



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

September 26, 2014

Mr. Timothy S. Rausch  
Senior Vice President and Chief Nuclear Officer  
PPL Susquehanna, LLC  
769 Salem Blvd, NUCSB3  
Berwick, PA 18603-0467

SUBJECT: **(Susquehanna Steam Electric Station, Units 1 and 2) - NRC TRIENNIAL FIRE PROTECTION INSPECTION REPORT 05000387/2014007 and 05000388/2014007**

Dear Mr. Rausch:

On August 22, 2014, the U.S. Nuclear Regulatory Commission (NRC) completed a triennial fire protection inspection at Susquehanna Steam Electric Station Units 1 and 2. The enclosed inspection report documents the inspection results, which were discussed on August 22, 2014, with you 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. The inspectors also reviewed mitigation strategies for addressing large fires and explosions.

Based on the results of this inspection, no findings 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).

T. Rausch

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ADAMS is accessible from the NRC Web Site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

*/RA/*

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

Docket Nos. 50-387; 50-388  
License Nos. NPF-14; NPF-22

cc w/encl: Distribution via ListServ

Enclosure: Inspection Report Nos. 05000387/2014007  
and 05000388/2014007 w/Attachment: Supplemental Information

T. Rausch

2

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**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION I**

Docket Nos.: 50-387; 50-388

License Nos.: NPF-14; NPF-22

Report Nos.: 05000387/2014007 and 05000388/2014007

Licensee: PPL Susquehanna, LLC

Facility: Susquehanna Steam Electric Station, Units 1 and 2

Location: 769 Salem Boulevard  
Berwick, PA

Dates: August 4-8 and 18-22, 2014

Inspectors: R. Fuhrmeister, Senior Reactor Inspector (Team Leader)  
C. Cahill, Senior Reactor Analyst  
K. Young, Senior Reactor Inspector  
J. Rady, Reactor Inspector

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

Enclosure

## **SUMMARY OF FINDINGS**

IR 05000387/2014007 and 05000388/2014007; 4/8/2014 – 8/8/2014 and 18/8/2014 – 22/8/2014; PPL Susquehanna, LLC; Susquehanna Steam Electric Station, Units 1 and 2; Triennial Fire Protection Baseline Inspection.

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

### Cornerstone: Mitigating Systems

No findings were identified.

### Other Findings

None

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## 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 PPL Susquehanna, 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 Susquehanna Steam Electric Station (Susquehanna) facility. The following fire zones (FZs) were selected for detailed review based on risk insights from the Susquehanna Individual Plant Examination of External Events (IPEEE).

- O-25A, Unit 2 Division II Lower Cable Spreading Room
- O-27E, Unit 1, Division I Upper relay Room
- O-41B, Diesel Generator Bay B
- 1-5G, Unit 1 4.16kV Switchgear Room, Division I

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

The inspection team evaluated Susquehanna's fire protection program (FPP) against applicable requirements which included plant Technical Specifications, Operating License Condition 2.C(6) (Unit 1) and 2.C(3) (Unit 2), NRC Safety Evaluations, 10 CFR 50.48, and 10 CFR 50, Appendix R and Branch Technical Position (BTP) Chemical Engineering Branch (CMEB) 9.5-1. The team also reviewed related documents that included the Updated Final Safety Analysis Report (UFSAR), Sections 9.5.1 and 9.5.2, the fire hazards analysis (FHA), and the post-fire safe shutdown analyses.

The team also evaluated 5 Susquehanna mitigating strategies for addressing large fires and explosions as required by Operating License Condition 2.C(34) (Unit 1) and 2.C(18) (Unit 2) and 10 CFR 50.54 (hh)(2). Inspection of these strategies fulfills the inspection procedure requirement to inspect a minimum of one sample.

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

### **1. REACTOR SAFETY**

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R05 Fire Protection (IP 71111.05T)

.01 Protection of Safe Shutdown Capabilities

a. Inspection Scope

The team reviewed the FHA, safe shutdown analyses and supporting drawings and documentation to verify that safe shutdown capabilities were properly protected. The team ensured that applicable separation requirements of Section III.G of 10 CFR 50,

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Appendix R and BTP CMEB 9.5-1 and Susquehanna's design and licensing bases 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.

b. Findings

No findings were identified.

.02 Passive Fire Protection

a. Inspection Scope

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

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

The team also reviewed recent inspection records for fire dampers, and the inspection records for penetration seals and fire barriers, to verify whether the inspection was adequately conducted, the acceptance criteria were met, and any potential performance degradation was identified. In addition, the team reviewed recent test results for the carbon dioxide (CO<sub>2</sub>) and Halon fire damper functionality tests for the areas protected to verify the testing was adequately conducted, the acceptance criteria were met, and any performance degradation was identified.

b. Findings

No findings were identified.

### .03 Active Fire Protection

#### a. Inspection Scope

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

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

The team reviewed routine functional testing for the CO<sub>2</sub> and Halon suppression systems for the areas protected. The team walked down accessible portions of the CO<sub>2</sub> and Halon systems, including storage tanks and supply systems, to independently assess the material condition, operational lineup, and availability of the systems.

