutdown

##### a. Inspection Scope

##### Methodology

The team reviewed the safe shutdown analysis, operating procedures, piping and instrumentation drawings (P&IDs), electrical drawings, the UFSAR, and other supporting documents to verify that hot and cold shutdown could be achieved and maintained for fires that rely on shutdown from outside the control room. This review included verification that shutdown from outside the control room could be performed both with and without the availability of offsite power. Plant walkdowns were also performed to verify that the plant configuration was consistent with that described in the safe shutdown and fire hazards analyses. These inspection activities focused on ensuring the adequacy of systems selected for reactivity control, reactor coolant makeup, reactor decay heat removal, process monitoring instrumentation, and support systems functions. The team verified that the systems and components credited for use during this shutdown method would remain free from fire damage. The team verified that the transfer of control from the control room to the alternative shutdown location(s) would not be affected by fire-induced circuit faults (e.g., by the provision of separate fuses and power supplies for alternative shutdown control circuits).

Similarly, for fire areas that utilize shutdown from the control room, the team also verified that the shutdown methodology properly identified the components and systems necessary to achieve and maintain safe shutdown conditions.

##### Operational Implementation

The team verified that the training program for licensed and non-licensed operators included alternative shutdown capability. The team also verified that personnel required for safe shutdown using the normal or alternative shutdown systems and procedures are trained and available onsite 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 to ensure the implementation and human factors adequacy of the procedures. The team also verified that the operators could be reasonably expected to perform specific actions within the time required to maintain plant parameters within specified limits. Time critical actions, which were

verified, included restoration of alternating current (AC) electrical power, establishing the remote shutdown and local shutdown panels, establishing reactor coolant makeup, and establishing decay heat removal.

Specific procedures reviewed for alternative shutdown, including shutdown from outside the control room included the following:

- HC.OP-IO.ZZ-00008(Q), Shutdown From Outside Control Room, Rev. 29
- HC.OP-AB.HVAC-0002(Q), Control Room Environment, Rev. 6.

The team reviewed manual actions to ensure that they had been properly reviewed and approved and that 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 capability and instrumentation and control functions to ensure the tests are adequate to ensure the functionality of the alternative shutdown capability.

b. Findings

No findings of significance were identified.

.02 Protection of Safe Shutdown Capabilities

a. Inspection Scope

The team reviewed the FHA, safe shutdown analyses and supporting drawings, and documentation to verify that safe shutdown capabilities were properly protected. The team ensured that separation requirements of Section III.G of 10 CFR 50, Appendix R and the UFSAR were maintained for the credited safe shutdown equipment and their supporting power, control and instrumentation cables. This review included an assessment of the adequacy of the selected systems for reactivity control, reactor coolant makeup, reactor heat removal, process monitoring, and associated support system functions.

The team reviewed the licensee'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 also reviewed. The team performed plant walkdowns to verify that protective features were being properly maintained and administrative controls were being implemented.

b. Findings

No findings of significance were identified.

.03 Passive Fire Protection

a. Inspection Scope

The team walked down accessible portions of the selected fire areas to observe material condition and the adequacy of design of fire area boundaries (including walls, fire doors, and fire dampers) and electrical raceway fire barriers to ensure they were appropriate for the fire hazards in the area.

The team reviewed installation/repair and qualification records for a sample of penetration seals to ensure the fill material was of the appropriate fire rating and that the installation met the engineering design. The team also reviewed similar records for the fire protection wraps to ensure the material was of an appropriate fire rating and that the installation met the engineering design.

b. Findings

No findings of significance were identified.

.04 Active Fire Protection

a. Inspection Scope

The team reviewed the design, maintenance, testing, and operation of the fire detection and suppression systems in the selected plant fire areas. This included verification that the manual and automatic detection and suppression systems were installed, tested, and maintained in accordance with the National Fire Protection Association (NFPA) code of record, or NRC approved deviations, and that each suppression system would control and/or extinguish fires associated with the hazards in the selected areas. A review of the design capability of the suppression agent delivery systems were verified to meet the code requirements for the hazards involved. The team also performed a walkdown of accessible portions of the detection and suppression systems in the selected areas as well as a walkdown of major system support equipment in other areas (e.g., fire pumps, Halon and/or carbon dioxide (CO<sub>2</sub>) storage tanks and supply system) to assess the material condition of the systems and components.

The team reviewed electric and diesel fire pump flow and pressure tests to ensure that the pumps were meeting their design requirements. The team also reviewed the fire main loop flow tests to ensure that the flow distribution circuits were able to meet the design requirements.

The team assessed the fire brigade capabilities by reviewing training, qualification, and drill critique records. The team also reviewed 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. In addition, the team inspected the fire brigade equipment (including smoke removal equipment) to determine operational readiness for fire fighting.

b. Findings

No findings of significance were identified.

.05 Protection From Damage From Fire Suppression Activities

a. Inspection Scope

The team performed document reviews and plant walkdowns to verify that redundant trains of systems required for hot shutdown are not subject to damage from fire suppression activities or from the rupture or inadvertent operation of fire suppression systems. Specifically, the team verified that:

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

b. Findings

No findings of significance were identified.

.06 Alternative Shutdown Capability

a. Inspection Scope

Alternative shutdown capability is discussed in section 1R05.01 of this report.

