From: McKenzie Thomas / RII
To: Francis Jape; Gerald Wiseman; Paul Fillion; Reinaldo Rodriguez; Shakur Walker
Date: 5/12/03 8:30AM
Subject: St. Lucie TFPI Report 2003-002

Attached is the final draft of the St. TFPI report. Please review and be prepared to provide concurrence today. The report is due out today!!! If you have any questions/comments on the report, please see me or Charlie Payne. Thanks for your cooperation.

McKenzie Thomas
Senior Reactor Inspector
USNRC Region II
404-562-4673

CC: Charlie Payne

NN-17

May xx, 2003

Florida Power and Light Company
ATTN: Mr. J. A. Stall, Senior Vice President
Nuclear and Chief Nuclear Officer
P. O. Box 14000
Juno Beach, FL 33408-0420

SUBJECT: ST. LUCIE NUCLEAR PLANT - NRC TRIENNIAL FIRE PROTECTION INSPECTION REPORT 50-335/03-02 AND 50-389/03-02

Dear Mr. Stall:

On March 28, 2003, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your St. Lucie Nuclear Plant, Units 1 and 2. The enclosed inspection report documents the inspection findings, which were discussed on March 28, 2003, with Mr. D. Jernigan and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

This report documents two findings that, combined, have potential safety significance greater than very low significance, however, a safety significance determination has not been completed. These findings did not present an immediate safety concern, however, a fire watch is in place as a compensatory measure.

In addition, the report documents one NRC-identified finding of very low safety significance (Green), which was determined to involve a violation of NRC requirements. However, because of the very low safety significance and because it was entered into your corrective action program, the NRC is treating this as a non-cited violation (NCV) consistent with Section VI.A of the NRC Enforcement Policy. Also, six licensee-identified violations which were determined to be of very low safety significance are listed in this report. If you contest any NCV in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at St. Lucie Nuclear Plant.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at

Sincerely,

Charles R. Ogle, Chief
Engineering Branch 1
Division of Reactor Safety

Docket Nos.: 50-335, 50-389
License Nos.: DPR-67, NPF-16

Enclosure: Inspection Report 50-335, 389/03-02
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

FP&L

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.:	50-335, 50-389
License Nos.:	DPR-67, NPF-16
Report No.:	50-335/03-02 and 50-389/03-02
Licensee:	Florida Power and Light Company (FPL)
Facility:	St. Lucie Nuclear Plant
Location:	6351 South Ocean Drive Jensen Beach, FL 34957
Dates:	March 10 - 14, 2003 (Week 1) March 24 - 28, 2003 (Week 2)
Inspectors:	R. Deem, Consultant, Brookhaven National Laboratory P. Fillion, Reactor Inspector F. Jape, Senior Project Manager M. Thomas, Senior Reactor Inspector (Lead Inspector) S. Walker, Reactor Inspector G. Wiseman, Senior Reactor Inspector
Approved by:	Charles R. Ogle, Chief Engineering Branch 1 Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000335/2003-002, 05000389/2003-002; Florida Power and Light Company; 3/10-28/2003; St. Lucie Nuclear Plant, Units 1 and 2; Triennial Fire Protection

The report covered a two-week period of inspection by regional inspectors and a consultant. One Green non-cited violation (NCV) and two unresolved items with potential safety significance greater than Green were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 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 and Self-Revealing Findings

Cornerstone: Mitigating Systems

- TBD. The St. Lucie fire hazards analysis failed to consider and evaluate the combustibility of 380 gallons of transformer silicone dielectric insulating fluid in each of six transformers installed in three Unit 2 fire areas. Three of the six transformers were located in the Train B Switchgear Room (Fire Area C). As a result, the transformers' contribution to fire loading and their effects on safe shutdown capability had not been assessed as required by the Fire Protection Program.

  This finding is unresolved pending completion of a significance determination. The finding is greater than minor because it affected the mitigating systems cornerstone objective to ensure the availability, reliability and capability of systems that respond to initiating events to prevent undesirable consequences. When assessed with the inadequate equipment physical protection finding (also discussed in this report), the finding may have potential safety significance greater than very low significance. (Section 1R05.02.b.1)

- TBD. The physical protection of equipment relied upon for safe shutdown (SSD) of Unit 2 during a fire in the Train B Switchgear Room (Fire Area C) was not adequate. The Train A 480V vital load center 2A5, and its associated electrical cables, was located in the Train B Switchgear Room without adequate spatial separation or fire barriers as required by the Fire Protection Program. Local, manual operator actions (which had not been reviewed and approved by NRC) would be used to achieve and maintain SSD of Unit 2 in lieu of providing adequate physical protection for load center 2A5 and its associated electrical cables.

  This finding is unresolved pending completion of a significance determination. The finding is greater than minor because fire damage to the unprotected cables could prevent operation of SSD equipment from the main control room and because it affects the mitigating systems cornerstone objective. When assessed

with the silicone oil-filled transformer finding (also discussed in this report), the finding may have potential safety significance greater than very low significance. (Section 1R05.02.b.2)

- Green. The inspectors identified a non-cited violation for the licensee's failure to comply with 10 CFR 50, Appendix R, Criterion III.G.2. This finding is related to a lack of spacial separation or barriers to protect cables in containment which could result in spurious opening of the pressurizer power operated relief valve (PORV) during a fire.

  This finding is greater than minor because it affected the mitigating systems cornerstone objective of equipment reliability, in that, spurious opening of the PORV during post-fire safe shutdown would adversely affect the ability to achieve and maintain the reactor in a hot shutdown condition. The finding is of very low safety significance because the initiating event likelihood was low, manual fire suppression capability remained unaffected and all mitigating systems except for the PORV and block valve were unaffected. (Section 4OA5)

B. Licensee-Identified Violations

Six violations of very low safety significance (previously identified by the licensee) were reviewed by the inspection team. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. These violations and corrective action tracking numbers are listed in Section 4OA7 of this report.

7

REPORT DETAILS

1. **REACTOR SAFETY**
Cornerstones: Initiating Events, Mitigating Systems and Barrier Integrity

1R05 FIRE PROTECTION

01. Systems Required to Achieve and Maintain Post-Fire Safe Shutdown

a. Inspection Scope

The team evaluated the licensee's fire protection program against applicable requirements, including Operating License Condition (OLC) 2.C.20, Fire Protection; Title 10 of the Code of Federal Regulations Part 50 (10 CFR 50), Appendix R; 10 CFR 50.48; Appendix A to Branch Technical Position (BTP) Auxiliary Systems Branch (ASB) 9.5-1, Guidelines for Fire Protection for Nuclear Power Plants; related NRC Safety Evaluation Reports (SERs); the Plant St. Lucie (PSL) Updated Final Safety Analysis Report (UFSAR); and plant Technical Specifications (TS). The team evaluated all areas of this inspection, as documented below, against these requirements. The team reviewed the licensee's Individual Plant Examination for External Events (IPEEE) and performed in-plant walk downs to choose three risk-significant fire areas for detailed inspection and review. The three fire areas selected were:

- Unit 2 Fire Area B, Cable Spreading Room (Fire Zone 52)
- Unit 2 Fire Area C, Train B Switchgear Room (Fire Zone 34) and Electrical Equipment Supply Fan Room (Fire Zone 48)
- Unit 2 Fire Area I, Cable Loft (Fire Zone 51 West), Personnel Rooms (Fire Zone 21), PASS and Radiation Monitoring Room (Fire Zone 32), Instrument Repair Shop (Fire Zone 33I), and Train B Electrical Penetration Room (Fire Zone 23)

The team reviewed the licensee's fire protection program (FPP) documented in the PSL UFSAR (Appendix 9.5A, Fire Protection Program Report); safe shutdown analysis (SSA); fire hazards analysis (FHA); safe shutdown (SSD) essential equipment list; and system flow diagrams to identify the components and systems necessary to achieve and maintain safe shutdown conditions. The objective of this evaluation was to assure the SSD equipment and post-fire SSD analytical approach were consistent with and satisfied the Appendix R reactor performance criteria for SSD. For each of the selected fire areas, the team focused on the fire protection features, and on the systems and equipment necessary for the licensee to achieve and maintain SSD in the event of a fire in those fire areas. Systems and/or components selected for review included: pressurizer power operated relief valves (PORVs); boric acid makeup pumps 2A and 2B; boric acid gravity feed valves V2508 and V2509; auxiliary feedwater (AFW); charging pumps and volume control tank (VCT) outlet valve V2501; shutdown cooling; heating, ventilation, and air conditioning (HVAC); atmospheric dump valves (ADVs); and component cooling water (CCW). The team also reviewed the licensee's maintenance

program to determine if a sample of manual valves used to achieve SSD were included.

b. Findings

No findings of significance were identified.