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

The team assessed the fire brigade capabilities by reviewing training, qualification, and drill critique records. The team also reviewed Susquehanna's firefighting strategies (i.e., pre-fire plans) and smoke removal plans for the selected fire areas to determine if appropriate information was provided to fire brigade members and plant operators to identify safe shutdown equipment and instrumentation, and to facilitate suppression of a fire that could impact post-fire safe shutdown capability.



The team independently inspected the fire brigade equipment, including personnel protective gear (e.g., turnout gear) and smoke removal equipment, to determine operational readiness for firefighting. In addition, the team reviewed Susquehanna's fire brigade equipment inventory and inspection procedure and recent inspection and inventory results to verify adequate equipment was available, and any potential material deficiencies were identified.

b. Findings

No findings were identified.

.04 Protection From Damage From Fire Suppression Activities

a. Inspection Scope

The team performed document reviews and plant walkdowns to verify that redundant trains of systems required for hot shutdown, which are located in the same fire area, 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 indirectly, 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 indirectly cause damage to all redundant trains (e.g. sprinkler caused flooding of other than the locally affected train); and,
- Adequate drainage is provided in areas protected by water suppression systems.

b. Findings

No findings were identified.

.05 Post-Fire Safe Shutdown Capability – Normal and Alternative

a. Inspection Scope

The team reviewed the safe shutdown analysis, operating procedures, piping and instrumentation drawings (P&IDs), electrical drawings, the UFSAR and other supporting documents for the selected fire areas to verify that Susquehanna had properly identified the systems and components necessary to achieve and maintain safe shutdown conditions.

The team assessed the adequacy of the selected systems and components for reactivity control, reactor coolant makeup, reactor heat removal, process monitoring, and support system functions. This review included verification that alternative post-fire shutdown

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. The team verified that the systems and components credited for use during shutdown would remain free from fire damage.

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.

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

- ON-013-001, Response to Fire, Revision 38
- ON-100-009, Control Room Evacuation, Revision 31
- ON-200-009, Control Room Evacuation, Revision 31

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 were identified.

.06 Circuit Analysis

a. Inspection Scope

The team verified that Susquehanna 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 Susquehanna's analysis ensured that necessary electrical circuits were properly protected and that circuits that could adversely impact safe shutdown due to hot shorts or shorts to ground were identified, evaluated, and dispositioned to ensure spurious actuations would not prevent safe shutdown.

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

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

Circuit analysis was performed for the following components:

- |                  |   |
|------------------|---|
| 1. 1P202D        | RHR Pump 1D                                   |
| 2. HV-E11-1F009  | RHR Shutdown Cooling Inboard Isolation Valve  |
| 3. HV-E11-1F017B | RHR Outboard Injection Isolation Valve        |
| 4. HV-E21-2F004A | Core Spray Outboard Injection Isolation Valve |
| 5. HV-B21-2F001  | Reactor Head Vent Valve                       |
| 6. LI-14262      | Reactor Vessel Level Indicator                |
| 7. PI-14262      | Reactor Vessel Pressure Indicator             |

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

The team verified that the transfer of control from the control room to the alternative shutdown location 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).

b. Findings

No findings were identified.

.07 Communications

a. Inspection Scope

The team reviewed safe shutdown procedures, the safe shutdown analysis, and associated documents to verify 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 sound powered phones 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 were identified.

.08 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 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 consistent with the manufacturer's recommendations and in a manner that would ensure reliable operation.

a. Findings

No findings were identified.

.09 Cold Shutdown Repairs

a. Inspection Scope

The team verified that Susquehanna had evaluated the need for any dedicated repair procedures, equipment, and materials to accomplish repairs of components required for cold shutdown which might be damaged by the fire to ensure cold shutdown could be achieved within the time frames specific in their design and licensing bases. The team confirmed that the safe shutdown analysis for SSES did not identify any systems or components that would require repairs to achieve cold shutdown.

b. Findings

No findings were identified.

.10 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 Susquehanna was effective in returning the equipment to service in a reasonable period of time.

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

b. Findings

No findings were identified.

.11 Fire Protection Program Changes

a. Inspection Scope

The team reviewed recent changes to the approved fire protection program to verify that the changes did not constitute an adverse effect on the ability to safely shutdown.

b. Findings

No findings were identified.

.12 Control of Transient Combustibles and Ignition Sources

a. Inspection Scope

The team reviewed Susquehanna'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 transient combustibles and ignition sources were being controlled in accordance with the administrative requirements.

b. Findings

No findings were identified.

.13 Large Fires and Explosions Mitigation Strategies

a. Inspection Scope

The team reviewed Susquehanna's preparedness to handle large fires or explosions by reviewing five mitigating strategies to verify that they continue to meet operating license conditions 2.C(34) (Unit 1) and 2.C(18) (Unit 2) 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 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 Susquehanna 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 Susquehanna had taken or planned to take appropriate corrective actions.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

Exit Meeting Summary

The team presented their preliminary inspection results to Mr. T. Rausch, Chief Nuclear Officer, and other members of the Susquehanna staff at an exit meeting on August 22, 2014. No proprietary information was included in this inspection report.

