



Florida Power & Light Company, 6501 South Ocean Drive, Jensen Beach, FL 34957

August 13, 2002

L-2002-170
10 CFR § 50.73

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

Re: St. Lucie Units 1 and 2
Docket Nos. 50-335/389
Reportable Event: 2001-001-02
Date of Event: January 9, 2001
Control Room Ventilation Emergency
Recirculation Procedures Inadequate

The attached revision to Licensee Event Report 2001-001 is being submitted pursuant to 10 CFR 50.73. Additional insights are provided with regard to the cause of the high steady state St. Lucie Unit 2 control room pressure. This information was discovered subsequent to the original event.

Very truly yours,

A large, stylized handwritten signature in black ink, appearing to read 'DEJ', is written over the typed name of Donald E. Jernigan.

Donald E. Jernigan
Vice President
St. Lucie Nuclear Plant

DEJ/KWF

Attachment

IR22

NRC FORM 366 (1-2001)	U.S. NUCLEAR REGULATORY COMMISSION	APPROVED BY OMB NO. 3150-0104	EXPIRES 6-30-2001
LICENSEE EVENT REPORT (LER) (See reverse for required number of digits/characters for each block)		Estimated burden per response to comply with this mandatory information collection request 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.	

FACILITY NAME (1) St. Lucie Units 1 and 2	DOCKET NUMBER (2) 05000335	PAGE (3) Page 1 of 5
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TITLE (4)
 Control Room Ventilation Emergency Recirculation Procedures Inadequate

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
01	09	2001	2001	- 001	- 02	08	13	2002	St. Lucie Unit 2	05000389
									FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)								
POWER LEVEL (10)	100	<input type="checkbox"/> 20 2201(b)	<input type="checkbox"/> 20 2203(a)(3)(ii)	<input type="checkbox"/> 50 73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)					
		<input type="checkbox"/> 20 2201(d)	<input type="checkbox"/> 20 2203(a)(4)	<input type="checkbox"/> 50 73(a)(2)(iii)	<input type="checkbox"/> 50 73(a)(2)(x)					
		<input type="checkbox"/> 20 2203(a)(1)	<input type="checkbox"/> 50 36(c)(1)(i)(A)	<input type="checkbox"/> 50 73(a)(2)(iv)(A)	<input type="checkbox"/> 73 71(a)(4)					
		<input type="checkbox"/> 20 2203(a)(2)(i)	<input type="checkbox"/> 50 36(c)(1)(ii)(A)	<input type="checkbox"/> 50 73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(5)					
		<input type="checkbox"/> 20 2203(a)(2)(ii)	<input type="checkbox"/> 50 36(c)(2)	<input type="checkbox"/> 50 73(a)(2)(v)(B)	<input type="checkbox"/> OTHER					
		<input type="checkbox"/> 20 2203(a)(2)(iii)	<input type="checkbox"/> 50 46(a)(3)(ii)	<input type="checkbox"/> 50 73(a)(2)(v)(C)	Specify in Abstract below or in NRC Form 366A					
		<input type="checkbox"/> 20 2203(a)(2)(iv)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(A)	<input checked="" type="checkbox"/> 50 73(a)(2)(v)(D)						
		<input type="checkbox"/> 20 2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50 73(a)(2)(vii)						
		<input type="checkbox"/> 20 2203(a)(2)(vi)	<input type="checkbox"/> 50 73(a)(2)(i)(C)	<input type="checkbox"/> 50 73(a)(2)(viii)(A)						
<input type="checkbox"/> 20 2203(a)(3)(i)	<input type="checkbox"/> 50 73(a)(2)(ii)(A)	<input type="checkbox"/> 50 73(a)(2)(viii)(B)								

LICENSEE CONTACT FOR THIS LER (12)	
NAME Kenneth W. Frehafer, Licensing Engineer	TELEPHONE NUMBER (include Area Code) (561) 467 - 7748

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)									
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
D	VI	-	-	-	-	-	-	-	-

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (15)		
YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On January 9, 2001, St. Lucie Units 1 and 2 were in Mode 1 at 100 percent reactor power. St. Lucie began investigating issues related to the procedural requirements for operating the control room ventilation system in the emergency mode. On January 31, 2001, St. Lucie determined that existing equipment issues with the control room differential pressure instrumentation, along with the inadequate procedural guidance for operation of the control room ventilation system during the emergency recirculation mode, could have led to inadequate control room pressurization.