.07 Circuit Analysis

a. Inspection Scope

The team verified that the licensee performed a post-fire safe shutdown analysis for the selected fire areas and the analysis appropriately identified the structures, systems, and components important to achieving and maintaining safe shutdown. Additionally, the team verified that the licensee's analysis ensured that necessary electrical circuits were properly protected and that circuits that could adversely impact safe shutdown due to hot shorts, shorts to ground, or other failures were identified, evaluated, and dispositioned to ensure spurious actuations would not prevent safe shutdown.

The team's review considered fire and cable attributes, 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 for a sample of components required for post-fire safe shutdown to verify that cables were routed as described in the cable routing matrices.

Cable failure modes were reviewed for the following components:

- 1EA-HV-2371B, SACS Heat Exchanger B1 Service Water Outlet Valve
- 1EA-HV-2355B, SACS Heat Exchanger B2 Service Water Outlet Valve
- 1BC-HV-F015B, RHR Shutdown Cooling Injection Valve
- 1BC-HV-F024B, RHR Suppression Pool Cooling Return Valve
- 1EG-HV-2512B, RHR Heat Exchanger B SACS Outlet Valve
- 1BD-HV-F022, RCIC Test Return Valve to CST
- 1FC-HV-F007, RCIC Inboard Steam Line Isolation Valve
- 1FC-HV-F076, RCIC Inboard Steam Line Isolation Valve Isolation Valve Bypass
- 1EA-HV-2198B, SACS Heat Exchanger B1 Isolation Valve
- 1SN-SV-3652B, Main Steam Safety Relief Valve A
- 1BC-BP202, RHR Pump B
- 1EA-DP502, Service Water Pump D
- 1EG-DP210, SACS Pump D

The team reviewed 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. The team confirmed that coordination studies had addressed multiple faults due to fire. Additionally, the team reviewed a sample of circuit breaker maintenance records to verify that circuit breakers for components required for post-fire safe shutdown were properly maintained in accordance with procedural requirements.

b. Findings

No findings of significance were identified.

.08 Communications

a. Inspection Scope

The team reviewed safe shutdown procedures, the safe shutdown analysis, and associated documents to verify an adequate method of communications would be available to plant operators following a fire. During this review the team considered the effects of ambient noise levels, clarity of reception, reliability, and coverage patterns. The team also inspected the designated emergency storage lockers to verify the availability of portable radios for the fire brigade and for plant operators. The team also verified that communications equipment such as repeaters and transmitters would not be affected by a fire.

b. Findings

No findings of significance were identified.

Enclosure

.09 Emergency Lighting

a. Inspection Scope

The team observed the placement and coverage area of eight-hour emergency lights throughout the selected fire areas to evaluate their adequacy for illuminating access and egress pathways and any equipment requiring local operation and/or instrumentation monitoring for post-fire safe shutdown. The team also verified that the battery power supplies 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 verify that the emergency lighting was being maintained in a manner that would ensure reliable operation.

b. Findings

No findings of significance were identified.

.10 Cold Shutdown Repairs

a. Inspection Scope

The team reviewed the licensee's safe shutdown analysis and determined that there are no repairs necessary to accomplish cold shutdown following a fire.

b. Findings

No findings of significance were identified.

.11 Compensatory Measures

a. Inspection Scope

The team verified that 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, or pumps, valves or electrical devices providing safe shutdown functions or capabilities). The team also verified that the short term compensatory measures compensated for the degraded function or feature until appropriate corrective action could be taken and that the licensee was effective in returning the equipment to service in a reasonable period of time.

b. Findings

No findings of significance were identified.

.12 Large Fire and Explosion Mitigation Strategies

a. Inspection Scope

The team reviewed the licensee's preparedness to handle large fires or explosions by reviewing 6 mitigating strategies to verify they continue to meet license condition 2.C.(16) by determining that:

- Procedures are being maintained and adequate;
- Equipment is properly staged and is being maintained and tested; and,
- Station personnel are knowledgeable and can implement the procedures.

b. Findings

No findings of significance were identified.

4. **OTHER ACTIVITIES [OA]**

4OA2 Identification and Resolution of Problems

.01 Corrective Actions for Fire Protection Deficiencies

a. Inspection Scope

The team verified that the licensee was identifying fire protection and post-fire safe shutdown issues at an appropriate threshold and entering them into the corrective action program. The team also reviewed a sample of selected issues to verify that the licensee had taken or planned appropriate corrective actions.

b. Findings

No findings of significance were identified.

4OA6 Meetings, Including Exit

Exit Meeting Summary

The team presented their preliminary inspection results to Mr. John F. Perry, Site Vice President – Hope Creek Generating Station, and other members of the site staff at an exit meeting on April 8, 2010. No proprietary information was included in this inspection report.

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 meets the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as a Non-Cited

Enclosure

**Violation (NCV).**

Hope Creek operating license condition 2.C.(7), Fire Protection, requires, in part, that PSEG Nuclear LLC implement and maintain in effect all provisions of the approved fire protection program as described in the Updated Final Safety Analysis Report for the facility. Contrary to this requirement, on December 2, 2009, the licensee identified that the degree of physical separation specified in the UFSAR for redundant trains of safe shutdown equipment was not met. Specifically, it was discovered that a postulated fire in either of two reactor building fire areas could have resulted in the loss of both trains of chilled water system pumps and thereby causing the loss of room cooling to several areas. The issue was entered into the corrective action program as notification 20442958 and reported to the NRC in Licensee Event Report (LER) Number 2009-006, Post-fire Safe Shutdown Analysis Error. The inspectors reviewed the licensee's corrective actions and found them to be acceptable. The finding is of very low safety significance because the event would not have resulted in the immediate loss of any safe shutdown equipment and actions could have been taken to open doors and to provide supplemental cooling fans.