ATTACHMENT: SUPPLEMENTAL INFORMATION

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**SUPPLEMENTAL INFORMATION**

**KEY POINTS OF CONTACT**

Licensee Personnel

T. Rausch	Chief Nuclear Officer
J. Helsel	Plant Manager
W. Bishop	General Manager
R. Franssen	Operations Manager
T. Case	Licensing Engineer
T. Gorman	Safe Shutdown Engineer
T. Soffen	Site Fire Protection Engineer
S. Maguire	Fire Protection Programs Engineer
B. Hyduk	Fire Protection System Engineer
T. O'Conner	Fire Protection Engineer, Contractor
C. Poncavage	Systems Engineer, Communications
J. Lussi	Fire Protection Instructor
R. Thompson	Operations Instructor
J. Willis	Senior Reactor Operator
C. Young	Senior Reactor Operator

NRC

J. Rogge, Chief, Engineering Branch 3, Division of Reactor Safety  
J. Grieves, Senior Resident Inspector, Susquehanna Steam Electric Station  
T. Daun, Resident Inspector, Susquehanna Steam Electric Station

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

Opened

NONE

Opened and Closed

NONE

Closed

NONE

Discussed

NONE

## LIST OF DOCUMENTS REVIEWED

### Fire Protection Licensing Documents

Facility operating License NPF-14  
Facility Operating License NPF-22  
Fire Protection Review Report, Rev. 20  
NRC Letter dated 8/9/89, Safety Evaluation of Fire Protection Report, SSES, Units 1 and 2  
NRC Letter Dated 3/29/93, Rev. No. 4 to the FPRR, SSES, Units 1 and 2  
NRC Letter dated 10/21/97, Evaluation of Fire Protection Program Issues,  
Safe Shutdown Methodology and Analysis of Associated Circuits SSES, Units 1 and 2  
NRC Letter dated 6/24/98, Operating License Amend. Nos. 177 & 150, SSES, Units 1 and 2  
PP&L Letter dated 12/6/96, SSES Appendix R, Section III.G and III.L  
Spurious Operations Criteria  
Safety Evaluation Report, NUREG-0776, SSES, Units 1 and 2, dated 4/17/81  
Safety Evaluation Report, NUREG-0776, Supplement No. 1, SSES, Units 1 and 2, dated 6/81  
Safety Evaluation Report, NUREG-0776, Supplement No. 2, SSES, Units 1 and 2, dated 9/81  
Safety Evaluation Report, NUREG-0776, Supplement No. 3, SSES, Units 1 and 2, dated 7/82  
Safety Evaluation Report, NUREG-0776, Supplement No. 4, SSES, Units 1 and 2, dated 11/82  
Safety Evaluation Report, NUREG-0776, Supplement No. 6, SSES, Units 1 and 2, dated 3/84  
Safety Evaluation of Fire Protection Report, 8/9/89  
UFSAR, Section 9.5.1, Fire Protection System, Rev. 66  
UFSAR, Section 17.2.2, Quality Assurance Program, Rev. 66

### Design Basis Documents

DBD019, Design Basis Document for Fire Protection, Rev. 5  
DBD076, Design Basis Document for Appendix R, Rev. 2

### Calculations/Engineering Evaluation Reports

EC-PUPC-20611, EPU Task Report 0611 – Appendix R, Rev. 2  
EC-THYD-1064, MAAP Analysis of Appendix R Scenarios, Rev. 3  
EC-013-0563, Communication Requirements to Perform Manual Actions, Rev. 1  
EC-013-0678, RHR Shutdown Cooling Isolation/Operation Capability in the Event of a  
Plant Fire, Rev. 7  
EC-013-0788, Inadvertent Reactor Vessel Injection Resulting from Spurious Operation of the  
HPCI or RCIC Systems, Rev.10  
EC-013-0843, SSES 10CFR50 Appendix R Compliance Manual, Rev. 44  
EC-013-0845, Appendix R ADS/SRV Spurious Operation and Cable Analysis, Rev. 3  
EC-013-0859, Appendix R Analysis for a Control Room Fire, Rev. 30  
EC-013-1048, Impact of Inadvertent RPV Overfill on SRV Discharge Piping, Rev. 3  
EC-013-1873, Operator Manual Actions Feasibility Analysis, Rev. 3  
EC-013-1887, Attachment 5, Final Plant Specific MSO List, Rev. 2



EC-013-1897, Hydraulic Model of the Fire Water Supply System Using PIPE-FLO, Rev. 2  
EC-FLOD-0001, Internal Flooding Evaluations for Moderate Energy Pipe Cracks and Sprinkler System Actuations, Rev. 3  
EC-013-1090, Raceway Fire Barrier Qualification Evaluation of Typical Detail VW-U-W1-01 2-1/2" through 12" Wide Wireways Protected With 5/8" v-ribbed panels and 1/2" Sprayed-On, Requiring 1-hour Protection, Rev. 1  
EC-004-0501, Appendix R Associated Circuit Analysis, Rev. 50  
EC-013-0678, RHR Shutdown Cooling Isolation/Operation Capability in the Event of a Plant Fire, Rev. 7  
EC-013-0843, Appendix R Compliance Manual, Rev. 44  
EC-013-0859, Appendix R Analysis for a Control Room Fire, Rev. 30  
EC-EPVS-1017, Determine Necessity for Fuse Replacement, Rev. 0

