October 8, 2002

Mr. Bryce L. Shriver
Senior Vice President and
Chief Nuclear Officer
PPL Susquehanna, LLC
Susquehanna Steam Electric Station
769 Salem Boulevard
Berwick, Pennsylvania 18603

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION - NRC TRIENNIAL FIRE PROTECTION INSPECTION REPORT 50-387/02-008, 50-388/02-008

Dear Mr. Shriver:

On August 30, 2002, the NRC completed a triennial fire team inspection at your Susquehanna Steam Electric Station, Units 1 and 2. The enclosed report documents the inspection findings which were discussed on August 30, 2002, with you and other members of the PPL Susquehanna, LLC staff.

This 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 purpose of the inspection was to evaluate your post-fire safe shutdown capability and fire protection program. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Based on the results of this inspection, the NRC identified three findings of very low safety significance (Green) that were a violation of NRC requirements. However, because of the very low safety significance and because these issues were entered into your corrective action program, the NRC is treating these issues as Non-cited Violations, in accordance with Section VI.A.1 of the NRC's Enforcement Policy. If you deny these Non-cited Violations, you should provide a response within 30 days of the date of this letter, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Susquehanna Steam Electric Station.

In accordance with 10 CFR 2.790 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 Publically 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).

If you have any questions please contact me at 610-337-5129.

Sincerely,

/RA/

James C. Linville, Chief
Electrical Branch
Division of Reactor Safety

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

Enclosure: Inspection Report 50-387/02-008, 50-388/02-008

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REGION I

Docket Nos.:	50-387, 50-388
License Nos.:	NPF-14, NPF-22
Report No.:	50-387/02-008, 50-388/02-008
Licensee:	PPL Susquehanna, LLC
Facility:	Susquehanna Steam Electric Station
Location:	Post Office Box 35 Berwick, PA 18603
Dates:	August 12 - 30, 2002
Inspectors:	A. Della Greca, Sr. Reactor Inspector, Division of Reactor Safety C. Cahill, Sr. Reactor Inspector, Division of Reactor Safety K. Sullivan, NRC Contractor
Approved By:	James C. Linville, Chief Electrical Branch Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000387/02-008, IR 05000388/02-008; PPL Susquehanna, LLC; on 08/12-08/30/2002; Susquehanna Steam Electric Station; Units 1&2. Fire Protection.

The inspection was conducted by a team composed of regional specialists and a NRC contractor. The inspection identified three Green findings. 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 are indicated by "No Color" or by a severity level of the applicable violation. 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. Inspection Findings

Cornerstone: Mitigating Systems

- **Green**. The inspectors identified a Green non-cited violation of License Condition 2.C(6) of operating license NPF-14 (Unit 1) and License Condition 2.C.3 of operating license NPF-22 (Unit 2) because PPL failed to identify and correct degraded gypsum board during the surveillance of the upper cable spreading room (UCSR) structural fire barriers. This surveillance was conducted on April 30, 2002, in accordance with Procedure SE-013-007, "24 Month Inspection of Unit Common Fire Barriers," and the provisions of section 1.4.2, "Compliance," of the approved fire protection program described in the Susquehanna Steam Electric Station (SSES) Fire Protection Review Report (FPRR).

  The failure to identify and correct degraded fire barriers could result in a fire impacting multiple fire areas thereby having an adverse impact on safety. This finding was of very low safety significance (Green) because the likelihood of occurrence of a fire that could damage safety-related equipment in this area and propagate to other areas is small, and because equipment and procedures were available to shutdown the plants from the control room. (Section 1RO5.2)

- **Green**. The inspectors identified a Green non-cited violation of License Condition 2.C(6) of operating license NPF-14 (Unit 1) and License Condition 2.C.3 of operating license NPF-22 (Unit 2) because PPL could not demonstrate that the Units 1 and 2 total flooding CO_2 system would be able to reach and maintain the required concentration of CO_2 to extinguish a deep seated fire affecting the Units UCSR under-floor area. The need to reach and maintain the required CO_2 concentrations are established by NFPA 12 "Standard on Carbon Dioxide Extinguishing Systems," (1973 Edition) and required by the SSES FPRR.

  The failure to ensure the design adequacy of the CO_2 systems could result in a more challenging fire which would stress the remaining defense-in-depth elements and, thereby, have an adverse impact on safety. This finding was of very low safety significance (Green) because the likelihood of occurrence of a fire that could damage safety-related equipment in the UCSRs under-floor area is small, and equipment and

procedures were available to shutdown the plants from the control room. (Section 1RO5.4)

- **Green**. The inspectors identified a Green non-cited violation of License Condition 2.C(6) of operating license NPF-14 (Unit 1) and License Condition 2.C.3 of operating license NPF-22 (Unit 2) because PPL could not demonstrate that the pre-action sprinkler system in the Units 1 and 2 UCSRs and lower cable spreading rooms (LCSR) met the requirements of NFPA 13, "Standard for the Installation of Sprinkler Systems" with regard to the placement of the sprinkler heads, area of sprinkler head coverage and obstruction of the sprinkler heads. NFPA 13 (1974 Edition) is the SSES code of record for the pre-action sprinkler system and required by the SSES FPRR.

  The failure to ensure the design adequacy of the pre-action sprinkler systems could result in a more challenging fire which would stress the remaining defense-in-depth elements and thereby have an adverse impact on safety. This finding was of very low safety significance (Green) because the likelihood of occurrence of a fire that could damage safety-related equipment in the affected areas is small, and equipment and procedures were available to shutdown the plants from the control room. (Section 1RO5.5)

Report Details

Background

This report presents the results of a triennial fire protection team inspection conducted in accordance with NRC Inspection Procedure (IP) 71111.05, “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 shut down capabilities have been established and are being properly maintained. The following fire areas were selected for detailed review based on risk insights from the Susquehanna Steam Electric Station, Units 1 and 2, Individual Plant Examination of External Events:

- I-2B, Reactor Building - Unit 1, North, Elevation 670'
- 0-27C, Upper Cable Spreading Room - Unit 1
- 0-25E, Lower Cable Spreading Room - Unit 1
- 0-28B-II, Division I Battery Charger Area, Unit 1
- 0-26H, Main Control Room, Units 1 & 2

This inspection was a reduced scope inspection in accordance with the March 23, 2001, revision to IP 71111.05, “Fire Protection.” Issues regarding equipment malfunction due to fire-induced failures of associated circuits were not inspected. Criteria for review of fire-induced circuit failures are currently the subject of a voluntary industry initiative. The definition of associated circuits of concern used was that contained in the March 22, 1982, memorandum from Mattson to Eisenhut, which clarified the requests for information made in Generic Letter 81-12.

