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ACCESSION NBR: 9305180328 DOC. DATE: 93/05/10 NOTARIZED: NO DOCKET #
 FACIL: 50-335 St. Lucie Plant, Unit 1, Florida Power & Light Co. 05000335
 AUTH. NAME AUTHOR AFFILIATION
 YOUNG, R.J. Florida Power & Light Co.
 SAGER, D.A. Florida Power & Light Co.
 RECIPIENT NAME RECIPIENT AFFILIATION

SUBJECT: LER 93-004-00: on 930409, typo discovered in rept used to determine RPS low RCS flow trip setpoint. Error existed since Aug 1988. Caused by design control inadequacy. Engineering package developed to correct calculations. W/930510 ltr.

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May 10, 1993

L-93-129
10 CFR 50.73

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

Re: St. Lucie Unit 1
Docket No. 50-335
Reportable Event: 93-004
Date of Event: April 9, 1993
Incorrect RCS Low Flow Trip Setpoint
due to a Design Error

The attached Licensee Event Report is being submitted pursuant to the requirements of 10 CFR 50.73 to provide notification of the subject event.

Very truly yours,

A handwritten signature in cursive script, appearing to read "D. A. Sager", is written over the typed name.

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 #917-93

170033

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PDR ADDCK 05000335
S PDR

an FPL Group company

A handwritten signature in cursive script, possibly reading "JWH", is written in the bottom right corner of the page.

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-630), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20546, 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) 051010335	PAGE (3) 1 OF 04
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TITLE (4) **Incorrect Reactor Coolant System Low Flow Trip Setpoint results in a condition prohibited by Technical Specifications due to a Design Control Inadequacy.**

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)
04	09	93	93	004	00	05	10	93	N/A		01510101
									N/A		01510101

OPERATING MODE (9) 6	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR : (Check one or more of the following) (11)						
POWER LEVEL (10) 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)		X 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 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)	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO				

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

On April 9, 1993, St. Lucie Unit 1 was in Mode 6 when a typographical error was discovered by FPL Nuclear Engineering in a report used to determine the Reactor Protection System (RPS) low Reactor Coolant System (RCS) flow trip setpoint. Technical Specification 2.2.1, Table 2.2-1 states that the trip setpoint will be greater than or equal to 95% of design reactor coolant flow. The FPL Nuclear Engineering report, which described the conversion of pressure drop across the steam generators to the RPS low RCS flow trip setpoint, contained an incorrect constant. The report was subsequently transmitted to the plant staff and the Instrument and Control Department adjusted the RCS low flow setpoint. This error caused the setting of the RCS low flow trip setpoint to a value approximately 3% below the minimum 95% of design flow. This setpoint error existed since August 1988.

The root cause of this event was a design control inadequacy. A typographical error was made in the report transmitted to the plant staff. The error would have been discovered if the review process for the transmitted report had undergone an independent review. The Nuclear Engineering process currently in place prevents a similar event from occurring by requiring independent review of transmitted setpoints.

Corrective actions for this event: An engineering evaluation was performed that concluded that the operation of Unit 1 during this time period was within the bounds of the safety analysis. A review of the procedure used to determine the Unit 2 low RCS flow setpoint verified that it did not contain a similar error. After a review of internal records, Nuclear Engineering verified that no other Unit 1 or 2 RPS setpoint changes were transmitted to the plant in error. An engineering package was developed to provide the corrected calculations for determination of the RPS reactor coolant system low flow trip setpoint. Instrumentation and Control personnel will revise appropriate procedures and install the correct trip setpoint in the Unit 1 RPS prior to entering mode 2. Prior to discovery of this event, Engineering adopted a process requiring independent review of setpoints before transmittal to the plant staff.

**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-300), 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 1	DOCKET NUMBER (2) 0 5 0 0 0 3 3 5	LER NUMBER (6)			PAGE (3)		
		YEAR 9 3	SEQUENTIAL NUMBER 0 0 4	REVISION NUMBER 0 0			

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

DESCRIPTION OF THE EVENT

On April 9, 1993, with Unit 1 in Mode 6, FPL Nuclear Engineering performed a review of the calculations that are contained in the St. Lucie Unit 1 Low Flow Trip Setpoint Calibration Guidelines. The review was being performed to support a proposed change to the steam generator tube plugging criteria. During this review, a typographical error in a report that described conversion of pressure drop across the Steam Generators (E11S:AB) to the Reactor Protection System (RPS) (E11S:JC) Reactor Coolant System (RCS) low flow trip setpoint was found. The error resulted in the calculation of a non-conservative setpoint with which the RPS creates an automatic reactor trip to protect against a loss of RCS flow. This error caused the RPS low RCS flow trip setpoint to be approximately 3 percent below the Technical Specification minimum of 95 percent of design flow.

In 1987 the report containing the incorrect information was sent to the plant staff to support a modification to the RPS. In August 1988, the report was referenced when the modification to the RPS was implemented and was used to modify plant procedures for the initial setting and subsequent monthly checks of this RPS low flow trip setpoint. This condition was discovered in April of 1993.