### Procedures

IC-149-005, Installation and Removal of Temporary RTD/readers for Local Monitoring of RHR Heat Exchanger B Inlet (TE-E11-1N004B) and outlet (TE-E11-1N027B) Temperatures, Rev. 4  
IC-180-004, Reactor Shutdown Range Level Measurement at Rack 1C005, LT-B21-1N027, Rev. 3  
NDAP-00-0316, Station Communication Practices, Rev. 6  
NDAP-QA-0300, Attachment C, Operations Shift Complement, Rev. 35  
NDAP-QA-0449, Fire protection Program, Rev. 10  
NDAP-QA-0440, Control of Transient Combustible/Hazardous Materials, Rev. 15  
NDAP-QA-0442, Control of Ignition Sources: Cutting, Welding, and Hot Work Permits, Rev. 6  
NDAP-QA-0443, Firewatch Procedure, Rev. 11  
NDAP-QA-0444, Fire Alarm Response, Rev. 3  
NDAP-QA-0445, Fire Brigade, Rev. 11  
MI-PD-002, Thermography Program, Rev. 4  
MT-GE-012, 480V MCC Cutler-Hammer Cubicle Inspection, Testing and Maintenance, Rev. 21  
MT-GE-050, 480Vac Motor Control Center Cubicle Inspection, Testing and Maintenance, Rev. 14  
NDAP-QA-0485, Thermography Training, Qualification, and Certification Program, Rev. 0  
NDAP-QA-1201, Configuration Management Process and Program, Rev. 11

### Operations Procedures

EO-000-102, RPV Control, Rev.73  
EO-000-103, Primary Containment Control, Rev.12  
EO-000-112, Rapid Depressurization, Rev. 7  
EO-000-114, RPV Flooding, Rev. 8  
OI-PM-005, Appendix "R" Sound Powered Phone System, Rev. 6  
ON-030-002, Loss of Control Structure HVAC, Rev. 7  
ON-100-101, SCRAM, SCRAM Imminent (U1), Rev. 35  
ON-104-001, U1 Response to Loss of All Offsite Power, Rev. 22  
ON-183-001, Stuck Open Safety Relief Valve, Rev. 30  
ON-200-101, SCRAM, SCRAM Imminent (U2), Rev. 31

ON-204-001, U2 Response to Loss of All Offsite Power, Rev. 22  
OP-024-001, Diesel Generators, Rev. 73  
OP-100-001, Remote Shutdown Panel, Rev.12  
OP-116-001, RHR Service Water, Rev. 46  
OP-149-001, RHR System (U1), Rev. 43  
OP-149-002, RHR Shutdown Cooling, Rev. 63  
OP-149-005, RHR Suppression Pool Cooling, Rev. 28  
OP-150-001, RCIC System (Reactivity Impact), Rev. 42  
OP-151-001, Core Spray System, Rev. 36  
OP-152-001, HPCI System (Reactivity Impact), Rev. 56  
ON-013-001, Response to Fire, Rev. 38  
ON-100-009, Control Room Evacuation, Rev. 31  
ON-200-009, Control Room Evacuation, Rev. 31  
SE-013-007, 24 Month Inspection of Unit Common Fire Barriers, Rev. 7  
SE-013-009, 24 Month Inspection of Fire Windows/Fire Dampers And  
Associated Hardware, Rev. 3  
SE-113-007, 24 Month Inspection of Unit 1 Fire Barriers, Rev. 7  
SE-013-006, 24 Month Inspection of Common Fire Rated Penetration Seals  
SM-113-015, 3 Year Level/Weight Measurements and Pressure/Flow Verification of  
Halon Cylinders, Rev. 3  
SE-013-008, 6 Month Inspection of Common Fire Doors, Rev. 8  
SE-113-008, 6 Month Inspection of Unit 1 Fire Doors, Rev. 7  
SE-013-003, 18 Month CO2 System Functional Test, Rev. 13  
SO-013-013, 18 Month Functional Test and Visual Inspections of Pre-Action Sprinkler Systems  
PA-011, PA-012, PA-013, PA-014, Rev. 10  
SO-213-022, 18 Month Functional Test and Visual Inspection of Pre-Action Sprinkler System  
PA-242, Rev. 8  
SI-113-257, Annual Functional test of CO2 System 1.27 Fire Protection Heat Detectors for  
Fire Zone 0-27E, Rev. 5  
SI-013-225, Annual Functional test of Fire Protection Ionization Detectors for Fire Zones 0-25A  
and 0-25E, Rev. 6  
SI-013-232, Annual Functional Test of Fire protection Ionization Detectors for Fire Zones 0-27A,  
0-27B, 0-27C, 0-27D, and 0-27E, Rev. 8  
SI-013-238, Annual Functional Test of Fire Protection Infrared and PhotoElectric Detectors for  
Fire Zone 0-41B (D/G B Room), Rev. 4  
SI-113-244, Annual Functional Test of Fire Protection Ionization Detectors for Fire Zones  
1-5F and 1-5G, Rev. 5  
SI-213-254, Annual Functional Test of Pre-Action System Fire Protection Heat Detectors for  
Fire Zone 0-25A, Rev. 5