1. REACTOR SAFETY
Cornerstones: Initiating Events, Mitigating Systems

1R05 Fire Protection (71111.05)

.1 Programmatic Controls

a. Inspection Scope

During tours of the facility, the team observed the material condition of fire protection systems and equipment, the storage of permanent and transient combustible materials, and control of ignition sources. The team also reviewed the procedures that controlled hot-work activities and combustibles at the site. These reviews were accomplished to ensure that the licensee was maintaining the fire protection systems, controlling hot-work activities, and controlling combustible materials in accordance with NDAP-QA-04493, "Fire Protection Program, Revision 3," and other fire protection program procedures.

b. Findings

No findings of significance were identified.

.2 Passive Fire Barriers

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, fire doors, and fire dampers. The team reviewed engineering evaluations, as well as surveillance and functional test procedures for selected items. The team also reviewed the licensee submittals and NRC safety evaluation reports (SERs) associated with fire protection features at Susquehanna Steam Electric Station (SSES), Units 1 and 2. Additionally, the team reviewed the design and qualification testing of raceway fire barriers and performed a walkdown of selected barriers and reviewed surveillance procedures for fire wrap, structural fire barriers, penetration seals and structural steel. These reviews were performed to ensure that the passive fire barriers were properly maintained and met the licensing and design bases as described in the licensee submittals, NRC SERs, and the SSES, Units 1 and 2, Fire Protection Review Report (FPRR).

The team conducted a detailed inspection of the fire rated gypsum structural fire walls in the upper and lower cable spreading rooms to confirm that they had been properly installed and qualified. The team walked down the walls and utilized the inspection criteria provided in SE-013-007, "24 Month Inspection of Unit Common Fire Barriers." The team reviewed associated design drawings, barrier and penetration seal engineering evaluations, test reports, and the fire barrier and penetration seal inspection procedure. The team compared the installed configurations with the design drawings and tested or evaluated configurations. The team also compared the penetration seal ratings with the ratings of the barriers in which they were installed. This was accomplished to ensure that the licensee had installed and maintained fire barriers and penetration seals in accordance with the design and licensing bases as described in the licensee submittals, NRC SERs, and the SSES, Units 1 and 2, FPRR.

b. Findings

Introduction

The team identified a non-cited violation having very low safety significance (Green) of License Condition 2.C(6) of operating license NPF-14 (Unit 1) and License Condition 2.C.3 of operating license NPF-22 (Unit 2) because PPL did not identify and correct defective fire rated gypsum structural fire walls in the upper and lower cable spreading rooms.

Description

SE-013-007, "24 Month Inspection of Unit Common Fire Barriers," section 6.3.2.c establishes the acceptance criteria for gypsum board structural fire barriers. The criterion states that, "fire barriers shall have no degradations that expose one or more layers." This surveillance test was last completed on April 30, 2002. The team identified several deficiencies with the fire rated gypsum structural fire walls in the upper and lower cable spreading rooms that exceed the inspection acceptance criteria. Specifically, the team identified:

- A section of missing gypsum board, measuring approximately 8"x4", on the lower corner section of wall separating the Unit 1 upper cable spreading room (UCSR) from the Unit 1 upper relay room (URR).

- Several gypsum board interfaces that did not have the joints taped and joint compound applied. The failure to tape the joints and apply the required compound to them resulted in the exposure of the underlying gypsum layer and the joints not conforming to the Underwriters Laboratory (UL) design U408 requirements for a qualified gypsum barrier. The non-conforming barriers included the lower section of wall separating the Unit 1 UCSR from the Unit 1 URR, the east end of the wall separating the Unit 1 and Unit 2 UCSRs (754' elevation in the control structure), and the west end of the wall separating the Unit 1 and Unit 2 lower cable spreading rooms (LCSRs) (714' elevation in the control structure).

- Inadequate sealing of electric outlets in the wall separating the Unit 1 UCSR from the Unit 1 URR. The team identified that air was flowing from the outlets. PP&L removed the wall plates from the receptacles in the UCSR and URR and found that this was not a qualified configuration and it constituted a breach of the fire barrier.

Analysis

PPL's failure to identify deficiencies with the fire rated gypsum structural fire walls in the upper and lower cable spreading rooms is a performance deficiency since these deficiencies were expected to be detected using the acceptance criteria contained in SE-013-007, section 6.3.2.c., when this surveillance test was last completed on April 30, 2002. Traditional enforcement does not apply because the issue did not have any actual safety consequences or potential for impacting the NRC's regulatory function and was not the result of any willful violation of NRC requirements or PPL's procedures. PPL's inadequate identification and correction of deficient gypsum fire barriers was considered more than minor because, if left uncorrected, the barrier deficiencies could become a more significant concern during a fire in the affected fire zones. The fire barrier deficiencies affected the objectives of the Mitigating Systems cornerstone in that they did not protect against the effects of a fire and, hence, did not ensure that the fire protection systems were capable of preventing undesirable consequences.

IMC 0609, Appendix F, "Determinating Potential Significance of Fire Protection and Post-Fire Safe Shutdown Inspection Findings," was used to assess the safety

significance of this fire protection finding. Since the finding affected the defense-in-depth (DID) element of "Fire Barriers," Phase 1, Step 1 required a Step 2 screening (See Figure 4-1). Scheme 2 was selected for the phase 1, step 2 screening criteria. In accordance with Figure 4-2, since the 1-hour fire barriers separating redundant SSD functions were not affected, a phase 2 SDP analysis was not required. Based on the results of the phase 1 SDP, the team determined that the significance of the inadequate fire barrier inspections was very low (Green).

Enforcement

License Condition 2.C(6) of operating license NPF-14 (Unit 1) and License Condition 2.C.3 of operating license NPF-22 (Unit 2) require that PPL implement and maintain in effect all provisions of the approved fire protection program as described in the Fire Protection Review Report (FPRR) for the facility. FPRR section 1.4.2 "Compliance" states that design specifications and plant procedures provide for the periodic surveillance of required fire protection features. SE-013-007, "24 Month Inspection of Unit Common Fire Barriers," Section 6.3.2.c, establishes the inspection acceptance criteria for fire barriers. Specifically, the section states that "fire barriers shall have no degradations that expose one or more layers."