**ATTACHMENT: SUPPLEMENTAL INFORMATION**

**ATTACHMENT**

**SUPPLEMENTAL INFORMATION**

**KEY POINTS OF CONTACT**

Licensee Personnel

M. Adair, Fire Protection SPE  
A. Bhuta, Safe Shutdown Engineer  
J. Carlin, Fire Protection Superintendent  
M. Cocking, Fire Protection Supervisor  
C. Lukacsy, Senior Reactor Operator  
J. Moss, Structural Engineer  
J. Perry, Site Vice President  
M. Pfizenmaier, Program Manager  
D. Rambo, Records Management  
M. Reeser, Fire Protection SPE  
S. Savar, Electrical Design Engineer  
D. Schiller, Emergency Lighting Engineer  
D. Shumaker, Corporate Fire Protection Program Engineer  
L. Whitney, Regulatory Assurance Lead

NRC

J. Rogge, Chief, Engineering Branch 3, Division of Reactor Safety  
C. Cahill, Senior Reactor Analyst, Division of Reactor Safety  
B. Welling, Senior Resident Inspector, Hope Creek Generating Station  
A. Patel, Resident Inspector, Hope Creek Generating Station

**LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**

Opened

NONE

Opened and Closed

NONE

Closed

05000354/2009009	LER	Post-fire Safe Shutdown Analysis Error
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Discussed

NONE

**LIST OF DOCUMENTS REVIEWED**Fire Protection Licensing Documents

CC-AA-211-1001, Generic Letter 86-10 Evaluations, Rev. 1  
 DE-PS.ZZ-0001(Q)-A7, Technical Standard Hope Creek Safe Shutdown Analysis, Rev. 0  
 Hope Creek Updated Final Safety Analysis Report Section 9.5.1 and Appendix 9A, Rev. 17  
 NC.DE-PS.ZZ-0001(Q), Programmatic Standard for Fire Protection, Rev. 3  
 NUREG-1048, Safety Evaluation Report Related to the Operation of Hope Creek Generating Station, 10/84

Calculations/Engineering Evaluation Reports

11-28(Q), Reactor Building Flood Calculations for Elevation 102' (Unit One Only), Rev. 4  
 11-92(Q), Reactor Building Flooding – Elevation 54' and 77', Rev. 5  
 19-18(Q), Maximum Flood Levels in Control/Diesel Generator Areas, Rev. 3  
 Calculation No. 31, Appendix 'R' Communication System, Rev. 0  
 BJ-0024, Failure of High Reactor Level Turbine Trip, Rev. 0  
 H-1-KC-FEE-1583, Diesel Room Non-Segregated Bus Duct Fire Wrap, Rev. 0  
 H-1-KC-NDC-1750, CO2 Flow Calculations for EDG Fire Suppression Systems, Rev. 0  
 PM650F-0365, Hydraulic Calc, Addendum 1 to Hydraulic Calculation for System 1PS16, Rev. 3

Procedures

CC-AA-209, Fire Protection Program Configuration Change Review, Rev. 3  
 CC-AA-211, Fire Protection Program, Rev. 4  
 FP-AA-0006, Fire Department Training, Rev. 0  
 FP-AA-001, Precautions Against Fire, Rev. 0  
 FP-AA-002, Fire Protection Impairment Program, Rev. 0  
 FP-AA-002-F2, Fire Protection Impairment Permit, Rev. 0  
 FP-AA-002-F4, Fire Protection Hand Written Impairment Log, Rev. 0  
 FP-AA-002-F5, Transient Combustible In Safety Related Areas Impairment Log, Rev. 0  
 FP-AA-005, Fire Protection Surveillance and Periodic Test Program, Rev. 0  
 FP-AA-005, Fire Protection Surveillance and Periodic Test Program, Rev. 0  
 FP-AA-006, Tracking Incomplete Testing of Fire Protection Equipment, Rev. 0  
 FP-AA-008, Fire Prevention for Hotwork, Rev. 2  
 FP-AA-008-F1, Hot Work Permit, Rev. 0  
 FP-AA-008-F2, Hot Work Authorization Log, Rev. 0  
 FP-AA-009, Control Of Temporary Heat Sources, Rev. 0  
 FP-AA-010, Pre-Fire Plans, Rev. 0  
 FP-AA-011, Control of Transient Combustible Material, Rev. 2  
 FP-AA-011-F1, Transient Combustible Permit, Rev. 0  
 FP-AA-012, Fire Protection Organization and Staffing, Rev. 0  
 FP-AA-014, Fire Protection Training Program, Rev. 0  
 FP-AA-014, Fire Protection Training Program, Rev. 0  
 FP-AA-015, Compensatory Measure Fire Watch Program, Rev. 2  
 FP-AA-016, Conduct of Shift Turnover, Rev. 0

