

NOTICE OF VIOLATION

Florida Power & Light Company
St. Lucie Nuclear Plant

Docket No. 50-335
License No. DPR-67
EA 98-513

During an NRC inspection conducted on October 10-23 and November 2-6, 1998, a violation of NRC requirements was identified. In accordance with the "General Statement of Policy and Procedures for NRC Enforcement Actions," NUREG-1600, the violation is listed below:

Operating License DPR-67 (Unit 1) Condition 2.C (3) specifies that the licensee implement and maintain in effect all provisions of the approved fire protection program as described in the Updated Final Safety Analysis Report (UFSAR) for the facilities and as approved by various NRC Safety Evaluation Reports. Unit 1, which was licensed to operate prior to January 1, 1979, is required by 10 CFR 50.48(b) to meet the requirements of Sections III.L of Appendix R to 10 CFR Part 50.

Section III.L.3 of Appendix R to 10 CFR Part 50 requires that the alternative shutdown capability be independent of the specific fire areas(s) and shall accommodate post-fire conditions where offsite power is available and where offsite power is not available for 72 hours. Procedures shall be in effect to implement this capability.

Procedure 1-ONOP-100.02, "Control Room Inaccessibility," Revision 1, is the procedure that implemented the licensee's alternative shutdown capability.

Contrary to the above, as of April 3, 1998, Procedure 1-ONOP-100.02 was inadequate to implement the alternative shutdown capability. Specifically, the procedure failed to provide adequate guidance to ensure that heating, ventilation and air conditioning equipment to the 1B Electrical Equipment Room and the Hot Shutdown Control Panel Room would be properly operated in the event of a fire in the Control Room or in the Cable Spreading Room. (01013)

This is a Severity Level III violation (Supplement I).

The NRC has concluded that information regarding the reasons for the violation, the corrective actions taken and planned to correct the violation and prevent recurrence, and the date when full compliance was achieved has been adequately addressed on the docket as discussed in the letter transmitting this Notice of Violation (Notice), and in Inspection Report Nos. 50-335/98-14, 50-389/98-14. However, you are required to submit a written statement or explanation pursuant to 10 CFR 2.201 if the description therein does not accurately reflect your corrective actions or your position. In that case, or if you choose to respond, submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555-0001 with a copy to the Regional Administrator, Region II, U.S. Nuclear Regulatory Commission, Atlanta Federal Center, 23T85, 61 Forsyth Street S.W., Atlanta, Georgia, 30303-3415 and a copy to the NRC Resident Inspector at the St. Lucie facility, within 30 days of the date of the letter transmitting this Notice.

Enclosure 1

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If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

If you chose to respond, your response will be placed in the NRC Public Document Room (PDR). Therefore, to the extent possible, the response should not include any personal privacy, proprietary, or safeguards information so that it can be placed in the PDR without redaction.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days after receipt.

Dated this 31 day of March 1999



LIST OF ATTENDEES

Nuclear Regulatory Commission

L. Reyes, Regional Administrator
V. McCree, Deputy Director, Division of Reactor Safety (DRS)
C. Casto, Deputy Director, Division of Reactor Projects (DRP)
A. Boland, Enforcement Officer, Enforcement and Investigations Coordination Staff (EICS)
S. Sparks, Senior Enforcement Specialist, EICS
C. Evans, Regional Counsel
L. Wert, Branch Chief, DRP
G. Belisle, Maintenance Branch Chief, DRS
T. Morrissey, Project Engineer, DRP
W. Rogers, Senior Reactor Analyst, DRS
M. Parker, Senior Reactor Analyst, Region III
W. Gleaves, Project Manager, Office of Nuclear Reactor Regulation (NRR) (video conference)
P. Madden, Fire Protection Engineering Section, Plant Systems Branch, NRR
T. Reis, Senior Enforcement Coordinator, Office of Enforcement (video conference)
S. West, Chief, Fire Protection Engineering Section, Plant Systems Branch, NRR (video conference)
S. Newberry, Deputy Director, Division of Systems Safety and Analysis, NRR (video conference)
K. Clark, Office of Public Affairs
M. Tschiltz, Regional Coordinator, Office of the Executive Director for Operations (video conference)

Florida Power and Light Company

T. Plunkett, President, Nuclear Division
A. Stall, Vice President, St. Lucie
R. Kundalkar, Vice President, Nuclear Engineering
C. Guey, Supervisor, Reliability and Risk Assessment
V. Rubano, Safe Shutdown Analysis Review Team Leader
J. Hoffman, Fire Protection Project Engineer
E. Weinkam, Licensing Manager, St. Lucie
C. Fisher, Fire Protection
M. Ross, Attorney

**OPEN PREDECISIONAL ENFORCEMENT CONFERENCE AGENDA
ST. LUCIE NUCLEAR STATION**

**JANUARY 7, 1999, 1:00 P.M.
NRC REGION II OFFICE, ATLANTA, GEORGIA**

- I. **OPENING REMARKS AND INTRODUCTIONS**
L. Reyes, Regional Administrator

- II. **SUMMARY OF THE ISSUES**
L. Reyes, Regional Administrator

- III. **NRC ENFORCEMENT POLICY**
A. Boland, Director
Enforcement and Investigations Coordination Staff

- IV. **STATEMENTS OF CONCERNS / APPARENT VIOLATIONS**
V. McCree, Deputy Director
Division of Reactor Safety

- V. **LICENSEE PRESENTATION**

- VI. **BREAK / NRC CAUCUS**

- VII. **NRC FOLLOWUP QUESTIONS**

- VIII. **CLOSING REMARKS**
L. Reyes, Regional Administrator

ISSUES TO BE DISCUSSED

- A. 10 CFR 50.48 requires that all operating nuclear power plants have a fire protection plan that satisfies Criterion 3 of Appendix A to 10 CFR Part 50.

Operating License DPR -67 (Unit 1) Condition 2.C (3) specifies that the licensee implement and maintain in effect all provisions of the approved fire protection program as described in the UFSAR for the facilities and as approved by various NRC SERs. Unit 1, which was licensed to operate prior to January 1, 1979, is required by 10 CFR 50.48(b) to meet the requirements of Section III.L of Appendix R to 10 CFR Part 50.

Sections III.L.2.e and III.L.3 of Appendix R to 10 CFR Part 50, require that supporting functions shall be capable of providing the process cooling necessary to permit the operation of the equipment used for safe-shutdown functions, and that alternative shutdown capability shall accommodate postfire conditions where off-site power is or is not available for 72 hours.

Support functions were not capable of providing the process cooling necessary to permit the operation of the equipment used for safe-shutdown functions, under certain predicted conditions. Specifically, for fires in the control room or in the cable spreading room, the normal HVAC could be lost due to a loss of offsite power (LOOP). This would result in a loss of HVAC to the Electrical Equipment Room 1B and the hot shutdown control panel room, which, in turn would cause heat and smoke from a cable spreading room fire to affect the habitability of the hot shutdown control panel (HSCP) room such that operation of the equipment from the HSCP room would be precluded.

Note: The apparent violations discussed in this PREDECISIONAL enforcement conference are subject to further review and are subject to change prior to any resulting enforcement action.



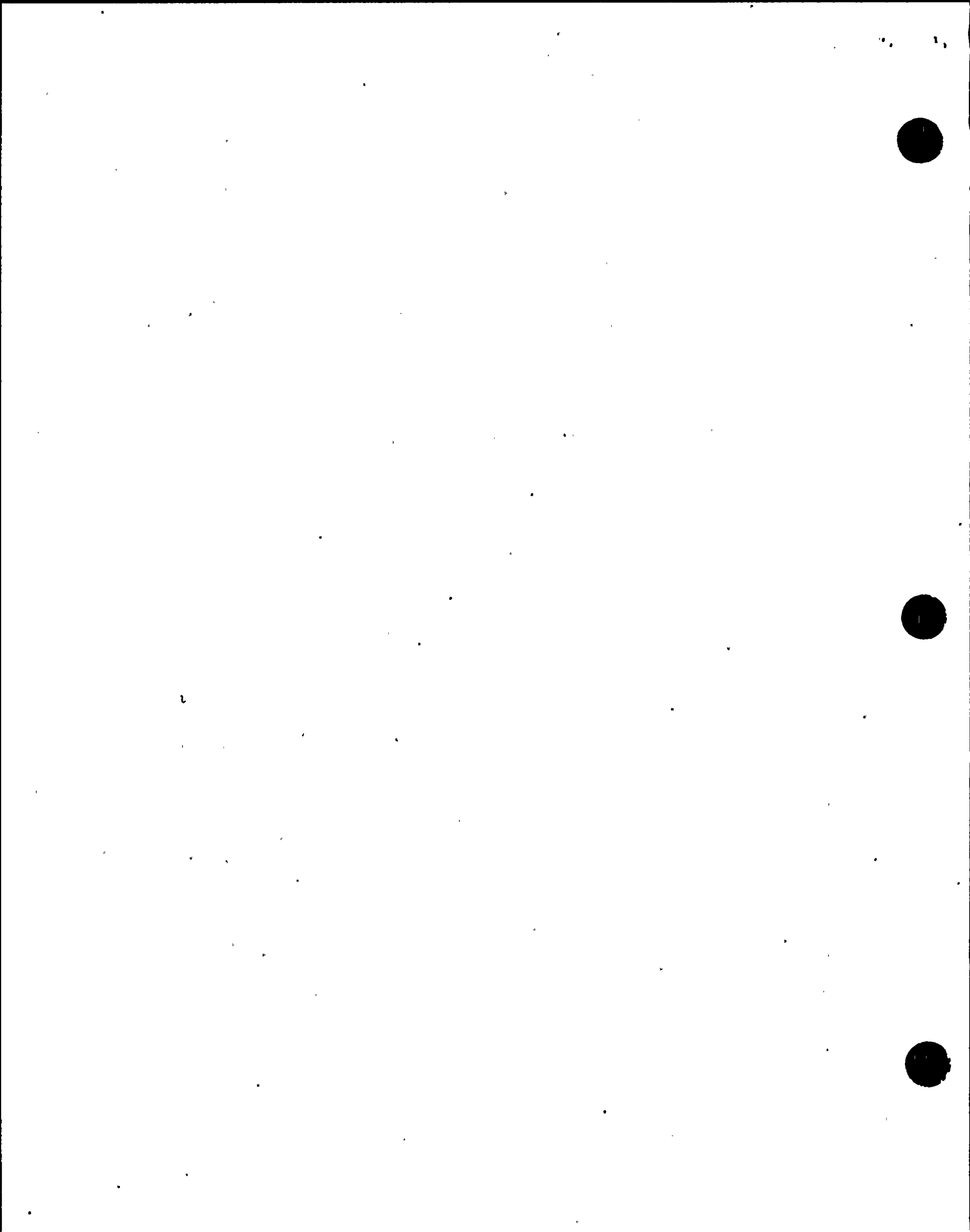
- B. 10 CFR 50.48 requires that all operating nuclear power plants have a fire protection plan that satisfies Criterion 3 of Appendix A to 10 CFR Part 50.