Contrary to the above, the licensee failed to identify degraded conditions for gypsum board structural fire barriers during the surveillance of required fire protection features. This surveillance was conducted under SE-013-007 and was completed on April 30, 2002. This violation is being treated as a Non-Cited Violation (NCV), consistent with Section VI.A.1 of the NRC Enforcement Policy. These deficiencies were entered into the licensee's corrective action program as Condition Reports 418916, 419972 and 419977. **(NCV 50-387&388/02-008-01)**

.3 Fire Detection System

a. Inspection Scope

The team reviewed the adequacy of the fire detection systems in the selected plant fire areas. This included a walk down of the systems and review of the type of installed detectors as shown per location drawings. The team also reviewed licensee submittals, the NRC SERs associated with the selected fire areas, and Calculation EC-013-0920, "Assessment of the Fire Detection and Fire Suppression Systems at the Susquehanna Steam Electric Station." These reviews were performed to ensure that the fire detection systems for the selected fire areas were installed in accordance with the design and licensing bases of the plant. Additionally, the team also reviewed fire detection surveillance procedures to determine the adequacy of the fire detection component testing and to ensure that the detection system would function as required.

b. Findings

No findings of significance were identified.

.4 Fixed Carbon Dioxide Systems and Equipment

a. Inspection Scope

The team reviewed the adequacy of the UCSR under-floor total flooding carbon dioxide (CO_2) system by performing walkdowns of the system, including the enclosures. The team also reviewed the design and installation specifications and the adequacy of surveillance procedures. These reviews were performed to ensure that the UCSR under-floor total flooding CO_2 system met the design and licensing bases as described in the licensee submittals and NRC SERs and that the system could perform its intended function in the event of a fire in the under-floor of the UCSR.

b. Findings

The team identified a non-cited violation having very low safety significance (Green) of License Condition 2.C(6) of operating license NPF-14 (Unit 1) and License Condition 2.C.3 of operating license NPF-22 (Unit 2) because PPL did not properly design and maintain the CO_2 systems in the Unit 1 and Unit 2, upper cable spreading rooms.

Description

The UCSRs include raised floor sections approximately one foot in height that are protected by total flooding CO_2 systems. Various control and DC cables are routed under the raised floor. During walkdowns of the Unit 1 UCSR system, the team identified numerous breaches in the raised floor enclosure. These breaches were deficiencies that either dated back to the original installation or were introduced during Thermo-Lag modifications that removed sections of the material penetrating the raised floor but did not reseal the enclosure. The team also found that PPL had not performed a full discharge test on the CO_2 system or any other approved test to demonstrate that the system would be able to deliver and maintain the required concentration of CO_2 in the under-floor area. This condition also applied to the Unit 2 UCSR.

Analysis

PPL's failure to design and maintain the CO_2 systems in the Unit 1 and Unit 2 upper cable spreading rooms as specified in SER section 9.5.1.3, "Gas Fire Suppression Systems," is a performance deficiency. Traditional enforcement does not apply because the issue did not have any actual safety consequences or potential for impacting the NRC's regulatory function and was not the result of any willful violation of NRC requirements or PPL's procedures. The CO_2 system deficiencies in the Unit 1 and Unit 2 upper cable spreading rooms were considered more than minor because, if left uncorrected, they could become a more significant concern during a fire in the affected fire zones. The CO_2 system deficiencies affected the objectives of the Mitigating Systems cornerstone in that they did not protect against the effects of a fire and, hence,

they did not ensure that the CO_2 system was capable of preventing undesirable consequences.

IMC 0609, Appendix F, “Determining Potential Significance of Fire Protection and Post-Fire Safe Shutdown Inspection Findings,” was used to assess the safety significance of this fire protection finding. Since the finding affected the defense-in-depth (DID) element of “automatic suppression capability,” Phase 1, Step 1 required a Step 2 screening (See Figure 4-1). Since the required SSD components located in the CO_2 envelope were provided with a 1-hour fire barrier enclosing one of the SSD trains, Scheme 2 was selected for the phase 1, step 2 screening criteria. In accordance with Figure 4-2, since the 1-hour fire barriers separating redundant SSD functions was not affected and the automatic suppression was affected, a phase 2 SDP analysis was required.

Phase 2 of the fire protection risk significance screening methodology requires development of a postulated fire damage scenario with the potential to impact equipment important to safety. The team inspected the Unit 1 and Unit 2 UCSRs and determined that the areas did not contain any substantial fixed ignition sources; therefore, the only possible source of ignition would be transient combustibles or self-ignition of cables. The NRC concluded that the probability of occurrence of a fire in these areas that could cause substantive damage to safety-related equipment was negligible, based on the following considerations:

- The licensee had placed stringent controls on ignition sources and transient combustibles in these areas.

- All of the cable in the these areas were either in conduit or enclosed cable trays and were qualified in accordance with IEEE-383, "IEEE Standard for Type Test of Class 1E Electric Cables, Field Splices, and Connections for Nuclear Power Generating Stations," which requires specific flammability tests.

- Operational experience within the United States indicates that the probability of a self-ignited instrumentation and control cable fire that would propagate beyond the initiating cable is very low, particularly for newer plants such as SSES which has IEEE-383 qualified cables. Additionally, cables in these areas that are required to remain free of fire damage were wrapped in qualified raceway fire barriers.

- On the remote chance that fire occurred in any of these areas, the licensee demonstrated that at least one shutdown path would remain free of fire damage to permit the shutdown of both plants from the control room. The applicable procedures were clear and complete and operators were well trained on implementation of the shutdown methods. Additionally, the use of emergency operating procedures (EOPs) for post-fire accident mitigation gives the operators multiple options in the use of equipment unaffected by the fire.

Considering the low frequency of a fire in these areas, the existing protection of the required cables, and the ability to shutdown both plants from the control room, the team could not develop a fire scenario that would have an adverse impact on safely shutting

down the plants. The team determined the significance of the inadequate design and maintenance of the CO_2 systems in the Unit 1 and Unit 2, upper cable spreading rooms to be very low (Green).