FP-HC-004, Actions for Inoperable Fire Protection - Hope Creek Station, Rev. 0  
HC.FP-EO-ZZ-0001(Z), Nuclear Fire Protection, Fire And Medical Emergency Response Manual. Hope Creek Control Room Fire Response, Rev. 7  
HC.FP-PM.QB-0039(F), Appendix "R" Standby Self-Contained 8 Hour Battery Powered Emergency Light Unit Inspection and Preventive Maintenance, Rev. 5  
HC.FP-ST.KC-0025(F), Class 1 Fire Hose Station Hydrostatic Test, Rev. 3  
HC.FP-ST.QB-0070(F), Standby Self Contained 8 Hour Battery Powered Emergency Light – 8 Hour Functional Test, Rev. 6  
HC.FP-SV.ZZ-0026(F), Flood and Fire Barrier Penetration Seal Inspection, Rev. 5  
HC.FP-SV.ZZ-0058(F), Inspection of Class 1 Fire Doors And Safety Related Areas for Transient Combustibles, Rev. 8  
HC.MD-PM.PB-0001(Q), 4.16 kV Breaker Cleaning and P.M., Rev. 25,  
HC.MD-PM.PB-0002(Q), 4.16 kV Breaker Time Response, Rev. 6  
HC.MD-PM.ZZ-0006(Q, General Preventive Maintenance for Distribution Panels, MCCs, Unit Substations, and Switchgear), Rev. 17  
HC.OP.AR.QK-0002(F), Fire Protection Status Panel 10C671 Alarm Responses, Rev. 16  
HC.OP-AB.RPV-0009(Q), Shutdown Cooling, Rev. 6  
HC.OP-AB.ZZ-0000(Q)-FC, Reactor Scram, Rev. 3  
HC.OP-EO.ZZ-0101(Q)-FC, Reactor/Pressure Vessel (RPV) Control, Rev. 11  
HC.OP-EO.ZZ-0102(Q)-FC, Containment Control, Rev. 12  
HC.OP-SO.BC-0002(Q), Decay Heat Removal Operation, Rev. 23  
HC.OP-SO.BC-0003(Q), RHR Alternate Cooling Modes, Rev.1  
HC.OP-ST.BE-0003(Q), Core Spray Loop B ECCS Time Response Functional Test-18 Months, Rev. 13  
SH.DE-TS.ZZ-2037(Q), Fuse Selection Design Standard for Salem & Hope Creek Generating Stations, Rev. 1  
SH.MD-GP.ZZ-0007(Q), General Guidelines for Fuses, Rev. 3  
SH.MD-PM.ZZ-0029(Q), Relay Testing, Rev. 5

Large Fires and Explosions Mitigation Strategies Documents

HC.OP-AM.TSC-0014, Rev. 7  
HC.OP-AM.TSC-0021, Rev. 4  
HC.OP-AM.TSC-0024, Rev. 6  
HC.OP-AM.TSC-1000, Rev.0  
SH.OP-AM.TSC-0001, Rev. 8  
SH.OP-AM.TSC-0002, Rev. 1  
LS-AA-126-1005, Check-In Self –Assessment Report

Completed Tests/Surveillances

HC.FP-PM.QB-0039(F), Appendix "R" Standby Self-Contained 8 Hour Battery Powered Emergency Light Unit Inspection and Preventive Maintenance, Rev. 5, Completed 02/09/10  
HC.FP-PT.KC-0015(Z), Interior Water Spray/Deluge System Functional Test and Inspection, Rev. 2, Completed 12/09/09  
HC.FP-PT.KC-0016(Z), Pre-Action Sprinkler System Functional Test and Inspection, Rev. 1, Completed 12/04/09

