

# CATEGORY 1

## REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9610230155      DOC. DATE: 96/10/17      NOTARIZED: NO      DOCKET #  
 FACIL: 50-335 St. Lucie Plant, Unit 1, Florida Power & Light Co.      05000335  
 AUTH. NAME      AUTHOR AFFILIATION  
 BENKEN, E.J.      Florida Power & Light Co.  
 STALL, J.A.      Florida Power & Light Co.  
 RECIP. NAME      RECIPIENT AFFILIATION

SUBJECT: LER 96-013-00: on 960918, operation prohibited by TS occurred due to failure to bypass inoperable ESF channel within required action time. Self assessment performed by operating crew. W/961017 ltr.

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Florida Power & Light Company, P.O. Box 128, Fort Pierce, FL 34954-0128

October 17, 1996

L-96-253  
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: 96-013  
Date of Event: September 18, 1996  
Operation Prohibited by Technical Specifications due to Failure to Bypass  
Inoperable Engineered Safety Feature Channel within the Required Action Time

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 dark ink, appearing to read 'JAS' or similar, enclosed in a simple oval scribble.

J. A. Stall  
Vice President  
St. Lucie Plant

JAS/EJB

Attachment

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

9610230155 961017  
PDR ADOCK 05000335  
S PDR

Handwritten initials 'JED' followed by a vertical line, possibly indicating a date or a specific reference.

**LICENSEE EVENT REPORT (LER)**

(See reverse for required number of digits/characters for each block)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 60.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (IT-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20566-0001, 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

PAGE (3)

1 OF 6

TITLE (4)

Operation Prohibited by Technical Specifications due to Failure to Bypass an Inoperable Engineered Safety Feature Channel within the Required Action Time

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 NAME	DOCKET NUMBER
09	18	96	96	013	00	10	17	96	N/A	
									N/A	

OPERATING MODE (9)	POWER LEVEL (10)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more) (11)							
1	100	20.2201(b)		20.2203(a)(2)(v)	X	50.73(a)(2)(i)		50.73(a)(2)(viii)	
		20.2203(a)(1)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)	
		20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71	
		20.2203(a)(2)(iii)		20.2203(a)(4)		50.73(a)(2)(iv)		OTHER	
		20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A	
		20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)			

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Edwin J. Benken, Licensing Engineer	(561) 467 - 7156

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	JE	RJX	S635	Y					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On September 18, 1996, St. Lucie Unit 1 was operating in Mode 1 at 100 percent reactor power. At approximately 1945, a 1B steam generator pressure instrument supplying input to the Engineered Safety Features Actuation System (ESFAS) logic for the main steam isolation signal (MSIS) failed. St. Lucie Unit 1 Technical Specifications require that the inoperable channel be placed in bypass or a trip condition within one hour. Operations personnel incorrectly placed the wrong MSIS bistable trip unit in bypass. As a result, the correct MSIS bistable trip unit associated with the failed instrument was not placed in the bypass or trip condition within 1 hour as required by the plant Technical Specifications. This constitutes a condition prohibited by plant Technical Specifications. The correct channel was subsequently placed in bypass upon discovery of the error.

The event was caused by personnel error, with the lack of adequate labeling and procedural guidance being substantial contributing factors.

Corrective actions include: 1) The correct ESFAS component was bypassed as required by plant Technical Specifications. 2) Labeling changes were made to correct the deficiencies at the ESFAS cabinets and on keys used to perform bypassing at those panels. 3) The event and corrective actions were reviewed with the operating crews and additional guidance was provided. 4) Administratively controlled key labeling is being upgraded. 5) The event is being included in licensed operator training. 6) Additional procedural guidance is to be developed to address ESFAS instrumentation failures. 7) A human factors review of the ESFAS cabinets is being performed to determine if additional improvements can be made.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

FACILITY NAME (1)  ST. LUCIE UNIT 1	DOCKET  05000335	LER NUMBER (6)			PAGE (3)  2 OF 6
		YEAR  96	SEQUENTIAL  013	REVISION  00	

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

**DESCRIPTION OF THE EVENT**

On September 18, 1996, St. Lucie Unit 1 was operating in Mode 1 at 100 percent reactor power. At 1945, while restoring instrumentation following the performance of an Area Radiation Monitoring System Periodic Test, a utility licensed operator in the control room noted that an automatic test insertion (ATI) fault light would not reset on the engineered safety features actuation system (ESFAS) panel (EIS:JE). From the indication on the ESFAS panel, it was determined that the cause of this condition was associated with a pressure input for the 1B steam generator (SG) main steam isolation signal (MSIS) (EIS:JE). All other indications on the ESFAS panel and in the control room were normal for steam generator pressure. The Nuclear Plant Supervisor (NPS) and the Instrument and Control (I&C) Department were notified. At 2030, I&C technicians confirmed that the 1B SG pressure input on ESFAS channel D was the cause of the ATI fault.