.02 Fire Protection of Safe Shutdown Capability

a. Inspection Scope

For the selected fire areas, the team evaluated the frequency of fires or the potential for fires, the combustible fire load characteristics and potential fire severity, the separation of systems necessary to achieve SSD, and the separation of electrical components and circuits located within the same fire area to ensure that at least one train of redundant SSD systems was free of fire damage. The team also inspected the fire protection features to confirm they were installed in accordance with the codes of record to satisfy the applicable separation and design requirements of 10 CFR 50, Appendix R, Section III.G, and Appendix A of BTP ASB 9.5-1. The team reviewed the following documents, which established the controls and practices to prevent fires and to control combustible fire loads and ignition sources, to verify that the objectives established by the NRC-approved FPP were satisfied:

- UFSAR, Appendix 9.5A, Fire Protection Program Report
- PSL Individual Plant Examination of External Events (IPEEE)
- Administrative Procedure 1800022, Fire Protection Plan
- Administrative Procedure 0010434, Plant Fire Protection Guidelines
- Electrical Maintenance Procedure 52.01, Periodic Maintenance of 4160 Volt Switchgear

The team toured the selected plant fire areas to observe whether the licensee had properly evaluated in-situ compartment fire loads and limited transient fire hazards in a manner consistent with the fire prevention and combustible hazards control procedures. In addition, the team reviewed fire protection inspection reports, corrective action program (CAP) condition reports (CRs) resulting from fire, smoke, sparks, arcing, and overheating incidents for the years 2001-2002 to assess the effectiveness of the fire prevention program, and to identify any maintenance or material condition problems related to fire incidents.

The team reviewed the fire brigade response, training, and drill program procedures. The team reviewed fire brigade initial and continuing training course materials to verify that appropriate training was being conducted. In addition, the team evaluated fire brigade drill training records for the operating shifts from August 2001 - February 2003. The reviews were performed to determine whether fire brigade drills had been conducted in high fire risk plant areas and whether fire brigade personnel qualifications, drill response, and performance met the requirements of the licensee's FPP.

The team walked down the fire brigade staging and dress-out areas in the turbine building and fire brigade house to assess the condition of fire fighting and smoke control equipment. The team examined the fire brigade's personal protective equipment, self-contained breathing apparatuses (SCBAs), portable communications equipment, and various other fire brigade equipment to determine accessibility, material condition and operational readiness of equipment. Also, the availability of supplemental fire brigade SCBA breathing air tanks, and the capability for refill, was evaluated. In addition, the team examined personnel evacuation pathways to verify that emergency exit lighting was provided to the outside in accordance with the National Fire Protection Association (NFPA) 101, Life Safety Code, and the Occupational Safety and Health Administration (OSHA) Part 1910, Occupational Safety and Health Standards. This review included an examination of backup emergency lighting units along pathways to, and within, the dress-out and staging areas in support of fire brigade operations during a fire-induced power failure.

Team members walked down the selected fire areas to compare the associated fire fighting pre-fire strategies and drawings with as-built plant conditions. This was done to verify that fire fighting pre-fire strategies and drawings were consistent with the fire protection features and potential fire conditions described in the UFSAR Fire Protection Program Report. Also, the team performed a review of drawings and engineering calculations for fire suppression-caused flooding associated with the floor and equipment drain systems for the Train B Switchgear Room, the electrical equipment supply fan room, and the train B electrical penetration room. The review focused on ensuring that those actions required for SSD would not be inhibited by fire suppression activities or leakage from fire suppression systems.

The team reviewed design control procedures to verify that plant changes were adequately reviewed for the potential impact on the fire protection program, SSD equipment, and procedures as required by PSL Unit 2 Operating License Condition 2.C.(20). Additionally, the team performed an independent technical review of the licensee's plant change documentation completed in support of 2002 temporary system alteration (TSA) 2-02-006-3, which placed two exhaust fans in a fire damper opening between the Cable Spreading Room and the Train B Switchgear Room. This TSA was evaluated in order to verify that modifications to the plant were performed consistent with plant design control procedures.

b. Findings

1. Inadequate Fire Hazards Analysis

Introduction: A finding was identified in that six silicone oil-filled transformers were not identified or evaluated in the FHA as contributors to fire loading and fire ignition frequency, as well as their effects on the SSD capability of Unit 2. These transformers were located in three separate fires areas including the Train B Switchgear Room. This is an unresolved item (URI) pending completion of the significance determination process (SDP).

Description: During a pre-inspection plant walk down on February 26, 2003, the team found six oil-filled transformers installed in three Unit 2 fire areas/fire zones. [One transformer in Fire Area A/Fire Zone 37 (Train A Switchgear Room); three transformers in Fire Area C/Fire Zone 34 (Train B Switchgear Room); and two transformers in Fire Area QQ/Fire Zone 47 (Turbine Building Switchgear Room).] The team found these transformers had not been evaluated in the FHA as contributors to fire loading, and for their effects on SSD capability, as required by the FPP. Each indoor medium-voltage power transformer is cooled and insulated by about 380 gallons of Dow Corning 561, a dimethyl silicone-type insulating fluid. This finding was entered into the licensee's CAP as CR 03-0637. The team also noted that the licensee had several opportunities over the past six years but failed to recognize this condition. [A 1997 UFSAR Combustible Loading Update evaluation (PSL-ENG-SEMS-97-070) and a 2001 PSL triennial fire protection audit (QA Audit Report QSL-FP-01-07).]

The team also identified that the transformer insulating fluid had not been annually sampled to confirm its dielectric strength as recommended by the I-T-E Unit Substation Transformers Instruction Manual. The licensee determined that, except for four tests conducted during the period 1990-1992, there were no records of the transformer fluid being sampled and tested. This issue regarding failure to sample the transformer fluid in accordance with the vendor's manual was entered into the CAP as CR 03-0978.

Analysis: The team determined that this finding was associated with the "protection against external factors" and "equipment performance" attributes. It affected the objective of the mitigating systems cornerstone to ensure the availability, reliability, and capability of systems that respond to initiating events, and is therefore greater than minor. In combination with other findings identified in this report, the team determined the finding had potential safety significance greater than very low safety significance because the higher fuel loading in the associated fire areas/zones could increase the duration and severity of postulated fires in those areas beyond that previously analyzed. However, this finding is unresolved pending completion of a significance determination.

Enforcement: 10 CFR 50.48 states, in part, that each operating nuclear power plant must have a fire protection program that satisfies Criterion 3 of 10 CFR 50, Appendix A. PSL Unit 2 Operating License NPF-16, Condition 2.C.(20) states, in part, that the licensee shall implement and maintain in effect all provisions of the approved FPP as described in the UFSAR, and supplemented by licensee submittals dated July 14, 1982, February 25, 1983, July 22, 1983, December 27, 1983, November 28, 1984, December 31, 1984, and February 21, 1985 for the facility; and as approved in the NRC Safety Evaluation Report Supplement 3 dated April 1983, and supplemented by NRC letter dated December 5, 1986. The approved FPP is maintained and documented in the PSL UFSAR, Appendix 9.5A, Fire Protection Program Report.

The Fire Protection Program Report states, in part, that the PSL fire protection program implemented the philosophy of defense-in-depth protection against fire hazards and

effects of fire on SSD equipment. The PSL fire protection program is guided by the plant FHA and by credible fire postulations. Further, it stated that the FHA performed for PSL Unit 2 considered potential fire hazards and their possible effect on SSD capability.

Contrary to the above, the licensee failed to meet 10 CFR 50.48 and their FPP commitments, in that, they did not adequately evaluate the combustible fire loading in the FHA for Fire Area A/Fire Zone 37, Fire Area C/Fire Zone 34, and Fire Area QQ/Fire Zone 47. Specifically, 380 gallons of in-situ combustible transformer silicone dielectric insulating fluid in each of six transformers located in Unit 2 was not considered nor evaluated in the FHA as contributors to fire loading and its possible effects on SSD capability. Pending determination of the finding's safety significance, this finding is identified as URI 50-389/03-02-01, Failure to Provide Adequate Protection for Redundant Safe Shutdown Equipment and Cables in the Event of a Fire in the Unit 2 Train B Switchgear Room (Fire Area C).