CAUSE OF EVENT

The root cause of this event was a design control inadequacy. A typographical error was made by FPL Nuclear Engineering in the transmittal of a calculated setpoint to the plant staff. During a transfer of information from an independently verified engineering calculation to a report, a transcription error caused a constant that converts pressure drop across the Steam Generators to the low RCS flow trip setpoint to be non-conservative. The incorrect report would have been discovered and corrected had the transmitted report to the plant staff received the same independent review that the original calculation had received. Prior to the discovery of this event, FPL Nuclear Engineering adopted the process for requiring independent review of all setpoints before transmittal to the plant staff.

ANALYSIS OF EVENT

This event is reportable under 10CFR50.73(a)(2)(i)(B), as "Any operation or condition prohibited by the plant's Technical Specifications." Technical Specification 2.2.1 requires that the RPS trip setpoint for RCS low flow be set at or above 95 percent of design flow (370,000 gpm). For cycles 9, 10 and 11 of Unit 1 operation, the RCS low flow trip was erroneously set at slightly higher than 92 percent of design flow.

The RCS low flow trip setpoint ensures that for a degradation of RCS flow resulting from analyzed transients, a reactor trip occurs to prevent departure from nucleate boiling ratio (DNBR) safety limits. The process signal for this function is developed from four independent differential pressure channels which measure the pressure drop across the primary side of both Steam Generators. The total Steam Generator pressure drop is compared with the low RCS flow trip setpoint. If two channels indicate a flow which is less than the trip setpoint, an RPS trip signal is initiated.

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

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION
REQUEST: 30 21 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS
AND REPORTS MANAGEMENT BRANCH (P-303), 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 1	DOCKET NUMBER (2) 0 5 0 0 0 3 3 5	LER NUMBER (6)			PAGE (3)	
		YEAR 9 3	SEQUENTIAL NUMBER 0 0 4	REVISION NUMBER 0 0	0 3	OF 0 4

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

ANALYSIS OF EVENT (continued)

An evaluation (JPN-PSL1-SEFJ-93-006) was performed by FPL Engineering to determine the available safety analysis margin for the most limiting transients (loss of offsite power and loss of RCS flow) for which protection is provided by the RCS low flow trip. The results show that the approximate 3 percent setpoint error is sufficiently offset by available flow margin. Thus, violation of the DNBR limit for a loss of offsite power or a loss of RCS flow event would not have occurred if there had been a degradation of RCS flow event during the time period that the setpoint error was in place. (A review of Unit 1 reactor trips showed that the RCS low flow trip function was not challenged during cycles 9,10 and 11. An additional review of actual operating conditions during cycles 9, 10, and 11 was performed to ensure that no other condition existed that would further aggravate the condition described in this LER).

The Reactor Coolant Pump (RCP)(E1S:P) seized rotor event has been reanalyzed by the fuel vendor for a 4 percent reduction in design flow and the corresponding 4 percent reduction in the RCS low flow trip setpoint. The analysis shows that the acceptance criteria for the postulated RCP seized rotor event was not violated. Therefore, the health and safety of the public was not affected by this condition.

CORRECTIVE ACTIONS

1. Prior to the discovery of this event, Nuclear Engineering proceduralized a review process to ensure the accuracy of setpoints and plant changes. This process requires an independent verification of setpoints and plant changes before transmittal to the plant staff, and would have detected the error described in this report.
2. Nuclear Engineering prepared an engineering evaluation and determined that operation of Unit 1 was bounded by the safety analyses for Cycles 9, 10, and 11.
3. Nuclear Engineering reviewed internal records and verified that no other Unit 1 or 2 RPS setpoint changes were transmitted to the plant staff in error.
4. Nuclear Engineering reviewed the Unit 2 RCS Low Flow Trip Setpoint Determination procedure and verified that it did not use erroneous data.
5. A FPL engineering package was developed to document and transmit the corrected calculation for the Unit 1 RPS low RCS flow trip setpoint.
6. The I&C Department will revise procedures 1-0120050 Reactor Protection System RCS Low Flow Trip Setpoint Determination and 1-1400050 Reactor Protection System - Monthly Functional Test to reflect the correct RCS low flow trip setpoints prior to Unit 1 entering Mode 2.
7. The I&C Department will make the RPS low RCS flow trip setpoint changes prior to Unit 1 entering Mode 2.



**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-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.

FACILITY NAME (1) St. Lucie Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 3 3 5	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		9 3 -	0 0 4	- 0 0	0 4	OF 0 4

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

ADDITIONAL INFORMATION

FAILED COMPONENT IDENTIFICATION

None

PREVIOUS SIMILAR EVENTS

A previous similar LER at St. Lucie involving a design error for the RPS was:

LER 335-79-30 Steam Generator Low Level RPS trip setpoints less than Technical Specifications due to a design error.