January 12, 2006

Mr. Britt T. McKinney
Senior Vice President & Chief Nuclear Officer
PPL Susquehanna, LLC
769 Salem Blvd. - NUCSB3
Berwick, PA 18603-0467

SUBJECT: SUSQUEHANNA GENERATING STATION - NRC TRIENNIAL FIRE PROTECTION INSPECTION REPORT NO. 05000387/2005009 AND 05000388/2005009

Dear Mr. McKinney:

On December 2, 2005, the NRC completed a triennial fire protection team inspection at the Susquehanna Steam Electric Station. The enclosed report documents the inspection findings which were discussed at an exit meeting on December 2, 2005, with you and other members of your staff.

This inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's 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, there was one NRC-identified finding of very low safety significance (Green), which did not involve violations of NRC requirements.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). 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

Enclosure: Inspection Report No. 05000387/2005009 and 05000388/2005009

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Director - Bureau of Radiation Protection, PA Department of Environmental Protection
Board of Supervisors, Salem Township
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REGION I

Docket No.	05000387, 05000388
License No.	NPF-14 and NPF-22
Report Nos.	05000387/2005009 and 05000388/2005009
Licensee:	PPL Susquehanna, LLC
Facility:	Susquehanna Steam Electric Station, Units 1 and 2
Location:	769 Salem Blvd. - NUCSB3
Dates:	November 14-18 and November 28-December 2, 2005
Inspectors:	L. Scholl, Senior Reactor Inspector, DRS B. Norris, Senior Project Engineer, DRP J. Bobiak, Reactor Inspector, DRS
Approved by:	John F. Rogge, Chief Engineering Branch 3 Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000387/2005009, 05000388/2005009; 11/14/2005 - 12/02/2005, Susquehanna Steam Electric Station; Triennial Fire Protection Team Inspection, Fire Protection.

This report covered a two-week triennial fire protection team inspection by three Region I inspectors. One Green finding was identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. NRC-Identified Findings

Cornerstone: Mitigating Systems

- Green. The inspectors identified a Green finding regarding the implementation of the fire brigade drill program. The finding involves practices that are not consistent with regulatory guidance (Branch Technical Position (BTP) SPLB 9.5.1and Regulatory Guide (RG) 1.189) and industry standards for the performance and crediting of fire brigade drills. Specifically, the program does not result in the five member, on-shift, fire brigade practicing as a team during drills and consequently does not allow for an effective assessment of the brigade's performance during drills. In addition, two examples were identified where the licensee failed to implement specific drill program requirements. The licensee has entered these issues into their corrective action program for review and resolution.

  The finding is more than minor because it affected the Protection Against External Factors attribute of the Mitigating Systems Cornerstone, in that it impacted manual fire suppression (fire brigade) capability; and affected the cornerstone objective of ensuring the availability of systems that respond to initiating events. This finding has been reviewed by NRC management and is determined to be a finding of very low safety significance (Green). (Section 1R05.04)

B. Licensee-Identified Violations

None

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 facility. The following fire areas (FAs) were selected for detailed review based on risk insights from the SSES Individual Plant Examination (IPE)/Individual Plant Examination of External Events (IPEEE):

- FA CS-9
- FA CS-11
- FA CS-31
- FA D-1
- FA R-2H

Section 71111.05-05 of the inspection procedure specifies a minimum sample size of three. Inspection of these five areas fulfills the procedure completion criteria. The inspection team evaluated the licensee’s fire protection program (FPP) against applicable requirements which include plant Technical Specifications, Operating License Condition 2.C.(6), NRC Safety Evaluations, 10 CFR 50.48 and 10 CFR 50 Appendix R. The team also reviewed related documents that include the Fire Protection Review Report (FPRR) and the Post-Fire Safe Shutdown Analysis.

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

1. **REACTOR SAFETY**

Cornerstones: Initiating Events, Mitigating Systems

1R05 Fire Protection

.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 FPRR and other supporting documents to verify that hot and cold shutdown could be achieved and maintained from outside the control room 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 AC electrical power, establishing reactor coolant makeup using the reactor core isolation cooling system and establishing decay heat removal.