Enforcement

License Condition 2.C(6) of operating license NPF-14 (Unit 1) and License Condition 2.C.3 of operating license NPF-22 (Unit 2) require PPL to implement and maintain in effect all provisions of the approved fire protection program as described in the Fire Protection Review Report (FPRR) for the facility and as approved in Fire Protection Program Section 9.5, SER. SER Section 9.5.1.3, "Gas Fire Suppression Systems," identifies NFPA 12, "Standard on Carbon Dioxide Extinguishing Systems," (1973 edition) as the design basis documents. NFPA 12, section 2212 states that "For deep seated fires such as will be involved with solids, uncloseable openings shall be restricted to small openings near or in the ceiling unless the system is tested to assure proper performance." Additionally, NFPA 12, Section 2421, specifies that the design concentration of CO_2 for this hazard is 50 per cent and Section 2523 states that "For deep-seated fires the design concentration shall be achieved within seven minutes, but the rate shall not be less than that required to develop a concentration of 30 per cent in 2 minutes."

Contrary to the above, the licensee failed to ensure that the Unit 1 and Unit 2 UCSRs under-floor CO_2 suppression systems would be able to reach and maintain the required concentration to extinguish a deep-seated fire. This violation is being treated as a Non-Cited Violation (NCV), consistent with Section VI.A.1 of the NRC Enforcement Policy. These deficiencies were entered into the licensee's corrective action program as Condition Report 419303. **(NCV 50-387& 388/02-008-02)**

.5 Sprinkler Systems and Equipment

a. Inspection Scope

The team reviewed the adequacy of the automatic sprinkler systems for the selected areas by performing walkdowns of the systems and observing their material condition. Additionally, the team reviewed the design and installation specifications, the adequacy of surveillance procedures and the hydraulic calculations. These reviews were performed to ensure that the sprinkler systems met the design and licensing bases as described in the licensee submittals and NRC SERs and that the systems could perform their intended function in the event of a fire in the respective areas.

b. Findings

The team identified a non-cited violation having very low safety significance (Green) of License Condition 2.C(6) of operating license NPF-14 (Unit 1) and License Condition 2.C.3 of operating license NPF-22 (Unit 2) because PP&L could not demonstrate that the Unit 1 or Unit 2 UCSR and LCSR pre-action sprinkler system met the requirements of NFPA 13, "Standard for the Installation of Sprinkler Systems," with regard to the

placement of the sprinkler heads, area of sprinkler head coverage and obstruction of the sprinkler heads.

Description

SER Section 9.5.1.2 “Sprinkler and Standpipe Systems” identifies NFPA 13, “Standard for the Installation of Sprinkler Systems,” as the code of record (COR) for pre-action sprinkler systems. The UCSR and LCSR are classified for “Ordinary Hazard” as defined by section 1-7.3.1 of the NFPA 13. Additionally, the licensee states that the ceilings of the rooms most closely resemble the “Beam and Girder Construction” type, as defined in section 4-1.3.2 of NFPA 13.

The team found that pre-action sprinkler system in these areas was fitted with type EA-1, automatic directional spray nozzles manufactured by Grinnel. The nozzles were positioned so that the discharge would be directed at specific targets. The positioning of the nozzles did not provide for area wide coverage throughout the room. Specifically, in the Unit 1 UCSR, the team observed Thermo-Lag wrapped conduits at the floor level for which sprinkler coverage would have been insufficient, in the event of a fire.

The Grinnel technical specification sheet TD610A states that, “Since the Type EA-1 Protectospray Nozzles are automatic nozzles, they must be located with consideration of their ability to detect abnormal temperature increases due to fire.” The team walked down the Unit 1 and Unit 2 UCSRs and LCSRs and found that the heat sensing elements (frangible bulbs) were located at various heights, ranging from approximately 24" to 36" below the ceiling. NFPA 13, section 4-3.2.2 specifies that the deflectors of the sprinklers under beams shall be located one to four inches below the beams and not more than 20 inched below noncombustible floor decks. The placement of these automatic nozzles further from the ceiling would impede their ability to detect abnormal temperature increases due to fire.

The team reviewed the sprinkler design calculations for the UCSR (PA-161) and LCSR (PA-142) and found that the calculations did not contain the required design information as specified in NFPA 13 sections 7-2.2, “Sprinkler System Requirements,” and 7-2.3, “Water Supply Information.” Also, in the Unit 1 UCSR, the team observed sections of Thermo-Lag-wrapped conduits that were located above the sprinklers. Therefore, some of the safe shutdown cables and the added combustibles were above the coverage of the sprinklers.

The team also identified an obstructed nozzle in the Unit 1 UCSR above the relay room. This nozzle, oriented at 90 degrees, was recessed in insulation at the bottom of a HVAC duct. This condition was contrary to NFPA 13, Chapter 4, which requires minimizing the interference to discharge patterns from beams, braces, girders, trusses, piping, lighting fixtures, and air conditioning ducts.

Analysis

PPL's failure to properly design the pre-action sprinkler systems in the Unit 1 and Unit 2 UCSRs and LCSRs, as specified in SER Section 9.5.1.2, "Sprinkler and Standpipe Systems," is a performance deficiency. Traditional enforcement does not apply because the issue did not have any actual safety consequences or potential for impacting the NRC's regulatory function and was not the result of any willful violation of NRC requirements or PPL's procedures. PPL's failure to properly design the pre-action sprinkler systems in the Unit 1 and Unit 2 UCSRs and LCSRs was considered more than minor because, if left uncorrected, the deficiencies could become a more significant concern during a fire in the affected fire zones. The pre-action sprinkler system deficiencies affected the objectives of the Mitigating Systems cornerstone in that they did not protect against the effects of a fire and, hence, they did not ensure that the sprinkler system was capable of preventing undesirable consequences.

IMC 0609, Appendix F, "Determinating Potential Significance of Fire Protection and Post-Fire Safe Shutdown Inspection Findings," was used to assess the safety significance of this fire protection finding. Since the finding affected the defense-in-depth (DID) element of "automatic suppression capability," Phase 1, Step 1, required a Step 2 screening (See Figure 4-1). Since the required SSD components located in the pre-action sprinkler protection envelope were provided with a 1-hour fire barrier enclosing one of the SSD trains, Scheme 2 was selected for the phase 1, step 2 screening criteria. In accordance with Figure 4-2, since the 1-hour fire barriers separating redundant SSD functions was not affected and the automatic suppression was affected a phase 2 SDP analysis was required.

Phase 2 of the fire protection risk significance screening methodology requires development of a postulated fire damage scenario with the potential to impact equipment important to safety. The team inspected the Unit 1 and Unit 2 UCSRs and LCSRs and determined that the areas did not contain any substantial fixed ignition sources; therefore, the only possible source of ignition would be transient combustibles or self-ignition of cables. The NRC concluded that the probability of occurrence of a fire in these areas that could cause substantive damage to safety-related equipment was negligible, based on the following considerations:

- The licensee had placed stringent controls on ignition sources and transient combustibles in these areas.

