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Building 130

April 27, 2003

Mr. McKenzie Thomas  
U.S. Nuclear Regulatory Commission  
Region II  
61 Forsyth Street SW  
Suite 23T85  
Atlanta, GA 30303-8931

Reference: Triennial Fire Protection Baseline Inspection, St. Lucie, Unit 2  
Inspection Report No. 50-389/2003-02

Dear Mr. Thomas:

The enclosed technical letter report (TLR) describes the results of my activities during the Baseline Tri-Annual Fire Protection Regional Inspection performed at the St. Lucie Nuclear Plant. My evaluation focused on a review of the post-fire safe shutdown capability of Unit 2, as documented in its current safe shutdown procedures and supporting analyses. The inspection effort focused on three fire areas that were determined to have fire-risk significance, based on review of the licensee's IPEEE submittal and fire protection program documentation. Those three fire areas were the "B" Switchgear Room and Electrical HVAC Supply Fan Room (Fire Area C); the Cable Loft Area and "B" Electrical Penetration Room (Fire Area I); and the Cable Spreading Room (Fire Area B), which is an alternate shutdown area. None of these fire areas were common with Unit 1.

The only issues found during the onsite inspection were weaknesses in the licensee's safe shutdown procedures. Two examples identified were: (1) performing manual actions in the procedures for IIIG.2 fire areas without an approved deviation request; and (2) using a wrench for MSIV closure to achieve hot shutdown, which is considered a repair. The licensee issued corrective actions for both these items prior to completion of the onsite inspection.

Please do not hesitate to contact me at 631-344-2820 if you have any additional questions.

Sincerely,

Richard E. Deem,  
Nuclear Energy & Infrastructure System Division  
Energy Sciences & Technology Department

cc: J. Higgins  
D. Norkin, NRC  
D. Diamond  
K. Sullivan

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**BROOKHAVEN NATIONAL LABORATORY**  
Energy Sciences & Technology Department

Report Input to U.S. Nuclear Regulatory Commission  
Region II

Fire Protection Baseline Inspection  
of  
St. Lucie Nuclear Plant Unit 2

DPR 50 - 389

(Inspection No.2003 - 02)

(JCN: J-2843 Task Order 12)

Licensee: Florida Power & Light

Facility: St. Lucie Nuclear Plant, Unit 2

Inspection Conducted: March 3<sup>rd</sup> - 10<sup>th</sup>, and 24<sup>th</sup> - 28<sup>th</sup>, 2003

NRC Inspectors: M. Thomas Region II (Team Leader)  
G. Wiseman Region II  
S. Walker Region II  
F. Jape Region II  
R. Rodriguez Region II

BNL Technical Specialist:

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R. Deem Date  
(Mechanical Systems)

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

### a. Inspection Scope

The licensee's Safe Shutdown Analysis (SSA) was reviewed to determine the identified components and systems necessary to achieve and maintain safe shutdown conditions. The objective of this evaluation was to assure the safe shutdown equipment and post-fire safe shutdown analytical approach were consistent and satisfied the Appendix R reactor performance criteria for safe shutdown. The effort focused on three fire areas determined to have fire-risk significance, based on review of the licensee's IPEEE, fire protection documentation, and the plant walkdowns conducted during the onsite inspection. Those three fire areas were: (1) the Cable Spreading Room (Fire Area B), which is an alternate shutdown area; (2) the "B" Switchgear Room, which contains the Unit 2 hot shutdown panel, and the Electrical HVAC Supply Fan Room (Fire Area C); and (3) the Cable Loft Area and "B" Electrical Penetration Room (Fire Area I). None of these Fire Areas are common with Unit 1.

### b. Issues and Findings

The licensee's SSA was based on assuring that a minimum set of safe shutdown systems and equipment was available for a fire in any given fire area. Two paths for safe shutdown of the plant were developed. Each path identified the required systems for satisfying the Appendix R performance goals of reactor shutdown, over-pressure protection, maintenance of both reactor coolant and steam generator inventory, and decay heat removal. The reactor shutdown function is provided by the reactor protection system (RPS), supplemented with boron addition to the reactor coolant system, initially using gravity feed from the Boron Addition Tanks (BAMT), and then the Water Storage Tank (WST) during cooldown to cold shutdown. Reactor coolant system inventory control utilizes the charging pumps, with flowpath alignment being through the normal makeup flow path. A minimum of one PORV and the pressurizer safety relief valves provide over pressure protection, while one steam generator and one train of Shutdown Cooling (SDC) provide the decay heat removal function. Decay heat transport to the ultimate heat sink is provided by one motor driven Auxiliary Feedwater (AFW) train and the Atmospheric Dump Valves (ADVs). Operability of these systems requires support from auxiliary systems, such as emergency onsite AC and DC power, Intake Cooling Water (ICW), Component Cooling Water (CCW), HVAC in selected areas of the plant, and instrumentation to properly monitor the safe shutdown operation.

