NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
St. Lucie Unit 2	0 5 0 0 0 3 8 9	1 OF 0 3

TITLE (4)
Manual Reactor Trip-Exciter TCW Leak Followed by Local Power Density Trip

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)
										N/A	0 5 0 0 0
0 1	0 7	8 6	8 6	—	0 0 1	— 0 0	0 2	0 5	8 6		0 5 0 0 0

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)	0 8 8	20.402(b)	20.405(c)	X 50.73(a)(2)(iv)	73.71(b)
		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)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		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	TELEPHONE NUMBER
	AREA CODE
S. E. Mohn - Technical Staff	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 NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	
B	K B	D R N	W 2 0	Y							

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

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

DESCRIPTION OF EVENT:

On January 7, 1986, St. Lucie Unit 2 was manually tripped due to a Turbine Cooling Water (TCW) (KB) leak in the main generator exciter housing (TL). The TCW (KB) leak was repaired and the unit was restarted. The reactor core (AC) is near end of core life and experienced a large negative axial shape index (ASI) during power ascension. The unit tripped on local power density (LPD) after the main generator (TB) was syncronized to the grid and caused power to exceed the LPD trip which enabled at 15 percent reactor power. The unit was restarted and maintained at low power until ASI was more favorable for power ascension.

CAUSE OF EVENT:

The TCW (KB) leak was from a wear hole in a 1/2" drain line caused by an installation error which allowed vibration against an adjacent structure. The LPD trip was due to a cognitive licensed personnel error.

CORRECTIVE ACTIONS:

1. The TCW drain line was repaired and securely mounted.
2. Operating Procedure 2-0030122 will be revised to include a caution on power ascension during unfavorable ASI conditions.

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

DESCRIPTION OF EVENT: On January 7, 1986, St. Lucie Unit 2 was operating at full power in Mode 1. During the early morning hours operational personnel had noticed an unusual odor in the vicinity of the generator excitor housing (TW). An inspection of the area did not reveal the source of the odor nor were there any abnormal alarms to indicate any problems. The Nuclear Plant Supervisor (NPS) informed the Plant Management and the site Westinghouse representative of the unusual odor during the 0730 hour morning meeting. After the meeting, the Westinghouse representative visually inspected the generator excitor housing (TL). The Westinghouse representative discovered a Turbine Cooling Water (TCW) (KB) leak in the excitor housing (TL). A controlled shutdown of Unit 2 was commenced at 0818 hr.

At 0830 hr, the shutdown was progressing smoothly with the Unit at 88 percent power (810 MWE). However, the TCW (KB) leak appeared to be getting worse. The NPS instructed the Reactor Control Operators (RCO) to insert a manual reactor trip at 0831 hrs.

The reactor trip was observed to be normal. All systems operated as required including the Auxiliary Feedwater Actuation Signal (AFAS) (BA) which initiated on low Steam Generator (SG) level. By 0909 AFAS (BA) was reset and the Unit entered the Post Trip Recovery procedures in preparation for startup.

The TCW (KB) leak was repaired and the reactor was returned to critical operations at 1250 hrs.

Unit 2 is near end of core life for this fuel cycle and is experiencing Axial Shape Index (ASI) oscillations. During the startup, the ASI became increasingly more negative. To counteract this the RCO's drove group 5 control rods (AA) into the upper half of the core to reduce the negative ASI. The RCO's were unable to reduce the ASI sufficiently. The four Reactor Protection System (RPS) (JD) ASI channels were near their negative ASI setpoints and were giving intermittent pre-trip alarms. The RCO's were cognitive of this and knew that they must maintain the reactor power less than 15 percent below the Local Power Density (LPD) trip enable setpoint (JD).

The RCO's believed they could syncronize the generator to the grid and maintain reactor power less than 15 percent. While monitoring nuclear power instrumentation (JD) the RCO's syncronized the generator to the power grid at 1838 hrs. The sudden increase in steam demand caused a greater than anticipated reactor power increase. The RCO's saw the power increase and attempted to arrest it by driving in the control rods (AR), however they were too late. At 1840 the reactor tripped on LPD.

The reactor trip was observed to be normal. All systems operated as required and the plant was stabilized in mode 3.

At 2317 has a normal reactor startup was commenced. The reactor was critical at 2400 hours and was kept at a low power level until the ASI was favorable for power escalation. The unit was again at full power by 1530 hrs on January 8, 1986.

CAUSE OF EVENT: The TCW (KB) leak was due to mechanical vibrational wear of the drain line from the inner TCW cooler (KB). The drain line was rubbing against an adjacent metal structure due to a construction installation error. The manual reactor trip (JD) was inserted due to the potential main generator (TB) and excitor (TL) damage which would have resulted from the TCW leak.

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

The direct cause of the reactor trip was a cognitive personnel error by the licensed operators. The operators misjudged their ability to maintain reactor power below the 15% LPD trip enable setpoint with the turbine generator synchronized to the grid.

ANALYSIS:

This event is considered reportable under 10 CFR 50.73 (a) (2) (IV) due to the manual and automatic actuation of the Reactor Protection System (RPS) and automatic actuation of auxiliary feedwater.

The manual reactor trip was inserted as a precaution due to the potential for damage to the main generator and exciter. All systems operated as required and the unit was stabilized.

The LPD trip is intended to protect the reactor core from exceeding the linear power limit. The setpoints for the LPD are conservative and well within the allowed Technical Specifications limits of 2.2. At no time during this event was the unit allowed to enter an unsafe or unanalyzed condition. The health and safety of the public was not affected by this event.

CORRECTIVE ACTION:

1. The drain line of the TCW cooler was repaired and securely mounted to preclude further mechanical wear.
2. The Operating Procedure 2-0030/22-"Reactor Start-up" is to be revised to include a caution statement. It will advise operators to remain at low power until ASI is favorable for power escalation.

ADDITIONAL INFORMATION:

The failed TCW line has 1/2 " copper tubing. This the first LER for reactor trips from these causes.

FLORIDA POWER & LIGHT COMPANY

FEB 6 1986

L-86-49

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

Gentlemen:

Re: Reportable Event 86-1
St. Lucie Unit 2
Date of Event: January 7, 1986
Manual Reactor Trip - Exciter Turbine Cooling
Water Leak Followed By Local Density Trip.

The attached Licensee Event Report is being submitted pursuant to the requirements of 10 CFR to provide notification of the subject event.

Very truly yours,

C. O. Woody
Group Vice President
Nuclear Energy

COW/SAV:dh

Attachment

cc: Dr. J. Nelson Grace, Region II, USNRC
Harold F. Reis, Esquire
File 933.1
PNS-LI-86-35

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