Large Fires and Explosions Mitigation Strategies Documents

DC-B5B-001, Spraying/Makeup to the Spent Fuel Pool Using the Portable Pump Truck or  
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DC-B5B-102, Connection of Portable Pump Truck to the RHRSW System to Provide Alternate  
Means of Low Pressure RPV Injection, Containment Sprays or Suppression Pool Makeup to  
Unit One, Rev. 8

CD-B5B-201, Depressurization of Unit Two RPV Using ADS SRV's with a Portable Supply  
 Connected at the Div 1 or Div 2 Containment Penetration, Rev. 8  
 EDMG-B5B-001, Extensive Damage Mitigation Guidelines (EDMG), Rev. 7  
 ES-273-001, Venting Suppression Chamber Within Radiological Release Limits, Rev. 12  
 ES-273-003, Venting Suppression Chamber Without Radiological Release Limits, Rev. 18

### Completed Tests/Surveillances

T2019-01, Plant Radio System Health Check & Calibration, Completed 11/20/13  
 SE-100-007, Emergency Service Water/RHR Service Water Functional Test at 1C201B, Rev. 9,  
 Performed 5/22/14  
 SE-149-009, Common RHR and Safety Relief Valves Functional Test at Remote Shutdown  
 Panel, Rev. 4, Performed 5/15/14  
 SE-150-004, Reactor Core Isolation Cooling Functional Test at 1C201A, Rev. 2, Performed  
 1/27/14  
 SE-200-007, Emergency Service Water/RHR Service Water Functional Test at 2C201B, Rev. 13,  
 Performed 5/15/13  
 SE-249-009, Functional Test of RHR Loop A, RHR Common, RHR Service Water And  
 Safety Relief Valves at 2C201B, Rev. 5, Performed 5/25/13  
 SE-249-010, Functional Test of RHR Loop B at 2C201B, Rev. 4 Performed, 5/13/13  
 SE-250-004, Reactor Core Isolation Cooling Functional Test at 2C201A, Rev. 4 Performed  
 3/14/13  
 SI-180-307, 24 Month Calibration of Reactor Pressure Indication Channel, Rev. 15, Performed  
 10/4/11 and 12/19/13  
 SI-180-308, 24 Month Calibration of Reactor Water Levels, Rev. 23, Performed 9/30/11 and  
 10/7/13  
 TP-200-012, Reactor Water Cleanup Functional Test at Remote Shutdown Panel, Rev. 9,  
 Performed 4/17/13  
 TP-013-034, Annual Diesel Driven Fire Pump, 0P511, Performance Test, completed March 4,  
 2014  
 TP-013-035, Annual Motor Driven Fire Pump, 0P512, Performance Test, completed July 9, 2012  
 TP-013-036, Annual Backup Diesel-Driven Fire Pump, 0P592, Performance Test, completed  
 March 9, 2013  
 TP-013-036, Annual Backup Diesel-Driven Fire Pump, 0P592, Performance Test, completed  
 October 11, 2013  
 SO-013-001, Monthly Diesel and Motor Driven Fire Pump Run, completed June 10, 2014  
 SE-013-007, 2 Yr Inspection of Fire Barriers, completed March 23, 2012  
 SE-013-007, Z1715-01 Perform 2 Yr Inspection of Fire Barriers, completed October 12, 2012  
 SE-013-007, Z1715-01 Perform 2 Yr Inspection of Fire Barriers, completed February 28, 2014  
 2 Yr Insp of Fire Window/Damper Per SE-013-009 20537-01, completed November 1, 2010  
 2-Yr Insp of Fire Windows/Dampers Per SE-013-009, completed January 2, 2013  
 2 Yr Inspection of Fire Barriers Ref SE-113-007, completed April 4, 2012  
 2 Yr Inspection of Fire Barriers Ref. SE-113-007 (Z1716-01), completed May 9, 2014  
 Z1717-01 2 Yr Inspec of Fire Barriers per SE-213-007, completed April 6, 2011  
 2 Yr Insp – Common Penetrations, completed March 1, 2013  
 2 Yr Insp – Unit 1 Penetrations per SE-113-006, completed April 27, 2012