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

- ON-013-001, Response to Fire, Rev. 16
- ON-100-009, Control Room Evacuation, Rev. 10
- ON-200-009, Control Room Evacuation, Rev. 11

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 fire hazards analysis, safe shutdown analyses and supporting drawings and documentation to verify that safe shutdown capabilities were properly protected. The team ensured that separation requirements of the FPRR 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 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 FPRR. 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.

The team also reviewed the licensee's design control procedures to ensure that the process included appropriate reviews and controls to assess plant changes for any potential adverse impact on the fire protection program and/or post-fire safe shutdown analysis and procedures.

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 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

b. 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 NFPA code of record and that they would control and/or extinguish fires associated with the hazards in the selected areas. A review of the design capability of suppression agent delivery systems were verified to meet the code requirements for the fire hazards involved. The team also performed a walkdown of accessible portions of the detection and suppressions systems in the selected areas as well as a walkdown of major system support equipment in other areas (e.g., fire protection pumps, Halon and CO_2 storage tanks and supply system) as 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 also assessed the fire brigade capabilities by reviewing training and qualification records 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. In addition, the team inspected the fire brigade's protective ensembles, self-contained breathing apparatus (SCBA), and various fire brigade equipment (including smoke removal equipment) to determine operational readiness for fire fighting.

b. Findings

Introduction. The inspectors identified a Green finding regarding the implementation of the fire brigade drill program. The finding involves practices that are not consistent with regulatory guidance and industry standards for the performance and crediting of fire brigade drills. Specifically, the program does not result in the five member, on-shift, fire brigade practicing as a team during drills and consequently does not allow for an effective assessment of the brigade's performance during drills. In addition, two examples were identified where the licensee failed to implement specific drill program requirements.

Description. The five member fire brigade consists of four members from the operations department (including the brigade leader) and one member from the security department. The fire brigade leader is normally the field unit supervisor, an on-shift senior reactor operator outside of the control room. The licensee's program requires that the operations department personnel qualified as fire brigade members participate in at least two drills per year. The program also specifies that the individuals from the security organization assigned to fire brigade duty at the time of a drill shall participate.

The inspectors reviewed the fire brigade training and qualification records, including Drill Critique and Training Roster Sheets, for the period of 2003 to 2005. The inspectors noted that, in addition to the assigned five on-shift fire brigade members, numerous other qualified fire brigade members report to the drill scene. The five responders that arrive at the dress out area first don protective equipment. The critique sheets typical list eight to ten, and at times, as many as 15, participants. The practice at SSES is that everyone that responds and "participates" receives credit for performing one of their required drills. The licensee's program does not specify the level of participation necessary to receive credit for a drill. The team also found that the Fire Brigade Training Program, NTP-QA-53.1, allows a qualified fire brigade leader in the control room at the time of a drill to get credit of one fire drill per year. This credit is given even though the field supervisor actually directs the fire brigade during the drill and the control room operator is not a direct participant in the drill.

Two deviations from specific program requirements were identified:

- One of the fire brigade leaders participated in only one drill in 2004 and continued to perform fire brigade leader duties in 2005 without having participated in minimum two drills per year as required by the program to maintain his qualification.

- A review of 2005 drill critique forms showed that the security force brigade members generally arrived at the dress-out area after the operations personnel and that the security force member donned protective equipment in only four of nineteen drills. In two instances, May 10 and September 27, 2005, the drill sheets did not document any security members reporting to the dress-out location for participation in the drill as specified by the program.