HC.FP-PT.KC-0021(Z), Exciter Housing CO2 System (1C17) Functional Test and Inspection, Rev. 6, Completed 05/08/09  
 HC.FP-PT.KC-0034(Z), Non-Class 1 Wet Pipe Sprinkler System Functional Test and Inspection, Rev. 4, Completed 09/18/09  
 HC.FP-PT.KC-0057(Z), Outside Water Spray System Functional Test and Inspection, Rev. 3, Completed 08/30/09  
 HC.FP-ST.KC-0002(F), Electric Motor Driven Fire Pump Operability Test, Rev. 7, Completed 12/08/09, 01/05/10  
 HC.FP-ST.KC-0006(F), Fire Pump Capacity Test, Rev. 9, Completed 05/17/09  
 HC.FP-ST.KC-0008(F), Fire Main Flow Test, Rev. 1, Completed 09/22/07  
 HC.FP-ST.KC-0016(F), Pre-Action Sprinkler System Functional Test and Inspection, Rev. 1, Completed 01/15/08, 01/12/09  
 HC.FP-ST.KC-0017(F), Pre-Action Water Spray System Functional Test and Inspection, Rev. 1, Completed 11/21/09  
 HC.FP-ST.KC-0018(F), Triennial Deluge Sprinkler Air Flow Test, Rev. 2, Completed 03/18/09  
 HC.FP-ST.KC-0021(F), CO2 Systems Operability and Partial Discharge Test, Rev. 11, Completed 04/02/09  
 HC.FP-ST.KC-0021(F), CO2 Systems Operability and Partial Discharge Test, Rev. 12, Completed 04/03/09  
 HC.FP-ST.KC-0025(F), Class 1 Fire Hose Station Hydrostatic Test, Rev. 2, Completed 04/03/08  
 HC.FP-ST.KC-0034(F), Wet Pipe Sprinkler System OWS6 Functional Test and Inspection, Rev. 2, Completed 12/29/09  
 HC.FP-ST.KC-0060(F), Pre-Action Sprinkler System 1PS4 Functional Test and Inspection, Rev. 1, Completed 07/09/09  
 HC.FP-ST.KC-0061(F), Deluge System 1D28 Functional Test and Inspection, Rev. 2, Completed 06/19/09  
 HC.FP-ST.QB-0039(F), Standby Self Contained 8 Hour Battery Powered Emergency Light Unit Test and Inspection, Rev. 5, Completed 05/22/07, 01/17/08  
 HC.FP-ST.QB-0039(F), Standby Self Contained 8 Hour Battery Powered Emergency Light Unit Test and Inspection, Rev. 6, Completed 04/10/08, 05/24/08, 06/10/08, 06/20/08, 03/20/08  
 HC.FP-ST.QB-0039(F), Standby Self Contained 8 Hour Battery Powered Emergency Light Unit Test and Inspection, Rev. 7, Completed 09/06/08, 11/18/08, 02/20/09  
 HC.FP-ST.QB-0039(F), Standby Self Contained 8 Hour Battery Powered Emergency Light Unit Test and Inspection, Rev. 8, Completed 07/14/09, 09/23/09, 10/06/09, 11/19/09, 12/18/09  
 HC.FP-ST.QK-0029(F), Class 1 Fire Detection Functional Test, Rev. 8, Completed 01/22/08, 08/30/08, 09/09/09, 09/19/09, 09/27/09, 11/11/09, 11/26/09, 12/28/09  
 HC.FP-ST.QK-0029(F), Class 1 Fire Detection Functional Test, Rev. 8, Completed 02/23/09, 03/11/09, 03/18/09, 03/28/09, 05/08/09, 06/25/09, 07/08/09, 09/09/09, 09/19/09, 09/27/09, 11/11/09, 12/28/09  
 HC.FP-ST.ZZ-0031(F), Class 1 Fire Damper Functional Test, Rev. 2, Completed 12/20/07, 11/03/09  
 HC.FP-SV.ZZ-0026(F), Flood and Fire Barrier Penetration Seal Inspection, Rev. 5, Completed 12/15/09  
 HC.FP-SV.ZZ-0026(F), Flood and Fire Barrier Penetration Seal Inspection, Rev. 4, Completed 06/18/08  
 HC.FP-SV.ZZ-0026(F), Flood and Fire Barrier Penetration Seal Inspection, Rev. 5, 12/15/09  
 HC.FP-SV.ZZ-0027(F), Class 1 Fire Door Inspection and Operability Test, Rev. 7, Completed 07/08/09, 01/05/10

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HC.FP-SV.ZZ-0056(F), Fire Barrier Inspection, Rev. 3, Completed 02/23/08  
HC.FP-SV.ZZ-0056(F), Fire Barrier Inspection, Rev. 4, Completed 10/02/09  
HC.FP-SV.ZZ-0078(F), Drywall Fire Barrier Inspection, Rev. 2, Completed 05/17/09  
HC.OP-ST.SV-0001(Q), Remote Shutdown Monitoring Instrumentation Channel Check –  
Monthly, Rev. 24, Completed 02/08/10  
HC.OP-ST.SV-0002(Q), Remote Shutdown Control Operability – 18 Months, RSP Transfer With  
“A” Shutdown Cooling In Service, Rev. 22, Completed 05/01/09  
HC.OP-ST-SV-0003(Q), Remote Shutdown Control Operability RSP Transfer with “B” Shutdown  
Cooling in Service, Rev. 10, Completed 04/11/09  
HC.OP-ST-SV-0004(Q), Remote Shutdown Control Operability – 18 Months, RSP Transfer With  
No Shutdown Cooling in Service, Rev. 9, Completed 04/17/09  
HC.OP-ST.SV-0005(Q), Remote Shutdown Control Operability- 18 Months, Testing  
BB.HV-F013B, Rev. 1, Completed 04/10/09  
HC.OP-ST.SV-0006(Q), A and C Channel Remote Shutdown Control Operability RSP Transfer –  
18 months, Rev. 0, Completed 04/04/09

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70095648-0040, Hope Creek Fire Protection FASA 2009, Completed 11/24/09  
CC-HC-211-1001, Fire Protection Program Implementation, Fourth Quarter 2009  
CC-HC-211-1001, Fire Protection Program Implementation, Third Quarter 2009  
DC-85-24, Appendix R Overview and NFPA Code Compliance Evaluation, 09/23/85  
ER-AA-610-1002, Fire Protection Indicators Worksheet, Fourth Quarter 2009  
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Hope Creek Fire Protection Focus Area Self-Assessment 2009  
Hope Creek Fire Protection Program, Audit Report, Audit # NOSA-HPC-06-09  
Hope Creek Generating Station Fire Protection, Audit # NOSA-HPC-08-07

### System Health Reports

ER-AA-610-1002, Fire Protection Performance Indicators Worksheet, 09/30/09, 12/31/09