In reviewing the safe shutdown equipment list, it was noted that manual valves operated during the safe shutdown process were not on the list. There was concern that not having them on the list would decrease their safety significance from a maintenance and operability standpoint. The licensee stated it was their position not to place manual valves on the safe shutdown equipment list. The inspection team verified that all the manual valves in question were on the plant preventative maintenance list for periodic inspection and exercising. The team also verified that equipment requiring locking devices had consistency between the plant P&IDs, and operational configuration of the safe shutdown equipment.

The charging system is vital for supplying RCS makeup and providing required boration for reactivity control. For implementation of safe shutdown for the "B" switchgear room, there was concern that valve V2501, the VCT outlet valve, could spuriously close due to fire damage to the cables, which could cause running charging pumps to "dead head" due to lack of Net Positive Suction Head (NPSH), possibly damaging the pumps. The inspection team was concerned about operability of the charging pumps and asked the licensee about this situation. As a result, the licensee changed the timing of when manual control of this valve was taken. This change ensured manual control would be taken before such a failure could damage the pumps due to insufficient NPSH.

The HVAC for the plant was also reviewed for equipment cooling adequacy and smoke control. A calculation for temperatures in the "B" switchgear room was reviewed and showed that the maximum temperature in that room would not occur prior to 24 hours, assuming the HVAC system was unavailable for the first three hours of the fire transient. This was judged acceptable. During a walkdown, the inspection team noticed a temporary modification that placed two exhaust fans on the fire damper between the cable spreading room and the "B" switchgear room. The inspection team was concerned that a substantial volume of smoke from a cable spreading room fire could impact the performance of required manual actions in the "B" switchgear room. When asked about this the licensee stated that an engineering analysis to determine the modification's impact on fire risk was performed. Review of the analysis demonstrated that the volume of smoke transported into the "B" switchgear room was minimal, due to the flow rate of the two fans, the location of an exhaust fan register just above the fire damper in the "B" switchgear room with a direct path to the outside. The risk significance of this temporary modification was judged minor.

c. Conclusions

PSL-ENG-SEMS-97-070, Rev.0, page 5 of 23, Section A.2 states that all plant modifications will be reviewed to assure compliance with fire protection requirements. By not performing the necessary fire protection review of this temporary modification for potential smoke migration impact on safe shutdown, the licensee did not adhere to its own program review requirements. As a result, the licensee issued CR-03-0966 to ensure there were no missing or conflicting requirements in the engineering review process.

4. **Alternative Post-Fire Safe Shutdown Capability**

a. Inspection Scope

The cable spreading room, which is one of the two alternate shutdown fire areas listed in the St. Lucie SSA for Unit 2, was selected for detailed inspection of post-fire safe shutdown 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 main control room to the alternate shutdown panel and other equipment isolation locations could be accomplished within the performance goals stated in Appendix R Section III.L3.

b. Issues and Findings

The inspection team verified that adequate isolation capability of equipment used for safe shutdown implementation was in place, accessible, and that the hot shutdown control panel was capable of controlling all the required equipment necessary bring the unit to a safe shutdown condition. The team also verified that the shutdown process met the performance goals of Appendix R Section III.L.3 and guidance in GL86-10, by comparing it to the thermal hydraulic timeline analysis provided by the licensee.

One issue that involved the timing of when the MSIVs were closed in the procedure was brought to the attention of the licensee. The team questioned whether the instruction to close the MSIVs was later in the procedure than it should be. This extended time could possibly result in overcooling of the RCS, and resultant shrinkage of the coolant could bring the pressurizer level off-scale low. The licensee performed a RETRAN analysis for a stuck open MSIV, which demonstrated that pressurizer level would remain on-scale for this situation, which is an Appendix R performance requirement.

c. Conclusions

There were no items of non-compliance found in this area.

5. **Operational Implementation of Post-Fire Safe Shutdown Capability**

a. Inspection Scope

The team performed a review of 2-ONP-100.02, Rev.13B, the licensee's operating procedure for alternate safe shutdown, and 2-ONP-100.01, Rev.9, the licensee's operating procedure for post-fire safe shutdown from the main control room. The review focused on ensuring that all required functions for post-fire safe shutdown and the corresponding equipment necessary to perform those functions were included in the procedures. The review also examined the consistency between the operations shutdown procedures and other procedure driven activities associated with post-fire safe shutdown (ie. fire fighting activities).

b. Issues and Findings

Appendix R III.G specifies the need to identify equipment to achieve and maintain safe shutdown functions, and the protection requirements for that equipment. It also states that one train of safe shutdown equipment should remain free of fire damage for non-

alternate shutdown (IIIG.2) designated fire areas. Two of the three fire areas inspected were so designated. In these areas, operator actions are being used to mitigate spurious operations that could undermine safe shutdown implementation. Determination of the licensing basis and required NRC exemption to use manual operations in lieu of protection for one shutdown train was addressed by another inspection team member. The inspection team was also concerned whether all potential spurious operations were properly accounted for in the shutdown procedures. Subsequent review of the licensee's procedures for these areas did demonstrate that manual actions required to mitigate spurious signals on both units were properly dispositioned.