Analysis. Section 6.5 of Branch Technical Position (BTP) SPLB 9.5.1, Guidelines for Fire Protection For Nuclear Power Plants, states that personnel assigned to the fire brigade should be qualified, trained and equipped for firefighting in accordance with the guidelines in Regulatory Guide (RG) 1.189, Fire Protection For Operating Nuclear Power Plants. Section 3.5.1.4 of RG 1.189 states, in part, that fire brigade drills should be performed in the plant so that the fire brigade can practice as a team and that each member should participate in at least two drills per year. In addition the RG provides performance assessment attributes that should be evaluated during drills. The performance deficiency is that the program does not result in the on-shift brigade practicing as a team and does not allow an effective assessment of the performance of the shift brigade and fire brigade leader. The finding is more than minor because it

affected the Protection Against External Factors attribute of the Mitigating Systems cornerstone, in that it impacted manual fire suppression (i.e., fire brigade) capability; and affected the cornerstone objective of ensuring the availability of systems that respond to initiating events. The Significance Determination Process (SDP), Appendix F does not specifically address fire brigade issues and allows for management discretion to determine issue significance. This issue has been reviewed by NRC management and is determined to be a finding of very low safety significance (Green). This issue was acknowledged by SSES management and entered into the corrective action program (CRs 728295, 728936, 730852, 730944, and 730947). **(FIN 05000387/2005-009-01; 05000388/2005-009-01) Fire Brigade Drill Program Not Consistent With Regulatory Guidance and Industry Standards**

Enforcement. The performance deficiency is the improper application of regulatory guidance and industry practices and therefore is documented as a finding. The specific examples of the licensee failing to implement the fire brigade drill program requirements were considered to be minor violations of the licensee's program but were documented because they are relevant to the overall issue of drill program adequacy.

.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 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 for the areas selected for inspection utilizes shutdown from outside the control room and is discussed in section 1R05.01 of this report.

.07 Circuit Analyses

a. Inspection Scope

The inspectors verified that the licensee performed a post-fire safe shutdown analysis for the selected fire areas and that 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, multiple spurious actuations, actuations resulting in flow diversion or loss of coolant events. This review included the results of a recent self-assessment performed by the licensee and documented in calculation EC-013-1871, Circuit Analysis Assessment for NRC RIS 2004-03 Revision 1.

The team also reviewed information in the cable and raceway information management system (CRIMPS) for a sample of components, including a sample of instrumentation circuits, required for post-fire safe shutdown to verify that licensee's program appropriately evaluated documented and the adequacy of cable routing as described in the cable routing matrices.

Cable failure modes were reviewed for the following components:

- HV-E11-2F009 RHR Shutdown Cooling Inboard Isolation Valve
- HV-E11-2F008 RHR Outboard Shutdown Isolation Valve
- HV-B21-1F001 Reactor Head Vent Valve
- HV-B21-1F002 Reactor Head Vent Valve

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 inspectors also verified that communications equipment such as repeaters, transmitters, etc. would not be affected by a fire.

b. Findings

No findings of significance were identified.

.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 8-hour capacity. Preventive maintenance procedures and various documents, including the vendors manual and completed surveillance tests were reviewed to ensure adequate surveillance testing and periodic battery replacements were in place to ensure reliable operation of the eight-hour emergency lights and that the emergency lighting units were being maintained consistent with the manufacturer's recommendations and accepted industry practices.

b. Findings

No findings of significance were identified.

.10 Cold Shutdown Repairs

a. Inspection Scope

The team verified that the licensee 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 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.

4. OTHER ACTIVITIES

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. However, the inspectors reviewed the most recent Quality Assurance audit and Self-Assessment of the fire protection program. They were generally thorough and critical with one exception; neither organization identified the fire brigade drill practice issues prior to this NRC inspection.

4OA6 Meetings, Including Exit

Exit Meeting Summary

The team presented their preliminary inspection results to Mr. B. McKinney, Chief Nuclear Officer, and other members of the site staff at an exit meeting on December 2, 2005. No proprietary information was included in this inspection report.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

D. Brophy, Licensing
L. Casella, Station Engineering
F. Czysz, Probablistic Risk Assessment
S. Davis, Station Engineering
T. Gorman, Fire Protection Project Manager
F. Gruscavage, Station Engineering
J. Krais, Design Engineering Manager
Y. Lee, Quality Assurance Engineer
M. Lichtner, Unit Supervisor
B. McKinney, Chief Nuclear Officer
F. Negvesky, Station Engineering
D. Ritter, Station Engineering