### Drawings and Wiring Diagrams

A-5-DSC-TEE-1766, Hope Creek Generating Station, Independent Spent Fuel Storage  
Installation, Fire Hazards Analysis, Rev. 0  
D8075285C, 862 System, Channel D Power Supply Monitoring Circuit Cabinets 5, 6, Sh. 1  
D8075302C, 862 System, Channel D Power Distribution DC652-5  
E-0001-0, Single Line Diagram – Station, Rev. 24  
E-0006-1(Q), Sh. 1, Single Line Meter & Relay Diagram – 4.16 KV Class 1E Power System,  
Rev. 11  
E-0006-1(Q), Sh. 2, Single Line Meter & Relay Diagram – 4.16 KV Class 1E Power System,  
Rev. 10  
E-0008-1(Q), Sh. 1, Single Line Meter & Relay Diagram – Diesel Generators, Rev. 4  
E-0009-1(Q), Sh. 1, Single Line Meter & Relay Diagram – 125VDC System-Channels A&C,  
Rev. 24  
E-0009-1(Q), Sh. 2, Single Line Meter & Relay Diagram – 125VDC System-Channels B&D,  
Rev. 28

- E-0009-1(Q), Sh. 3, Single Line Meter & Relay Diagram – 125VDC System, Rev. 26  
 E-0009-1(Q), Sh. 4, Single Line Meter & Relay Diagram – 125VDC System-Channels C&D, Rev. 13  
 E-0009-1(Q), Sh. 5, Single Line Meter & Relay Diagram – 125VDC System, Rev. 22  
 E-0011-1(Q), Sh. 1, Single Line Meter & Relay Diagram – 250VDC System-Unit 1, Rev. 16  
 E-0011-1(Q), Sh. 1, Single Line Meter & Relay Diagram – 250VDC System-Unit 1, Rev. 18  
 E-0012-1(Q), Sh. 1, Single Line Meter & Relay Diagrams, 120VAC Instrumentation & Misc Systems, Rev. 13  
 E-0012-1(Q), Sh. 2, Single Line Meter & Relay Diagrams, 120VAC Instrumentation & Misc Systems, Rev. 27  
 E-0012-1(Q), Sh. 3, Single Line Meter & Relay Diagrams, 120VAC Instrumentation & Misc Systems, Rev. 26  
 E-0012-1(Q), SH.4, Single Line Meter & Relay Diagrams, 120VAC Instrumentation & Misc Systems, Rev. 7  
 E-0012-1(Q), Sh. 5, Single Line Meter & Relay Diagrams, 120VAC Instrumentation & Misc Systems, Rev. 36  
 E-0084-0, Electrical Schematic Diagram, Class 1E 4.16 kV Station Power System Switchgear Diesel Generator Circuit Breaker (1)52-40107, Rev. 12  
 E-0208-0, Sh. 4, Electrical Schematic Diagram, 4.16 kV Circuit Breaker Control, Station Service Water Pump, Rev. 10  
 E-0209-0, Sh. 2, Electrical Schematic Diagram, Station Service Water Sys SACS Loop B, HX Outlet Valves HV-2371B & HV-2355B, Rev. 7  
 E-0211-0, Sh. 6, Electrical Schematic Diagram, Station Service Water System, Loop B Pump Discharge MOVs HV-2198B & HV-2198D, Rev. 11  
 E-0223-0, Sh. 2, Electrical Schematic Diagram, Safety Auxiliaries Cooling, RHR HX BE205 Outlet Valve, Rev. 6  
 E-1421-0, Single Line Lighting Distribution, Rev. 21  
 E-1466-0, Remote Shutdown Communication System, Rev. 3  
 E-1475-1, UHF Radio System Riser Diagram, Rev. 10  
 E-1533-1, Raceway Plan, Reactor Bldg. Area 13, Plan at El. 102'-0", Rev. 30  
 E-1631-1, Raceway Plan, Reactor Building-Area 22, Plan El. 54'-0", Rev. 25  
 E-6084-0, Sh. 10, Electrical Schematic Diagram, Reactor Core Isolation Cooling System, Test Bypass Valve, Rev. 7  
 E-6085-0, Sh. 1, Electrical Schematic Diagram, Reactor Core Isolation Cooling System, Steam Supply Isol. Vlv F007, Rev. 10  
 E-6108-0, Sh. 4, Electrical Schematic Diagram, Residual Heat Removal System, Shutdown Cooling Outbd Isol Vlv 1HV-F015B, Rev. 10  
 E-6234-0, Sh. 6, Electrical Schematic Diagram, Residual Heat Removal System, RHR Test Return Valve 1HV-F024B, Rev. 8  
 E-6443-0, Electrical Schematic Diagram, 4.16kV Circuit Breaker Control, RHR Pump 1BP202, Rev. 8  
 E-6603-0, Sh. 1, Remote Shutdown Panel (RSP) (10C399) Transfer Switch Contact Utilization, Rev. 6  
 E-6603-0, Sh. 2, Remote Shutdown Panel (RSP) (10C399) Transfer Switch Contact Utilization, Rev. 2  
 E-6603-0, Sh. 3, Remote Shutdown Panel (RSP) (10C399) Transfer Switch Contact Utilization, Rev. 2  
 E-6603-0, Sh. 4, Remote Shutdown Panel (RSP) (10C399) Transfer Switch Contact Utilization,