2. Inadequate Protection of Equipment and Cables Required for Safe Shutdown

Introduction: A finding was identified in that physical protection of the Train A 480V vital load center 2A5, and its associated electrical cables, located in the Train B Switchgear Room (Fire Area C) did not meet the requirements of 10 CFR 50, Appendix R, Criterion III.G.2. Instead, the licensee substituted the use of local, manual operator actions, which had not received NRC approval, to achieve and maintain SSD. This is a URI pending completion of the SDP.

Description: On January 22, 2003, the licensee identified that PSL relied on manual operator actions outside the MCR for SSD in non-alternative shutdown fire areas (i.e., areas designated as complying with 10 CFR 50, Appendix R, Criterion III.G.2) and that the manual actions did not have prior NRC approval. The licensee documented this issue in CR 03-0153. The team reviewed the local, manual operator actions for the Criterion III.G.2 areas selected for this inspection (Fire Area C and Fire Area I). The finding related to physical protection deficiencies in Fire Area C is discussed in this section of the inspection report. The finding related to physical protection deficiencies relative to Fire Area I is discussed in Section 4OA7 of this inspection report.

The team found that 480V vital load center 2A5 (a Train A component) and its associated electrical cables were located in the Train B Switchgear Room without adequate spatial separation or fire barriers. Load center 2A5 provides power to boric acid makeup (BAM) pumps 2A and 2B via motor control center (MCC) 2A6. MCC 2B5, also located in the Train B Switchgear Room, provides power to the boric acid gravity-feed motor operated valves V2508 and V2509. The licensee's SSA stated that the BAM pumps and the boric acid gravity feed valves were redundant to each for achieving and maintaining SSD. However, rather than providing adequate physical protection for redundant trains of systems necessary to achieve and maintain SSD (as specified for Appendix R, Criterion III.G.2 areas), the licensee substituted the use of manual operator actions outside the MCR. The use of local manual operator actions, in fire areas

designated as complying with the provisions of Appendix R, Criterion III.G.2, requires prior NRC review and approval. These local manual actions had not received NRC approval.

The licensee developed an SSD time line of local, manual operator actions for the Train B Switchgear Room (Fire Area C) to determine when the SSD actions were needed and if personnel, and procedural guidance, were adequate to perform these actions. The licensee determined that the assistance of one operator from the Unit 1 operating shift staff was needed to perform the actions required for SSD of Unit 2 during a fire in this area. The team reviewed the time line, personnel needed (compared to TS shift staffing requirements), and the SSD procedures. Based on this review, the team determined that potential maloperation was properly accounted for in the SSD procedures and that adequate personnel were available to perform the specified local, manual operator actions. The team assessed the feasibility of these local, manual operator actions using the guidance provided in Enclosure 2 of NRC Revised Oversight Program (ROP) Procedure 71111.05, Fire Protection, dated March 6, 2003. The team determined that the manual actions were reasonable and met the criteria in Enclosure 2 of Procedure 71111.05.

Analysis: The team determined that this finding was associated with the "equipment performance" attribute of the mitigating systems cornerstone. It affected this cornerstone's objective to ensure the availability, reliability, and capability of systems that respond to initiating events, and is therefore greater than minor. In combination with other findings in this report, the team determined that this finding had potential safety significance greater than very low, safety significance because fire damage to the unprotected cables could prevent operation of SSD equipment from the MCR and challenge the operators' ability to maintain adequate reactor coolant system inventory and reactor coolant pump seal flow during a fire in the B Switchgear Room. However, this finding is unresolved pending completion of a significance determination.

Enforcement: The licensee's Fire Protection Program commits to 10 CFR 50, Appendix R, Section III.G. Criterion III.G.2 states in part, that,

"...where cables or equipment, including associated non-safety circuits that could prevent operation or cause maloperation due to hot shorts, open circuits, or shorts to ground, of redundant trains of systems necessary to achieve and maintain hot shutdown conditions are located within the same fire area outside of primary containment, one of the following means of ensuring that one of the redundant trains is free of fire damage shall be provided:

(a) Separation of cables and equipment of redundant trains by a fire barrier having a 3-hour rating.
(b) Separation of cables and equipment of redundant trains by a horizontal distance of more than 20 feet with no intervening combustibles or fire hazards. In addition, fire detectors and an automatic, fire suppression system shall be installed in the fire area.

(c) Enclosure of cable and equipment of one redundant train in a fire barrier having a 1-hour rating. In addition, fire detectors and an automatic, fire suppression system shall be installed in the fire area."

Contrary to the above, on March 28, 2003, the team found that the licensee failed to protect redundant equipment (powered by Train A load center 2A5 and Train B MCC 2B5) located within the Train B Switchgear Room (Fire Area C) with an adequate fire barrier or to provide 20 feet of separation. Pending determination of the finding's safety significance, this finding is identified as URI 50-389/03-02-02, Failure to Provide Physical Protection for Redundant Safe Shutdown Equipment and Cables in the Event of a Fire in the Unit 2 Train B Switchgear Room (Fire Area C).

.03 Post-Fire Safe Shutdown Circuit Analysis

a. Inspection Scope

The team reviewed how systems would be used to achieve inventory control, reactor coolant pump seal protection, core heat removal and reactor coolant system (RCS) pressure control during and following a postulated fire in the fire areas selected for review. Portions of the licensee's Appendix R Safe Shutdown Analysis Report which outlined equipment and components in the chosen fire areas, power sources, and their respective cable functions and system flow diagrams were reviewed. Control circuit schematics were analyzed to identify and evaluate cables important to safe shutdown. The team traced the routing of cables through fire areas selected for review by using cable schedules, and conduit and tray drawings. The team walked down the chosen fire areas to compare the actual plant configuration to the layout indicated on the drawings. The team evaluated the above information to determine if the requirements for protection of control and power cables were met. The licensee's circuit breaker and fuse coordination study was reviewed for adequate electrical scheme protection of equipment necessary for safe shutdown. The following equipment and components were reviewed during the inspection:

- V1474 and V1475, Pressurizer PORVs
- V1476 and V1477, Pressurizer Isolation Block Valves
- MV-09-03 and MV-09-04, Feedwater Bypass Valves
- 2HVE-13B, Control Room Booster Fan
- V2501, Volume Control Tank Discharge Outlet Valve
- MV-07 -04, Containment Spray Isolation Valve
- LP-208, Lighting Panel 208
- LP-209, Lighting Panel 209
- HCV-3625, Safety Injection Block Valve
- V3444, Shutdown Cooling Block Valve
- PI-1107/1108, Pressurizer Pressure for Hot Shutdown Panel
- LI-1104/1105, Pressurizer Level for Hot Shutdown Panel
- LI-9113/9123, Steam Generator Level for Hot Shutdown Panel
- Safety Injection Actuation System Logic

- 2A5/2A6 and related feeds, 480V Motor Control Center
- 2B5/2B6 and related feeds, 480V Motor Control Center
- Load Center 2A5 480V Switchgear

b. Findings

No findings of significance were identified.

04. Alternative Post-Fire Safe Shutdown Capability

a. Inspection Scope

The Cable Spreading Room (Fire Area B), one of two alternative shutdown (ASD) fire areas listed in the licensee's SSA, was selected for detailed inspection of post-fire SSD capability. Emphasis was placed on verification that hot and cold shutdown from outside the control room could be implemented, and that transfer of control from the MCR to the hot shutdown control panel (HSCP) and other equipment isolation locations, could be accomplished within the performance goals stated in 10 CFR 50, Appendix R, Section III.L.3. This review also included a comparison of actions in procedures with the licensee's thermal hydraulic time line analysis.

Electrical diagrams of power, control, and instrumentation cables required for ASD were analyzed for fire-induced faults that could defeat operation from the MCR or the HSCP. The team reviewed the electrical isolation and protective fusing in the transfer circuits of components (e.g., motor operated valves) required for post-fire SSD at the HSCP to verify that the SSD components were physically and electrically separated from the fire area. The team also examined the electrical circuits for a sampling of components operable at the HSCP to ensure that a fire in the B Switchgear Room would not adversely affect SSD capability from the MCR. The team's review was performed to verify that adequate isolation capability of equipment used for SSD implementation was in place, accessible, and that the HSCP was capable of controlling all the required equipment necessary to bring the unit to a SSD.

b. Findings

No findings of significance were identified.

