

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8704070388 DOC.DATE: 87/04/02 NOTARIZED: NO DOCKET #
 FACIL:50-389 St. Lucie Plant, Unit 2, Florida Power & Light Co. 05000389
 AUTH.NAME AUTHOR AFFILIATION
 GREEN,W.C. Florida Power & Light Co.
 WOODY,C.O. Florida Power & Light Co.
 RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 87-001-00:on 870303,auxiliary feedwater actuation signal received when util instrument & control technicians lost power to Channel D.Caused by combination of design, procedural & personnel errors.W/870402 ltr.

DISTRIBUTION CODE: IE22D COPIES RECEIVED:LTR 1 ENCL 1 SIZE:4
 TITLE: 50.73 Licensee Event Report (LER), Incident Rpt, etc.

NOTES:

	RECIPIENT ID CODE/NAME	COPIES LTR ENCL	RECIPIENT ID CODE/NAME	COPIES LTR ENCL
	PD2-2 LA	1 1	PD2-2 PD	1 1
	TOURIGNY,E	1 1		
INTERNAL:	ACRS MICHELSON	1 1	ACRS MOELLER	1 1
	ACRS WYLIE	1 1	AEOD/DOA	1 1
	AEOD/DSP/ROAB	2 2	AEOD/DSP/TAPB	1 1
	NRR/ADT	1 1	NRR/DEST/ADE	1 0
	NRR/DEST/ADS	1 0	NRR/DEST/CEB	1 1
	NRR/DEST/ELB	1 1	NRR/DEST/ICSB	1 1
	NRR/DEST/MEB	1 1	NRR/DEST/MTB	1 1
	NRR/DEST/PSB	1 1	NRR/DEST/RSB	1 1
	NRR/DEST/SGB	1 1	NRR/DLPQ/HFB	1 1
	NRR/DLPQ/GAB	1 1	NRR/DOEA/EAB	1 1
	NRR/DREP/EPB	1 1	NRR/DREP/RAB	1 1
	NRR/PMAS/ILRB	1 1	NRR/PMAS/PTSB	1 1
	REG FILE 02	1 1	RES SPEIS,T	1 1
	RGN2 FILE 01	1 1		
EXTERNAL:	EG&G GROH,M	5 5	H ST LOBBY WARD	1 1
	LPDR	1 1	NRC PDR	1 1
	NSIC HARRIS,J	1 1	NSIC MAYS,G	1 1

TOTAL NUMBER OF COPIES REQUIRED: LTR 41 ENCL 39

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) ST. LUCIE, UNIT 2	DOCKET NUMBER (2) 0 5 0 0 0 3 8 9	PAGE (3) 1 OF 0 3
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TITLE (4)
REACTOR TRIP DURING AUXILIARY FEEDWATER ACTUATION SYSTEM SURVEILLANCE DUE TO LOSS OF POWER SUPPLIES

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 N/A											
0	3	03	8	7	8	7	0	0	1	0	0	0	4	0	2	8	7			

OPERATING MODE (9) 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)									
POWER LEVEL (10) 1 0 0	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.406(a)	<input checked="" type="checkbox"/> 60.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)						
	<input type="checkbox"/> 20.406(a)(1)(i)	<input type="checkbox"/> 60.36(a)(1)	<input type="checkbox"/> 60.73(a)(2)(v)	<input type="checkbox"/> 73.71(e)						
	<input type="checkbox"/> 20.406(a)(1)(ii)	<input type="checkbox"/> 60.36(a)(2)	<input type="checkbox"/> 60.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 365A)						
	<input type="checkbox"/> 20.406(a)(1)(iii)	<input type="checkbox"/> 60.73(a)(2)(i)	<input type="checkbox"/> 60.73(a)(2)(viii)(A)							
	<input type="checkbox"/> 20.406(a)(1)(iv)	<input type="checkbox"/> 60.73(a)(2)(ii)	<input type="checkbox"/> 60.73(a)(2)(viii)(B)							
<input type="checkbox"/> 20.406(a)(1)(v)	<input type="checkbox"/> 60.73(a)(2)(iii)	<input type="checkbox"/> 60.73(a)(2)(ix)								

LICENSEE CONTACT FOR THIS LER (12)

NAME W. C. Green, Shift Tech. Advisor	TELEPHONE NUMBER
	AREA CODE 3 0 5 4 6 5 - 3 5 5 0

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS

SUPPLEMENTAL REPORT EXPECTED (14)

<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/> NO	EXPECTED SUBMISSION DATE (15)
		MONTH: DAY: YEAR:

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

ABSTRACT

On March 3, 1987, Unit #2, while operating in Mode 1 at 100 percent power, tripped on low Steam Generator (S/G) level while Instrument and Control personnel were performing the Auxiliary Feedwater Actuation System (AFAS) monthly functional test. The trip occurred when redundant power supplies were lost to one of the AFAS channels, which caused a B side Main Feedwater Isolation Valve (MFIV) to close leading to the low S/G level.

The root cause of this event involves a combination of design, procedural, and personnel errors which led to the loss of AFAS channel power.

Plant management and manufacturer representatives have decided to raise power supply over-voltage protection to setpoint to 15 volts to prevent recurrence. Appropriate changes will also be made to the vendor's technical manual.