Operating License DPR-67 (Unit 1) Condition 2.C (3) specifies that the licensee implement and maintain in effect all provisions of the approved fire protection program as described in the UFSAR.

The UFSAR, Volume 9.5, Section 4N, Exemption N1 states that conduits carrying cables for charging pump (CP) 1A in Fire Zone 38 will be provided with a minimum 1-hour rated protection.

The 1-hour rated fire protection for CP 1A was not installed as described in the UFSAR.

Note: The apparent violations discussed in this PREDECISIONAL enforcement conference are subject to further review and are subject to change prior to any resulting enforcement action.



- C. 10 CFR 50.48 requires that all operating nuclear power plants have a fire protection plan that satisfies Criterion 3 of Appendix A to 10 CFR Part 50.

Operating License DPR -67 (Unit 1) Condition 2.C (3) specifies that the licensee implement and maintain in effect all provisions of the approved fire protection program as described in the UFSAR.

Section III.G.1 of Appendix R to 10 CFR Part 50 requires that fire protection features limit fire damage so that one train of system necessary to achieve hot or cold-shutdown are free from fire damage, or can be repaired.

Off-normal Operating Procedure 1-ONOP-100.01, "Response to Fire" identified the use of Train A equipment including the 1A low pressure safety injection (LPSI) pump, to maintain safe-shutdown conditions in the event of a fire in Fire Area J.

Fire Area J contained unprotected cables associated with Train A of shutdown cooling equipment, including the 1A LPSI pump. Since this pump was required for safe shutdown of the plant in the event of a fire, the licensee did not meet the requirements of the fire protection program, UFSAR, or Appendix R.

Note: The apparent violations discussed in this PREDECISIONAL enforcement conference are subject to further review and are subject to change prior to any resulting enforcement action.

- D. 10 CFR 50.48 requires that all operating nuclear power plants have a fire protection plan that satisfies Criterion 3 of Appendix A to 10 CFR Part 50.

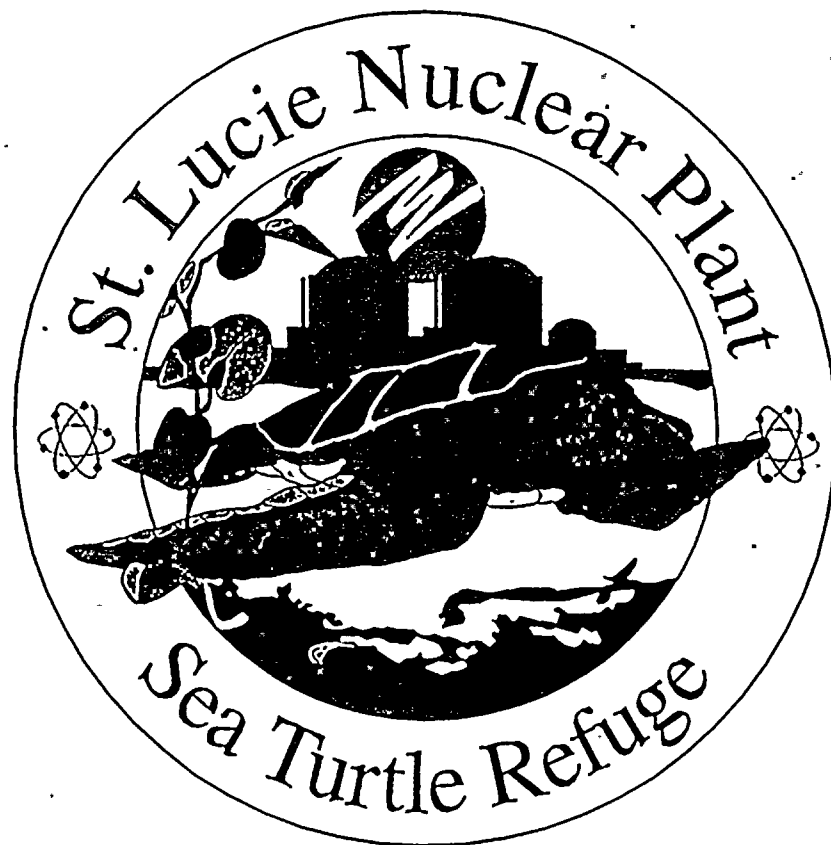
Unit 1 which was licensed to operate prior to January 1, 1979, is required by 10 CFR 50.48(b) to meet the requirements of Sections III.G, III.L, III.J, and III.O.

10 CFR 50, Appendix R, Section III.G.1.a requires that one train of systems necessary to achieve and maintain hot shutdown conditions from either the control room or the emergency control station(s) is free of fire damage.

In 10 CFR Part 50, Appendix R, Section III.L.7 requires that the safe shutdown equipment and systems for each fire area shall be known to be isolated from associated non-safety circuits in the fire area so that hot shorts, open circuits or shorts to ground in the associated circuits will not prevent operation of the safe shutdown equipment.

The requirements of Appendix R, Sections III.G.1.a and III.L.7 were not being met as evidenced by the following specific deficiencies: (1) an analysis methodology, which assumed only one spurious operation to occur as a result of fire in any area without any further consideration of the number, type, or specific location of potentially affected cables and circuits; (2) potential for fire to cause a breach of pressurizer power operated relief valve (PORV) and reactor coolant system gas vent system (RCSGV) high/low pressure interface boundaries; and, (3) inadequate evaluation of the potential for fire to cause damage to motor operated valves (MOVs) relied on to accomplish post-fire safe-shutdown functions.

Note: The apparent violations discussed in this PREDECISIONAL enforcement conference are subject to further review and are subject to change prior to any resulting enforcement action.



NRC Inspection Report Nos. 50-335, 389/98-14
Pre-Decisional Enforcement Conference
January 7, 1999
Atlanta, Ga.



Agenda

Introduction

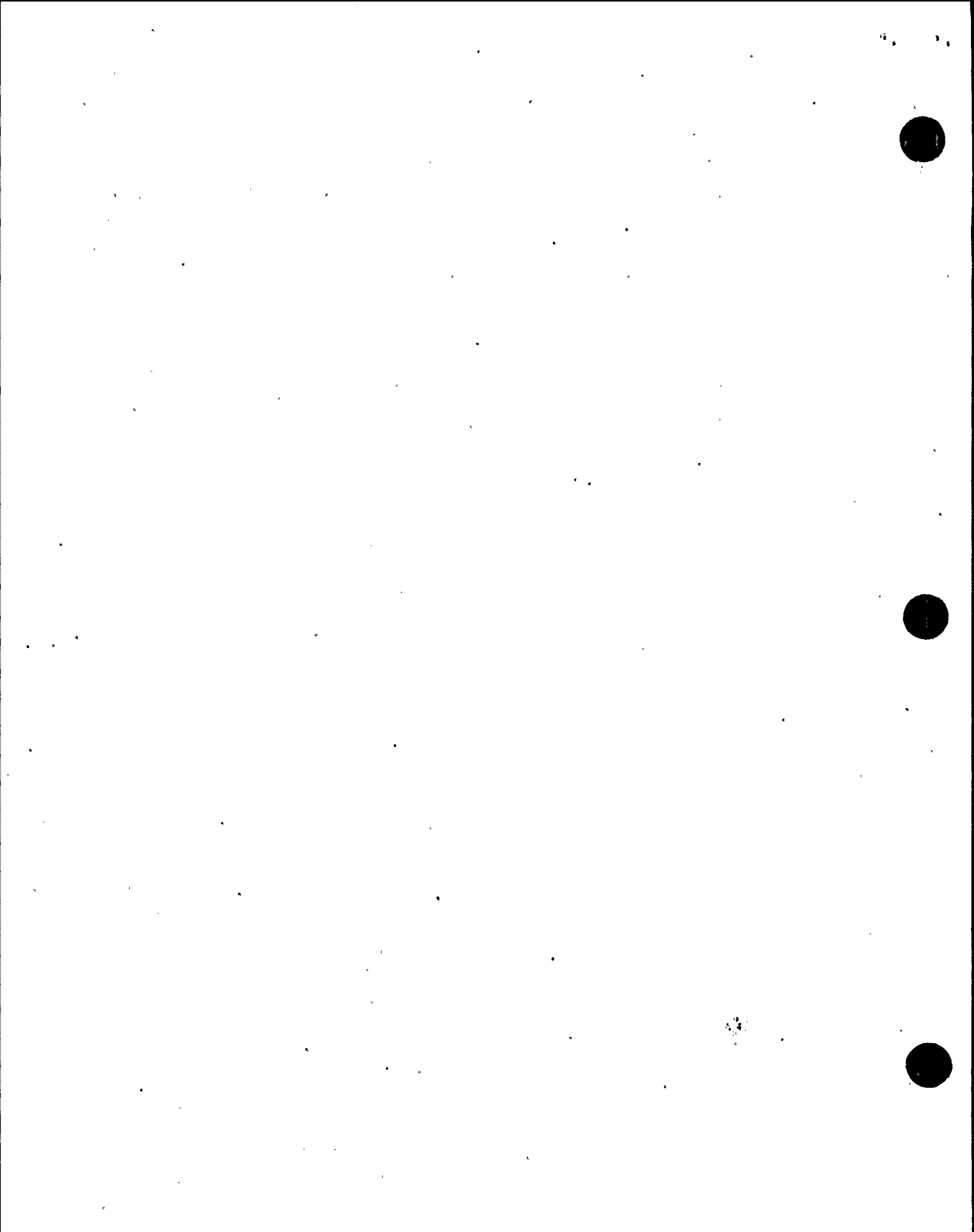
- R. S. Kundalkar, Vice President, Nuclear Engineering