The operators declared the 1B SG MSIS for ESFAS channel D out of service as of 1945. St. Lucie Unit 1 Technical Specification (TS) 3.3.2.1 requires, in part, that, with the number of operable channels one less than the total number of channels, operation may proceed provided the following conditions are satisfied:

- a. The inoperable channel is placed in either the bypassed or tripped condition within 1 hour.
- b. Within one hour, all functional units receiving an input from the inoperable channel are also placed in the same condition (either bypassed or tripped, as applicable) as that required by the above for the inoperable channel.
- c. The minimum channels operable requirement is met; however, one additional channel may be bypassed for up to 48 hours while performing tests and maintenance on that channel provided the other inoperable channel is placed in the tripped condition.

At 2045, in accordance with TS requirements, utility licensed operators took actions to bypass the SG 1B pressure MSIS bistable trip for ESFAS channel D, and also bypass the functional trip units on the reactor protection system (RPS) (EIS:JC) and auxiliary feedwater actuation system (AFAS) (EIS:BA) receiving input from the inoperable SG pressure channel.

On September 19, 1996, at approximately 0700, a utility I&C supervisor reviewing the status of the ESFAS discovered that the SG 1A pressure MSIS bistable trip for ESFAS channel D had been bypassed rather than the SG 1B pressure MSIS bypass trip. The condition was then brought to the attention of the licensed operators in the control room. At 0708, operators restored the SG 1A pressure MSIS bistable trip for ESFAS channel D to operable status and correctly bypassed the SG 1B pressure MSIS bistable trip for the D ESFAS channel. Plant management and the NRC resident inspector were notified of the event.

A failed 15 volt regulated power supply was subsequently determined to have caused the 1B SG pressure MSIS failure on Channel D of ESFAS. The power supply was replaced and the channel was returned to service at 1638 on September 19, 1996.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL	REVISION	
ST. LUCIE UNIT 1	05000335	96	-- 013	-- 00	3 OF 6

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

CAUSE OF THE EVENT

The immediate cause of this event was cognitive personnel error by a utility licensed operator who incorrectly bypassed the SG 1A pressure MSIS bistable trip on ESFAS channel D, when required by Technical Specifications to place the inoperable channel (SG 1B pressure MSIS bistable trip) in the bypass or trip condition. Additionally, an independent verification performed by a second licensed operator failed to identify the error.

The root causes of this event were a combination of inadequate labeling of the ESFAS channel components and keys, and insufficient procedural guidance for operator actions associated with this system. Specifically, the labeling for the ESFAS bypass keyswitch was unclear, in that the alphanumeric label associated with the keyswitch for the SG 1B pressure MSIS bypass did not match the label on the bistable trip unit for which it applied. The keyswitch was labeled with a four character designator (BA10) which differed from the corresponding trip unit, which was labeled with a five character designator (BA410). Also, the keys used for placing ESFAS channels in bypass were numbered, but had no descriptive label attached to identify their function.

The operators performing this evolution assumed that the proper bistable module was bypassed since the bypass key switch which was manipulated physically lined up on the ESFAS cabinet with an isolation module for SG 1B MSIS. Several of the bypass key switches on the ESFAS channels do align in this manner, with corresponding isolation modules, however, the correct bypass keyswitch for 1B SG pressure does not. Additionally, prior to this event, the operator who placed the incorrect channel in bypass had successfully bypassed containment high pressure bistables on the ESFAS channels without incident, while performing a routine surveillance. The bypass keyswitches for those (containment high pressure) trip units were physically arranged in line with isolation modules for their bistable trip unit, whereas the bypass keyswitch for 1B SG pressure was not. The physical arrangement of the components at the ESFAS cabinet (i.e. bistables, isolation modules and bypass keyswitches), and the lack of clear labeling associated with those components significantly contributed to the incorrect channel being bypassed.

Additionally, no procedural guidance was in place to address specific operator actions required for off normal conditions related to the ESFAS cabinet or associated instrumentation failures. Operator knowledge is relied upon when placing the ESFAS channels into a bypass or trip condition.