This event was caused by procedural inadequacies that could have allowed operation of the control room ventilation system without proper alignment of outside air make up to the control room envelope.

Procedure changes have been made to correct the condition. Changes to the EOPs are in progress.

Revision 1 added additional information concerning the adequacy of previous surveillances. Revision 2 adds information regarding the cause of the high steady state St. Lucie Unit 2 control room pressure and the additional corrective actions associated with that condition.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
St. Lucie Units 1 and 2	05000335	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	Page 2 of 5
	05000389	2001	- 001	- 02	

TEXT (if more space is required, use additional copies of NRC Form 366A) (17)

Description of the Event

On January 9, 2001, St. Lucie Units 1 and 2 were in Mode 1 at 100 percent reactor power. St. Lucie began investigating issues related to the procedural requirements for operating the control room ventilation system in the emergency mode. On January 31, 2001, St. Lucie determined that existing equipment issues with the control room differential pressure instrumentation, along with the inadequate procedural guidance for operation of the control room ventilation during the emergency recirculation mode, could have led to inadequate control room pressurization following automatic system actuation. This was reported to the NRC under 10 CFR 50.72 on January 31, 2001.

The St. Lucie Unit 2 UFSAR description of the normal operation of the control room ventilation system is with outside air make up provided by either of two outside air intakes. The operators control the return air flowrate by adjusting the return dampers to maintain a positive pressure of .125 inch water gage to the average pressure differential between the control room and its surroundings. PDIS-25-23A and PDIS-25-23B provide differential pressure indication.

The St. Lucie Unit 2 UFSAR description for emergency control room ventilation is as follows. On receipt of a containment isolation actuation signal (CIAS) from either St. Lucie Unit 1 or Unit 2, the control room emergency cleanup system (CRECS) fans are automatically started and the charcoal filter train dampers are opened. Both outside air intakes are isolated by redundant low leakage butterfly valves FCV-25-14, -15, -16, and -17 located in the outside air make up ducts.

The control room outside air intakes are provided with radiation monitors. Upon receipt of a high radiation signal, isolation valves FCV-25-14, -15, -16 and -17 automatically close to prevent contaminated outside air from entering the control room. The CRECS fans automatically start to provide HEPA and charcoal filtration to the recirculating air. Following control room isolation, the UFSAR states that the operator restores outside air make up by selecting the set of valves to open corresponding to the lowest radiation levels by observing the radiation monitors located in the outside air intake ducts.

Previously, St. Lucie discovered that PDIS-25-23A and PDIS-25-23B indicated approximately .1 to .15 inches water gage differential pressure when the control room was equalized with its surroundings. During the development of procedural guidance to compensate for the recently identified positive pressure bias, St. Lucie identified that procedural guidance for operation of CRECS in the emergency mode was inadequate.

A review of emergency operating procedures (EOPs) determined that the operator would verify system alignment and proper operation in control room clean-up mode (recirculation) during execution of Table 2 of EOP-99, "Appendixes, Figures, and Tables." This would be approximately 45-60 minutes into the event. However, there is no instruction within the EOPs to align the outside air intake valves to provide outside air make up.