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Z0529-02 SM-113-015, completed January 24, 2014  
Z0529-02 SM-113-015, completed June 11, 2011  
Z1838-01 6 Month Inspection Unit Common Fire Door Per SE-013-008, completed August 2, 2013  
Z1838-01 6 Month Inspection Unit Common Fire Door Per SE-013-008, completed February 4, 2014  
Z0541-01 6 Month Inspection Unit 1 Fire Doors SE-113-008, completed August 14, 2013  
Z0541-01 6 Month Inspection Unit 1 Fire Doors, SE-113-008, completed February 11, 2014  
SE-013-003 Z0173-01, completed March 17, 2012  
18 Month Functional Test and Visual Inspection of Pre-Action Sprinkler Systems PA-011, PA-012, PA-013, and PA-014, completed December 9, 2013  
18 Mo Func Tst & VI of PA-011, 012, 013, & 014, completed March 26, 2014  
18 Mo Func Test & VI PA-242, completed July 11, 2012  
18 Mo Func Tst & VI PA-242, completed December 11, 2013  
Annual Functional Test – Fire Zone 0-27E (CO2 System 1.27), completed November 14, 2012  
Annual Functional test – Fire Zone 0-25A & 0-25E (Detector Test), completed January 21, 2014  
Annual Functional Test – Fire Zones 0-27A, 0-27B, 0-27C, 0-27D & 0-27E (Detector Test), completed February 5, 2014  
Annual Functional Test – Fire Zones 0-27A, 0-27B, 0-27C, 0-27D & 0-27E (Detector Test), completed January 20, 2014  
SI-013-238 Annual “B” DG Bay Fire Protection Infrared & Photo Electric Detectors, completed August 10, 2012  
Annual Functional Test – Fire Zone 0-41B (Detector Test), completed June 5, 2013  
Annual Functional Test – Fire Zones 1-5F and 1-5G (Detector Test), completed October 11, 2012  
Annual Functional Test – Fire Zones 1-5F & 1-5G (Detector Test), completed October 11, 2013  
Annual Functional Test – Fire Zone 0-27E (Upper Relay Room PGCC Halon), completed August 28, 2013  
Annual Functional Test – Fire Zone 0-27E (Upper Relay Room PGCC Halon), completed July 7, 2014  
Z0529-01 SM-113-014, completed December 5, 2012  
Z0259-01 SM-113-014 Halon Cylinder Annual Inspection, completed January 21, 2014  
SI-013-243 Z1948-01 Fire Zone 0-41B, completed July 24, 2013  
SI-013-243 Z1948-01 Fire Zone 0-41B, completed April 10, 2014  
SI-213-254 Z1924-01 Fire Zone 0-25A, completed October 15, 2012  
SI-213-254 Z1924-01 Fire Zone 0-25A, completed October 15, 2013

System Health Reports

Units 1 and 2, 13.8kV Systems, 2<sup>nd</sup> thru 4<sup>th</sup> qtrs. 2013 and 1<sup>st</sup> qtr. 2014  
Units 1 and 2, 4.16kV Systems, 2<sup>nd</sup> thru 4<sup>th</sup> qtrs. 2013 and 1<sup>st</sup> qtr. 2014  
Units 1 and 2, 480V Load Centers, 2<sup>nd</sup> thru 4<sup>th</sup> qtrs. 2013 and 1<sup>st</sup> qtr. 2014  
Fire Protection Water Systems 13A, 13B, 13F, 13G, 2014-1  
Fire Protection Water Systems 13A, 13B, 13F, 13G, 2014-2  
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Fire Protection Program Health Scorecard, 2014-2

007/107 120V Lighting and Misc. Distribution System Health Scorecard, 2014-1  
207 120V Lighting and Misc. Distribution System Health Scorecard, 2014-1  
007 120V Lighting and Misc. Distribution System health Scorecard, 2013-3  
107 120V Lighting and Misc. Distribution System health Scorecard, 2013-3  
207 120V Lighting and Misc. Distribution System Health Scorecard, 2013-3

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E-690, Appendix "R" Safe Shutdown Manual Actions List, Rev. 7  
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07113620-LD-21, Sh. 1, Layout Drawing for Full Voltage Reversing Cubicle Breaker 1B236052,  
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D107298, Sh. 1, Schematic Diagram Remote Shutdown Panel 1C201 Transfer Switches, Rev. 10  
D107298, Sh. 4, Schematic Diagram Panel 1C201 Transfer Lights, Rev. 6  
D107302, Sh. 14, Unit 1 Schematic Diagram RHR Injection Control Valve HV-E11-1F017B,  
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D107302, Sh. 17, Unit 1 Schematic Diagram RHR Shutdown Cooling Inboard Isolation Valve  
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D107306, Sh. 1, Unit 1 Block Diagram Reactor Protection System Power Distribution, Rev. 18  
D107330, Sh. 8, Unit 2 Schematic Diagram Nuclear Boiler Head Vent Valves, Rev. 21  
E107150, Sh. 1, Unit 1 and 2 Single Line Diagram, Rev. 36  
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E107158, Sh. 11, Unit 1 Single Line Meter and Relay Diagram 480V Motor Control Center 1B216,  
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E107158, Sh. 9, Unit 1 Single Line Meter and Relay Diagram 480V Motor Control Center 1B237,  
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E205951, Sh. 10, Reactor Building Fire Zone Plan of Protected Tray Raceway Elevation 683'-0",  
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FF126510, Sh. 3, Core Spray System, Rev. 25  
FF62008, Sh. A, Fire Barrier Upgrade Index, Rev. 9  
FF62009, Sh. 105, Fire Barrier Upgrade F1KY11 and F1KX11 Wrapped Raceways, Rev. 0  
FF62009, Sh. 106, Fire Barrier Upgrade F1KY11 and F1KX11 Wrapped Raceways, Rev. 0  
M-1002, Safe Shutdown Equipment, Rev. 8  
E205889, Sh. 8, Susquehanna S.E.S. Unit 1&2, Control Structure Fire Zone Plan of Protected  
Tray Raceway Elevation 714'-0", Rev. 1  
FF61009, Sh. 267, Susquehanna S.E.S. Unit 1&2, Fire Barrier Upgrade E2KQ23-25 Wrapped  
Raceway Sketch No. 0-25A-1, Rev. 0  
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VW-U-Index-01, Rev. 9  
FF62008, Sh. 143, Susquehanna S.E.S. Unit Common Fire Barrier Upgrade, Wireway –  
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FF62008, Sh. 144, Susquehanna S.E.S. Unit Common Fire Barrier Upgrade, Wireway – All Sizes, Sketch No. VW-U-W1-01, Rev. 2