Rev. 0  
 E-6603-0, Sh. 4, Rev. 0, Remote Shutdown Panel (RSP) (10C399) Transfer Switch Contact Utilization  
 E-6604-0, Sh. 1, Remote Shutdown Panel (RSP) (10C399) Scheme Dwg. Index, Rev. 12  
 E-6604-0, Sh. 3, Electrical Schematic Diagram, Remote Shutdown Panel (10C399) Details, Rev. 9  
 E-6604-0, Sh. 4, Electrical Schematic Diagram. Remote Shutdown Panel (10C399) Details, Rev. 9  
 E8069366J, 862 System, Station Service Water System, SSWS PP Discharge Valve HV-2198D  
 J-10-0, Sh. 17, Logic Diagram, Station Service Water System, Rev. 10  
 M-5001, Fire Protection and Detection Plan, Elevation 54'-0", Rev. 18  
 M-5002, Fire Protection and Detection Plan, Elevation 77'-0", Rev. 18  
 M-5003, Fire Protection and Detection Plan, Elevation 102'-0", Rev. 19  
 M-5004, Fire Protection and Detection Plan, Elevation 120'-0" And 132'-0", Rev. 20  
 M-5006, Fire Protection and Detection Plan, Elevation 155'-3" and 163'-6", Rev. 16  
 M-5068, Reactor Building Fire and Smoke Detector Locations Plan at Elevation 102'-0" Area 7, Rev. 6  
 M-5101, BTP CMEB 9.5-1 Fire Barriers Floor Plan at Level 1, Elevation 54'-0", Rev. 2  
 M-5102, BTP CMEB 9.5-1 Fire Barriers Floor Plan at Level 2, Elevation 77'-0", Rev. 5  
 M-5103, BTP CMEB 9.5-1 Fire Barriers Floor Plan at Level 3, Elevation 102'-0", Rev. 7  
 M-5104, BTP CMEB 9.5-1 Fire Barriers Floor Plan at Level 4, Elevation 120'-0" and 132'-0",  
 M-5106, BTP CMEB 9.5-1 Fire Barriers Floor Plan at Level 6, Elevation 153'-0" and 162'-0",  
 M-5112, Fire Area Boundaries, Elevation 54'-0", Rev. 2  
 M-5113, Fire Area Boundaries, Elevation 77'-0", Rev. 5  
 M-5114, Fire Area Boundaries, Elevation 102'-0", Rev. 3  
 M-5115, Fire Area Boundaries, Elevation 120'-0" and 132'-0", Rev. 2  
 M-5116, Fire Area Boundaries, Elevation 137'-0", 145'0", 146'0" and 150'-0", Rev. 5  
 M-5117, Fire Area Boundaries, Elevation 153'-0" and 162'-0", Rev. 2

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M-01-1(Q), Sh. 1, Main Steam, Rev. 51  
 M-01-1(Q), Sh. 2, Main Steam, Rev. 4  
 M-05-1, Sh. 1, Condensate, Rev. 24  
 M-05-1, Sh. 2, Condensate, Rev. 23  
 M-05-1, Sh. 3, Condensate, Rev. 43  
 M-05-1, Sh. 4, Condensate, Rev. 7  
 M-06-1, Sh. 1, Feedwater, Rev. 28  
 M-06-1, Sh. 2, Feedwater, Rev. 2  
 M-10-1(Q), Sh. 1, Service Water, Rev. 52  
 M-10-1(Q), Sh. 2, Service Water, Rev. 40  
 M-10-1(Q), Sh. 3, Service Water, Rev. 29  
 M-10-1(Q), Sh. 4, Service Water, Rev. 0  
 M-11-1(Q), Sh. 1, Safety Auxiliaries Cooling – Reactor Building, Rev. 29  
 M-11-1(Q), Sh. 2, Safety Auxiliaries Cooling – Reactor Building, Rev. 40  
 M-11-1(Q), Sh. 3, Safety Auxiliaries Cooling – Reactor Building, Rev. 26  
 M-11-1(Q), Sh. 4, Safety Auxiliaries Cooling – Reactor Building, Rev. 2  
 M-12-1(Q), Sh. 1, Safety Auxiliaries Cooling – Auxiliary Building, Rev. 31

M-12-1(Q), Sh. 2, Safety Auxiliaries Cooling – Auxiliary Building, Rev. 01  
 M-13-0, Reactor Auxiliaries Cooling, Rev. 22  
 M-13-1, Reactor Auxiliaries Cooling, Rev. 37  
 M-15-0, Compressed Air (Instrument Air), Rev. 5  
 M-42-1(Q), Sh. 1, Nuclear Boiler Vessel Instrumentation, Rev. 34  
 M-42-1(Q), Sh. 2, Nuclear Boiler Vessel Instrumentation, Rev. 21  
 M-44-1(Q), Sh. 1, Reactor Water Cleanup, Rev. 31  
 M-44-1(Q), Sh. 2, Reactor Water Cleanup, Rev. 0  
 M-46-1(Q), Sh. 1, Control Rod Drive Hydraulic – Part A, Rev. 24  
 M-46-1(Q), Sh. 2, Control Rod Drive Hydraulic – Part A, Rev. 6  
 M-47-1(Q), Sh. 1, Control Rod Drive Hydraulic – Part B, Rev. 21  
 M-47-1(Q), Sh. 2, Control Rod Drive Hydraulic – Part B, Rev. 5  
 M-49-1(Q), Sh. 1, Reactor Core Isolation Cooling, Rev. 29  
 M-51-1, Sh. 1, Residual Heat Removal, Rev. 38  
 M-51-1, Sh. 2, Residual Heat Removal, Rev. 36  
 M-52-1(Q), Sh. 1, Core Spray, Rev. 31  
 M-55-1(Q), Sh. 1, High Pressure Coolant Injection, Rev. 39  
 M-97-0 (2), Building and Equipment Drains – Auxiliary Building Control and Diesel Areas Oily, Normal, and Chemical Waste Systems, Rev. 15