05. Operational Implementation of Post-Fire Safe Shutdown Capability

a. Inspection Scope

The team reviewed off-normal operating procedures 2-ONP-100.02, Control Room Inaccessibility, Rev. 13B [the licensee's procedure for ASD] and 2-ONP-100.01, Response to Fire, Rev. 9 [the licensee's procedure for post-fire SSD from the MCR]. The review focused on ensuring that all required functions for post-fire SSD and the corresponding equipment necessary to perform those functions were included in the

procedures. The review also examined the consistency of the operator's shutdown procedures with other procedure-driven post-fire SSD activities (i.e., fire fighting activities).

b. Findings

No findings of significance were identified. The licensee identified that manual operator actions outside the MCR were used in lieu of physical protection of equipment and cables relied on for SSD during a fire, without obtaining prior NRC approval. Findings related to this issue are discussed in Section 1R05.02.b.2 of this inspection report for Fire Area C, and in Section 4OA7 of this inspection report for Fire Area I.

06. Communications

a. Inspection Scope

The team reviewed plant communication capabilities to verify that they were adequate to support unit shutdown and fire brigade duties. This included verifying that site paging (PA), portable radios, and sound-powered phone systems were consistent with the licensing basis and would be available during fire response activities. The team reviewed the licensee's communications features to assess whether they were properly evaluated in the licensee's SSA (protected from exposure fire damage) and properly integrated into the post-fire SSD procedures. The team also walked down sections of the post-fire SSD procedures to verify that adequate communications equipment would be available to support the SSD process. In addition, the team reviewed the periodic testing of the site fire alarm and PA systems, the maintenance checklists for the sound-powered phone circuits and amplifiers, and the inventory surveillance of post-fire SSD operator equipment to assess whether the maintenance/surveillance test program for the communications systems was sufficient to verify proper operation of the systems.

b. Findings

No findings of significance were identified.

07. Emergency Lighting

a. Inspection Scope

The team compared the installation of the licensee's emergency lighting systems to the requirements of 10 CFR 50, Appendix R, Criterion III.J, to verify that 8-hour emergency lighting coverage was provided in areas where manual operator actions were required during post-fire SSD operations, including the ingress and egress routes. The team's review also included verifying that emergency lighting requirements were evaluated in the licensee's SSA and properly integrated into the post-fire SSD procedures as described in the UFSAR, Appendix 9.5A, Section 3.7. During plant walk downs of selected areas where local manual operator actions would be performed, the team

inspected area emergency lighting units (ELUs) for operability and checked the aiming of lamp heads to determine if adequate illumination was available to correctly and safely perform the actions directed by the procedures. The team also inspected emergency lighting features along access and egress pathways that would be used during SSD activities for adequacy and personnel safety. The team checked a sample of ELU battery power supplies to verify that they were rated with at least an 8-hour capacity. In addition, the team reviewed the manufacturer's information and the licensee's periodic maintenance tests to verify that the ELUs were being maintained and tested in accordance with the manufacturer's recommendations.

b. Findings

No findings of significance were identified.

08. Cold Shutdown Repairs

a. Inspection Scope

The team reviewed the licensee's SSA and existing plant procedures to determine if any repairs were necessary to achieve cold shutdown, and if needed, the equipment and procedures required to implement those repairs was available onsite.

b. Findings

No findings of significance were identified.

.09 Fire Barriers and Fire Area/Zone/Room Penetration Seals

a. Inspection Scope

The team walked down the selected fire zones/areas to evaluate the adequacy of the fire resistance of barrier enclosure walls, ceilings, floors, and cable protection. The team selected several fire barrier features for detailed evaluation and inspection to verify proper installation and qualification. These features included fire barrier penetration fire stop seals, fire doors, fire dampers, fire barrier partitions, and Thermo-Lag ERFBS enclosures.

The team observed the material condition and configuration of the selected fire barrier features and also reviewed construction details and supporting fire endurance tests for the installed fire barrier features. This review was performed to verify that the observed fire barrier penetration seal and ERFBS configurations conformed with the design drawings and tested configurations. The team also compared the penetration seal and ERFBS ratings with the ratings of the barriers in which they were installed.

The team reviewed licensing documentation, engineering evaluations of Generic Letter 86-10 fire barrier features, and NFPA code deviations to verify that the fire barrier

installations met design requirements and license commitments. In addition, the team reviewed surveillance and maintenance procedures for selected fire barrier features to verify the fire barriers were being adequately maintained.

b. Findings

No findings of significance were identified.

.10 Fire Protection Systems, Features, and Equipment

a. Inspection Scope

The team reviewed flow diagrams, electrical schematic diagrams, periodic test procedures, engineering technical evaluations of NFPA code deviations, valve lineup procedures, and cable routing data for the power and control circuits of the electric motor-driven fire pumps and the fire protection water supply system yard mains. The team assessed the common fire protection water delivery and supply components to determine if they could be damaged or inhibited by fire-induced failures of electrical power supplies or control circuits and subsequent possible loss of fire water supply to the plant. Additionally, team members walked down the fire protection water supply system piping and actuation valves for the selected fire areas to assess the adequacy of the system material condition, consistency of the as-built configuration with engineering drawings, and operability of the system in accordance with applicable administrative procedures and NFPA standards.

The team walked down accessible portions of the fire detection and alarm systems in the selected fire areas to evaluate the engineering design and the operation of the installed configurations. The team also reviewed engineering drawings for fire detector spacing and locations in the three selected fire areas for consistency with the licensee's fire protection plan, engineering evaluations for NFPA code deviations, and the requirements in NFPA 72A and 72D.

The team also walked down the selected fire zones/areas with automatic sprinkler suppression systems to verify the proper type, placement and spacing of the heads/nozzles as well as the lack of obstructions for effective functioning. The team examined vendor information, engineering evaluations for NFPA code deviations, and design calculations to verify that the required suppression system density for each protected area was available.

The team reviewed the manual suppression standpipe and fire hose system to verify adequate design, installation, and operation in the selected fire areas. The team examined design flow calculations and evaluations to verify that the required fire hose water flow and sprinkler system density for each protected area were available. The team checked a sample of manual fire hose lengths to determine whether they would reach the SSD equipment. Additionally, the team observed placement of the fire hoses and extinguishers to confirm consistency with the fire fighting pre-plan drawings.

b. Findings

No findings of significance were identified.

4. Other Activities

4OA2 Problem Identification and Resolution

a. Inspection Scope

The team reviewed a sample of licensee audits, self-assessments, and CRs to verify that items related to fire protection and to SSD were appropriately entered into the licensee's CAP in accordance with the PSL quality assurance program and procedural requirements. The items selected were also reviewed for classification and appropriateness of the corrective actions taken or initiated to resolve the items. In addition, the team reviewed the licensee's applicability evaluations and corrective actions for selected industry experience issues related to fire protection. The operating experience (OE) reports were reviewed to verify that the licensee's review and actions were appropriate.

b. Findings

No findings of significance were identified

4OA3 Event Followup

.01 (Closed) LER 50-335, 389/00-01, Outside Design Bases Appendix R Hi-Lo Pressure Interface and Separation Issues.

On March 9, 2000, the licensee identified seven cases where the plant was not in compliance with 10 CFR 50, Appendix R, Criterions III.G.2.d and III.G.2.f. The first case, involving the pressurizer PORVs, applied to Units 1 and 2, and is discussed in Section 4AO5 of this report. The other six cases apply to Unit 2 only, and are discussed below.

a. Shutdown Cooling Valves

Shutdown cooling (SDC) system valves, V3652 and V3481, isolate the SDC piping from the RCS while the plant is operating. The SDC piping is not rated for RCS normal operating pressure. Hence, these valves are procedurally de-energized in the closed position during normal plant operation. Only one valve needs to remain closed to effectively isolate the SDC piping from RCS pressure. The licensee found that the power cables for these valves were routed through a pull box (JB-2031), located in the annulus region of containment, which also contained other three-phase power cables. During a fire, one or both of these motor-operated valves could spuriously open due to fire-induced cable-to-cable short circuits. Should both valves open when the RCS is at

normal operating pressure, a pressure relief valve would open and RCS coolant would flow from the RCS to the containment sump causing a loss of coolant accident (LOCA). SDC valve V3545 is a normally open motor-operated valve in series with V3652 and V3481 which could be closed by the operator to re-isolate the SDC piping. However, the power cables for V3545 also could be damaged by the fire. The licensee corrected the problem by installing new power cables using armored cable. The inspectors confirmed implementation of the modification through review of plant modification PCM01028. This finding is more than minor because it could adversely affect the equipment reliability objective of the mitigating systems and barrier integrity cornerstones. Using Appendix F of the SDP, the inspector determined that the finding was of very low safety significance (Green) because the likelihood of an LOCA event occurring was very low and cables for systems used to mitigate a LOCA were located outside containment. This licensee-identified finding involved a violation of 10 CFR 50, Appendix R, Criterion III.G.2 requirements. The enforcement considerations for this violation are given in Section 4OA7. This issue is closed.