FF62008, Sh. 145, Susquehanna S.E.S. Unit Common Fire Barrier Upgrade, Wireway – All Sizes, Sketch No. VW-U-W1-01, Rev. 1

FF62008, Sh. 146, Susquehanna S.E.S. Unit Common Fire Barrier Upgrade, Wireway – All Sizes, Sketch No. VW-U-W1-01, Rev. 1

FF62008, Sh. 216, Susquehanna S.E.S. Unit Common Fire Barrier Upgrade, Wireway – All Sizes, Sketch No. VW-U-W1-01, Rev. 0

FF62008, Sh. 216, Susquehanna S.E.S. Unit Common Fire Barrier Upgrade, Wireway – All Sizes, Sketch No. VW-U-W1-01, Rev. 1

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E205953, Sh. 4A, Susquehanna S.E.S. Unit 1 Reactor Building Fire Detector Location Plan, Elevation 749'-1" to 779'-1", Rev. 2

E205089, Sh. 1, Susquehanna S.E.S. Units 1&2 Control Structure Fire Zone Plan Elevation 714'-0", Rev. 6

E205089, Sh. 2, Susquehanna S.E.S. Units 1&2 Control Structure Fire Doors and Fire Dampers Elevation 714'-0", Rev. 5

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E205089, Sh. 5, Susquehanna S.E.S. Units 1&2 Control Structure Fire Zone Plan of Protected Conduit Raceway Area 12 Plan of Elevation 714'-0"

E205992, Sh. 4A, Susquehanna S.E.S. Units 1&2 Control Structure Heat & Ionization Detector, Upper Relay Room Plan @ Elevatoin 754'-0", Rev. 0

E206001, Sh. 2, Susquehanna S.E.E. Common Diesel Generator Building Fire Doors and Dampers Elevation 677'-0", Rev. 4

E206001, Sh. 3, Susquehanna S.E.S. Common Diesel Generator Building Fire Protection Plan, Elevation 677'-0", rev. 3

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FF62262, Sh. 3, Susquehanna S.E.S. Fire protection Hydraulic Node Diagram Unit 1 Turbine Bldg & Radwaste, Rev. 1

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M-101, Sh. 1, 2, 3, U1 Main Steam, Rev. nos. 42, 18, 13  
 M-105, Sh. 1, 2, 3, 4, 6, U1 Condensate Filtration System, Rev. nos. 43, 24, 9, 5, 0  
 M-106, Sh. 1-5, U1 Feedwater, Rev. nos. 41, 30, 29, 29, 3  
 M-109, Sh. 1-3, U1 Service Water, Rev. nos. 55, 16, 6  
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 M-144, Sh. 1-3, U1 Reactor Water Cleanup, Revs. 45, 17, 7  
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#### Pre-Fire Plans

FP-013-146, U2 Lower Cable Spreading Room (C-301) Fire Zone 0-25A Elev. 714', Rev. 5  
FP-013-155, Control Room (C-409) & Soffits Fire Zones 0-26H, 0-26N, & 0-26P Elev. 729'-1", Rev. 7  
FP-013-164, U1 Upper Relay Room (C-501) fire Zone 0-27E Elev. 754', Rev. 7  
FP-013-192, Diesel Generator Bay "B" Fire Zone 0-41B Elevs. 677', 660', & 710', Rev. 4  
FP-113-123, Load Center Room (I-507), Load Center Room (I-510), Fire Zone 1-5F, 1-5G Elev. 749'-1", Rev. 4

#### Fire Brigade Training

FB002, Initial Fire Brigade Training Susquehanna Specific, Rev. 2  
FB003, Fire Brigade Leader Training, Rev. 2  
FB017, Plant Fire protection, Rev. 1  
FB018, Fire Hazard Identification Rev. 1  
FB019, Plant Firefighting Plan, Rev. 0  
FB020, Fire Brigade Safety, Rev. 0  
FB 021, Fire protection Review, Rev. 1  
FB022, Hazardous Materials, Rev. 1  
Mobile Fire Pump Training, Parts 1, 2, 3 (PowerPoint presentations)