NRC

J. Rogge, Chief, Engineering Branch 3, Division of Reactor Safety
B. Bickett, Senior Resident Inspector, Susquehanna Steam Electric Station
F. Jaxheimer, Resident Inspector, Susquehanna Steam Electric Station

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Open and Closed

05000387/2005009-01 05000388/2005009-01	FIN	Fire Brigade Drill Program Not Consistent With Regulatory Guidance and Industry Standards

LIST OF DOCUMENTS REVIEWED

Fire Protection Licensing Documents

Appendix R Deviation Request No. 2, Suppression Pool Temperature Indication, Rev. 11
Fire Protection Review Report, Rev. 13
NUREG 0776, SSES Safety Evaluation Report (Including Supplements 1,2,3 and 4)
NRC Letter dated October 21, 1997, “Evaluation of Fire Protection Program Issues, Safe Shutdown Methodology and Analysis of Associated Circuits, SSES Units 1 and 2"
Safety Evaluation of the Fire Protection Report, August 9, 1989

Calculations/Engineering Evaluation Reports

EC-004-0501, Appendix R Associated Circuit Analysis, Rev. 45
EC-013-0509, Minimum Reactor Water Level Under Spurious Operation During a Fire, Rev. 2
EC-013-0678, RHR Shutdown Cooling Isolation/Operation in the Event of a Plant Fire, Rev. 4
EC-013-0843, SSES 10CFR50 Appendix R Compliance Manual, Rev. 27
EC-013-0859, Appendix R Analysis for a Control Room Fire, Rev. 14
EC-013-0873, Appendix R Evaluation of Flow Diversion and High/Low Pressure Interface, Rev. 3
EC-013-0968, "Determination of Carbon Dioxide Mass Addition Requirements for the Control Structure Cable Chase, Relay, UPS, and Computer Rooms Based on Model Predictions," Rev. 4
EC-013-1009, "Fire Dampers Subject to Technical Requirements," Rev. 4
EC-013-1048, Impact of Inadvertent RPV Overfill on SRV Discharge Piping, Rev. 2
EC-013-1051, "SSES, Phase II Thermo-Lag, Destructive Examination Report," Rev. 1
EC-013-1062, "Scope Review of Fire Protection Features Technical Specification Surveillance Requirements," Rev. 3
EC-013-1068, "SSES Raceway Fire Barrier Qualification Evaluation of Typical Detail VW-U-C1-02," Rev. 2
EC-013-1069, "SSES Raceway Fire Barrier Qualification Evaluation of Typical Detail VW-U-C1-03," Rev. 2
EC-013-1071, "SSES Raceway Fire Barrier Qualification Evaluation of Typical Detail VW-U-G1-01," Rev. 3
EC-013-1072, "SSES Raceway Fire Barrier Qualification Evaluation of Typical Detail VW-U-B1-01," Rev. 3
EC-013-1079, "SSES Raceway Fire Barrier Qualification Evaluation of Typical Detail VW-U-B1-02," Rev. 1
EC-013-1080, "SSES Raceway Fire Barrier Qualification Evaluation of Typical Detail VW-U-H1-01," Rev. 1
EC-013-1438, "Examination of Appendix R Safe Shutdown Components with Regard to Fire Suppression Activities," Rev. 2
EC-013-1829, "SSES Raceway Fire Barrier Qualification Evaluation of Typical Detail VW-U-C1-15," Rev. 1
EC-013-1873, Operator Manual Actions Feasibility Analysis, Rev. 1
EC-059-0545, Dual Unit Suppression Pool Cooling Analysis, Rev. 3
EC-Risk-1092, Susquehanna PRA Model: Event Tree Analysis and Success Criteria, Rev. 6

Procedures

C-1071, "Inspection of Fire Dampers for Compliance with Technical Specification," Rev. 1
DC-OP-001, Post Fire Recovery Actions, Rev. 8
EO-000-102-2, RPV Control, Rev. 4
EO-000-112-2, Rapid Depressurization, Rev. 3
EO-000-113-2, Level/Power Control, Rev. 5
GO-200-004, Plant Shutdown to Minimum Power, Rev. 39
GO-200-005, Plant Shutdown to Hot/Cold Shutdown, Rev. 33