- All of the cable in the these areas were either in conduit or enclosed cable trays and were qualified in accordance with IEEE-383, "IEEE Standard for Type Test of Class 1E Electric Cables, Field Splices, and Connections for Nuclear Power Generating Stations," which requires specific flammability tests.

- Operational experience within the United States indicates that the probability of a self-ignited instrumentation and control cable fire that would propagate beyond the initiating cable is very low, particularly for newer plants such as SSES which has IEEE-383 qualified cables. Additionally, cables in these areas that are required to remain free of fire damage were wrapped in qualified raceway fire barriers.

- On the remote chance that fire occurred in any of these areas, the licensee demonstrated that at least one shutdown path would remain free of fire damage to permit the shutdown of both plants from the control room. The applicable procedures were clear and complete and operators were well trained on implementation of the shutdown methods. Additionally, the use of emergency operating procedures (EOPs) for post-fire accident mitigation gives the operators multiple options in the use of equipment unaffected by the fire.

Considering the low frequency of a fire in these areas, the existing protection of the required cables, and the ability to shutdown both plants from the control room, the team could not develop a fire scenario that would have an adverse impact on safely shutting down the plants. The team determined the significance of the inadequate pre-action sprinkler systems to be very low (Green).

Enforcement

License Condition 2.C(6) of operating license NPF-14 (Unit 1) and License Condition 2.C.3 of operating license NPF-22 (Unit 2) require PPL to implement and maintain in effect all provisions of the approved fire protection program as described in the Fire Protection Review Report (FPRR) for the facility and as approved in Fire Protection Program Section 9.5, SER. SER Section 9.5.1.2, "Sprinkler and Standpipe Systems," identifies NFPA 13, "Standard for the Installation of Sprinkler Systems," (1974 edition) as the design basis documents. NFPA 13, section 4-3.2.2 specifies that the deflectors of the sprinklers under beams shall be located one to four inches below the beams and not more than 20 inched below noncombustible floor decks. Also, NFPA 13, sections 7-2.2, "Sprinkler System Requirements," and 7-2.3, "Water Supply Information," specify the required design information for hydraulically designed sprinkler systems. Additionally, NFPA 13, Chapter 4, requires minimizing the interference to discharge patterns from beams, braces, girders, trusses, piping, lighting fixtures, and air conditioning ducts.

Contrary to the above, the licensee failed to design and install the Unit 1 and Unit 2 UCSR and LCSR pre-action sprinkler systems with regard to placement of the sprinkler heads, area of sprinkler head coverage, and sprinkler heads obstruction, in accordance with NFPA 13, "Standard for the Installation of Sprinkler Systems," (1974 edition). This violation is being treated as a Non-Cited Violation (NCV), consistent with Section VI.A.1 of the NRC Enforcement Policy. These deficiencies have been entered into the licensee's corrective action program as Condition Report 419542. **(NCV 50-387& 388/02-008-03)**

.6 Manual Fire Suppression Capability

a. Inspection Scope

The team walked down selected standpipe systems and observed portable extinguishers to determine the material condition of the manual fire fighting equipment and verify locations as specified in the firefighting strategies (pre-fire plans) and fire protection program documents. 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 inspected the fire brigade's protective ensembles, self-contained breathing apparatus (SCBA), and various fire brigade equipment to determine operational readiness for fire fighting.

The team reviewed fire fighting strategies 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 safe shutdown.

The team performed in-plant walkdowns to evaluate the physical configuration of electrical raceway and safe shutdown components in the selected fire areas to determine whether water from an inadvertent fire suppression system pipe rupture or from manual fire suppression activities in the selected areas could cause damage that could inhibit the plant's ability to safely shutdown.

b. Findings

No findings of significance were identified.

.7 Safe Shutdown Capability

a. Inspection Scope

The team reviewed the Susquehanna Steam Electric Station Appendix R Compliance Manual (Safe Shutdown Analysis) to confirm that the licensee had identified the methods and the structures, systems, and components (SSCs) necessary to achieve hot shutdown and cold shutdown, following postulated fires in the selected risk significant fire zones. The team further reviewed the applicable piping and instrumentation drawings (P&IDs) and Appendix R Safe Shutdown Components List (SSCL) to identify the components required for establishing the specified flow paths and for isolating the flow diversion paths. The team sampled sections of operating procedures associated with shutdown following a fire, to confirm the availability of selected components required for different fire scenarios.

The team verified that the applicable requirements of 10 CFR 50, Appendix R, Sections III.G and III.L for achieving and maintaining safe shutdown were properly addressed. The team verified that systems necessary to assure the safe shutdown functions of reactivity control, reactor coolant makeup, reactor heat removal, and process monitoring were protected within or independent of the selected fire zones. Where deviations from

Appendix R requirements were identified, the team verified that the deviations had been approved and that conditions required by the deviations were implemented and being maintained.

b. Findings

No findings of significance were identified.

.8 Safe Shutdown Circuit Analyses

a. Inspection Scope

The team reviewed applicable system flow diagrams, electrical one line diagrams, control panel diagrams, control circuit schematic diagrams, cable tray designations, fire zone/area arrangements drawings, panel and rack wiring diagrams, operating procedures, circuit breaker coordination curves, calculations, modifications, vendor information and the electrical cable and raceway information system to verify that the conclusions of selected sections of the safe shutdown analysis were correct and that the procedures, equipment, fire barriers, and systems provided were sufficient to assure post-fire safe shut down of the plant.

Due to the issuance of Change Notice 00-020 against Inspection Procedure 71111.05, “Fire Protection,” the team did not review associated circuit issues during this inspection. This change notice has suspended this review pending completion of an industry initiative in this area.

b. Findings

No findings of significance were identified.

.9 Operational Implementation of Post-Fire Safe Shutdown Capability

a. Inspection Scope

The team reviewed post-fire shutdown procedures for the selected areas to determine if appropriate information is provided to plant staff to perform required actions to achieve and maintain safe shutdown. This review included a comparison of the procedures with the safe shutdown analysis to ensure that the actions assumed in the safe shutdown analysis were included in the procedures. Postulating a fire scenario that requires shutdown of the plant from outside of the control room, the team conducted a detailed review of procedure ON-100-009, Control Room Evacuation, Revision 5, dated June 7, 2000. The review included a walk down of the procedure with a licensed senior reactor operator. This review also addressed:

- Usability of the procedure from a human factors standpoint.
- Operator familiarity with the steps of an infrequently used procedure.
- Verification that appropriate equipment was staged for specific Appendix R fire usage, i.e., tools for manual valve operation.