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PDR ADOCK 05000389
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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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

DESCRIPTION OF EVENT

St. Lucie Unit #2 had been operating in Mode 1 at 100 percent power for the past 168 days, when an Auxiliary Feedwater Actuation Signal (AFAS) (EIIS:JE) was received. The AFAS channel actuation occurred when utility Instrument and Control technicians lost power to the D channel of the four channel system, while performing the AFAS monthly functional test. During performance of the approved procedure, it was discovered that one of the redundant power supplies to the D channel was reading out of specification. The procedure instructions were to remove the fuses of the one power supply, while adjustments are made to the other. While the technician was adjusting the power supply voltage to the desired value, the power supply shut down because its over-voltage protection set point was reached. All power to the D channel was lost causing one of the series of two B side Main Feedwater Isolation Valves (MFIV) (EIIS:SJ) to close. This prevented any feedwater from being supplied to the B Steam Generator (S/G) (EIIS:AB), which caused an immediate and continuous drop in B S/G level until approximately 20 seconds later when the reactor trip set point was reached. The Reactor Protective System (RPS) (EIIS:JC) initiated a reactor trip at 1423 hours on Thursday, March 3, 1987.

After the trip, because the B side off-site power start-up transformer (S/U xfrms) (EIIS:EA) was out of service due to maintenance being performed in conjunction with a Unit #1 refueling outage, the B side Emergency Diesel Generator (EDG) (EIIS:EK) started as designed and supplied power to the appropriate safety related components. The A side power was supplied by its designated off-site power S/U xfrms. Because of the loss of B side non-safety related equipment power, 2 of 4 Reactor Coolant Pumps (RCPs) (EIIS:AB) and 2 of 4 Circulating Cooling Water Pumps (CIRCs) (EIIS:KE) were deenergized. No problems resulted.

Both Steam Generator Feed Pumps (SGFP) (EIIS:SJ) were briefly lost. The B SGFP was lost due to deenergization of the B side non-safety loads. The A side Main Feedwater System (MFW) (EIIS:SJ) was also lost. An investigation was performed but the actual cause was not determined. With no MFW to the S/Gs, levels reached the Engineering Safety Feature Actuation System (ESFAS) (EIIS:JE) setpoint and Auxiliary Feedwater Pumps (AFPs) (EIIS:BA) automatically started to refill the S/Gs. The Main Steam Isolation Valves (MSIV) (EIIS:SB) were closed 3 minutes after the trip to maintain the existing S/G inventory. Eventually the Main Steam Safety Valves (MSSV) (EIIS:SB) set point was reached and the valves lifted. The A side MFW was reestablished about 6 minutes into the event. One MSSV remained partially open for approximately 18 minutes and then reseated. After visual verification of the MSSVs reseating the plant was stabilized in Mode 3 hot standby. S/G levels were restored to their normal post trip levels by using the SGFP and AFP. Reactor coolant system (RCS) (EIIS:AB) temperatures were controlled by the Atmospheric Dump valves (ADV) (EIIS:SB).

The plant Sequence of Events Recorder (EIIS:IQ) was out of service at the time of the trip for maintenance. No other components or system failures occurred other than those previously mentioned. A post trip review was conducted.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		0 0 1	0 0	0 0	0 3	OF 0 3

TEXT (If more space is required, use additional NRC Form 368A's) (17)

CAUSE OF THE EVENT

The root cause of this event involves a combination of design, procedural, and personnel errors. The original design of the AFAS is such that each channel power supply circuitry has a 2.5 volt voltage drop between the power supply output and the point where its output is measured. This was discovered during the AFAS unit start-up preoperational test in 1983. The AFAS Technical Manual was not changed to reflect the voltage drop in the channels. Thus, when the D channel power supply was being adjusted during the monthly functional test, the unexpected voltage drop was enough to cause the actual voltage to be too high. This resulted in an automatic power supply over-voltage shutdown and subsequent total loss of D channel power.

ANALYSIS OF THE EVENT:

The event is reportable under 10 CFR 50.73 (a) .(2) (iv) as any event or condition that results in an automatic actuation of the RPS or ESFAS. This event when compared against the analysis in section 15.2.5.2 of the St. Lucie Unit #2 Final Updated Safety Analysis Report (FUSAR) is determined to be of little significance. The actual plant response was more conservative than the FUSAR analysis because there was only partial loss of off-site power and MFW, where as the FUSAR analysis assumes total loss of both and that the reactor tripped on high RCS pressure not on low S/G level. The health and safety of the public were not affected by this event.

CORRECTIVE ACTIONS

Plant management personnel have contacted and reviewed this event with the AFAS designer. The event has been analyzed and it has been decided upon to raise the over-voltage protection set point of the power supply from 13.5 volts to 15 volts and make appropriate changes in the technical manual.

ADDITIONAL INFORMATION

FAILED COMPONENT INFORMATION:

No component or system failures occurred during this event, because the power supply functioned as designed and the MSSV did reset.

PREVIOUS SIMILAR EVENTS:

See LER 335-84-059 for a previous reactor trip which occurred due to a different root cause, while performing the AFAS monthly.



APRIL 03 1987

L-87-153
10 CFR 50.73

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

Gentlemen:

Re: St. Lucie Unit 2
Docket No. 50-389
Reportable Event: 87-01
Date of Event: March 3, 1987
Reactor Trip During Auxiliary Feedwater
Actuation System Surveillance Due to Design Error

The attached License Event Report is being transmitted pursuant to the requirements of 10 CFR 50.73.a to provide notification of the subject event.

Very truly yours,

C. O. Woody
C. O. Woody
Group Vice President
Nuclear Energy

COW/GRM/gp

Attachment

cc: Dr. J. Nelson Grace, Regional Administrator, Region II, USNRC
USNRC Senior Resident Inspector, USNRC, St. Lucie Plant

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