IC-280-004, Reactor Shutdown Range Level Measurement at Rack 2C005, LT-B21-2N027, Rev. 2
IC-249-005, Installation and Removal of Temporary RTD Readers for Local Monitoring of RHR Heat Exchanger A Inlet (TE-E11-2N004A) and Outlet (TE-E11-2N027A) Temperatures, Rev. 3
MT-007-002, "E8 and E30 Emergency Lighting Preventive Maintenance and Functional Failure Check," Rev. 10
NDAP-QA-0002, Procedure Program and Procedure Change Process, Rev. 19
NDAP-QA-0300, Conduct of Operations, Rev. 19
NDAP-QA-0440, "Control of Transient Combustible/Hazardous Materials," Rev. 5
NDAP-QA-0442, "Control of Ignition Sources: Cutting, Welding, and Hot Work Permits," Rev. 4
NDAP-QA-0443, Firewatch Procedure, Rev. 6
NDAP-QA-0444, Fire Alarm Response, Rev. 2
NDAP-QA-0445, Fire Brigade, Rev. 7
NDAP-QA-0446, Fire Barrier Program, Rev. 5
NDAP-QA-0449, Fire Protection Program, Rev. 3
NSEI-AD-145, SFPE Responsibilities in the Fire Brigade Program, Rev. 5
NTP-QA-53.1, Susquehanna Fire Brigade Training Program, Rev. 13
OI-013-001, "Fire Protection Component Technical Data," Rev. 5
OI-PM-005, Appendix "R" Sound Powered Phone System, Rev. 3
ON-013-001, Response to Fire, Rev. 16
ON-200-009, Control Room Evacuation, Rev. 11
ON-200-101, Scram, Scram Imminent, Rev. 14
ON-204-001, Unit 2 Response to Loss of All Offsite Power, Rev. 14
ON-249-001, Loss of RHR Shutdown Cooling Mode, Rev. 20
OP-013-001, "Fire Protection System," Rev. 24
OP-013-003, "Backup Fire Protection System," Rev. 18
OP-024-001, Diesel Generators, Rev. 44
OP-030-002, "Control Structure HVAC," Rev. 20
OP-107-001, "Plant Lighting System," Rev. 12
OP-249-002, RHR Shutdown Cooling, Rev. 41
SE-013-009, "Eighteen Month Inspection of Fire Windows/Fire Dampers and Associated Hardware," Rev. 1
SO-100-008, "Weekly Surveillance Operating Log," Rev. 18
TP-013-110, "Monthly Inspection, Annual Maintenance, and Hydro Testing of Fire Extinguishers," Rev. 1

Completed Tests/Surveillances

SC-013-001, "Quarterly Fire Pump Diesel Fuel Oil Storage Tank - Viscosity, Water, and Sediment," Rev. 6, Completed 08/31/05
SE-013-001, "Three Year Fire Protection System Flow Test," Rev. 6, Completed 09/05/03
SE-013-003, "18 Month CO2 System Functional Test," Rev. 10, Completed 08/29/05
SE-013-006, "Two Year Inspection Common Penetrations," Rev. 4, Completed 09/28/04
SE-013-007, "24 Month Inspection of Unit Common Fire Barriers," Rev. 4, Completed 02/30/04
SE-013-008, "Six Month Inspection of Unit Common Fire Doors," Rev. 4, Completed 07/25/05
SE-200-007, ESW/RHRSW Functional Test at Remote Shutdown Panel 2C201B, Rev. 4
SE-213-007, "24 Month Inspection of Unit 2 Fire Barriers," Rev. 4, Completed 02/28/05