#### Operator Safe Shutdown Training and Job Performance Measures (JPM)

TM-OP-016-ST, RHR Service Water, Rev. 10  
TM-OP-025-ST, Containment Instrument Gas (CIG), Rev. 0  
TM-OP-030-ST, Control Structure HVAC, Rev. 0  
TM-OP-049-ST, Residual Heat Removal, Rev. 0  
TM-OP-050-ST, Reactor Core Isolation Cooling, Rev. 0  
TM-OP-083-ST, Main Steam System, Rev. 0  
00.ON.015.104, Establish and Maintain Reactor Pressure with SRVs from Remote Shutdown Panel, Rev. 2



- 00.ON.015.105, Immediate Operator Action for Control Room Evacuation, Rev. 4
- 00.ON.015.154, Immediate Operator Action for Control Room Evacuation, Rev. 0
- 00.ON.1153.102, Perform Operator Actions Outside the Control Room in Accordance with ON-100-009, Rev. 2
- 13.ON.003.001, Activate the Fire Brigade, Rev. 2
- 30.ON.1522.01, Place Control Structure HVAC in Service, Rev. 4
- 50.OP.1895.101, Lower Suppression Pool Water Level with RHR, Rev. 0
- 50.OP.1916.201, Establish & Maintain Reactor Vessel Level (RCIC Not Injecting) from the U2 Remote Shutdown Panel (RSDP), Rev. 1

Operator Safe Shutdown Training – Simulator

- ISG-ON100009, ON-100-009, Control Room Evacuation, Rev. 0
- ISG-ON013001, ON-013-001, Response to Fire, Rev. 0
- TQ-106-0307, Simulator Scenario, CV Fails to Open, Control Room Evacuation, RCIC from RSDP, Rev. 0

Hot Work and Ignition Source Permits

1655484      1719754      1748347      1688084      1711112

Miscellaneous Documents

Operations Shift Staffing Report U1 & U2, 7/21-23/14

Condition Reports

1540535	1612394	1692071	1745724
1420895	1655570	1718611	1426750
1446630	1526133	1596673	1648655
1648670	1677071	1489059	1648727
1607326	1613760	1630216	1631367
1635334	1673745	729324	2014-18254
2014-26413*	2014-07017	201409755	2014-11420
2014-07018	2014-06998	2014-01041	2014-15736
2014-23614	2014-25188*	2014-25260*	2014-25479*
2014-25482*	2014-25484*	2014-26588*	2014-03020

\* NRC identified during this inspection.

Work Orders

1668882	1508963	1508964	1717733
1806935	1229893	1600728	1631006
1091423	1320538	1255267	1555083
1142640	1364405	1255268	1496351
1420798	1670251	1733751	1672556
1275305	1736936	1650753	1625170
1330815	1599942	1485536	1643812
1669339	1667659	1671053	1433123
1608431	1496761	1630999	1609875
1741222	1542927	1650237	1581087
1730066	1477103	1631901	450931
461063	482469	568353	824077
846513	848416	986921	1113455
1113458	1259812	1259812	1311247
1414155	1435205	1541608	1564229
1576712	1582147	1582148	1587356
1600734	1620748	1622232	1636567
1669857	1690349	1690369	1694166
1775985	1813216	1360620	1393597
1397931	1649424	1715781	1796375
1801121	1801125	1801127	1802388
1802389	1802390	1802392	1830744
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**LIST OF ACRONYMS**

ADAMS	Agencywide Documents Access and Management System
AC	Alternating Current
BTP	Branch Technical Position
CFR	Code of Federal Regulations
CIG	Containment Instrument Gas
CMEB	Chemical and Mechanical Engineering Branch
CO <sub>2</sub>	Carbon Dioxide
DC	Direct Current
DRS	Division of Reactor Safety
EGM	Enforcement Guidance Memorandum
Elev.	Elevation
FA	Fire Area
FHA	Fire Hazards Analysis
FPP	Fire Protection Program
FPRR	Fire Protection Review Report
FZ	Fire Zone
HPCI	High Pressure Coolant Injection
HVAC	Heating, Ventilation, and Air Conditioning
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IPE	Individual Plant Examination
IPEEE	Individual Plant Examination of External Events
IR	Inspection Report
JPM	Job Performance Measures
kV	Kilo-Volts
MSO	Multiple Spurious Operation
NFPA	National Fire Protection Association
NRC	Nuclear Regulatory Commission
PAR	Publicly Available Records
P&ID	Piping and Instrumentation Drawing
RCIC	Reactor Core Isolation Cooling
RHR	Residual Heat Removal
RPV	Reactor Pressure Vessel
RSDP	Remote Shutdown Panel
SCBA	Self-Contained Breathing Apparatus
SER	Safety Evaluation Report
SRO	Senior Reactor Operator
SSES	Susquehanna Steam Electric Station
TRM	Technical Requirements Manual
UFSAR	Updated Final Safety Analysis Report