Discussion

- J. R. Hoffman, Fire Protection Project Engineer, St. Lucie Plant

Concluding Remarks

- J. A. Stall, Vice President, St. Lucie Plant





Introduction

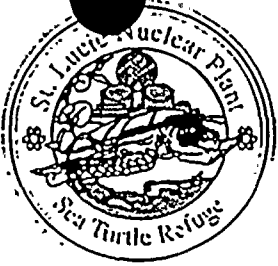
Background

- St. Lucie Pilot FPI Performed March/April, 1998
- FPI Inspection Report Issued July 9, 1998
- FPL Provided Corrective Action Status on August 4, 1998
- NRC Follow-Up Inspections October 19 and November 2, 1998
- NRC Inspection Report 98-14 Issued December 4, 1998

Reason for Visit

- Update Status of Completed or In-Progress Corrective Actions
- Confirm NRC's Understanding of Two Level IV Violations
- Provide FPL's Assessment on Four Apparent Violations

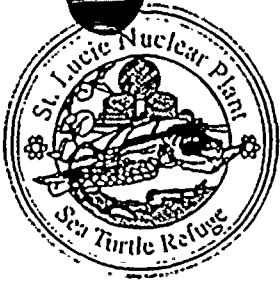




Corrective Action Status

1998 Fire Protection Activities Completed

- Comprehensive Self Assessment Performed (> 20,000 MHrs)
- Established Compensatory Measures
- Completed Safe Shutdown Analysis (SSA) Validation
- Revised Unit 1 and 2 Fire Response Procedures
- Implemented SSA Circuit Modifications
- Completed Unit 1 Non-Outage Thermo-Lag Corrective Actions

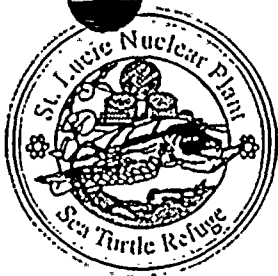


Corrective Action Status

Planned Major Corrective Actions

- Complete Outage Related Unit 1 Thermo-Lag Modification
- Implement Remaining SSA Circuit Modifications
- Required Hose Station Modifications
- Required Emergency Lighting Modifications
- Perform Penetration Seal Repairs





Level IV Violations

Violation A - Failure to Follow Combustible Controls Program

Violation B - Fire Fighting Strategies Did Not Address HVAC for Equipment Cooling or Include Detailed Smoke Removal Instructions

- **Corrective Action Summary Provided on August 4, 1998**
- **FPL Agrees That Corrective Actions Properly Characterized in Inspection Report Nos. 50-335, 389/98-14**



Apparent Violations

Four Apparent Violations Identified

1. Hot Shutdown Control Panel (HSCP) Habitability Could Not Be Demonstrated for Compliance With Appendix R
2. Charging Pump 1A Fire Barriers Not in Compliance With Original Appendix R Exemption
3. Incorrect Protected Safe Shutdown Method Specified for Fire Area J
4. Fire Induced Spurious Operation Analysis and Protection Methods Do Not Satisfy Appendix R Requirements
 - Three Issues





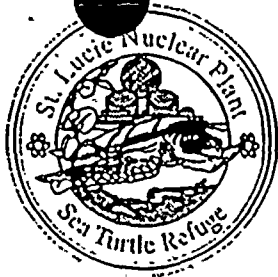
Summary

Majority of the Fire Protection Deficiencies Identified by FPL Self Assessment Activities

Safe Shutdown Analysis Deficiencies Associated with Apparent Violations Have Low or No Safety Significance

FPL Corrective Action Plan Continues to Resolve Fire Protection Deficiencies in a Timely Manner

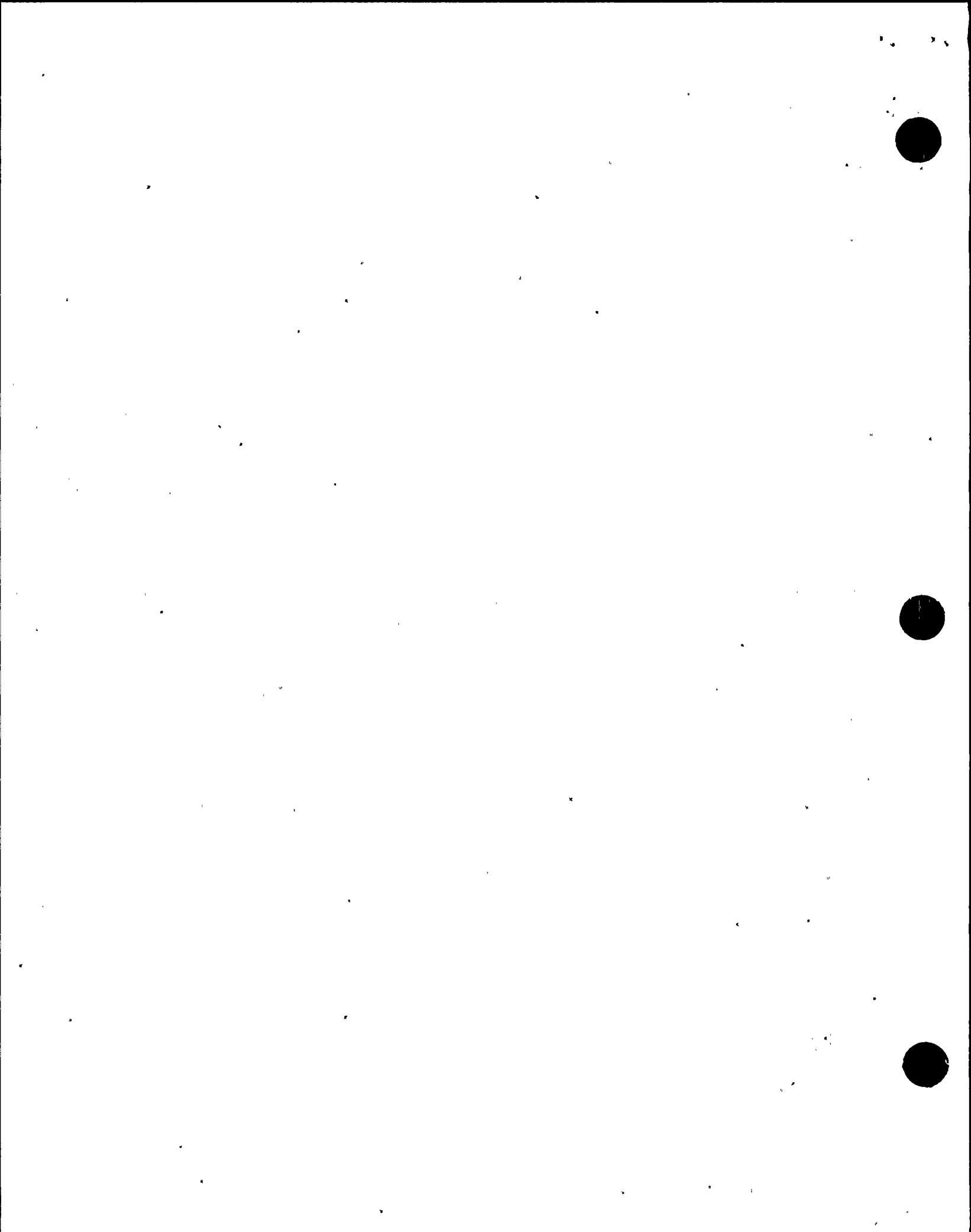
Fire Safety at St. Lucie Continues to Be Maintained



Apparent Violations

Four Apparent Violations Identified

1. HSCP Habitability Could Not Be Demonstrated for Compliance With Appendix R
2. Charging Pump 1A Fire Barriers Not in Compliance With Original Appendix R Exemption
3. Incorrect Protected Safe Shutdown Method Specified for Fire Area J
4. Fire Induced Spurious Operation Analysis and Protection Methods Do Not Satisfy Appendix R Requirements
 - Three Issues