SE-213-008, “Six Month Inspection Unit 2 Fire Doors,” Rev. 5, Completed 08/10/05
SE-249-009, Functional Test of RHR Loop A, RHR Common, RHRSW, CIG, and SRV’s at [Remote Shutdown Panel] 2C201B, Rev. 0
SE-250-004, RCIC Functional Test at Remote Shutdown Panel, Rev. 0
SI-013-227, “Annual Functional Test of Fire Protection Ionization Detectors for Fire Zone O-26H,” Rev. 3, Completed 05/04/05
SI-013-232, “Annual Functional Test of Fire Protection Ionization Detectors for Fire Zone O-27A,” Rev. 5, Completed 02/07/05
SI-013-233, “Annual Functional Test of Fire Protection Ionization Detectors for Fire Zone O-28A-I,” Rev. 4, Completed 01/17/05
SI-013-237, “Annual Functional Test of Fire Protection Infrared and Photoelectric Detectors for Fire Zone O-41A,” Rev. 3, Completed 05/25/05
SI-013-242, “Annual Functional Test of Fire Protection Heat Detectors for Fire Zone O-41A,” Rev. 5, Completed 04/29/05
SI-013-247, “Annual Functional Test of Fire Protection Ionization Detectors for Fire Zone O-26H (Elevation 728', Under Floor),” Rev. 2, Completed 09/29/05
SI-013-248, “Annual Functional Test of Fire Protection Ionization Detectors for Fire Zone O-26H,” Rev. 2, Completed 10/25/05
SI-013-249, “Annual Functional Test of Fire Protection Ionization Detectors for Fire Zone O-26H,” Rev. 2, Completed 09/29/05
SI-213-244, “Annual Functional Test of Fire Protection Ionization Detectors for Fire Zone 2-5G,” Rev. 2, Completed 02/02/05
SI-213-253, “Annual Functional Test of Heat and Ionization Detectors for Upper Relay Room PGCC Halon Systems for Fire Zone O-27A,” Rev. 4, Completed 06/13/05
SI-213-257, “Annual Functional Test of CO2 System 1.28 Fire Protection Heat Detectors for Fire Zone O-27A,” Rev. 5, Completed 10/13/05
SM-013-004, “Annual Inspection - Yard Fire Hydrants,” Rev. 5, Completed 10/14/05
SM-013-005, “Diesel Driven Fire Pump 24 VDC Batteries Seven Day, 92 Day, and 18 Month Checks,” Rev. 5, Completed 02/14/05, 11/08/05, 11/16/05
SM-013-006, “18 Month Diesel Driven Fire Pump Engine Inspection,” Rev. 7, Completed 08/26/05
SM-213-002, “18 Month Hose & Gasket Inspection of Indoor Fire Hose Stations,” Rev. 5, Completed 06/04/04
SM-213-014, “Six Month Inspection, Level/Weight Measurement, and Pressure Verification of Halon Cylinders,” Rev. 0, Completed 11/03/05
SM-213-015, “Eighteen Month Inspection, Level/Weight Measurement, and Pressure/Flow Verification of Halon Cylinders,” Rev. 1, Completed 11/03/05
SO-013-001, “Monthly Diesel and Motor Driven Fire Pump Run,” Rev. 22, Completed 10/31/05
SO-013-006, “Annual Fire Protection Flush and Hydrant Flow,” Rev. 13, Completed 09/10/05
SO-013-008, “Monthly Hose House 1FH122 and 1FH104 Inspection,” Rev. 10, Completed 10/25/05
SO-013-010, “Monthly Fire Protection System Valve Alignment Check,” Rev. 24, Completed 11/02/05
SO-013-013, “Eighteen Month Functional Test and Visual Inspection of Pre-Action Sprinkler Systems PA-011, PA-012, PA-013, and PA-014,” Rev. 6, Completed 03/16/05
SO-200-001, Monthly Remote Shutdown Panel Instrumentation Channel Checks, Rev. 18

TP-013-034, “Annual Diesel Driven Fire Pump, OP511, Performance Test,” Rev. 3, Completed 10/31/05
TP-013-035, “Annual Motor Driven Fire Pump, OP512, Performance Test,” Rev. 2, Completed 07/01/05
TP-013-036, “Annual Backup Diesel Driven Fire Pump Performance Test,” Rev. 1, Completed 10/04/05
TP-200-012, RWCU Functional Test at Remote Shutdown Panel, Rev. 5
Z0537-01, “Two Year Inspection of Fire Windows/Dampers,” Completed 07/16/04