ANALYSIS OF THE EVENT

This event is reportable under 10 CFR 50.73 (a) (2) (i) (B), as any operation or condition prohibited by the plant's Technical Specifications. Technical Specification 3.3.2.1 requires, in part, that with the number of operable channels one less than the total number of channels, operation may proceed provided the inoperable channel is placed in either the bypassed or tripped condition within 1 hour. For this event, the inoperability of the 1B SG pressure input on ESFAS channel D was discovered at 1945 on September 19, 1996. At 2045, operators had bypassed the appropriate reactor protection system (RPS) and auxiliary feedwater actuation system (AFAS) channels for this failure. The inoperable ESFAS channel, however, was not placed in a bypass or trip condition within one hour as specified in the action requirement of TS 3.3.2.1.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
ST. LUCIE UNIT 1	05000335	YEAR	SEQUENTIAL	REVISION	4 OF 6
		96	-- 013	-- 00	

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

**ANALYSIS OF THE EVENT** Continued

The operability of the ESF instrumentation system and bypasses, as described by the Unit 1 TS, ensures 1) the associated ESF action when the parameter monitored by each channel or combination thereof reaches its set point, 2) the specified coincidence logic is maintained, 3) sufficient redundancy is maintained to permit a channel to be out of service for testing or maintenance, and 4) sufficient system functional capability is available for ESF purposes from diverse parameters.

The function of the main steam isolation signal (MSIS) for ESFAS is to limit the uncontrolled cooldown of the reactor coolant system (RCS) following the occurrence of a steam line break. The St. Lucie Updated Final Safety Analysis Report (UFSAR), Section 7.3.1, describes the redundant features and diversity associated with the ESF system which ensure that this function is maintained. The redundant features described in UFSAR Section 7.3.1, ensure the ESFAS meets the single failure criterion, and permits two-out-of-three logic versus two-out-of-four logic, when required to support maintenance. Additionally, this design diversity provides reasonable assurance that the system will not be made inoperable by the inadvertent actions of operating and maintenance personnel.

For MSIS, there are four independent channels of SG pressure for each steam generator. During this event, operators failed to bypass an inoperable channel of 1B SG pressure for channel D MSIS within the one hour required by St. Lucie Unit 1 TS 3.3.2.1, Action 9.a. The channel was placed in bypass approximately eleven hours later upon discovery of the condition. The 1A SG pressure for MSIS on channel D of ESFAS was incorrectly bypassed during this period. Both of these pressure measurement inputs affect only the D channel of the ESFAS. The resulting configuration (refer to Figure 1 Logic Diagram) was such that the MSIS feature of ESFAS remained in a two-out-of-three logic condition for both the 1A and 1B SG MSIS, which is bounded by the assumptions described in the St. Lucie UFSAR Section 7.3.1.

Sufficient redundancy existed during this event to ensure that the functional capability of MSIS for the St. Lucie Unit 1 ESFAS was maintained. Based on the above, the health and safety of the public were not adversely affected.

**CORRECTIVE ACTIONS**

1. The St. Lucie Unit 1 ESFAS bypass key switches were re-labeled to provide agreement with the ESFAS bistable trip units which they affect. An assessment was performed of the ESFAS cabinet labeling on Unit 2 which determined that the labeling there was consistent with acceptable human factors requirements.
2. Descriptive labels were attached to the tags which identify the ESFAS bypass keys used in bypassing the trip unit modules at both St. Lucie Units 1 and 2.
3. To provide operators with additional guidance, a night order was issued to all operations personnel by the Operations Supervisor requiring a review of the event and the corrective actions taken with respect to ESFAS component labeling.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL	REVISION	
ST. LUCIE UNIT 1	05000335	96	-- 013	-- 00	5 OF 6

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

CORRECTIVE ACTIONS Continued

4. A self assessment was performed by the operating crew following the event and was distributed to operations personnel for lessons learned.
5. The labeling associated with all operations administratively controlled keys is being upgraded to provide an improvement in key description.
6. This event is to be included in licensed operator requalification training and unit differences associated with the ESFAS cabinet components on St. Lucie Unit 1 and 2 will be emphasized.
7. Procedural guidance will be developed for St. Lucie Unit 1 and 2 to address operator actions required for ESF cabinet component and instrumentation failures.
8. A human factors review of the St. Lucie Unit 1 ESFAS panel is being performed to assess if any additional improvements can be made to enhance the operator interface with this system.

ADDITIONAL INFORMATION

Failed Components Identified

Manufacturer: Semiconductor Circuits  
Model Number: ES-23-100  
Device: Power Supply

Previous Similar Occurrences

None

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

FACILITY NAME (1)  ST. LUCIE UNIT 1	DOCKET  05000335	LER NUMBER (6)			PAGE (3)  6 OF 6
		YEAR  96	SEQUENTIAL  013	REVISION  00	

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

FIGURE 1  
SIMPLIFIED MSIS LOGIC DIAGRAM

1A STEAM GENERATOR PRESSURE MEASUREMENT CHANNELS

1B STEAM GENERATOR PRESSURE MEASUREMENT CHANNELS