- Existence of adequate and accessible communications and emergency ingress/egress capability, i.e., radios and security door keys.
- Verification that operator actions in the field would not be impeded due to the existence of fire in the area.
- Verification that hot shutdown and entry into cold shutdown could be achieved from the alternate shutdown panel.

b. Findings

No findings of significance were identified.

.10 Post-Fire Safe Shutdown Emergency Lighting and Communications

a. Inspection Scope

As part of its review of the control room evacuation procedure (ON 100-009), the team observed the placement and aim of emergency battery light units to evaluate their adequacy for illuminating access and egress pathways and any equipment requiring local operation for post-fire safe shutdown. The team also evaluated installed communication systems to determine if communications could be maintained in the event of a fire in the selected areas and during a shutdown from outside of the control room.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems

.1 Corrective Actions for Fire Protection Deficiencies

a. Inspection Scope

The team reviewed self-assessment reports and quality assurance audit reports for fire protection activities conducted during the past three years. Selected condition reports (CRs) for fire protection and post-fire safe shutdown equipment were also reviewed. This review included the CRs initiated to address issues identified during this inspection. The team also reviewed selected outstanding and completed fire protection equipment work requests. These reviews were conducted to determine if the SSES, Units 1 and 2, personnel were identifying fire protection deficiencies and implementing appropriate corrective actions.

b. Findings

No findings of significance were identified.

4OA6 Meetings, Including Exit

.1 Exit Meeting Summary

The team presented their preliminary inspection results to Mr. B. Shriver and other members of the PPL Susquehanna, LLC, staff at an exit meeting on August 30, 2002.

The inspectors asked whether any materials examined during the inspection should be considered proprietary. Materials identified as proprietary were returned to the licensee at the completion of the inspection.

PARTIAL LIST OF PERSONS CONTACTED

PPL Susquehanna LLC

B. L. Shriver	Senior Vice President - Chief Nuclear Officer
R. L Anderson	Vice President - Nuclear Operations
T. Harpster	General Manager - Nuclear Services
R. A. Saccone	General Manager - Nuclear Engineering
R. D. Pagodin	Manager - Nuclear Design
D. F. Roth	Manager - Quality Assurance
R. R. Sgarro	Manager - Regulatory Affair
J. D. Shaw	Manager - Station Engineering
W. Smith	Manager - Corrective Action and Assessment
J. R. Buczynski	Program and Component Engineering Supervisor
F. S, Gruscavage	Programs Engineering Supervisor
T. A. Gorman	Project Manager - Fire Protection
J. E. Agnew	Senior Engineer - Nuclear Design
G. Birmingham	Nuclear Design
M. Crowthers	Nuclear Regulatory Affairs
S. E. Davis	Site Fire Protection Engineer - Station Engineering
S. Kuhn	Maintenance
C. Markley	Nuclear Regulatory Affairs
M. Peal	Operations
W. Rigotti	Station Engineering
F. A. Tarselli	Simulator Instructor - Nuclear Training
J. P. Tripoli	Senior Engineer - Regulatory Affairs

Nuclear Regulatory Commission

W. Lanning	Director, Division Reactor Safety
S. Hansell	Senior Resident Inspector

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-387 & 388/02-008-01	NCV	Inadequate Fire Barrier Surveillance
50-387 & 388/02-008-02	NCV	Inadequate UCSR Under-Floor CO_2 Suppression System
50-387 & 388/02-008-03	NCV	Inadequate UCSR and LCSR Pre-Action Sprinkler System

Closed

50-387 & 388/02-008-01	NCV	Inadequate Fire Barrier Surveillance
50-387 & 388/02-008-02	NCV	Inadequate UCSR Under-Floor CO_2 Suppression System
50-387 & 388/02-008-03	NCV	Inadequate UCSR and LCSR Pre-Action Sprinkler System

LIST OF ACRONYMS USED

CFR	Code of Federal Regulations
CO_2	Carbon Dioxide
CR	Condition Report
EOP	Emergency Operating Procedures
FPRR	Fire Protection Review Report
IEEE	Institute of Electrical and Electronics Engineers
IP	Inspection Procedure
IR	Inspection Report
LCSR	Lower Cable Spreading Room
NCV	Non-Cited Violation
NFPA	National Fire Protection Association
NRC	Nuclear Regulatory Commission
PPL	Pennsylvania Power & Light
P&ID	Piping and Instrumentation Drawing
SCBA	Self Contained Breathing Apparatus
SDP	Significance Determination Process
SER	Safety Evaluation Report
SSC	Structures, Systems, Components
SSCL	Safe Shutdown Component List
SSES	Susquehanna Steam Electric Station
UCSR	Upper Cable Spreading Room
UL	Underwriters Laboratories
URR	Upper Relay Room

LIST OF DOCUMENTS REVIEWED

Fire Protection Program Documents

NDAP-QA-0045	Fire Brigade, Rev 5
SE-013-006	24 Month Inspection of Common Rated Penetration Seals, Rev 4
SO-013-007	24 Month Inspection of Unit Common Fire Barriers, Rev 4