Design Change Packages / Evaluations

ECO-556814, Relocate Receptacles in Gypsum Wall Fire Barriers and Inspect and Repair Control Structure Barriers as Required, Rev. 0

Quality Assurance (QA) Audits and System Health Reports

QA Audit #451198, Fire Protection
QA Surveillance #AR691929, Station’s Ability to Complete the Required Fire Protection Modifications Prior to NRC Triennial Inspection
QA Surveillance #AR700726, Fire Protection Improvement Project Work Activities Assessment
QA Surveillance #AR715388, Walk-Up Assessment of TP-013-036, Annual Backup Diesel Fire Pump Performance Test
Self-Assessment #DE-05-02, Fire Protection Program

Drawings

C-1754, “Control Structure Fire Doors and Fire Dampers Elevation 771' - 0,” Sheet 2, Rev. 8 and Sheet 6, Rev. 5
C-1761, “Diesel Generator Building Fire Zone Plan of Protected Conduit Raceway,” Sheet 6, Rev. 4
D103779, Loop Diagram - Remote Shutdown Instrumentation Division II, Rev. 14
D107302, Schematic Diagram - RHR Shutdown Cooling Inboard Isolation Valve Unit 2, Sheet 62, Rev. 17
D107302, Schematic Diagram - RHR Outboard Shutdown Cooling Isolation Valve Unit 2, Sheet 60, Rev.2
E-1, Single Line Diagram - Station, Rev. 30
E-5, Single Line Meter & Relay Diagram 4.16 KV Engineered Safeguards Power System Sheet 1, Rev. 31, Sheet 2, Rev. 29
E-10, Single Line Meter & Relay Diagram 125 VDC, 250 VDC & 120 VAC Systems, Sheet 1, Rev. 23
E-154, RCIC Barometric Condenser Vacuum Pump Schematic Diagram, Sheet 1, Rev.16
E-154, RCIC Outboard Steam Line Isolation Valve Schematic Diagram, Sheet 3, Rev. 18
E-154, RCIC Inboard Steam Line Isolation Valve Schematic, Sheet 4, Rev. 15
E-154, RCIC Steam to Turbine Valve HV-E51-1F045 Schematic Diagram, Sheet 5, Rev. 18
E-154, RCIC Injection Shutoff Valve Schematic Diagram, Sheet 7, Rev. 20
E-180, ADS Safety Relief Valves Schematic Diagram, Rev. 17
E-181, Nuclear Boiler Head Vent Valves Schematic Diagram, Sheet 1, Rev. 19

E-181, Nuclear Boiler Head Vent Valves Schematic Diagram, Sheet 8, Rev. 17
E-690, SSES Units 1 & 2 Appendix "R" Safe Shutdown Manual Actions List, Rev. 5
FF62009, "Fire Barrier Upgrade," Sheet 1, Rev. 1, Sheet 2, Rev. 1, Sheet 231, Rev. 0, and Sheet 232, Rev. 0
J-2442, Reactor Pressure Vessel Level Ranges/Div. 1, Sheet 2, Rev. 8
J-2442, Reactor Pressure Vessel Pressure Loops/Div. 1 and 2, Sheet 4, Rev. 7
M-101, Main Steam System P&ID, Sheet 1, Rev. 3
M-111, Emergency Service Water System P&ID, Sheet 1, Rev. 48
M-112, RHR Service Water System P&ID, Rev. 47
M-141, Nuclear Boiler P&ID, Rev. 46
M-149, Reactor Core Isolation Cooling System P&ID, Rev. 47
M-151, RHR System P&ID, Rev. 58
M-152, Core Spray System P&ID, Rev. 37
M-160, Miscellaneous Drainage Systems P&ID, Rev. 19
M-1002, Appendix "R" Safe Shutdown Component List, Rev. 6
X-21-7, "Penetrations Central Control Building Area 2 - Plan of Elevation 771' - 0," Sheet 1, Rev. 31 and Sheet 5, Rev. 0
X-44-1, "Penetrations Diesel Generator Building Area 44 - Plan of Elevation 660' - 0," Sheet 1 Rev. 26 and Sheet 3, Rev. 0

