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ACCESSION NBR: 9302110279 DOC. DATE: 93/02/01 NOTARIZED: NO DOCKET # 05000335
 FACIL: 50-335 St. Lucie Plant, Unit 1, Florida Power & Light Co.
 AUTH. NAME AUTHOR AFFILIATION
 WACHTEL, M.B. Florida Power & Light Co.
 SAGAR, D.A. Florida Power & Light Co.
 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 93-002-00: on 930128, discovered inability of ECCS ventilation to maintain negative pressure in ECCS pump room & RAB. Caused by ventilation imbalance. Ventilation dampers readjusted & surveillance procedure changed. W/930203 ltr.

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 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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February 3, 1993

L-93-031

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

Re: St. Lucie Unit 1
Docket No. 50-335
Reportable Event: 93-002
Date of Event: January 28, 1993
Inability of Emergency Core Cooling System Ventilation
to maintain a negative pressure in the ECCS pump room
due to a ventilation imbalance

The attached Licensee Event Report is being submitted voluntarily
to provide notification of the subject event.

Very truly yours,

D. A. SAGER

By H. J. Bandy
D. A. Sager
Vice President
St. Lucie Plant

DAS/JWH/kw

Attachment

cc: Stewart D. Ebnetter, Regional Administrator, USNRC Region II
Senior Resident Inspector, USNRC, St. Lucie Plant

DAS/PSL #856-93

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LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.8 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20545, AND TO THE PAPERWORK REDUCTION PROJECT (3150 8104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) St. Lucie Unit 1		DOCKET NUMBER (2) 051010335	PAGE (3) 1 OF 05
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TITLE (4) Inability of Emergency Core Cooling System Ventilation to maintain a negative pressure in the ECCS pump room due to a ventilation imbalance.

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 NAMES		DOCKET NUMBER(S)
0	1	28	9	3	002	0	2	01	N/A		051010111
0	1	28	9	3	002	0	2	01	N/A		051010111

OPERATING MODE (9) 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR : (Check one or more of the following) (11)			
	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10) 100	20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
	20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	X OTHER (Specify in Abstract below and in Text NRC Form 366A)
[Shaded]	20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	Voluntary
	20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
	20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME Michael B. Wachtel, Shift Technical Advisor	TELEPHONE NUMBER	
	AREA CODE 407	465-3550

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces. i.e. approximately fifteen single-space typewritten lines) (16)

On 28 January 1993, Instrumentation and Controls (I&C) personnel identified an unrecognized design condition for the Unit 1 differential pressure switches between the Emergency Core Cooling System (ECCS) pump room and the Reactor Auxiliary Building. The function of these devices is to provide an alarm in the control room when the safety related ECCS ventilation fans do not draw a sufficient negative pressure in the ECCS pump room. An I&C supervisor noted that these alarms are only enabled with a Safety Injection Actuation Signal present.

Operations supervision recognized that the absence of this alarm was used in the ECCS ventilation surveillance procedure to verify satisfactory operation of that system as described in the Unit 1 FUSAR. A subsequent test demonstrated that the ECCS ventilation system could satisfy Technical Specification requirements for operability, but that the B train of the ECCS ventilation system could not draw a negative pressure in the ECCS pump room as outlined in the FUSAR. ECCS exhaust fan HVE 9B was declared out of service and a four hour notification of this condition was made to the NRC. On 2 February, adjustments on various ventilation dampers were made which enabled HVE-9B to be returned to service.

The root cause of this condition was due to a ventilation imbalance of the various system dampers. A FPL Engineering analysis demonstrated that the ventilation system was able to perform its safety function without having to maintain a negative pressure in the ECCS pump room. Corrective actions: The ventilation dampers were readjusted, the A and B trains of ventilation were satisfactory surveilled, and the surveillance procedure was changed to rely on installed pressure differential indication instead of relying upon the absence of an alarm.

This voluntary LER is being submitted for informational purposes.



LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.8 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-332), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) St. Lucie Unit 1	DOCKET NUMBER (2) 05000335	LER NUMBER (6)			PAGE (3)		
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TEXT (If more space is required, use additional NRC Form 366A's) (17)

DESCRIPTION OF THE EVENT

On 28 January 1993, Instrumentation and Controls(I & C) personnel had successfully completed a routine preventative maintenance calibration on differential pressure switches PDIS -25-16A and 16B (EISS : PDS). These switches measure the differential pressure between the Emergency Core Cooling System (ECCS) pump room and the Reactor Auxiliary Building (RAB) hallway. The switches are calibrated to provide an alarm in the control room at -0.2" Wg. The differential pressure switches were within calibration limits, but the control room alarm is not designed to actuate under non-emergency conditions. Subsequent investigation revealed that the control room annunciation would not have been received unless a Safety Injection Actuation Signal (SIAS) is present. This annunciator characteristic was not previously recognized. Additionally, the absence of alarm by this annunciator was used in the surveillance procedure for determining ECCS fan operability.