b. Pressurizer Pressure Instrumentation Affected by Tray-Conduit Interaction

The licensee identified that cable tray L2224, located in containment, lacked 20-foot separation or a radiant heat shield to prevent interaction with conduits 25018Y and 23091A during a fire as required by 10 CFR 50, Appendix R, Criterion III.G.2. Pressurizer pressure instruments PT-1105, PT-1106 and PT-1107 were routed in cable tray L2224; and pressure instruments PT-1103, PT-1104 and PT-1108 were routed in conduits 25018Y and 23091A. Instruments PT-1107 and PT-1108 would be used to achieve and maintain SSD during a fire. The licensee corrected this finding by protecting conduits 25018Y and 23091A with a radiant heat shield 20 feet on either side of cable tray L2224 (plant modification PCM99104, Supplement 1). The inspector evaluated the consequences and ramifications of these instruments failing high or low, as well as the availability of pressurizer pressure instruments which would remain unaffected by the fire. This finding is more than minor because it could adversely affect the equipment reliability objective of the mitigating systems cornerstone. Using Appendix F of the SDP, the inspector determined that the finding was of very low safety significance (Green) because the affected instrumentation would not lead to any transient or a change in core damage frequency. This licensee-identified finding involved a violation of 10 CFR 50, Appendix R, Criterion III.G.2 requirements. The enforcement considerations for this violation are given in Section 4OA7. This issue is closed.

c. Pressurizer Level Instrumentation Affected by Tray-Conduit Interaction

The licensee identified that cable tray L2213, located in containment, lacked 20-foot separation or a radiant heat shield to prevent interaction with conduits 23320D and 23090A during a fire as required by 10 CFR 50, Appendix R, Criterion III.G.2. Pressurizer level instruments LT-1110X and LT-1105 were routed in cable tray L2213; and level instruments LT-1110Y and LT-1104 were routed in conduits 23320D and 23090A. Instruments LT-1110X & Y would be used to achieve and maintain SSD during

a fire. The inspector determined that level failing low was the most limiting effect of a fire-induced fault with these cables. Low indicated pressurizer level would initiate several automatic actions, some cause level to rise while others cause level to fall. The loss of pressurizer heaters dominates the situation and causing actual pressurizer level and pressure to decrease. Low pressurizer pressure would initiate a reactor trip and a safety injection (SI) actuation. Safety injection flow would increase actual pressurizer level. Because actual pressurizer level cannot be determined, the operator may not secure the safety injection pumps resulting in the pressurizer completely filling. The post-fire SSD procedure directs the operator to place the PORVs in override due to concerns about spurious opening. Therefore, once the pressurizer completely fills, the associated pressure increase would be relieved by the safety relief valves. This finding is more than minor because it could adversely affect the equipment reliability objective of the mitigating systems and barrier integrity cornerstones. Using Appendix F of the SDP, the inspector determined that the finding was of very low safety significance (Green) because the likelihood of a stuck open safety valve event occurring was very low, manual suppression systems for fires in containment were in a normal state, and cables for systems used to mitigate this event were located outside containment. This licensee-identified finding involved a violation of 10 CFR 50, Appendix R, Criterion III.G.2 requirements. The enforcement considerations for this violation are given in Section 4OA7. This issue is closed.

d. Pressurizer Level Instrumentation Affected by Conduit to Conduit Interaction

The licensee identified that two conduits in containment, containing cables for redundant channels of pressurizer level instrumentation, did not have 20-foot separation or radiant heat shield protection as required by 10 CFR 50, Appendix R, Criterion III.G.2. The conduits were located in the containment annulus at an elevation where there were no ignition sources other than the cables themselves. The licensee corrected the separation problem by installing a radiant heat shield on one of the conduits (plant modification PCM99104, Supplement 1). The inspector determined that self-induced cable ignition of low voltage, low energy, instrument circuits, was not a credible event. The inspector noted even if a fire occurred within a conduit, the fire would not affect another conduit. The inspector determined that, given the particular configuration at issue, it could not credibly adversely affect any reactor safety cornerstone. No new findings were identified in the inspector's review. This finding constitutes a violation of minor significance that is not subject to enforcement action in accordance with Section IV of the NRC's Enforcement Policy. The licensee documented the problem in CR 99-1963, Rev. 2 and CR 00-0386. This issue is closed.

e. Circuits Related to Automatic Pressurizer Pressure Control Affected by Conduit to Conduit Interaction

The licensee identified that certain conduits in containment, containing cables for the pressurizer PORV and the auxiliary spray isolation valves, did not have 20-foot separation or radiant heat shield protection as required by 10 CFR 50, Appendix R, Criterion III.G.2. The licensee's SSA considered these two systems to be separate and

independent, and would be used in the post-fire SSD procedures as diverse methods to reduce RCS pressure when necessary. The conduits were located in the containment annulus at an elevation where there were no ignition sources other than the cables themselves. The licensee corrected the separation problem by installing a radiant heat shield on one of the conduits (plant modification PCM99104, Supplement 2). The inspector determined that a fire in one conduit could not credibly expand to affect other nearby conduits. The inspector determined that, given the particular configuration at issue, it could not credibly adversely affect any reactor safety cornerstone. No new findings were identified in the inspector's review. This finding constitutes a violation of minor significance that is not subject to enforcement action in accordance with Section IV of the NRC's Enforcement Policy. The licensee documented the problem in CR 99-1963, Rev. 2 and CR 00-0386. This issue is closed.

f. Radiant Heat Shields Not Installed per Accepted Appendix R Deviation

The licensee identified that radiant heat shields had not been installed directly below four groups of cable trays, running above the 45-foot elevation grating inside containment [in the space between the containment wall and the bioshield], as required by a NRC-approved deviation in the Unit 2 Operating License. Examples of cable trays involved were instrumentation trays L2223 (Train A) and L2224 (Train B). The licensee corrected the problem by installing the missing radiant heat shields [plant modification PCM01028]. Train B cables were in trays near the containment wall, and Train A cables are in trays near the bioshield. At certain locations, these cable trays are only separated by seven feet. This finding is more than minor because a fire could adversely affect the equipment reliability objective of the mitigating systems cornerstone by damaging redundant trains of SSD equipment. The finding was considered to have very low safety significance (Green) using Appendix F of the SDP because:

- Fire brigade capability for a fire in containment was not impaired.
- In-situ ignition sources are negligible and transient ignition sources and combustibles are not present during normal plant operation.
- Only the top tray in each group contains power cables carrying sufficient energy (480V) for IEEE 383 cables to self-ignite. These trays are solid metallic bottom and cover-type trays. This construction inherently limits the spread of an internal tray fire, and provides a shield limiting the radiant heat energy release. Most of these power cables are not energized during normal plant operation.
- A very similar configuration in the Unit 1 containment was analyzed by the licensee, reviewed by the NRC in great detail, and found to be an acceptable configuration. The Unit 1 study had a safety factor of at least two, which provides a margin to account for geometry and other unknown differences between the two units.

This licensee-identified finding involved a violation of PSL Unit 2 Operating License NPF-16, Condition 2.C.(20) and 10 CFR 50, Appendix R, Criterion III.G.2 requirements. The enforcement aspects of the violation are discussed in Section 4AO7. This issue is closed.

.02 (Closed) LER 50-335/00-04, Pressurizer Level Instrumentation Conduit Separation Outside Appendix R Design Bases

The licensee identified that a Unit 1 cable tray in containment containing pressurizer level instrumentation, lacked 20-foot separation or a radiant heat shield to prevent interaction with conduit containing redundant pressurizer level instrumentation, as required by 10 CFR 50, Appendix R, Criterion III.G.2. A fire in the cable tray could result in damage to all pressurizer level instrumentation causing the pressurizer to completely fill and causing the safety valves to lift. [This is essentially the same issue as discussed for Unit 2 in Section 4OA3.01.c above.] This finding is more than minor because it could adversely affect the equipment reliability objective of the mitigating systems and barrier integrity cornerstones. Using Appendix F of the SDP, the inspector determined that the finding was of very low safety significance (Green) because the likelihood of a stuck open safety valve event occurring was very low, manual suppression systems for fires in containment were in a normal state, and cables for systems used to mitigate this event were located outside containment. This licensee-identified finding involved a violation of 10 CFR 50, Appendix R, Criterion III.G.2 requirements. The enforcement considerations for this violation are given in Section 4OA7. This LER is closed.