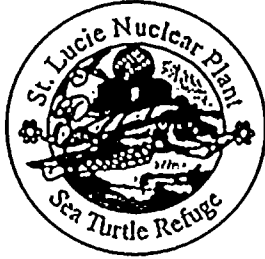


Apparent Violation 1

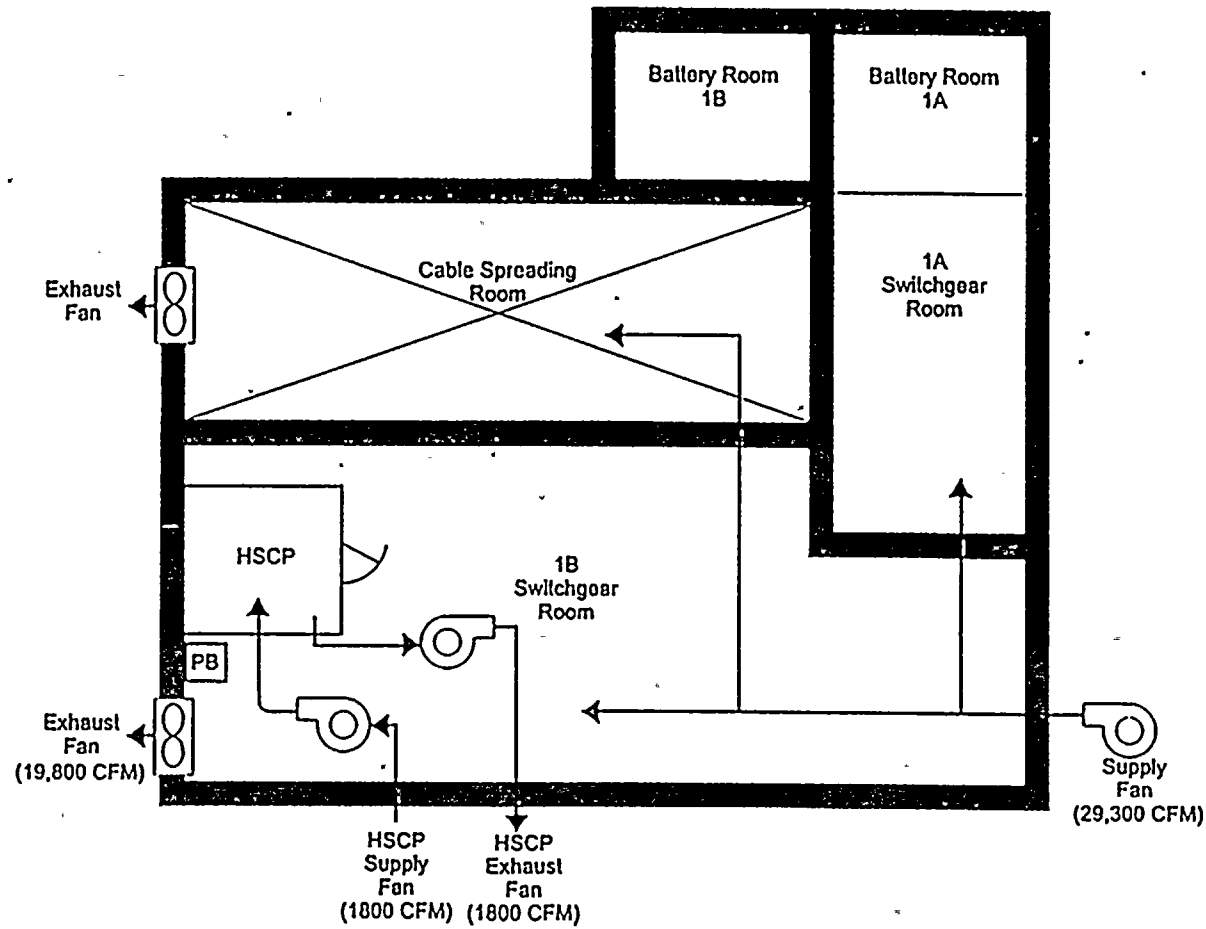
Issue - Original Unit 1 SSA and Alternate Shutdown Procedure Did Not Adequately Address HSCP Habitability

- **Cause - Original SSA Deficiency**
- **Corrective Actions**
 - ◆ **Immediately Revised Alternate Shutdown Procedure to Include HVAC Manual Actions**
 - ◆ **Added HSCP Fans to Essential Equipment List**
 - ◆ **Modifications Planned for HSCP Fan Circuits (1999)**
 - ◆ **Continuous Fire Watch Remains in Place (Cameras)**





Unit 1 Electrical Equipment Room Layout





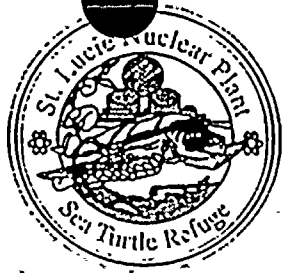


Apparent Violation 1

Issue - Original Unit 1 SSA and Alternate Shutdown Procedure Did Not Adequately Address HSCP Habitability

- **Within Scope of In-Progress SSA Revalidation - Credit for Self Identification Warranted**
- **Safety Significance - Low**
 - ◆ **HVAC Analyses Demonstrate Up to Three Hours Available to Restore Ventilation to Ensure Habitability**
 - ◆ **Existing Emergency Operating Procedure Includes Appropriate HVAC Manual Actions**
 - ◆ **Increase in Core Damage Frequency (CDF) < 1.0E-7/Yr**





Apparent Violation 2

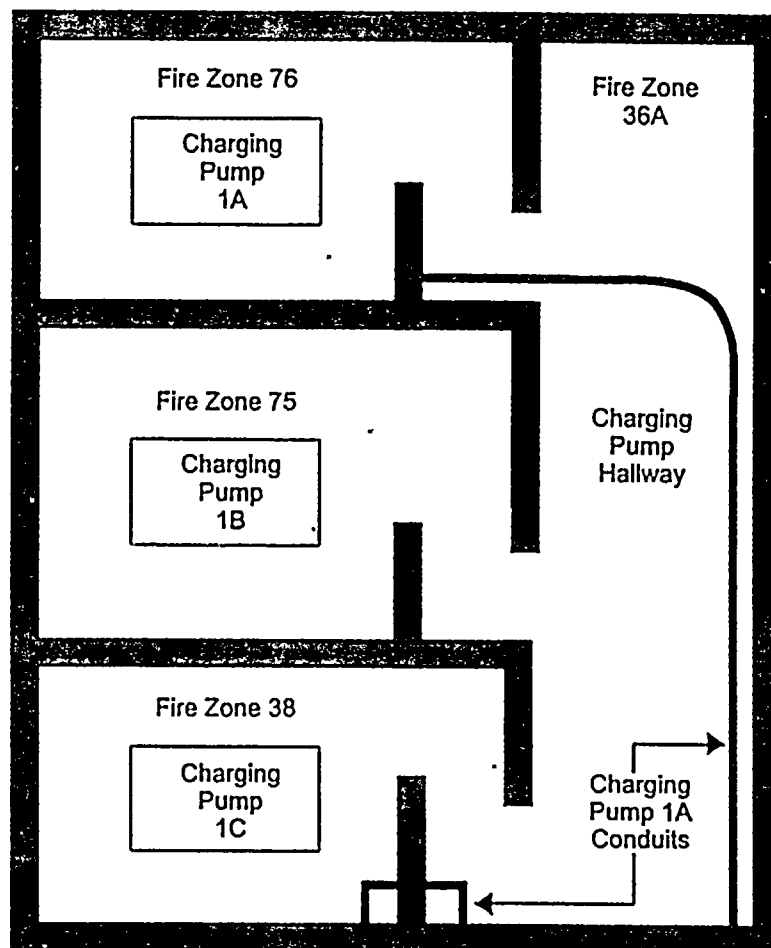
Issue - Self Assessment Identified That Charging Pump 1A Circuits Not Protected as Required by Original Exemption

- Documented Prior to FPI in CR 98-0188 and LER 98-005
- Cause - Inadequate Implementation of an Original Fire Protection Exemption
- Corrective Actions
 - ◆ Completed Control Circuit Reroute (10/98)
 - ◆ 1A Charging Pump Power Cable Protection in Progress - Complete by 3/99
 - ◆ Continuous Fire Watch Remains in Place (Cameras)





Unit 1 Charging Pump Cubicle Layout



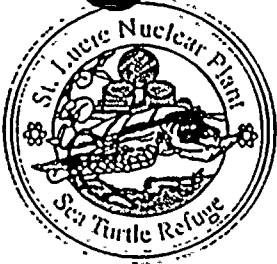


Apparent Violation 2

Issue - Self Assessment Identified That Charging Pump 1A Circuits Not Protected as Required by Original Exemption

- **Safety Significance - Low**
 - ◆ Available Alternate Reactor Coolant System (RCS) Makeup Source Via High Pressure Safety Injection (HPSI) Pumps
 - ◆ EOPs in Place to Use HPSI Pumps
 - ◆ Increase in CDF $< 1.0E-7/Yr$





Apparent Violation 3

Issue - Self Assessment Identified That Original SSA Incorrectly Assumed A Train Protected but 1A Low Pressure Safety Injection (LPSI) Pump Control Circuit Unprotected

- Documented Prior to FPI in CR 98-0407
- Cause - Original SSA Deficiency
- Corrective Actions
 - ◆ Immediately Revised Response to Fire Procedure to Reflect B Train Protected
 - ◆ SSA Validation Effort Corrected Protected Train Designation



Apparent Violation 3

Issue - Self Assessment Identified That Original SSA Incorrectly Assumed A Train Protected but 1A Low Pressure Safety Injection (LPSI) Pump Control Circuit Unprotected