In Appendix B of the alternate safe shutdown procedure, it was noted that a wrench was being used to bleed air from the control valves of the MSIVs to ensure their closure. Since this instruction is being done to achieve hot shutdown, it constitutes a hot shutdown repair. The licensee was appraised of this and issued CR 03-0847, to install manual valves that would preclude the use of a hand tool. The licensee committed to have this modification installed prior to the restart from refueling outage SL2-14 scheduled to begin in April, 2003.

c. Conclusions

A manual action other than pulling a fuse is considered a repair. Therefore, use of a wrench or any other hand tool is considered a repair. 10CFR50 Appendix R II.G.2 states that for safe shutdown from the control room, one train of safe shutdown equipment must be free of fire damage, to achieve hot shutdown. Repairs are allowed under Appendix R to achieve cold shutdown. Since closure of the MSIVs for a fire in the "B" switchgear room involves safe shutdown from the control room and closure of the MSIVs is required to achieve hot shutdown, the use of a tool does not meet 10CFR50 Appendix R II.G.2 requirements.

6. **Communications**

a. Inspection Scope

The inspection team verified whether communication requirements were properly evaluated in the licensee's SSA and properly integrated into the Appendix R safe shutdown procedures.

b. Issues and Findings

The licensee has committed to maintain a voice-powered communications system throughout the plant to meet Appendix A of Branch Technical Position APSCB 9.5-1 (BTP 9.5-1), which requires fixed emergency communications to be available. During a plant walkdown it was noticed that the power supplies for both the Gaitronics and

radio communications systems were both located in the "B" switchgear room. This leaves only the sound powered phone system available for in-plant communications. The licensee was asked if this was sufficient to implement safe shutdown, maintain in-plant security communications, and support the fire brigade. Review of the licensee response showed that there were a sufficient number of communications channels to adequately support the safe shutdown process.

c. Conclusions

There were no items of non-compliance found in this area.

**7. Emergency Lighting**

a. Inspection Scope

Section III.J of 10CFR50 Appendix R requires eight hour emergency lighting coverage in any area where manual operator actions are required during post-fire safe shutdown operations, including the ingress and egress routes. The inspection team verified that emergency lighting requirements were evaluated in the licensee's SSA and properly integrated into the Appendix R safe shutdown procedures.

b. Issues and Findings

No outstanding issues or non-compliances were found in this area of the inspection.

c. Conclusions

The inspection team found that the emergency lighting throughout the unit provided sufficient illumination to adequately implement safe shutdown.

**8 Cold Shutdown Repairs**

a. Inspection Scope

Any repairs necessary to achieve cold shutdown must be accomplished in 72 hours. All equipment required to implement those repairs must be available onsite.

b. Issues and Findings

The licensee's SSA states that no repairs were necessary to achieve cold shutdown. In reviewing the shutdown procedure for the "B" switchgear room, the inspection team noted that fuses were being replaced to energize the pressurizer low range pressure indicators. Replacement of fuses is considered a repair. Although performing this action is allowed under Appendix R and there were no timing or other technical issues associated with performing this repair, having to perform it was in disagreement with the licensing basis documentation.

c. Conclusions

The licensee was appraised of this situation, and agreed to remove this inconsistency from the documentation.

**List of Persons Contacted During the Inspection**

P. Barnes	Fire Protection Engineering Supervisor	FPL
R. McDaniel	Fire Protection Supervisor	FPL
V. Rubano	Engineering Design Manager	FPL
J. Hoffman	Plant Engineering Manager	FPL
R. Lamb	Operations	FPL
D. Albritton	Operations	FPL
K. Frehafer	Licensing Engineer	FPL

**List of Documents and Drawings Reviewed during Inspection**

2998-B-048, "Safe Shutdown Analysis Fire Area report".  
2998-B-049, "Essential Equipment List", Rev.6, dated 02/14/02.  
Procedure 2-ONP-100.02, "Control Room Inaccessibility", Rev.13B, dated 10/29/02.  
Procedure 2-ONP-100.01, "Response to Fire", Rev.9, dated 12/28/01.  
PSL-1FJM-91-001, "PSL-1 RAB Electrical Equipment Rooms HVAC Computer model Data Inputs and Outputs", Rev.1, dated 10/5/92.

St. Lucie, Unit 2 Flow Diagrams:

2998-G-078, SH 121A,121B,122, "Chemical and Volume Control System," Rev. 16.  
2998-G-879, SH 1&2, "HVAC Flow and Control Diagrams," dated 10/20/89.  
2998-G-079, SH 1, 2 & 7, "Main Steam System," Rev. 20.  
2998-G-080, SH 2A & 2B, "Feedwater and Condensate System," Rev. 25.  
2998-G-082, SH 1 & 2, "Circulating and Intake Cooling Water System," Rev. 37.  
2998-G-083, SH 1 & 2, "Component Cooling Water System," Rev. 28.  
2998-G-078, SH 107, 108, 109, 110, "Reactor Coolant System," Rev. 1.  
2998-G-078, SH 130A, 130B, 131, 132, "Safety Injection System," Rev. 12.  
2998-G-088, SH 1, "Containment Spray and Refueling Water System," Rev. 35.