4OA5 Other Activities

.01 (Closed) URI 335,389/99-08-03, PORV Cabling May Not be Protected from Hot-Shorts Inside Containment

Introduction: A Green NCV was identified for failure to provide 20-foot separation or radiant heat shield protection for the pressurizer PORV cables inside containment as required by 10 CFR 50, Appendix R, Criterion III.G.2.

Description: During an NRC fire protection inspection (Inspection Report 50-335, 389/99-08, dated January 31, 2000), the inspectors identified that the PORV cables inside containment were not protected from fire-induced cable-to-cable short circuits. The licensee's SSA referred to a study which documented that spurious opening of the PORV due a cable-to-cable short circuit was not credible. Because the study could not be located at the time of the inspection, the inspectors initiated this URI to track the issue. Subsequently, the licensee determined that either pressurizer PORV could spuriously open as a result of fire-induced short circuits in a cable tray in containment. In addition, cables for the associated PORV block valve were routed in the same cable tray and could be damaged by the same fire. Cables for one PORV and its block valve were routed in a tray near the containment wall. Cables for the other PORV and its block valve were routed in a tray near the bioshield. The condition applied to both units. The licensee reported this finding in LER 50-335, 389/00-01. The licensee corrected this problem by installing new PORV cables using armored cable [plant modification PCM00059 (Unit 1) and PCM99104, Rev. 4 (Unit 2)].

Analysis: The finding was a performance deficiency because it represented a violation of 10 CFR 50, Appendix R, Criterion III.G.2 requirements. It was considered greater than

minor because it affects the "equipment performance" attribute of the mitigating systems and barrier integrity cornerstones. Using Appendix F of the SDP, the inspector determined that the finding was of very low safety significance (Green) because the initiating event likelihood was relatively low, manual suppression of fires in the containment was in the normal state, and other mitigating systems were unaffected because their associated cables were outside of containment.

Enforcement: The licensee's Fire Protection Program commits to 10 CFR, Appendix R, Criterion III.G. For noninerted containments, Criterion III.G.2.d. and III.G.2.f, state, in part "one of the following fire protection means shall be provided:

- Separation of cables and equipment and associated non-safety circuits of redundant trains by a horizontal distance of more than 20-feet with no intervening combustibles or fire hazards;
- Separation of cables and equipment and associated non-safety circuits of redundant trains by a noncombustible radiant energy shield."

Contrary to the above, the cabling for redundant trains of pressurizer PORVs, and their associated block valves did not meet this requirement. Because the failure to protect these cables is of very low safety significance, has been entered into the CAP (CR 00-0386) and the problem has been corrected through a plant modification, this violation is being treated as an NCV consistent with Section VI.A of the NRC Enforcement Policy. This finding is identified as NCV 50-335,389/03-02-02, PORV Cables in Containment Fail to Meet 10 CFR 50, Appendix R, Criterion III.G.2 Requirements.

4OA6 Meetings

On March 28, 2003, the team presented the inspection results to Mr. D. Jernigan and other members of your staff, who acknowledged the findings. The team confirmed that proprietary information is not included in this report.

4OA7 Licensee-Identified Violations

The following findings of very low safety significance (Green) were identified by the licensee and are violations of NRC requirements which meet the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as NCVs.

- 10 CFR 50, Appendix R, Criterion III.G.2, requires in part, that, where cables or equipment, including associated non-safety circuits that could prevent operation or cause maloperation due to hot shorts, open circuits, or shorts to ground, of redundant trains of systems necessary to achieve and maintain hot shutdown conditions are located within the same fire area outside of primary containment, one of the following means of ensuring that one of the redundant trains is free of fire damage shall be provided: (1) separation of cables and equipment of redundant trains by a fire barrier having a 3-hour rating; (2) separation of cables and equipment of redundant trains by a horizontal distance of more than 20 feet with no intervening combustibles or fire

hazards; (3) enclosure of cable and equipment of one redundant train in a fire barrier having a 1-hour rating.

Manual operator actions to respond to maloperations are not listed as an acceptable method for satisfying this requirement.

Contrary to the above, the licensee did not provide adequate protection to ensure that redundant trains of systems and equipment necessary to achieve and maintain SSD were maintained free of fire damage in the event of a fire in Fire Area I. In lieu of providing adequate physical protection, the licensee used manual operator actions outside the MCR without obtaining prior NRC approval.

This finding was entered into the licensee's CAP as CR 03-0153. The licensee performed a SSD manual operator action time line for Fire Area I to determine the time requirements when the SSD functions were needed, and, if personnel and procedural guidance were adequate to perform the actions. The licensee determined that the assistance of one operator from the Unit 1 operating shift staff was needed perform the actions required for Unit 2 SSD in the event of a fire in Fire Area I. The team reviewed the time line, personnel needed versus Unit 1 TS shift staffing requirements, and the SSD procedures. Based on this review, the team determined that manual actions to mitigate potential maloperations were properly addressed in the SSD procedures and the personnel needed to perform the manual actions (including the use of an operator from Unit 1) for Fire Area I was reasonable. The team assessed the manual operator actions used for this fire area against the guidance provided in Enclosure 2 of NRC ROP Procedure 71111.05, Fire Protection, dated March 6, 2003. The team determined that the manual actions were reasonable and met the criteria in Enclosure 2 of Procedure 71111.05.

- 10 CFR 50, Appendix R, Criterion III.G.2, Fire protection of safe shutdown capability, requires that, for cables that could prevent operation or cause maloperation due to hot shorts, open circuits or shorts to ground, of redundant trains of systems necessary to achieve and maintain hot shutdown conditions and located inside noninerted containments, one of the following fire protection means shall be provided: (1) separation of cables of redundant trains by a horizontal distance of more than 20-feet with no intervening combustibles or fire hazards; or (2) separation of cables of redundant trains by a non-combustible radiant energy shield.

  Contrary to the above, since the requirement became effective, the required fire protection was not provided for the following redundant cables:

  - Shutdown cooling valves V3652 and V3481 on Unit 2.
  - Pressurizer pressure instrumentation PT-1107 and PT-1108 on Unit 2
  - Pressurizer level instrumentation LT-1110X and LT-1110Y on Units 1 & 2

- Radiant heat shields on Unit 2 cable trays L2223 (Train A) and L2224 (Train B)
- Cable tray lacked radiant heat shield or 20-feet separation from conduit on Unit 1

These findings have been entered into the licensee's CAP (CR 99-1963, Rev. 2, and CR 00-0386), corrected by plant modifications, and are of very low safety significance for reasons given in Sections 4OA3.01 and 4OA3.02.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

D. Albritton, Senior Reactor Operator
P. Barnes, Fire Protection Engineering Supervisor
R. De La Espriella, Site Quality Manager
B. Dunn, Site Engineering Manager
K. Frehafer, Licensing Engineer
J. Hoffman, Design Engineering Manager
D. Jernigan, Site Vice President
R. Lamb, Senior Reactor Operator
G. Madden, Licensing Manager
R. Maier, Protection Services Manager
R. McDaniel, Fire Protection Supervisor
T. Patterson, Operations Manager
R. Rose, Plant General Manager
V. Rubano, Engineering Special Projects Manager
S. Short, Electrical Engineering Supervisor

NRC Personnel

C. Ogle, Branch Chief
R. Rodriguez, Nuclear Safety Intern (Trainee)
T. Ross, Senior Resident Inspector
S. Sanchez, Resident Inspector

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-389/03-02-01 URI Failure to Provide Adequate Protection for Redundant Safe Shutdown Equipment and Cables in the Event of a Fire the Unit 2 Train B Switchgear Room (Fire Area C) (Section 1R05.02.b.1)

50-389/03-02-02 URI Failure to Provide Physical Protection for Redundant Safe Shutdown Equipment and Cables in the Event of a Fire in the Unit 2 Train B Switchgear Room (Fire Area C) (Section 1R05.02.b.2)

Opened and Closed

50-335,389/03-02-03 NCV PORV Cables in Containment Fail to Meet 10 CFR 50, Appendix R, Criterion III.G.2 Requirements (Section 4OA5)

Closed

50-335,389/99-08-03 URI PORV Cabling May Not be Protected from Hot-Shorts Inside Containment (Section 4OA5.01)

