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ACCESSION, NBR: 9212310117 DOC. DATE: 92/12/23 NOTARIZED: NO DOCKET #
 FACIL: 50-389 St. Lucie Plant, Unit 2, Florida Power & Light Co. 05000389
 AUTH. NAME AUTHOR AFFILIATION
 YOUNG, R.J. Florida Power & Light Co.
 SAGAR, D.A. Florida Power & Light Co.
 RECIPIENT NAME RECIPIENT AFFILIATION

SUBJECT: LER 92-008-00: on 921105, digital data process sys indicated power level slightly greater than 100%, due to RTD instrument error. Failed RTDs will be evaluated by consultant for root cause analysis. W/921223 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 6
 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

NOTES:

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INTERNAL:	ACNW	2	2	ACRS	2	2
	AEOD/DOA	1	1	AEOD/DSP/TPAB	1	1
	AEOD/ROAB/DSP	2	2	NRR/DET/EMEB 7E	1	1
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A0-4



December 23, 1992

L-92-350

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

Re: St. Lucie Unit 2
Docket No. 50-389
Event: 92-008
Date of Event: November 5, 1992
DDPS Calorimetric Error due to
Instrument Calibration Error

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

Very truly yours,

D.A. SAGER

By G.J. Biny

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 #832-92

310027

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) St. Lucie Unit 2	DOCKET NUMBER (2) 05000389	PAGE (3) 1 OF 4
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TITLE (4) **Digital Data Process System Calorimetric Error due to Instrument Calibration Error.**

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)							
1	1	05	9	2	0	0	8	0	0	0	1	2	2	3	9	2	N/A	01510101
												N/A	01510101					

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	20.402(b)			20.405(c)			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 Robert J. Young, Shift Technical Advisor	TELEPHONE NUMBER
	AREA CODE 4 0 7
	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
X	I O	R T D	R 1 3 5	Y					

SUPPLEMENTAL REPORT EXPECTED (14)

<input checked="" type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)	<input type="checkbox"/> NO	EXPECTED SUBMISSION DATE (15)	MONTH 0 2	DAY 2 8	YEAR 9 3
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ABSTRACT (Limit to 1400 spaces, i.e. approximately fifteen single-space typewritten lines) (16)

On 5 November 1992, St. Lucie Unit 2 was in mode 1 operating at 100% steady state power. Utility Instrumentation and Control (I&C) personnel were implementing a plant modification to replace six resistance temperature detectors (RTDs) for the main feedwater system. These RTDs provide inputs to the digital data process system (DDPS) and are used in the calorimetric power calculation. Upon installation of the new RTDs the DDPS indicated a power level slightly greater than 100%. Utility operators reduced power until the DDPS indicated less than 100%. It was noted that lower feedwater temperature readings were being obtained from the new RTDs. The original RTDs were subsequently determined to be incorrectly reading main feedwater temperatures.

The cause of this event was RTD instrument error. A review of historical data showed that the RTD error had been slowly increasing since Unit 2 startup in 1984. The root cause of the instrument error is under investigation.

Corrective actions taken were: 1) Operations reduced unit power to less than 100%, 2) I&C personnel determined that the new RTDs were functioning correctly, 3) A review of historical data for St. Lucie Unit 1 from 1982 to present verified that there were no similar instrument errors, 4) At plant management's request FPL Nuclear Engineering performed an evaluation and concluded that St. Lucie Unit 2 was operating within its safety analysis, 5) I&C personnel verified that all other calorimetric DDPS inputs were correct and only the main feedwater RTDs were reading erroneously, 6) The failed RTDs are being examined by a consultant for root cause analysis.

This Licensee Event Report is being submitted voluntarily.

**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 2	DOCKET NUMBER (2) 05000389	LER NUMBER (6)			PAGE (3)	
		YEAR 92	SEQUENTIAL NUMBER 008	REVISION NUMBER 00	02	OF 04

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

DESCRIPTION OF EVENT

On 5 November 1992, St. Lucie Unit 2 was in mode 1 operating at 100% steady state power. Utility Instrumentation and Control (I&C) personnel were replacing six resistance temperature detectors (RTDs) that are inputs to the digital data process system (DDPS) (EII:SIO) for temperature of the main feedwater system (EII:SJ). These inputs are used by the DDPS in the calculation of calorimetric power. Upon installation of the new RTDs the DDPS power indicated approximately 1% greater than 100% power. Utility operators reduced the Unit power level until a DDPS indicated power level less than 100% was obtained.

Plant personnel determined that temperature differences existed between the feedwater temperature inputs to the DDPS before and after the installation of new RTDs. I&C personnel performed a calibration test on the original RTDs and found that five of the six RTDs read high by an average of 5.5 degrees Fahrenheit (One RTD was damaged during removal). The instrument error resulted in a DDPS reactor power calculation that was lower than actual power. I&C compared the calibration data of the new RTDs with the vendor data and concluded that the new RTDs were reading correctly.