Pre-Fire Plans

FP-013-155, Fire Zone O-26H, Rev. 6
FP-013-161, Fire Zone O-27A, Rev. 6
FP-013-171, Fire Zone O-28A-I, Rev. 4
FP-013-189, Fire Zone O-41A, Rev. 4
FP-213-258, Fire Zone 2-5G, Rev. 5

Vendor Manuals

IOM 692, FENWAL Halon 1301 PGCC Fire Suppression System, Rev. 1
IOM 827, Six Volt Emergency Lighting Unit, Teledyne Big Beam

Miscellaneous Documents

A-84-4, Discharge Test, Unit 2 Lower Relay Room
Component Data Sheets for Penetrations X-44-1-38 and X-21-7-D3
Current System Health Reports, System 213, Fire Protection and System 207, Lighting
DBD 019, "Fire Protection," Rev. 2
DBD 076, "Appendix R," Rev. 2
Engineering Evaluation X-21-7-D3, "Engineering Analysis for Penetration X-21-7-D3," 06/15/92
GE-NE-T43-00002-00-03-R01, BWROG position on the Use of Safety Relief Valves and Low Pressure Systems as Redundant Safe Shutdown Paths, August 1999
GE Spec 22A5981, 22A5981AC, "PGCC Fire Protection System," Rev. 0
Fire Brigade Quarterly Drills, Scenarios 2, 3, 5, 9, 10, 11, 12, 15, 16, 17, 19, 21, 31, 34, 35, 36, 38, 41, and 47
Hot Work Permits, 2/28/05, 3/11/05, 6/8/05, 9/20/05, 9/21/05

Impairment Log, 11/15/05
NFPA 027, Private Fire Brigades, 1967 Edition
NFPA 600, Standard on Industrial Fire Brigades, 2005 Edition
Operational Policy Statement, Appendix OPS-1-P, Quality Assurance for the Fire Protection Program and Related Systems, Rev. 2
QA Independent Assessment Basis Document, Audit Area - Fire Protection, Rev. 2
Simulator Scenario # OP002-05-02-02, Plant Shutdown Outside Control Room and Loss of Instrument Bus, Rev. 0
Systems Training, TM-OP-402-ST, Relay Rooms, Including Remote Shutdown Panel, Rev. 0

Condition Reports

075402	420970	593097	648361	689196	727942	730805
418386	431109	593101	649287	704813	728295	730817
418396	438344	594402	649832	721766	728341	730852
418916	549877	594699	657610	722568	728936	730944
419542	582588	618412	660941	727891	729238	730947
419972	592724	625619	679182	727900	730541	730852
419977	592895	631809				

Work Orders / Engineering Work Requests

EWR M50115
EWR M89560
WO E1969-01
WO E1969-02
WO E1969-51
WO E1969-52
WO 355740
WO 355771
WO 355790

LIST OF ACRONYMS USED

BTP	Branch Technical Position
CFR	Code of Federal Regulations
CO_2	Carbon Dioxide
CR	Condition Report
DRP	Division of Reactor Projects
DRS	Division of Reactor Safety
EDG	Emergency Diesel Generator
FA	Fire Area
FPPR	Fire Protection Review Report
FSAR	Final Safety Analysis Report
IP	Inspection Procedure

IR	Inspection Report
IPE	Individual Plant Examination
IPEEE	Individual Plant Examination of External Events
IR	Inspection Report
NFPA	National Fire Protection Association
NRC	Nuclear Regulatory Commission
PAR	Publicly Available Records
P&ID	Piping and Instrumentation Drawing
QA	Quality Assurance
RG	Regulatory Guide
SCBA	Self-Contained Breathing Apparatus
SDP	Significance Determination Process
SER	Safety Evaluation Report
SRO	Senior Reactor Operator
SSES	Susquehanna Steam Electric Station
TRM	Technical Requirements Manual