50-335,389/00-001 LER Outside Design Bases Appendix R Hi-Lo Pressure Interface and Separation Issues (Section 4OA3.01)

50-335/00-004 LER Pressurizer Level Instrumentation Conduit Separation Outside Appendix R Design Bases (Section 4OA3.02)

Discussed

None

LIST OF DOCUMENTS REVIEWED

Section 1R05: Fire Protection

Procedures:

2-ADM-03.01, Unit 2 Power Distribution Breaker List, Rev. 6C
2-ONP-100.01, Response to Fire, Rev.9
2-ONP-100.02, Control Room Inaccessibility, Rev.13B
2-M-0018D, Mechanical Maintenance Safety-Related PM Program (Dampers), Rev. 11
Administrative Procedure 0005729, Fire Protection Training, Qualification, and Requalification, Rev. 17
Administrative Procedure 0010239, Fire Protection System Impairment, Rev. 13B
Administrative Procedure 0010434, Plant Fire Protection Guidelines, Rev. 37C
Administrative Procedure 1800022, Fire Protection Plan, Rev. 35
EMP 50.10, Self-Contained Emergency Lighting Unit Maintenance and Inspection, Rev. 9
EMP 52.01, Periodic Maintenance of 4160 Volt Switchgear, Rev. 14
General Maintenance Procedure 2-M-0018F, Safety-Related PM Program (Fire PMs), Rev. 25B
Protection Services Guidelines, PSG-15.01, Monitoring Fire Protection System Failures, Rev. 0
QI-3-PSL-1, Design Control, Rev. 11
0-OSP-15.11, Fire Protection System Quarterly Alignment Verification, Rev. 6
0-OSP-15.17, Fire Protection System Triennial Flow Test, Rev. 1
2-OSP-100.16, Remote Shutdown Components 18 Month Functional Test, Rev. 2
2-IMP-69.02, ESFAS Monthly Channel Functional Test, Rev. 4A

Drawings:

2998-G-078, Sheets 107, 108, 109, 110, Unit 2 Reactor Coolant System, Rev. 1

2998-G-078, Sheets 121A, 121B & 122, Unit 2 Chemical and Volume Control System, Rev. 16
2998-G-078, Sheets 130A, 130B, 131, 132, Unit 2 Safety Injection System, Rev. 12
2998-G-079, Sheets 1, 2 & 7, Unit 2 Main Steam System, Rev. 20
2998-G-080, Sheets 2A & 2B, Unit 2 Feedwater and Condensate System, Rev. 25
2998-G-082, Sheets 1 & 2, Unit 2 Circulating and Intake Cooling Water System, Rev. 37
2998-G-083, Sheets 1 & 2, Unit 2 Component Cooling Water System, Rev. 28
2998-G-084, Unit 2 Flow Diagram Domestic & Make-up Water Systems, Rev. 33
2998-G-088, Sheet 1, Unit 2 Containment Spray and Refueling Water System, Rev. 35
2988-G-275 series, 480 V. Switchgear One Line Wiring Diagrams, Rev. 4
2988-G-424, Reactor Auxiliary Building Fire Detectors and Emergency Lights, Rev 9.
2988-G-890, Reactor Auxiliary Building Plumbing and Drainage Plan, Rev. 8
2988-G-891, Reactor Auxiliary Building Plumbing and Drainage Plan El. 43', Rev. 10
2998-B-733, Unit 2 Fire Protection Penetration Schedule, Rev. 6
2998-G-785, Reactor Auxiliary Building Room and Door Schedule, Rev. 8
2998-G-882, HVAC Equipment Schedule and Details, Rev. 1
2998-16082, Air Balance Inc. SL-2121 List of Materials, 319 ALV & 319 ALH Fire Dampers, Rev. 0
8770-B-327, Control Wiring Diagrams for Fire Water Pumps, Rev. 14
2998-G-424, Sheet 7, Unit 2 Reactor Containment Fire Detectors and Emergency Lights, Rev 1
2998-G-879, Sheets 1 & 2, Unit 2 HVAC Flow and Control Diagrams, dated 10/20/89
2998-G-411, Reactor Auxiliary Building El' 19'50 Conduit Layout, Sheet 14, Rev. 8
2998-G-411, Reactor Auxiliary Building El' 19'50 Conduit Layout, Sheet 15, Rev. 6
2998-G-411, Reactor Auxiliary Building El' 19'50 Conduit Layout, Sheet 19, Rev. 5
2998-G-411, Reactor Auxiliary Building El' 19'50 Conduit Layout, Sheet 10, Rev. 6
2998-G-411, Reactor Auxiliary Building El' 19'50 Conduit Layout, Sheet 4, Rev. 5
2998-G-411, Reactor Auxiliary Building El' 19'50 Conduit Layout, Sheet 3, Rev. 6
2998-G-411, Reactor Auxiliary Building El' 19'50 Conduit Layout, Sheet 13, Rev. 5
2998-G-411, Reactor Auxiliary Building El' 19'50 Conduit Layout, Sheet 7, Rev. 9
2998-G-411, Reactor Auxiliary Building El' 19'50 Conduit Layout, Sheet 8, Rev. 8
2998-G-411, Reactor Auxiliary Building El' 19'50 Conduit Layout, Sheet 9, Rev. 8
2998-G-411, Reactor Auxiliary Building Electrical Pen Area Conduit Layout, Sheet 20, Rev. 9
2998-G-410, Cable Vault Trays - Key Plan , Sheet 6, Rev. 6
2998-G-394, Reactor Auxiliary Building El' 43'0 Conduit, Trays & Grounding, Sheet 1, Rev. 27
2998-G-392, Reactor Auxiliary Building El' 19'6 Conduit, Trays & Grounding, Sheet 1, Rev. 17
2998-G-374, Reactor Auxiliary Building Pen Area Conduit, Trays & Grounding, Sheet 1, Rev. 11
2998-G-076, Reactor Auxiliary Building Misc. Plans & Sections, Rev. 19
2998-G-071, General Arrangement Reactor Auxiliary Building Plan Sheet 3, Rev. 24
2998-G-272A, Combined Main and Auxiliary One Line Diagrams, Rev. 7
2998-B-327, Pressurizer Relief Isolation Valve V-1477, Sheet 118, Rev. 14
2998-B-327, Pressurizer Relief Isolation Valve V-1476, Sheet 120, Rev. 14
2998-B-327, LPSI Pump 2A Suction Valve V-3444, Sheet 1531, Rev. 6
2998-B-327, LPSI Flow Control Valve HCV-3625, Sheet 260, Rev. 16
2998-B-327, Pressurizer Relief Valve V-1475, Sheet 1630, Rev. 10
2998-B-327, Pressurizer Relief Valve V-1474, Sheet 1624, Rev. 10
2998-B-327, Pressurizer Level Channel L-1110, Sheet 139, Rev. 13

2998-B-400, Lighting Panel Details, Sheet 209, Rev. 8
2998-B-325, Bill of Material, Sheet 026-01, Rev. 5
2998-B-327, Steam Generator 2A/2B Pressure & Level , Sheet 369, Rev. 12
2998-B-327, Pressurizer Pressure & Level , Sheet 370, Rev. 12
2998-B-327, Measurement Channels F2212, P2212, P2215, T2229, T2221, Sheet 150, Rev. 15
C-13172-412-522, Process Instruments Remote Nest Interconnection Diagram, Sheet 1, Rev. 3
C-13172-412-523, Process Instruments Remote Nest Interconnection Diagram, Sheet 1, Rev. 2

Calculations and Evaluations

2998-B-048, St. Lucie Unit 2, Appendix R Safe Shutdown Analysis Fire Area Report
2998-B-049, St. Lucie Unit 2 Essential Equipment List, Rev. 6
2998-2-FJE-98-002, Review of Circuit Breaker and Fuse Coordination for St. Lucie Unit 2 Appendix R Essential Equipment List Circuits, Rev. 0
PSL-2-FJE-90-0020, St. Lucie Unit 2 2A & 2B EDG Electrical Loads, Rev. 7
PSL-1FJM-91-001, PSL-1 RAB Electrical Equipment Rooms HVAC Computer Model Data Inputs and Outputs, Rev. 1
PSL-FPER-00-004, Disposition of Unit 2 Fire Detection System Nonconformance, Rev. 1
PSL-BFSM-98-004, Hose Station Supply Piping (Standpipe) Hydraulic Analysis, Rev. 0
PSL-ENG-97-070, UFSAR Combustible Loading Update for Unit 2, Rev. 0
PSL-FPER-99-008, Two-sided Cable Tray Fire Stop Redesign, Rev. 1
PSL-FPER-99-011, Disposition of Unit 2 NFPA Code Nonconformance, Rev. 1
PSL-FPER-00-0126, Evaluation of Fire Barrier Rating for Barriers Containing Two-sided Fire Stops, Rev.0
Calculation to determine the capacity of diked areas surrounding Unit 2 transformers 2A5, 2B5 and 2B2, dated March 12, 2003
Evaluation to determine compliance with DC 561 Technical Manual "Use Restrictions" for Unit 2 transformers 2A5, 2B5 and 2B2, dated March 10, 2003