CAUSE OF EVENT

The cause of this event was main feedwater temperature instrument error. The root cause for the RTD instrument error is under investigation. A review of historical data, since Unit 2 startup in 1984, revealed that the RTD instrument error had been increasing at a very slow rate. A review of historical data for St. Lucie Unit 1 since 1982, did not reveal any similar problems and the same model of RTDs are not installed on Unit 1.

Contributing factors to this event included: 1) DDPS instrument limits (deadband or acceptance limits), which are a part of the software package, force the DDPS to accept only those inputs that are within set limits. If the inputs are within these limits then the DDPS considers them believable. The DDPS limits were set at a 10 degrees Fahrenheit input comparison which allowed all of the feedwater temperature inputs to be used for the DDPS calculations even though the RTD inputs had drifted high. 2) The main feedwater temperature instrument loops are periodically calibrated, but their RTDs are not routinely calibrated. This is due to the risk of damaging the RTDs when removing them from their thermowells. These two factors contributed to the inability to detect the slowly increasing instrument error.

ANALYSIS OF EVENT

This event is being reported voluntarily for informational purposes.

A representative sample of manual calorimetrics performed as per OP 2-3200020, Primary System Manual Calorimetric, were reviewed. All manual calorimetrics were found to be within the 2% procedural limit when compared with the DDPS calorimetric power. Manual calorimetrics are an independent check of DDPS calorimetric power and are performed using instrument readings on the Reactor Turbine Generator Boards (RTGBs) (EII:IU) and use a different style of feedwater temperature instruments than the RTDs used to provide input to the DDPS.

**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-503), U.S. NUCLEAR REGULATORY COMMISSION,
WASHINGTON, DC 20545; AND TO THE PAPERWORK REDUCTION PROJECT (3150-0184), OFFICE
OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) St. Lucie Unit 2	DOCKET NUMBER (2) 0500389	LER NUMBER (6)			PAGE (3)		
		YEAR 92	SEQUENTIAL NUMBER 008	REVISION NUMBER 00			
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TEXT (If more space is required, use additional NRC Form 366A's) (17)

ANALYSIS OF EVENT (continued)

FPL Nuclear Engineering evaluated this event using a conservative approach. Calculations performed show that with the observed feedwater RTD error the actual nominal unit power was 101.04% with an additional instrument uncertainty of up to +0.95%. This power level is the worst case since a review of historical data revealed that the RTD error had been increasing at a very slow rate since 1984. From the evaluation it is concluded that St. Lucie Unit 2 was operating within the bounds of its FSAR Chapter 15 safety analysis which assumes a maximum power level of 102% (100% nominal power level plus 2% due to calibration and instrument errors). The Bases for the Technical Specifications also take into account variations due to calibration and instrument error for the Variable High Power Trip.

The health and safety of the public were unaffected by this event.

CORRECTIVE ACTIONS

1. Operations reduced Unit 2 power to maintain DDPS indicated power below 100%.
2. I&C sent the failed RTDs to an independent laboratory for analysis of root cause. Appropriate corrective actions will be applied when this analysis is complete. As an interim measure, Operations will perform a channel check of feedwater temperatures when performing Manual Calorimetrics.
3. I&C personnel reviewed the calibration test data and determined that the newly installed main feedwater RTDs were functioning correctly (the new RTDs are made by a different manufacturer than the original RTDs).
4. Plant performance, MWs generated, and MWs expected were examined for St. Lucie Unit 1 to determine if a similar problem existed for that unit. No adverse trends were noted.
5. A historical review of the St. Lucie Unit 1 DDPS feedwater temperature inputs from 1982 to the present verified that no inconsistencies existed to give an erroneous DDPS calorimetric power.
6. An I&C generated calibration curve for the newly installed RTDs was compared to a vendor supplied calibration curve with minimal differences detected. This allows a high degree of confidence in the new RTD curves.
7. At the request of plant management, Nuclear Engineering performed an evaluation, JPN-PSL-SEIS-92-018, and determined that St. Lucie Unit 2 did not operate outside of its FSAR Chapter 15 safety analysis.
8. I&C determined that a tighter instrument deadband of a nominal 5 degrees Fahrenheit should be maintained in the DDPS software for RTD instrument input comparisons and has made the change.
9. I&C determined that RTDs of the same model are not installed in other Unit 1 or Unit 2 systems.
10. I&C determined only the Unit 2 main feedwater RTDs provided erroneous input to the DDPS.

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

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AND REPORTS MANAGEMENT BRANCH (P-330), U.S. NUCLEAR REGULATORY COMMISSION,
WASHINGTON, DC 20545, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE
OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) St. Lucie Unit 2	DOCKET NUMBER (2) 05000389	LER NUMBER (6)			PAGE (3)	
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		92	008	00	04	OF 04

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

ADDITIONAL INFORMATION

Component Failure

RDF Corporation
RTD part number 21453

Previous Similar Events

No other LERs pertaining to inaccurate RTDs were identified.

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)

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RTD part number 21453

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