Calculations

EC-004-0501	Appendix R Associated Circuit Analysis, Rev 43
EC-013-0638	Evaluation for Identification and Disposition of Appendix R Section III.G Non-Compliant Cables, Rev 1
EC-013-0788	Inadvertent Reactor Vessel Injection Resulting From Spurious Operation of the HPCI or RCIC Systems, Rev 5
EC-013-816	Assessment of the Impact of a fire in one Unit on the Availability of RCIC or HPCI on the Non-Fire Unit, Rev 1
EC-013-0843	Susquehanna Steam Electric Station 10CFR50 Appendix R Compliance Manual, Rev 23
EC-013-0845	Appendix R ADS/SRV Spurious Operation and Cable, Rev 1
EC-013-0859	Appendix R Analysis for Control Room Fire, Rev 10
EC-013-0873	Appendix R - Evaluation of Flow Diversion and High/Low Pressure Interface Components, Rev 2
EC-013-0878	Design Change Packages Review, Rev 0
EC-013-0979	Safe Shutdown Paths for Outside and Inside Control Room, Rev 1
EC-013-1460	Duct 3 hour Gypsum Board Wall Loading / Fire Induced Duct Failure, Rev 0
EC-013-1821	Justification for 3/8" Orifice Sprinkler Heads Installed on Pre-Action Sprinkler Systems in Unit 1 and 2 Reactor Building and Control Structure, Rev 1
EC-013-1849	Hydraulic Calculation for Preaction Sprinkler System No. PA-124 Upgrades
EC-059-0545	Dual Unit Suppression Pool Cooling Analysis, Rev 2
EC-PIPE-1032	PSTR, PSUP, MELB, Moderate Energy Pipe Crack Evaluation, Rev 1
EC-SQRT-1373	Seismic II/I Evaluation of First Aid Station, Rev 0
FF 100230, Sh. 0101	USG Steel-Framed Drywall Systems
FF 108930	Hydraulic Calculation for Preaction Sprinkler 124, 7/24/81
FF 108930, Sh 8601	Hydraulic Calculation for Preaction Sprinkler 142, Rev 1
FF 108930, Sh 9601	Hydraulic Calculation for Preaction Sprinkler 161, Rev 1
FF 108940, Sh. 3101	Low Pressure Carbon Dioxide Flow Calculation, Control Room Underfloor Unit 1, Rev 1
FF 108940, Sh. 3901	Low Pressure Carbon Dioxide Flow Calculation, Control Room Underfloor Unit 2, Rev 2
FF 108940, Sh. 4001	Low Pressure Carbon Dioxide Flow Calculation, Control Room Underfloor Unit 1, Rev 2
FF 108940, Sh. 6101	Low Pressure Carbon Dioxide Flow Calculation, Upper Cable Spreading Room Underfloor Unit 1, Rev 2

Drawings

D103779 Sh 2-5	Loop Diagram Remote Shutdown Panel Instrumentation
D107254	Schematic Diagram 4.16 KV Bus Ckt Brkr Control (1, 1A, 3, 3A, 5, 5A, 7, 7A, 9-12A, 13, 19 & 20)
D107295 Sh 1-8	Schematic Diagram Emergency Service Water Pumps

D107299	Schematic Diagram RHR Service Water System (Sh 1, 2, 4, 5, 8, 8A, 11, 12, & 29)
D107300 Sh 5	Block Diagram Reactor Recirc Pump and Generator, Rev 6
D107300 Sh 8	Schematic Diagram Reactor Recirc Pump Suction Valve, Rev 21
D107302	Schematic Diagram RHR System (Sh 3, 4, 9-17, 20, 36, 39, 40, 93, 94, 107, 112, 114 and 115)
D107303	Schematic Diagram RCIC System (Sh 1-17 and 39)
D107304	Schematic Diagram Core Spray System Valves(Sh 1-5)
D107305	Schematic Diagram Core Spray System Pumps (Sh 1-4)
D107306 Sh 2	Block Diagram Reactor Protection System, Rev 20
D107319 Sh 1	Block Diagram Nuclear Steam Supply Shutoff System, Rev 26
D107321	Schematic Diagram Containment Instrument Gas Valves (Sh 2, 5, & 5A)
D107329 Sh 1 & 2	Schematic Diagram ADS & Safety Relief Valves
D107333 Sh 2 & 2A	Schematic Diagram Diesel Generator and Auto Start Signal
D107408	Schematic Diagram Diesel Generator Excitation Control (Sh 1-1C, 9-10C, 23-23D, 29 & 29A)
E103562 Sh 1-3	Remote Shutdown Panel
E106227 Sh 2	Fire Protection Turbine Building, Control Structure and Rad Waste
E106227 Sh 3	Fire Protection Reactor Building, Standby D. G., River Intake Structure, Service and Administration Building and Circ Water Pump House
E106227 Sh 4	Fire Protection Carbon Dioxide Systems
E106227 Sh 9	Fire Protection Typical Wet Pipe Sprinkler System Details
E106227 Sh. 10	Fire Protection Typical 3" or 4" Pre-Action Sprinkler System Detail
E106227 Sh 11	Fire Protection Typical 2" Pre-Action Sprinkler System Detail
E106227 Sh 12	Fire Protection Typical 3", 4" and 6" Deluge Sprinkler System Detail
E106227 Sh 13/14	Fire Protection Typical 2" Deluge Sprinkler System Detail
E106227 Sh 15	Fire Protection Typical Dry Pipe Sprinkler System Detail
E107150 Sh 1	Single Line Diagram Station, Rev 25
E107152 Sh 1	Single Line Meter and Relay Diagram Generator, Main and Unit Auxiliary Transformer, Rev 18
E107153 Sh 2	Single Line Meter and Relay Diagram 13.8 KV Power System, Rev 34
E107154 Sh 4 & 5	Single Line Meter and Relay Diagram 4.16 KV Diesel Generator
E107158	Single Line Meter and Relay Diagram 480V Motor Control Center (Sh 11, 12, &78
E107160 Sh 1-4	Single Line Meter and Relay Diagram 125 & 250 VDC System
E107160 Sh 6-7	Single Line Meter and Relay Diagram 250 VDC Control Centers
E107160 Sh 11	125 VDC One Line Diagram Rev 14
E107162 Sh 1	Single Line Meter and Relay Diagram 24 VDC System, Rev 13
E107172 Sh 1 & 6	Schematic Meter and Relay Diagram 4.16 KV System
E205950 Sh 1-11	Reactor Building Fire Zone Plan
E205989 Sh 1-8	Control Structure Fire Zone Plan
E205990 Sh 1-8	Control Structure Fire Zone Plan
E-690	Appendix R Safe Shutdown Manual Actions List, Rev 4
FF114511	Elementary Diagram Auto Depressurization System (Sh 2904, 2905, 3106, & 3112)
FF116512 Sh 7519	Elementary Diagram Reactor Recirc Pump & MG Set, Rev 16
FF122610	Elementary Diagram Reactor Protection System (Sh 2205 & 2212)
FF1229010	Elementary Diagram RCIC System (Sh 3 & 9)
M-1002	Appendix R Safe Shutdown Components List, Rev 6

M-111 Sh 1 - 4	P&ID Emergency Service Water System
M-112 Sh 1 & 2	P&ID RHRSW System
M-141 Sh 1 & 2	P&ID Nuclear Boiler
M-148 Sh 1	P&ID Standby Liquid Control, Rev 32
M-149 Sh 1	P&ID Reactor Core Isolation Cooling, Rev 46
M-150 Sh 1	P&ID RCIC Turbine-Pump, Rev 25
M-151 Sh 1 - 5	P&ID Residual Heat Removal
M-152 Sh 1	P&ID Core Spray, Rev. 36
M-155 Sh 1	P&ID High Pressure Coolant Injection, Rev 42
M-156 Sh 1	P&ID HPCI Turbine-Pump, Rev 31
M-156 Sh 2	P&ID HPCI Lube Oil and Control Oil, Rev 8