Operations personnel concluded that previously conducted ECCS fan surveillances were now suspect due to the reliance on alarms actuated by PDIS-25-16A and 16B. The ECCS ventilation trains are subject to operational surveillances every 31 days. The Technical Specifications require that one train be operated for at least fifteen minutes on a rotating basis. The Final Updated Safety Analysis Report (FSAR) states that the ECCS Ventilation system is designed to draw a slight negative pressure (-0.25" to -1.0" Wg.) in the ECCS room with respect to the RAB hallway. During this monthly surveillance, the absence of the control room annunciator signaling this negative pressure condition was utilized to verify satisfactory surveillance requirements. However, since a SIAS signal is not present when performing the surveillance, the control room annunciator for inadequate ECCS pump room negative pressure is not enabled. Based on the ECCS system description outlined in the FUSAR, the ability to draw sufficient negative pressure in the ECCS pump room and therefore the operability of the ECCS ventilation system was now in question. No such criteria are referenced in the Technical Specifications.

To determine if this negative pressure could be achieved, data was collected with the RAB supply fans (HVS-4A/HVS-4B) (EISS : FAN), the non-safety RAB exhaust fans (HVE-10A/HVE-10B) (EISS : FAN), and the ECCS exhaust fans (HVE-9A/HVE-9B) running in various combinations. This testing revealed that with a non-safety RAB exhaust fan running simultaneously with the ECCS exhaust fans, negative pressure as described in the FUSAR could not be established in the ECCS pump room under simulated emergency conditions with offsite power available. With the non-safety RAB exhaust fans secured, as they would be under simulated emergency conditions with a loss of offsite power, adequate negative pressure could be established on the 'A' train of the ECCS exhaust system but not the 'B' train. The non-safety, non-vital RAB exhaust fans were then secured and removed from service. The safety related HVE-9B was also removed from service based on its inability to draw sufficient vacuum even with the normal RAB exhaust fans secured. This condition placed the plant in a seven day action statement as both safety related ECCS ventilation trains are required to be operable in modes 1 thru 4. An NRC notification was deemed appropriate since prior to this discovery, the ability of the ECCS exhaust system to perform its safety function was in question.

**LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION**

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION
REQUEST: 50 8 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS
AND REPORTS MANAGEMENT BRANCH (P-320), U.S. NUCLEAR REGULATORY COMMISSION,
WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE
OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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

DESCRIPTION OF THE EVENT (continued)

On January 29 1993, Operations stationed a dedicated licensed operator, meeting the requirements of NRC Generic Letter 91-18, to the control room staff with the sole responsibility of securing the non-safety RAB exhaust fans in the event of any SIAS or the implementation of the Control Room Inaccessibility procedure. HVE 10A and 10B fans were then placed back in service. On 2 February, adjustments to the supply ventilation dampers were made which enabled a negative pressure to be drawn in the ECCS pump room and the returning the 'B' train of ECCS ventilation to service.

CAUSE OF THE EVENT

The root cause of the ECCS ventilation system's inability to maintain a negative pressure in the ECCS pump room as described in the FUSAR was due to a ventilation imbalance of various system dampers. This condition existed for an unknown period of time. There were two contributing factors to this condition. First, the ECCS ventilation system's surveillance procedure partially relied on an alarm feature for verification of satisfactory test results. Secondly, the alarm circuit for insufficient negative pressure in the ECCS pump room would only alarm with a SIAS present. This design condition masked the inadequate negative pressure in the pump room when the ECCS ventilation surveillance was performed.

ANALYSIS OF EVENT

This event was conservatively reported under 10 CFR 50.72.b.2.iii.C four hour notification to the NRC as a "loss of safety function." However, the subsequent analysis prepared by FPL Nuclear Engineering as described below demonstrates that the ability of the ECCS ventilation system to perform its safety function as described in the Unit 1 FUSAR was not affected. Based upon this analysis, there was no loss of safety function with respect to ECCS ventilation capability. Additionally, the ECCS ventilation system was able to satisfy its operability requirements as outlined in Technical Specification 3.7.8.1's Limiting Condition for Operation and Surveillance Requirements with the condition described in this Licensee Event Report. Therefore, this Licensee Event Report is being submitted voluntarily for informational purposes.