- **Safety Significance - None**
 - ◆ **Appendix R Section III.G Always Met for Fire Area J**
 - ◆ **Use of LPSI Pumps a Long-Term Cold Shutdown Action**
 - ◆ **No CDF Impact**





Apparent Violation 4

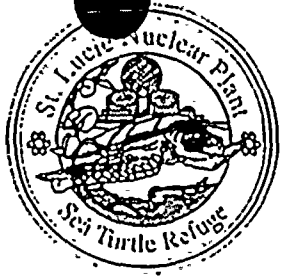
Issue 1 - Original SSA Methodology Assumed Only One Spurious Equipment Operation

- Original SSA Assumed Any and All Spurious Equipment Operations One at a Time in Accordance With NRC GL 86-10
 - ◆ Concurrent Multiple Spurious Assumed for High/Low Pressure Interfaces (HLPI)

- Unit 1 and 2 SSA Validation Effort Considers Multiple Concurrent Spurious Equipment Operation

- Safety Significance - Low
 - ◆ Three High Risk Fire Zones Evaluated
 - ◆ CDF Increase Estimated at $2.0E-7/Yr$





Apparent Violation 4

Issue 2 - Inadequate Implementation of HLPI Protection

- First Example - Potential for Fire Induced Spurious Operation of Unit 1 Power Operated Relief Valves
 - ◆ Self Assessment Identified That a Small Portion of PORV Circuits Not Protected

- Documented Prior to FPI in CR 98-0189 and LER 98-005

- Cause - Inadequate SSA Implementation





Apparent Violation 4

Issue 2 - Inadequate Implementation of HLPI Protection - First Example

- **Corrective Actions**
 - ◆ PORV Circuit Modifications Planned for 1999 Unit 1 Outage
 - ◆ Continuous Fire Watch Remains in Place (Cameras)

- **Safety Significance - Low**
 - ◆ Only Small Portion of PORV Circuit Unprotected
 - ◆ CDF Increase $<1.0E-7/Yr$





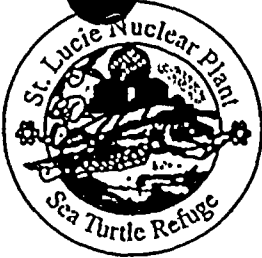
Apparent Violation 4

Issue 2 - Inadequate Implementation of HLPI Protection

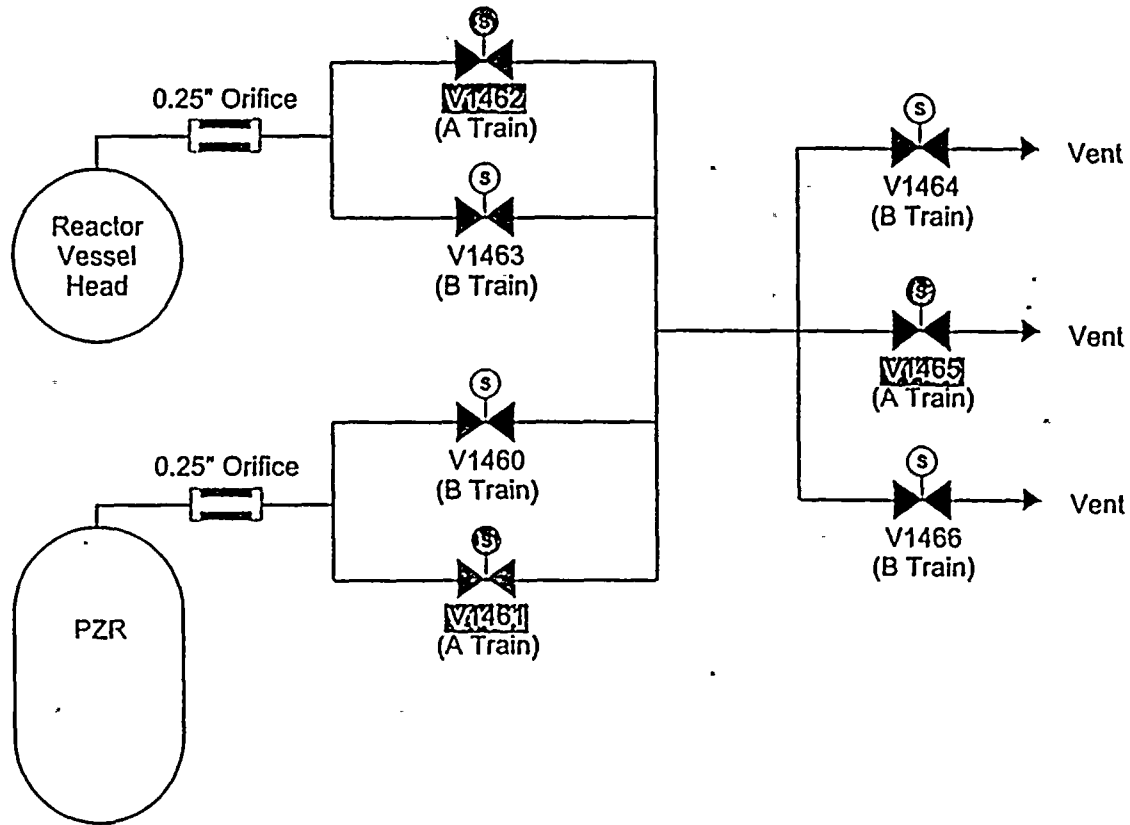
- **Second Example - Potential for Fire Induced Spurious Operation of Unit 1 and 2 Reactor Coolant Gas Vent System (RCGVS) Valves**
 - ◆ **Self Assessment Identified That Original SSA Lacked Detail for RCGVS Spurious Operation**

- **Documented Prior to FPI in CR 98-0403**

- **Cause - Original SSA Documentation Inadequate**



Unit 1 Reactor Coolant Gas Vent System





Apparent Violation 4

Issue 2 - Inadequate Implementation of HLPI Protection - Second Example

- **Corrective Actions**
 - ◆ Immediately Developed Procedural Actions for Both Units to Mitigate Spurious RCGVS Operation
 - ◆ Modified Unit 2 RCGVS Circuits During Outage (12/98)
 - ◆ Unit 1 RCGVS Circuits to Be Modified in 1999 Outage

- **Safety Significance - Low**
 - ◆ RCS Inventory Loss Within Charging Pump Capacity
 - ◆ Increase in CDF < 1.0E-8/Yr





Apparent Violation 4

Issue 2 - Inadequate Implementation of HLPI Protection

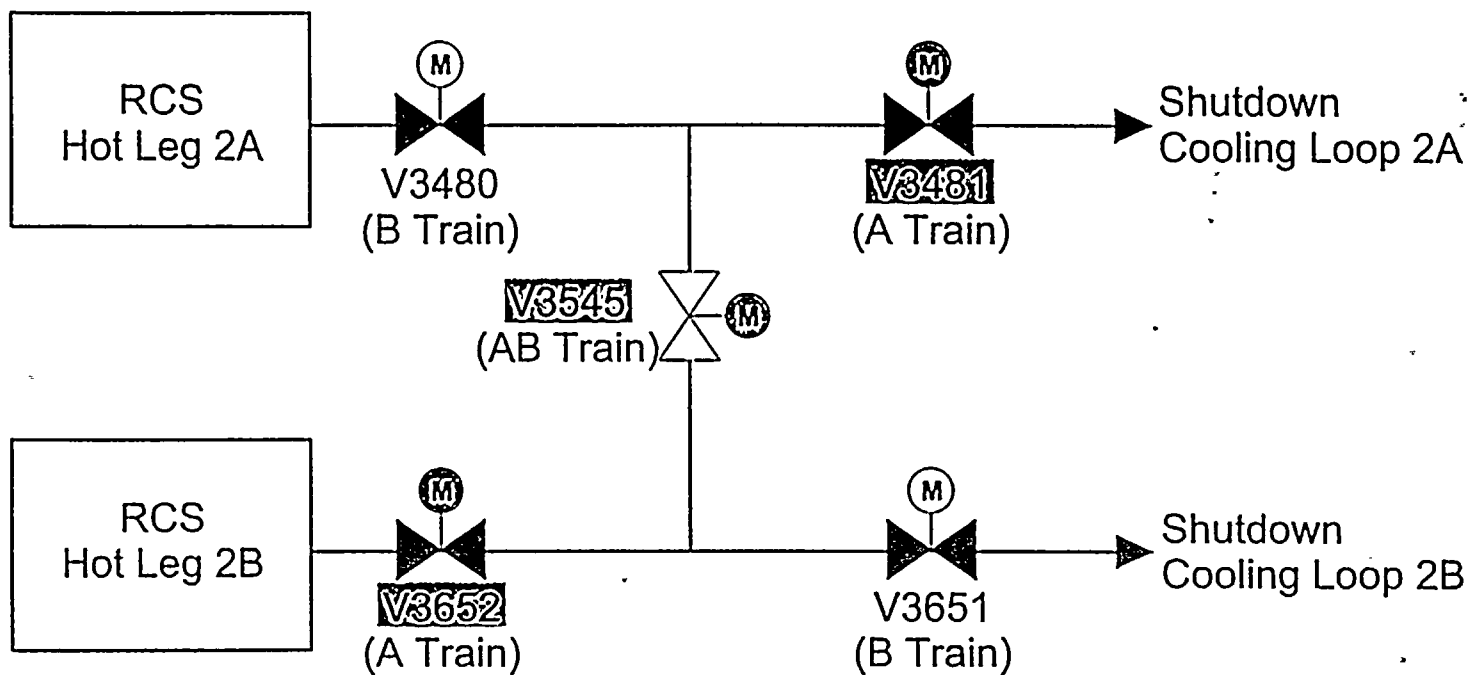
- Third Example - Inadequate Evaluation of Unit 2 Shutdown. Cooling System (SDC) Motor Operated Valves (MOVs)
 - ◆ Self Assessment Identified That HLPI Protection Removed by Previous Plant Modification