Procedures

FP-013-150	Pre-fire Plan - Fire Zone 0-15E, Rev 5
FP-013-163	Pre-Fire Plan - Fire Zone 0-27C, Rev 5
FP-013-164	Pre-fire Plan - Fire Zone 0-27E, Rev 5
FP-013-168	Pre-fire Plan - Fire Zone 0-28B-II, Rev 4
FP-113-109	Pre-fire Plan Fire Zone 1-2B, Rev 5
MFP-QA-2218	Design Requirements for Maintaining the Safe Shutdown Requirements of 10CFR50 Appendix R, Rev 4
NDAP-QA-0300	Conduct of Operations, Rev 13
NDAP-QA-0445	Fire Brigade, Rev 5
NDAP-QA-0524	Equipment Reliability Process, Rev 1
NDAP-QA-04415	Fire Protection System Status Control, Rev 5
NDAP-QA-04423	Control of Ignition Sources: Cutting, Welding, and Hot Work Permit, Rev 3
NDAP-QA-04435	Fire Watch Procedure, Rev 5
NDAP-QA-04442	Fire Alarm Response Procedure, Rev 2
NDAP-QA-04464	Fire Barrier Program, Rev 4
NDAP-QA-04472	Fire Rated Penetration Seal Surveillance, Rev 2
NDAP-QA-04483	Penetration Sealing Procedure, Rev 3
NDAP-QA-04493	Fire Protection Program, Rev 3
ON-013-001	Response to Fire, Rev 14
ON-030-001	Loss of Control Structure HVAC, Rev 6
ON-100-009	Control Room Evacuation, Rev 6
ON-200-009	Control Room Evacuation, Rev 7
OP-054-001	Emergency Service Water System, Rev 20
OP-100-001	Remote Shutdown Panel, Rev 9
OP-149-001	RHR System, Rev 25
OP-030-002	Control Structure HVAC, Rev 19
SE-200-011	HV-243-F023A Functional Test at 2B237043
SI-216-301	24 Month Calibration of Remote Shutdown System-Residual Heat Removal Service Water System Flow Channel FT-E11-2N007A, Rev 14
SI-249-308	24 Month Calibration of Remote Shutdown Instrumentation, RHR System Flow Channel FT-E11-2N015A, Rev 12
SI-250 313	24 Month Calibration of Reactor Core Isolation Cooling Turbine Speed Channel (Remote Shutdown System), Rev 10
SI-259-303	24 Month Calibration of Suppression Pool Water Temperature Channels TX-25751 and TX-25752 (PAM, Remote Shutdown and Alarms), Rev 14

SP-00-308	Emergency Medical Response, Rev 3

Completed Tests/Surveillance

SE-013-001	Three Year Fire Protection System Flow Test, Completed 9/11/00
SE-100-008	RCIC Functional Test at Remote Shutdown Panel, Completed 3/28/02
SE-200-007	ESW/RHRSW Functional Test at Remote Shutdown Panel, Completed 4/4/01
SO-013-001	Monthly Diesel and Motor Driven Fire Pump Run, Completed 6/26/02 & 6/26/02
SO-013-003	18 Month CO_2 Functional Test, Completed 4/18/02
SO-113-021	18 Month Functional Test and Visual Inspection of Pre-Action Sprinkler System PA-161, Completed 1/15/02
SO-113-022	18 Month Functional Test and Visual Inspection of Pre-Action Sprinkler System PA-142, Completed 1/15/02
SO-113-024	18 Month Functional Test and Visual Inspection of Pre-Action Sprinkler System PA-124, Completed 2/27/02

Design Change Packages/Evaluations

DCN2002-0222	Design Change Notice to Add RHRSW Crosstie Valves to M-1002 [Appendix R Safe Shutdown Components List], 8/22/02
DCN2002-0223	Design Change Notice to Add the “E” Diesel and Associated components to M-1002 [Appendix R Safe Shutdown Components List], Draft, 8/22/02
DCP 195576	Conduit D1P025 Reroute, Rev 0
DCP 214696	Reactor Building Fire Detection System Upgrade, Rev 0
DCP 98-3005	Thermo-Lag Abandonment - Upgrade Control Structure El. 714', 754' and and 771' -, Rev 0
DCP 98-3014A	Unit 1 Reactor Building El. 670', 683' - Thermo-Lag Upgrade, Rev 1
DCP 98-3015A	Control Structure El. 714' and 771' - Thermo-Lag Upgrade, Rev 1
DCP 98-3015B	Control Structure El. 754' - Thermo-Lag Upgrade, Rev 2
DCP/ECO 225241	Fire Detection System Evaluations, Rev 2

Quality Assurance Audits and Surveillance

QSR 99-023	Worker Knowledge Survey - Unit 2 9RIO
QSR-99-064	Modification 98-3013E, Addition of Fire suppression, Review
QSR 99-071	Compensatory Roving Firewatch Performance
QSR-00-017	Inspection of Temporary Combustible Material Storage Locations
QSR 01-013	Assessment of SSES Fire Protection Program
QSR 2001-015	Class 1E Battery Surveillance & Testing
QSR 2002-048	Susquehanna Fire Protection Program

Miscellaneous Documents

DBD 076	Design Basis Document for Appendix R, Rev 1
EC-043-0511	Appendix R Evaluation of Main Condenser Low Vacuum Pressure Switches, Rev 0
NFPA No. 12	Standard on Carbon Dioxide Extinguishing Systems, 1973 edition
NFPA No. 13	Standard for the Installation of Sprinkler Systems, 1974 edition
PCAF2002-1167	Procedure Change Process Form Procedure No. ON-013-001, Rev 14

Fire Protection Impairment Log for 8/15/02
Specification No. C1010, Drywall Construction

SSES Individual Plant Examination for External Events

Condition Reports
193589, 214740, 272242, 292192, 316779, 325181, 343209, 353470, 364230, 374110, 375646, 375649, 378339, 398137, 406390, 408377, 412911, 413260, 418386, 418396, 418868, 418914, 418916, 418917, 418963, 419303, 419972, 419977, 420970, EWR-420892