Design Basis Documents:

Component Functions for Pressurizer Wide Range Pressure Instrument Loop, Section 7.22
Component Functions for Pressurizer Instrument Loop P-1100X&Y, Section 7.23
Component Functions for Pressurizer Pressure/Safety Injection Instrument Loop, Section 7.28
DBD-ESF-2, Engineering Safety Features Actuation System, Rev. 1
DBD-CVCS-2, Chemical and Volume Control System, Rev. 1

Applicable Codes and Standards:

IEEE Standard 100, Standard Dictionary of Electrical and Electronics Terms, Fourth Edition
NFPA 13, Standard for the Installation of Sprinkler Systems, 1973 Edition
NFPA 14, Standard for the Installation of Standpipe and Hose Systems, 1973 Edition
NFPA 20, Standard for the Installation of Centrifugal Fire Pumps, 1972 Edition
NFPA 72A, Standard on Local Protective Signaling Systems, 1972 Edition
NFPA 72D, Standard for the Installation, Maintenance, and Use of Proprietary Protection Signaling Systems, 1973 Edition

NFPA 80, Standard on Fire Doors and Windows, 1973 Edition
NFPA 90A, Standard on Air Conditioning and Ventilating Systems, 1981 Edition
NUREG-1552, Supplement 1, Fire Barrier Penetration Seals in Nuclear Power Plants, dated January 1999
Underwriters Laboratories, Fire Resistance Directory, January 1998
OSHA Standard 29 CFR 1910, Occupational Safety and Health Standards,

Audit Reports:

QSL-FP-00-07, Annual Fire Protection Functional Area Audit
QSL-FP-01-07, Triennial Fire Protection Functional Audit
QSL-FP-02-05, Fire Protection Functional Audit

Condition Reports:

CR 98-0260, Evaluate Deviations from NFPA 72 Code
CR 98-0405, Evaluate Deviations from NFPA 13-1975 Code
CR 98-0563, Assess Currently Installed Fire Hose Nozzles in Both Units
CR 00-1514, Failure of 500KV Main Transformer, SEN 215
CR 01-0577, Circuit Breaker Failure and Fire, SEN 218
CR 01-2296, Assess Deviations from NFPA 72 Code addressed in QA Audit QSL-FP-01-07
CR 01-2459, 4-kV Breaker Failure, SER 5-01
CR 02-0396, Assess Qualifications of Thermo-Lag Walls at PSL
CR 02-1619, Potential Problems with Heat Collectors, NRC Information Notice 2002-24
CR 02-2081, Design Change Checklist
CR 02-2098, PSL CARS
CR 02-3145, Failure to Obtain FRG Review of Several Procedure Changes

Condition Reports Generated During this Inspection

CR 03-0153, Use of manual actions in Appendix R, III.G.2 areas without prior NRC approval
CR 03-0637, Silicone oil-filled transformers installed in Unit 2 interior rooms
CR 03-0847, Hot shutdown repairs using tools to achieve safe shutdown in the event of a fire
CR 03-0888, Update UFSAR to show previously approved Deviation C6 no longer required
CR 03-0942, Discrepancies between the SSA, EEL, and the breaker/fuse coordination study
CR 03-0964, Rubatex insulation installed in U2 intake (fire area R-R) not considered in the FHA
CR 03-0965, Combustible fire load for U1 and U2 intake fire areas different for each unit's FHA
CR 03-0966, Temp Mod did not sufficiently evaluate potential impact on fire protection
CR 03-0978, Transformers' oil not being sampled and tested in accordance with vendor manual
CR 03-0986, Discrepancies between SSA and EEL, determined that EEL was in error
CR 03-1010, Discrepancy between UFSAR and procedure regarding cold shutdown repairs

Work Orders/Job Tasks

WO 3201713801, T.S. 044A S/G 2A Level Loop Calibration, dated 1/7/03
WO 3100661301, T.S. 044A S/G 2A Level Loop Calibration, dated 8/8/01

WO 3101259101, T.S. 044B S/G 2B Level Loop Calibration, dated 11/03/01
WO 3181734101, T.S. F-2212 Charging Pump Flow Calibration, dated 4/24/02
WO 3101222101, T.S. Charging Pump Discharge P-2212 Calibration, dated 9/7/01
WO 3201736501, T.S. Pressurizer Level (P1107/1108/1116) Calibration, dated 11/10/03
WO 3100693301, T.S. Pressurizer Level (P1107/1108/1116) Calibration, dated 7/12/01
WO 3261652901, T.S. Pressurizer & Quench Tank Level (L1103/4/5/1116) Calibration, dated 1/10/03
WO 3100682601, T.S. Pressurizer & Quench Tank Level (L1103/4/5/11) Calibration, dated 7/11/01

Technical Manuals/Vendor Information

Dow Corning 561 Silicone Transformer Liquid, Material Safety Data Sheet 01496247, 1/27/97
Dow Corning 561 Silicone Transformer Fluid Technical Manual,10-453-97, 1997
Data Sheet Issue C Duraspeed, Automatic Sprinklers, Grinnell Sprinkler Corporation
Data Sheet Model F950, Upright and Pendent Sprinklers, Grinnell Sprinkler Corporation
Data Sheet Model L-205-EB, Industrial Electrical Non-Shock Fog Nozzles, Elkhart Brass Manufacturing Co. Inc.
IB-PD-1001, Gould Inc. I-T-E Unit Substation Transformers Instruction Manual
S2000, Protecto-wire Fire Systems Fire System 2000 Fire Alarm Control Panel, Rev. 1998
Sheet 5-4/14-8, Factory Mutual Research Approval Guide-Transformer Fluids

Miscellaneous

0711206, Reactor Operator Lesson Pressurizer Pressure and Level Control, Rev.12
1/M-CE 917 Foxboro Specification 200 Control System Manual # 79N-36291, dated 8/20/98
Consumer Product Safety Commission (CPSC) Recall Alert, Invensys Building Systems Recall of Siebe Actuators in Building Fire/Smoke Dampers, dated October 2, 2002
Ebasco Specification - Electric Cables, Project 10 # FLO 298.292, dated 10/28/77
IPEEE Submittal for St. Lucie Units 1 and 2, Rev. 0, dated December 15, 1994
Fire Brigade Drill Training Reports for operating shifts, August 2001- February 2003
Letter from Ebasco to Florida Power and Light, on the subject of UL Qualification Test for Pullman Industries Internal Expansion Damper Assembly, dated April 16, 1986
NRC Supplemental Safety Evaluation Report SSER 3, for St. Unit 2
PC/M 174-295M, Reroute of Cable 21702C, Rev. 1
Pre-fire Strategy No. 4, A Switchgear Room, Fire Area A, Rev. 23
Pre-fire Strategy No. 6, Cable Spread Room, Fire Area B, Rev. 23
Pre-fire Strategy No. 7, B Switchgear Room, Fire Area C, Rev. 23
Pre-fire Strategy No. 8, Electrical Equipment Supply Fan Room, Fire Area C, Rev. 23
Pre-fire Strategy No. 25, Personnel Monitoring Area & Health Physics Area, Fire Area I, Rev. 23
Pre-fire Strategy No. 26, Electrical Penetration Room B, Fire Area I, Rev. 23
Pre-fire Strategy No. 57, Turbine Building, Fire Area QQ, Rev. 23
Technical Specifications, St. Lucie Unit 2, LCO 3.3.3.5
Technical Specifications, St. Lucie Unit 2, SR 4.3.3.5.1 / 4.3.3.5.2
UFSAR Section 8, Electrical Power
UFSAR Appendix 9.5A, Fire Protection Program Report

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Underwriters Laboratories, Report File R4708, Fire Test of 3HR Curtain Type Fire Damper Utilizing an Alternate Method of Installation, Air Balance, Inc., dated December 5, 1984

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