- Documented Prior to FPGI in CR 98-0225 and LER 98-001

- Cause - Inadequate Consideration of Existing Fire Protection Requirements During Modifications to Meet GL 95-07 Requirements



Unit 2 Shutdown Cooling System







Apparent Violation 4

Issue 2 - Inadequate Implementation of HLPI Protection - Third Example

- **Corrective Actions**
 - ◆ **Implemented Modification to Protect SDC System Valves During Unit 2 Outage (12/98)**

- **Safety Significance - Low**
 - ◆ **Failure Mode Not Credible**
 - **All Valves Normally Deenergized**
 - **Two MOV Failures Required**
 - **Correct Polarity 480V 3-Phase Cable Faults Required**
 - ◆ **CDF Increase < 1.0E-7/Yr**



Apparent Violation 4

Issue 3 - Inadequate Implementation of IN 92-18

- IN 92-18 Describes Fire Induced Faults in MOV Control Circuits
- Original St. Lucie IN 92-18 Response Evaluated MOV Control Circuit Faults for Control Room Fire Scenarios
- SSA Validation Effort Identified Need to Evaluate IN 92-18 Faults for All Fire Areas
- MOV Evaluation Scheduled for 1999 Per PMAI 98-07-006
- Compensatory Measures in Place
- Recommend Issue Remain Open Pending Completion of MOV Evaluation



Issue Summary

Self Identified

- 1A Charging Pump Protection Issue - Low Safety Significance
- 1A LPSI Pump Protection Issue - No Safety Significance And No Violation Occurred
- PORV HLPI Issue - Low Safety Significance
- RCGVS HLPI Issue - Low Safety Significance
- SDC HLPI Issue - Low Safety Significance
- IN 92-18 Issue - Recommend Item Remain Open

NRC Identified

- HSCP Habitability Issue - Low Safety Significance And Credit for Self Identification Warranted
- Multiple Spurious Equipment Operation Issue - Low Safety Significance And Original Regulatory Requirements Met





Concluding Remarks

**Majority of the Fire Protection Deficiencies Identified by FPL
During Self Assessment**

Apparent Violations Have Low or No Safety Significance

Effective Interim Compensatory Measures in Place

**Aggressive Corrective Action Plan Developed to Correct
Deficiencies**





Fire PSA Results for Multiple Spurious Actuations

Apparent Violation 4 Issue 1

Fire Induced Hot-Short Probability was determined (NUREG/CR-2258) $6.8E-2$ per cable

Sensitivity Analysis Results for Spurious Actuation

Fire Zone	Ignit. Freq.	Zone Factor	Baseline	Single Spurious	Multiple Spurious
"B" Pen. Rm	$3.0E-04/Yr$	1.00	$6.7E-7/Yr$	$8.7E-07/Yr$	$1.0E-06/Yr$
"B" Cable Loft	$3.0E-03/Yr$	0.1	$6.7E-7/Yr$	$8.7E-07/Yr$	$1.0E-06/Yr$
"B" SWGR	$4.0E-03/Yr$	0.05	$4.5E-7/Yr$	$5.8E-07/Yr$	$6.7E-07/Yr$



II. Fire-Induced Circuit Failures

Example 2: From NRC Correspondence

“In evaluating your response regarding spurious actuation of equipment, the staff intends to utilize the following guidelines:

- a. The safe shutdown capability should not be adversely affected by any one spurious actuation or signal from a fire in any plant area; and
- b. The safe shutdown capability should not be adversely affected by a fire in any plant area which results in the loss of all automatic function (signals, logic) from the circuits located in the area in conjunction with one worst-case spurious actuation of signal resulting from the fire; and
- c. The safe shutdown capability should not be adversely affected by a fire in any plant area which results in simultaneous spurious actuation of all valves in high-low pressure interface lines

II. Fire-Induced Circuit Failures

Example 1: From NRC Documentation

“ It was noted that the three assumptions of Question and Answer 5.3.10 are meant for independent use (that is, only one assumption applies for any given configuration in a reactor plant). These assumptions are therefore consistent with the established NRR review practice of requiring licenses to analyze for any and all spurious actuations or failures where no two such spurious actuations or failures occur simultaneously.” [Emphasis Added]

S 1 OPS

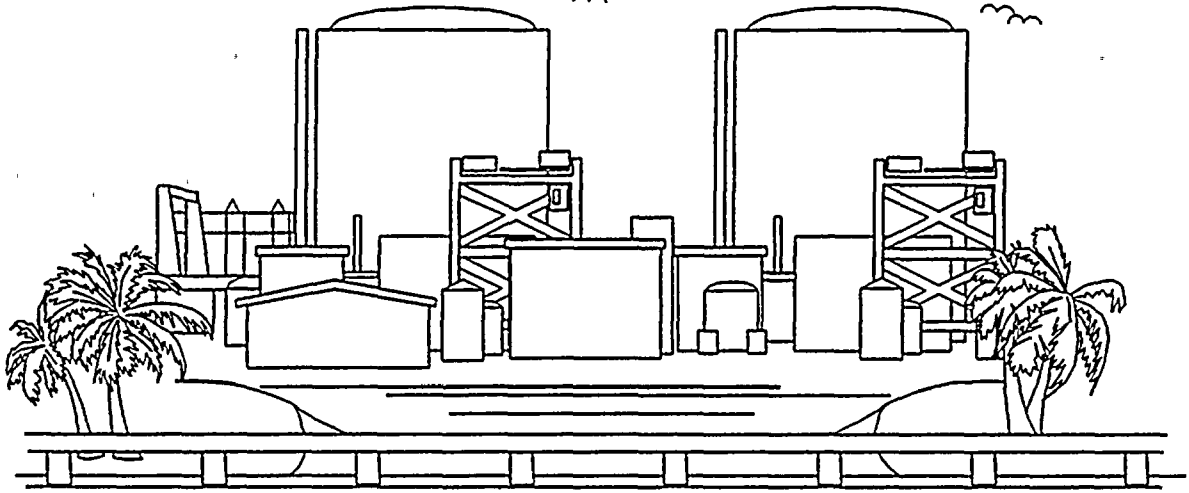
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 DOCN 1-EOP-99 _____
 SYS _____
 COMP COMPLETED _____
 ITM 22 _____

FLORIDA POWER & LIGHT

ST. LUCIE PLANT

UNIT NO. 1

1-EOP-99
 REVISION 22



FC INFORMATION ONLY

This document is not controlled. For more
 verify information with the original document.

DATE VERIFIED _____

APPENDIXES/FIGURES/TABLES

EMERGENCY OPERATING PROCEDURE

REVISION	REVIEWED BY FRG ON	APPROVED BY	DATE
0	9/19/89	G. J. Boissy Plant General Manager	9/19/89
22	10/22/98	R. G. West Plant General Manager	10/22/98

Responsible
 Department: OPERATIONS

TJB 11/5/98

REVISION NO.: 22	PROCEDURE TITLE: APPENDIXES/FIGURES/TABLES	PAGE: 2 of 120
PROCEDURE NO.: 1-EOP-99	EMERGENCY OPERATING PROCEDURE ST. LUCIE UNIT 1	

1.0 TITLE:

APPENDIXES/FIGURES/TABLES

2.0 PURPOSE:

This addendum contains the Appendixes, Figures, and Tables required to be used in conjunction with the Unit 1 Emergency Operating Procedures. The following items are included:

APPENDIXES		FIGURES		TABLES	
B	Alternate DC Power Supply	1	RCS Press. Temp.	1	SIAS
C	Diesel Generator Local Start	2	SI Flow Vs. RCS Press.	2	CIAS
D	Power Restoration Loss of Offsite Power	3	Time Until S/D Cooling Req. Vs. Cond. Avail.	3	CSAS
E	Power Restoration Station Blackout	4	Cond. Required for Cooldown	4	RAS
F	Alternate Method of Crosstying U-2 Diesel or S/U Xfmr to U-1	5	RWT Level Vs. Cntmt. Sump Level	5	MSIS
G	Local Operation of the 'C' Auxiliary Feedwater Pump	-	N/A	6	Vital Power Breaker Configuration (LOOP)
H	Operation of the 1A & 1B Inst. Air Compressors	-	N/A	7	Vital Power Breaker Configuration (SBO)
I	MSIV Local Closure	-	N/A	8	Emerg. Diesel Gen. Loading (LOOP)
J	Restoration of Component Cooling Water to RCPs	-	N/A	9	125 VDC Equip. Which May Be Deenergized to Extend Battery Life
K	RCS Fill & Drain Method of Void Elimination	-	N/A	10	Non-essential MCC Loads
L	Placing H ₂ Analyzer in Service	-	N/A	11	Emerg. Diesel Generator Loading (SBO)
M	Operation of the H ₂ Recombiners	-	N/A	-	N/A
N	H ₂ Purge System Operation	-	N/A	-	N/A
O	Hot & Cold Leg Injection	-	N/A	-	N/A
P	Restoration of Components Actuated by SIAS and CIAS	-	N/A	-	N/A
Q	Restoration of Electrical Equipment Room Ventilation	-	N/A	-	N/A
R	Steam Generator Isolation	-	N/A	-	N/A
S	Safety Injection Throttling and Restoration	-	N/A	-	N/A
T	Alternate Charging Flow Path to RCS Through Aux. HPSI Header	-	N/A	-	N/A
U	Local Operation of Unit 1 ADVs	-	N/A	-	N/A
V	SBO Crosstie from Unit 2 to Unit 1	-	N/A	-	N/A
W	Supplying Unit 2 With AC Power Using SBO Crosstie	-	N/A	-	N/A
X	NPO Secondary Plant Post Trip Actions	-	N/A	-	N/A

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APPENDIX Q
RESTORATION OF ELECTRICAL EQUIPMENT ROOM VENTILATION

(Page 1 of 1)

The following instructions provide guidance for the restoration of forced ventilation to the Reactor Auxiliary Building Electrical Equipment Rooms, following a Loss of Offsite Power (LOOP). This lineup addresses diesel generator fuel conservation and ensures that electrical equipment room temperatures remain within the designed range.