The function of the ECCS ventilation system is two fold: First, one of the two trains of ventilation is needed to remove heat from the motors and other equipment in the ECCS pump room. Adequate ventilation is a function of air flow. As long as sufficient quantities of air flow through an area, acceptable equipment temperatures are maintained. During the surveillance, the ECCS fan low flow switches did not annunciate. This indicates that sufficient air was flowing through the ECCS area, therefore maintaining adequate equipment cooling. The second function of the ECCS ventilation system is to ensure that gaseous effluents are passed through charcoal filters prior to being discharged through the plant stack for monitoring. The Unit 1 FUSAR describes post-LOCA operation of the ECCS area ventilation system with a negative pressure between the ECCS pump room and the RAB hallway. This feature is intended to help minimize radioactive materials leaking from ECCS equipment during the recirculation phase of a LOCA. Without a negative pressure in the

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TEXT CONTINUATION**

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.8 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-830), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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

ANALYSIS OF EVENT (continued)

ECCS area, the ventilation system remains functional in that radioactive material will continue to be filtered in accordance with the design of the system. This is because the positive pressure differential observed is small, the ECCS pump room is sealed, and the primary exhaust path is through charcoal filters. Migration of radionuclides from the ECCS equipment area to other portions of the RAB due to a small positive pressure in the ECCS equipment room, with respect to the RAB hallway, has been evaluated as not significant.

An engineering analysis, (ref. PSL-1FJN-93-001 Rev 0), was performed on the contribution to 10 CFR 100 limits at the site boundary for leakage from the ECCS room resulting from a conservatively assumed 10 percent unfiltered release from the RAB. Possible impact on control room doses were also addressed. Results of this assessment indicate that off-site doses as stated in the FUSAR remain unchanged and continue to be a small fraction of the 10 CFR 100 limits. With regard to impact on control room doses since the source term for the control room analysis remains unchanged the control room doses also remain unchanged.

Another engineering analysis, (ref. JPN-PSL-SEMP-93-006 Rev. 0), was performed to determine if the ECCS area ventilation system would have met its design function based on the results of the surveillance conducted on January 28, 1993. Results indicated that even without a negative pressure in the ECCS room the system remains functional in that radioactive material will continue to be filtered in accordance with system design. This is judged to be the case since the positive pressure differential is small, the ECCS pump room is sealed, and the primary exhaust path is through charcoal absorbers.

Therefore, the health and safety of the public and onsite personnel was not affected by the conditions described in this LER.

CORRECTIVE ACTIONS

1. Operations performed an operability run on HVE-9A with the normal RAB exhaust fans, HVE-10A/HVE-10B, secured. Satisfactory negative pressure results were attained.
2. A dedicated licensed operator has been assigned to the control room staff, meeting the requirements of NRC generic letter 91-18. His sole responsibility is to secure the running normal RAB exhaust fan in the event of any SIAS or the implementation of the Control Room Inaccessibility procedure.
3. Procedure AP-1-0010125, "Schedule of Periodic Tests, Checks, and Calibrations", was changed to require the quantitative verification of ECCS pump room negative pressure by permanently installed instrumentation.
4. Operations is reviewing all operations surveillance test procedures on both units with respect to those that rely on the receipt of, or the absence of, an alarm condition to satisfactorily meet Tech Spec or design basis requirements. Vulnerabilities identified in this review will be evaluated for corrective actions.

**LICENSEE EVENT REPORT (LER)
TEXT-CONTINUATION**

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 30.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-330), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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

CORRECTIVE ACTIONS (continued)

5. Unit 2 control room circuitry was reviewed for design similarity to Unit 1. On Unit 2, SIAS is not required to initiate the inadequate negative pressure alarm for the ECCS pump room.

6. Troubleshooting was completed on the 'B' train ECCS ventilation system and the following deficiencies were identified and have been repaired or repairs are presently underway:

- All associated dampers were inspected for satisfactory operation and seal tightness. Several were identified with misadjusted linkages and/or limit switches. These discrepancies were rectified.
- System-wide flow balances and total flow checks were performed. Damper and louver adjustments were made to return the system to design specifications.
- System dampers were checked for proper positioning upon receipt of a safeguards signal. No discrepancies were noted.

ADDITIONAL INFORMATION

Failed Component Identification:

None

Previous Similar Events:

There are no previous LERs at St. Lucie which are similar to the condition described in this LER.