2-ONP-25.02, "Ventilation Systems," Appendix B, aligns the outside air make up based on CIAS or outside air intake radiation monitor alarms. The procedure requires that the operators select a set of outside air intake valves to throttle open based on the radiation levels detected by the outside air intake radiation monitors. The procedure also contains throttling criteria for the chosen outside air intake valves in order to maintain pressure in the control room greater than .125 inches water gage

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
St. Lucie Units 1 and 2	05000335 05000389	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	Page 3 of 5
		2001	- 001	- 02	

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

and maintain the make up air flow rate less than 450 cfm. However, if the throttling criteria are already met, the procedure does not clearly require opening a set of outside air intake valves. If an operator elected not to open a set of outside air intake valves because the minimum throttling criteria were met, then continued operation of the control room ventilation system in extended emergency recirculation mode would invalidate the UFSAR operational description of the control room ventilation system.

2-ONP-25.02, "Ventilation Systems," Appendix C, also provides for operator response to the control room annunciator if the differential pressure drops to near zero. However, this alarm would not occur with the small positive bias exhibited by the control room pressure differential pressure gauges.

Subsequent to the original event, on October 19, 2001, FPL declared the St. Lucie Unit 2 'B' train control room ventilation system inoperable because the revised 18 month TS surveillance was not successful. The control room was unable to maintain pressure greater than 0.125" water gage with respect to its surroundings with less than 450 cfm makeup air. On October 20, 2001, FPL determined that the cable spreading room, an area adjacent to the control room envelope, was at a higher pressure than the control room. Communication between the control room and electrical equipment rooms raised the initial control room pressure such that control room pressure could not be read by installed narrow range instrumentation. FPL alleviated the high control room pressure condition by lowering the pressure in the cable spreading room. This was accomplished by opening the fire doors, RA-90 and RA-150, between the cable spreading room and the electrical switchgear rooms 2A and 2B. Additionally, operating procedures were revised to clarify the method for control room emergency cleanup system ventilation testing. These corrective actions were accomplished, and the TS surveillance was re-performed. The 'B' train was successfully tested pulling air from the north outside air intake (OAI), but failed using the south side OAI. FPL declared the control room ventilation system operable, the south side OAI was declared inoperable, and TS 3.7.7 Action Statement c was entered. On December 18, 2001, the south side OAI was returned to service after passing its surveillance.

Cause of the Event

This event was caused by procedural inadequacies that could have allowed operation of the control room ventilation system without proper alignment of outside air make up to the control room envelope. The positive control room pressure bias is considered to be a contributing factor to this event.

Subsequent to the initial report, FPL determined that the inability of the St. Lucie Unit 2 control room to achieve the required increase in control room differential pressure (dP) was caused by a combination of high air pressure condition in the cable spreading room, instrument sensitivities due to erratic outside conditions, and communication between the electrical equipment room and the control room envelope. The high air pressure raised the initial pressure within the control room such that testing for the additional 0.125 inch water gage positive pressure was beyond the range of the narrow span pressure instrumentation. These factors resulted in failing the Technical Specification surveillance by exceeding the maximum allowed outside make up air flowrates.

When the revised Technical Specification surveillance was performed in October 2001, FPL originally thought that the higher cable spreading room pressure was due to improper flow balancing of the HVAC system. After evaluation of the condition, FPL

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
St. Lucie Units 1 and 2	05000335 05000389	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	Page 4 of 5
		2001	- 001	- 02	

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

determined that the existing flow balance of the HVAC system was in accordance with all design documents. Supply and exhaust fan discharge flow measurements were found in line with initial installation flow measurements. An elevated cable spreading room pressure is intrinsic to the HVAC design. The design airflow through the cable spreading room could only be accomplished by a pressure buildup of 0.4" to 0.5" dP between the cable spreading room and the 2B switchgear room.

Until a permanent solution is established, FPL is mitigating the higher pressure in the cable spreading room by opening fire doors RA-90 and RA-150. Additionally, normal and off-normal operating procedures were revised to ensure that the control room would be able to be maintained at a higher pressure than its surroundings in accordance with Design Bases requirements.