1. If the diesel generators are supplying power to the vital buses, Then stop HVA-4, "Cable Spreading Room Air Conditioning" by opening breakers 1-41341 and 1-41349 on 1A6 MCC.
2. If a Loss of Offsite Power (LOOP) has occurred, Then ensure the following ventilation equipment is operating:
 - A. Ensure the start switches for "Electrical Equipment Room Supply Fans", HVS-5A and HVS-5B are in the ON position.
 - B. Ensure started or locally start "Exhaust Fans", HVE-11 and HVE-12.
 1. HVE-11 control push button is located in the cable spreading room near the N.W. exit, alarm door 152.
 2. HVE-12 control push button is located in the 'B' Electrical Switchgear room near the S.W. exit, alarm door 151.
 - C. Ensure started or locally start RV3 and RV4, "Roof Ventilators."
 1. RV3 and RV4 control push buttons are located in the 1A Electrical Switchgear room. (RV3 on north column outside 1A Battery room and RV4 on column south of 1A Battery room.)
 - D. Ensure RV1 and RV2, "Roof Ventilators" are operating.
 1. RV2 control switch is located outside the 1A Battery room. (On same column as RV3.)
 2. RV1 control switch is located in the 1B Battery room.

END OF APPENDIX Q



S 1 OPS

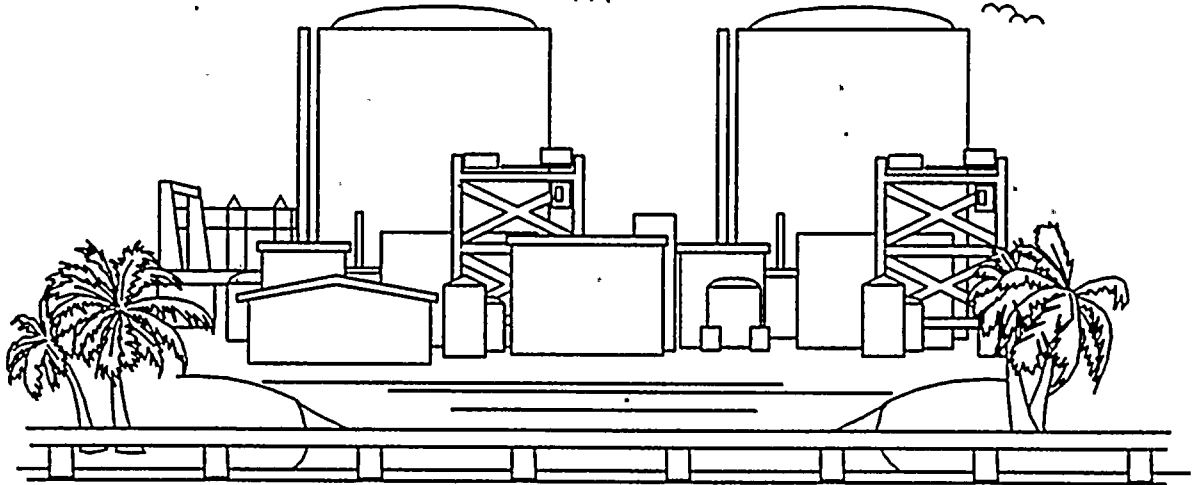
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FLORIDA POWER & LIGHT

ST. LUCIE PLANT

UNIT NO. 1

1-EOP-15 REVISION 15



FUNCTIONAL RECOVERY

FR

EMERGENCY OPERATING PROCEDURE

REVISION	REVIEWED BY FRG ON	APPROVED BY	DATE
0	<u>9/19/89</u>	<u>G. J. Boissy</u> Plant General Manager	<u>9/19/89</u>
15	<u>9/28/98</u>	<u>R. G. West</u> Plant General Manager	<u>9/28/98</u>

Responsible
Department: OPERATIONS

HCB 9/28/98

FOR INFORMATION ONLY
Date Verified 11-12-98 Initial AWP
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5.1 FUNCTIONAL OVERVIEW
(continued)

INSTRUCTIONS

- 9. If ALL safety function acceptance criteria are satisfied by Success Path 1, Then exit this procedure and go to 1-EOP-02, "Reactor Trip Recovery."

CONTINGENCY ACTIONS

- 9. Perform ALL of the following in order:
 - A. If any safety function acceptance criteria are NOT met, Then implement the recovery action steps for the success paths most likely to meet that safety function.
 - B. Implement the recovery action steps for all success paths in service which are NOT met by Success Path 1 in the order of Chart 3, "Functional Recovery Success Paths."
 - C. Implement the recovery action steps for all success paths in service which are met by Success Path 1.
 - D. Implement Long Term Action steps, Section 5.10.

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5.1 FUNCTIONAL OVERVIEW
(continued)

INSTRUCTIONS

**CONTINGENCY
ACTIONS**

INDEX OF RECOVERY ACTION SECTIONS	RECOVERY ACTION SECTION
REACTIVITY CONTROL	5.2
MAINTENANCE OF VITAL AUXILIARIES	5.3
RCS INVENTORY CONTROL	5.4
RCS PRESSURE CONTROL	5.5
RCS AND CORE HEAT REMOVAL	5.6
CONTAINMENT ISOLATION	5.7
CONTAINMENT TEMPERATURE AND PRESSURE CONTROL	5.8
CONTAINMENT COMBUSTIBLE GAS CONTROL	5.9
LONG TERM ACTIONS	5.10

END OF SECTION 5.1 FUNCTIONAL OVERVIEW



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5.4 RCS INVENTORY CONTROL

Success Path 1: Charging & Letdown

INSTRUCTIONS

**CONTINGENCY
ACTIONS**

- 1. Verify charging and letdown are operating automatically to maintain or restore pressurizer level 28% to 35%.
- 2. Verify adequate suction sources exist to the charging pumps.

- 1. If pressurizer level is NOT being maintained, Then manually operate charging and letdown to maintain or restore pressurizer level 28% to 35%.
- 2. Replenish sources or transfer charging pump suction to RWT as follows:
 - A. Place control switch for V2504, "Refueling Water to Charging Pumps" to OPEN, and hold open.
 - B. Place control switch for V2501, "VCT Discharge Valve" to CLOSE, and hold closed.
 - C. Locally (1B5 MCC) OPEN breaker 1-42018 (V2501), "VCT Discharge Valve."
 - D. Locally (1B5 MCC) OPEN breaker 1-42017 (V2504), "Refueling Water to Charging Pumps."
 - E. Release V2501 and V2504, control switches.

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5.4 RCS INVENTORY CONTROL
(continued)

Success Path 1: Charging & Letdown

INSTRUCTIONS

**CONTINGENCY
ACTIONS**

- 3. If high pressurizer level condition appears to be caused by voiding, Then refer to Section 5.6, "RCS and Core Heat Removal" Success Path 2, "Natural Circulation With No SIAS", (Step 32) for void elimination.

CAUTION

It may be necessary to take the pressurizer solid to maintain 20°F subcooling. Actions to maintain subcooling take precedence over maintaining pressurizer level.

- 4. Verify RCS inventory control by:
 - A. Pressurizer level 10% to 70% and being restored by charging and letdown to 28% to 35%.
 - AND
 - B. RCS greater than or equal to 20°F subcooled (during natural circulation use Representative CET, page 213, or during forced circulation use T-hot, page 211, QSPDS.)

AND

(Continued on Next Page)

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5.4 RCS INVENTORY CONTROL
(continued)

Success Path 1: Charging & Letdown

INSTRUCTIONS

**CONTINGENCY
ACTIONS**

4. (continued)

C. Reactor vessel level indicates core covered (sensors 7 and 8 covered, page 212, QSPDS).

5. If "RCS Inventory Control" is satisfied, Then go to the next safety function in jeopardy.

5. If "RCS Inventory Control" is NOT satisfied, Then go to Success Path 2, "SIAS and Charging Pumps."

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5.4 RCS INVENTORY CONTROL
(continued)

Success Path 2: SIAS and Charging Pumps

INSTRUCTIONS

**CONTINGENCY
ACTIONS**

- * 1. If pressurizer pressure is less than 1600 psia or containment pressure greater than 5.0 psig, Then verify SIAS is actuated.
- * 2. Ensure maximum safety injection and charging flow to the RCS by:
 - A. Safety injection flow per Figure 2, "Safety Injection Flow vs. RCS Pressure."

AND

 - B. All available charging pumps operating.
- * 3. If safety injection flow is inadequate due to high RCS pressure or unavailability of HPSI pumps, Then attempt to cooldown and depressurize to obtain adequate safety injection flow.