Vendor Manuals

VTD 313666-01, 12 Volt DC Power Pack for Automatic Emergency Lighting Installation and Maintenance Instructions, Rev. 0  
 VTD 325953, Instruction Manual for the BIRNS Emergency Lighting Fixture Model 4701, Rev. 1  
 VTD PA400F-0152 (1-2), Cable Tray thru Fire Barrier. SE-Foam, Rev. 1  
 VTD PA400F-0158 (1-2), Sleeve or Conduit with Cable thru Fire Barrier, Rev. 4  
 VTD PA400F-0017 (1-2), Typical High Pressure Seal - Biscoseal, Rev. 6

Pre-Fire Plans

FRH-II-413, HPCI Pump and Turbine Room, RHR Pump and Heat Exchanger Rooms, Elevation 54'-0", Rev. 3  
 FRH-II-414, Core Spray Pump Room and CRW – DRW Pump and Sump Rooms, Elevation 54'-0", Rev. 3  
 FRH-II-423, MCC Area, RHR Heat Exchanger Room, Safeguard Instrument Rooms and RACS Pumps and Heat Exchanger Area, Elevation 77'-0", Rev. 4  
 FRH-II-424, MCC Area, Elevation 77'-0", Rev. 3  
 FRH-II-433, "A" SACS Heat Exchanger and Pump Room, Elevation 102'-0", Rev. 3  
 FRH-II-434, MCC Area Elevator Machine Room, Elevation 102'-0" And 119'-6", Rev. 3  
 FRH-II-435, Steam Tunnel, RCIC Pipe Chase, CRD Removal and Repair Area, HPCI Chase, Elevation 102'-0", Rev. 4  
 FRH-II-521, H and V Equipment Rooms, Elevation 77'-0", Rev. 6  
 FRH-II-531, Diesel Generator Rooms, Elevation 102'-0", Rev. 8  
 FRH-II-532, Lower Control Equipment Room, Elevation 102'-0", Rev. 6  
 FRH-II-541, Class 1E Switchgear Rooms, Elevation 130'-0", Rev. 7  
 FRH-II-561, Control Equipment, HVAC, Inverter and Battery Rooms Elevation 163'-6", Rev. 7

Fire Drills and Critiques

Fire Drill Reports: 11/24/09, 12/16/09, 01/14/10, 02/01/10, 02/16/10, 02/23/10, 03/08/10, 03/15/10

Fire Brigade Training

Fire Brigade Training Module, Fire Fighting in Nuclear Power Plants, 10/17/00  
 Fire Brigade Training Module, Site Specific; Fire Hazards, Plans, and Procedures, 04/26/00

Operator Safe Shutdown Training Lesson Plans

NOH04ABPROCUC-06, Abnormal Operating Procedures, 10/22/09  
 NOH04IOP008C-03, Shutdown from Outside Control Room, HC.OP-IO.ZZ-0008, 04/24/07

Hot Work and Transient Combustible Evaluations

4246016, 4127553, 4127533, 30170752, 50112922, 60088448, 60085781

Miscellaneous Documents

Fire Protection Impairment Tracking Report, 03/22/10  
 H-1-KC-PEE-1453, 'Diesel Generator Room Carbon Dioxide Migration Study,' Rev. 0  
 HC Emergency Lights Reliability Appendix R (Cumulative) Graph, 03/26/2010  
 VTD 3224279, HCGS Fire IPEEE Quantitative Screening Assessment  
 VTD 322799-01, HCGS Fire IPEEE Walkdown Report  
 VTD 322800, High Hazard Analysis for the HCGS Fire IPEEE  
 VTD 322802, Fire Risk Scoping Study Issues Assessment

Notifications

20453718*	20455749*	20457186*	20301083	20438076
20455299*	20455837*	20457734*	20307860	20440688
20455313*	20455838*	20457188*	20310863	20447539
20455315*	20455840*	20457189*	20374218	20449966
20455382*	20455930*	20457190*	20381306	20452335
20455546*	20456641*	20457462*	20393556	30171742
20455575*	20453912*	20455732*	20396021	30186771
20455627*	20455971*	20457489*	20415626	
20455659*	20457187*	20042040	20432573	

\*Initiated during this inspection.

Work Orders

30022978	30115649	30184623	70088846	70102519
30022979	30179256	70080091	70093304	80017849

**LIST OF ACRONYMS**

ADAMS	Agencywide Documents Access and Management System
AC	Alternating Current
CFR	Code of Federal Regulations
CO <sub>2</sub>	Carbon Dioxide
DRS	Division of Reactor Safety
FA	Fire Area
FHA	Fire Hazards Analysis
FPP	Fire Protection Program
FZ	Fire Zone
IP	Inspection Procedure
IPE	Individual Plant Examination
IPEEE	Individual Plant Examination of External Events
IR	Inspection Report
LER	Licensee Event Report
NCV	Non-Cited Violation
NFPA	National Fire Protection Association
NRC	Nuclear Regulatory Commission
PAR	Publicly Available Records
P&ID	Piping and Instrumentation Drawing
QA	Quality Assurance
RCIC	Reactor Core Isolation Cooling
RHR	Residual Heat Removal
SACS	Safety Auxiliaries Cooling System
SCBA	Self-Contained Breathing Apparatus
SER	Safety Evaluation Report
UFSAR	Updated Final Safety Analysis Report