Analysis of the Event

This condition was originally reported under 10 CFR 50.73(a)(2)(v)(D) as a condition that may have prevented the fulfillment of a safety function necessary to mitigate the consequences of an accident. On June 20, 2002, FPL completed an assessment of the operator dose consequences of the control room being pressurized by the cable spreading room and determined that GDC 19 limits may have been exceeded by this condition. The reporting criteria and safety significance are bounded by the previous LER revisions. FPL is in the process of re-performing the licensing and design bases control room habitability calculations. If the results of the re-analysis indicate that the safety function was met during this event, then FPL may supplement this LER.

Analysis of Safety Significance

The St. Lucie Unit 2 FSAR states that the design of the control room ventilation system requires that the operators align the outside air intake valves to provide fresh air make up to the control room envelope to maintain a positive pressure with respect to the surrounding spaces. Maintaining a positive pressure during postulated accident conditions ensures that unfiltered inleakage to the control room is minimized.

The procedures governing operation of the control room ventilation system were inadequate in that the operators were not clearly directed to open the outside air intake valves to establish make up air to the control room. Although the initial operator response to verify control room emergency recirculation may not have resulted in control room pressurization, either control room personnel, support personnel in the Technical Support Center, or Emergency Operations Facility personnel would have ultimately identified extended operation of the control room in the recirculation mode. Although St. Lucie Unit 1 did not exhibit the control room differential pressure bias, the Unit 1 procedures were deficient in that the operators were not clearly directed to open the outside air intake valves to establish make up air to the control room.

Improper operation of the control room ventilation system has the potential for operator doses to exceed GDC 19 criteria (5 Rem whole body or 30 Rem thyroid). However, FPL judges that the total operator dose would be but a fraction of 10 CFR Part 100 limits. Therefore, this event had no adverse impact on the health and safety of the public.

The Unit 1 HVAC design is different than the Unit 2 HVAC design. The Unit 1 electrical equipment room HVAC system has an exhaust fan for all of the major spaces

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
St. Lucie Units 1 and 2	05000335 05000389	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	Page 5 of 5
		2001	- 001	- 02	

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

in the electrical equipment room. Fans HVS-5A/B provide the supply air for the cable spreading room and the 1A/1B switchgear rooms, but HVE-11 exhausts the air from the cable spreading room, HVE-12 exhausts the air from the 1B switchgear room and RV-3/4 exhaust the air from the 1A switchgear room. This design allows for the air supplied to be exhausted at the same rate thus maintaining the spaces at atmospheric pressure. Therefore, the Unit 1 control room maintains a positive differential pressure with respect to the cable spreading room below.

Corrective Actions

1. The St. Lucie Unit 2 control room differential pressure indicators were calibrated and the sensing lines blown down.
2. The St. Lucie Unit 2 control room differential pressure probes were relocated to provide more stable readings.
3. The Units 1 and 2 ONP-25.02 were revised to accommodate the positive pressure bias exhibited by the control room differential pressure indicators.
4. The Units 1 and 2 EOPs were revised to ensure make up air is provided to the control room ventilation system when operating in the emergency mode.
5. Doors RA-90 and RA-150 separating the 2A and 2B switchgear room for the cable spreading room were opened using a fire breach permit.
6. FPL is developing long-term corrective actions for the electrical equipment room HVAC to allow fire doors RA-90 & RA-150 to be closed while maintaining the cable spreading room at atmospheric pressure and also maintaining adequate cooling.
7. FPL will review preventive maintenance requirements for all doors on the perimeter of the control room envelope.

Additional Information

The positive pressure bias in the Unit 2 control room led to inadequate past surveillances of the Unit 2 control room ventilation system. At that time, these surveillances were considered satisfactory even though the test data showed that the Unit 2 control room was pressurized without providing any outside air make up. Data obtained during the January 2001 troubleshooting efforts were used to corroborate proposed changes for the TS surveillance procedure and the Unit 2 control room surveillance procedure was subsequently revised to account for the observed positive pressure bias.

Failed Components Identified

None

Similar Events

None