- 1. If SIAS does NOT occur automatically, Then manually initiate SIAS.
- 2. If safety injection flow is NOT per Figure 2, "Safety Injection Flow vs. RCS Pressure", Then verify SIAS per Table 1, "Safety Injection Actuation Signal."



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5.4 RCS INVENTORY CONTROL
(continued)

Success Path 2: SIAS and Charging Pumps

INSTRUCTIONS

**CONTINGENCY
ACTIONS**

- * 4. If pressurizer pressure decreases to less than 1300 psia following SIAS, Then:
- A. If RCS subcooling is less than 20°F (T-hot page 211, QSPDS), Then:
1. Ensure all 4 RCPs are tripped.
 2. Initiate seal injection to the RCPs if available:
 - a. Ensure charging flow is available.
 - b. OPEN MV-02-1, "RCP Seal Injection Isolation."
- OR
- B. If RCS subcooling is greater than or equal to 20°F (T-hot page 211, QSPDS), Then:
1. Ensure 1 RCP in each loop is tripped.
 2. Initiate seal injection to the RCPs if available:
 - a. Ensure charging flow is available.

4. If pressurizer pressure is NOT less than 1300 psia, Then RCP operation may continue provided CCW flow has NOT been lost for greater than 10 minutes.

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5.4 RCS INVENTORY CONTROL
(continued)

Success Path 2: SIAS and Charging Pumps

INSTRUCTIONS

**CONTINGENCY
ACTIONS**

4. (continued)

4.

B. (continued)

2. (continued)

b. OPEN MV-02-1, "RCP
Seal Injection
Isolation."

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5.4 RCS INVENTORY CONTROL
(continued)

Success Path 2: SIAS and Charging Pumps

INSTRUCTIONS

**CONTINGENCY
ACTIONS**

- | | |
|--|--|
| <p><input checked="" type="checkbox"/> 5. Verify RCP operating limits are satisfied by the following:</p> <ul style="list-style-type: none"> A. Pump seal requirements of Figure 1, "RCS Pressure Temperature" curve. B. Guide bearing temperatures less than 185°F. C. Thrust bearing temperatures less than 200°F. D. Controlled bleedoff temperature less than 225°F. | <p>5. <u>If</u> RCP operating limits are NOT satisfied, <u>Then</u> perform the following as appropriate:</p> <ul style="list-style-type: none"> A. <u>If</u> below pump seal requirements of Figure 1, "RCS Pressure Temperature", <u>Then</u> monitor RCP instrumentation for cavitation or seal failure. B. <u>If</u> guide bearing temperatures exceed 185°F, <u>Then</u> trip the affected RCPs. C. <u>If</u> thrust bearing temperatures exceed 200°F, <u>Then</u> trip the affected RCPs. D. <u>If</u> controlled bleedoff temperature exceeds 225°F, <u>Then</u> trip the affected RCPs. |
|--|--|



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5.4 RCS INVENTORY CONTROL

(continued)

Success Path 2: SIAS and Charging Pumps

INSTRUCTIONS

**CONTINGENCY
ACTIONS**

- * 6. If the HPSI pumps are operating, Then determine if all the following throttling criteria are met:
 - A. Representative CET temperature indicates at least 20°F subcooling.
 - B. Pressurizer level is greater than or equal to 30% and NOT decreasing.
 - C. At least one S/G is greater than or equal to 15% (wide range) level with feedwater available for removing heat.
 - D. The reactor vessel level indicates hot leg covered (sensors 4 through 8 covered, page 212, QSPDS).
 - E. HPSI pumps are NOT being used to satisfy "Reactivity Control" Success Path 4.

- 7. If HPSI throttling criteria are met, Then pumps may be throttled or stopped per Appendix S, "Safety Injection Throttling and Restoration."

- 7. If HPSI throttling criteria can NOT be maintained, Then reinitiate HPSI flow per Appendix S, "Safety Injection Throttling and Restoration."

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5.4 RCS INVENTORY CONTROL
(continued)

Success Path 2: SIAS and Charging Pumps

INSTRUCTIONS

**CONTINGENCY
ACTIONS**

8. If the following criteria are met:

- A. RCS pressure greater than 200 psia and controlled.
- B. HPSI throttling criteria met.

Then the LPSI pumps may be stopped as follows:

- 1. CLOSE LPSI Header Loop Isolation Valves:

HCV-3615 HCV-3625
HCV-3635 HCV-3645
- 2. Stop 1A and 1B LPSI Pumps.
- 3. Return 1A and 1B LPSI Pump control switches to AUTO.

9. Verify proper transfer of water from RWT to containment sump per Figure 6, "RWT Level vs. Containment Sump Level."

8. If LPSI termination criteria can NOT be maintained and RAS has NOT occurred, Then restart LPSI pumps and OPEN header isolation valves.

9. If RWT level versus containment sump level relationship is NOT satisfied, Then leakage outside the containment may exist. Perform the following:

- A. Verify CIAS per Table 2, "Containment Isolation Actuation Signal."
- B. Verify no unexplained RAB radiation monitors in alarm.

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5.4 RCS INVENTORY CONTROL
(continued)

Success Path 2: SIAS and Charging Pumps

INSTRUCTIONS

**CONTINGENCY
ACTIONS**

9.

9. (continued)

C. Verify no unexplained RAB sump level alarms (Annunciators R-4, R-14, S-20, S-30).

D. Replenish the RWT as necessary to maintain level greater than 4 feet, from sources identified by the Technical Support Center.

* 10. When RWT level is less than or equal to 8 feet, and at least one containment spray pump is running, Then:

A. Verify the same train HPSI pump(s) running.

B. OPEN the valves listed below for the running Containment Spray pump(s) to provide cool water from the SDC heat exchanger(s) to the corresponding running HPSI pump(s) during recirculation:

1. V3663, "SDC Heat Exchanger 'A' to 1A HPSI Pump."

2. V3662, "SDC Heat Exchanger 'B' to 1B HPSI Pump."



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5.4 RCS INVENTORY CONTROL
(continued)

Success Path 2: SIAS and Charging Pumps

INSTRUCTIONS

**CONTINGENCY
ACTIONS**

- 11. When refueling water tank is 6-8 feet, Then:
 - A. Ensure power available to V3659 and V3660, "Min. Flow Isolation Valves."
 - B. Ensure HVE-10A and HVE-10B, "RAB Main Exhaust Fans," are stopped.

- 12. When RWT level is less than 4 feet, Then verify RAS has actuated.

- 12. If RAS does NOT occur automatically, Then:
 - A. Manually initiate RAS.
 - B. Verify RAS per Table 4, "Recirculation Actuation Signal."

CAUTION
HPSI pump flow rate should be limited to less than 640 gpm per pump during operation after RAS.

- 13. When RAS is complete, Then:
 - A. Verify V3659 and V3660, "Min. Flow Isolation Valves" are CLOSED, Then deenergize the valves.

- 13. If the operating HPSI pumps are delivering less than 114 gpm per pump, Then:
 - A. Stop one charging pump at a time until minimum flow requirements are met.

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5.4 RCS INVENTORY CONTROL
(continued)

Success Path 2: SIAS and Charging Pumps

INSTRUCTIONS

**CONTINGENCY
ACTIONS**

13. (continued)

B. Verify operating HPSI pumps are delivering greater than or equal to 114 gpm per pump after RAS.

13. (continued)

B. If minimum HPSI flow requirements are still NOT met with all charging pumps off, Then stop the HPSI pump with the lowest indicated flow.

NOTE

ECCS area sump pumps are only available when non-vital MCCs (1A2/1B2) are energized.

14. After RAS, pump ECCS leakage and RCS sample water collected in the ECCS area sumps to the reactor drain tank by performing the following:

A. At the CRAC panel, place ECCS Area Leakage System control switch to the RDT position and verify that:

1. HCV-06-9, "RDT Pump Suction" closes.
2. HCV-06-7, "Sump Pump to EDT" closes.
3. HCV-06-8, "Sump Pump to RDT" opens.

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5.4 RCS INVENTORY CONTROL
(continued)

Success Path 2: SIAS and Charging Pumps

INSTRUCTIONS

**CONTINGENCY
ACTIONS**

14. (continued)

B. At RTGB 105, OPEN V6301 and V6302, "RDT Containment Isolation Valves" by placing the switches to RESET, Then OPEN.

C. Ensure the CRAC panel annunciator, Annunciator Y-19, "ECCS Pump Room Leakage Valves Misaligned" is lit.

15. Verify "RCS Inventory Control" is being satisfied by the following criteria:

A. Reactor vessel level indicates core is covered. (Sensors 7 and 8 covered, page 212, QSPDS.)

AND

15. If "RCS Inventory Control" is NOT satisfied, Then:

A. Continue actions to establish inventory control while pursuing other safety functions in jeopardy.

B. Contact the Technical Support Center to evaluate implementation of the Severe Accident Management Guidelines (SAMGs).

/R15

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5.4 RCS INVENTORY CONTROL
(continued)

Success Path 2: SIAS and Charging Pumps

INSTRUCTIONS

**CONTINGENCY
ACTIONS**

15. (continued)

15.

B. One of the following conditions exists:

1. All available charging pumps are operating and safety injection pumps are injecting water into the RCS per Figure 2, "Safety Injection Flow vs. RCS Pressure."

OR

2. Safety injection pumps throttling criteria has been satisfied.

OR

3. RAS has actuated and at least one HPSI pump is operating.

16. If "RCS Inventory Control" is satisfied, Then go to next safety function in jeopardy.

END OF SECTION 5.4 RCS INVENTORY CONTROL

