

# ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

## REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9001250312 DOC.DATE: 90/01/18 NOTARIZED: NO DOCKET #  
 FACIL:50-250 Turkey Point Plant, Unit 3, Florida Power and Light C 05000250  
 AUTH.NAME AUTHOR AFFILIATION  
 POWELL,D.R. Florida Power & Light Co.  
 HARRIS,K.N. Florida Power & Light Co.  
 RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 89-020-00:on 891223,Unit 4 reactor trip & Unit 3 reactor shutdown required by Tech Specs.

W/8 ltr.

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JAN 18 1990

L-90-24  
10 CFR 50.73

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

Gentlemen:

Re: Turkey Point Units 3 and 4  
Docket No. 50-250 and 50-251  
Reportable Event: 89-20  
Date of Event: December 23, 1989  
Unit 4 Reactor Trip and Unit 3 Reactor Shutdown Required  
by Technical Specifications Due to Corrosion in  
Electrical Terminal Boxes for Main Steam Isolation Valves

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,

*JE Cross for K.N. HARRIS*

K. N. Harris  
Vice President  
Turkey Point Plant Nuclear

KNH/DRP/DWH/rat

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

9001250312 900118  
PDR ADOCK 05000250  
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*IF 22*  
*1/1*



## LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Turkey Point Units 3 and 4										DOCKET NUMBER (2) 0 5 0 0 0 2 5 0 1 of 0 4										PAGE (3) 1 of 0 4			
TITLE (4) Unit 4 Reactor Trip and Unit 3 Reactor Shutdown Required By Technical Specifications Due to Corrosion in Electrical Terminal Boxes for Main Steam Isolation Valves																							
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)								
									Turkey Point Unit 4						0 5 0 0 0 2 5 1								
1	2	2	3	8	9	8	9	0	2	0	0	0	1	1	8	9	0	0 5 0 0 0 1					
OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)																					
1		20.402(b)				20.406(e)				<input checked="" type="checkbox"/> 80.73(a)(2)(iv)				73.71(b)									
POWER LEVEL (10)		0 9 4				20.406(a)(1)(i)				80.73(a)(2)(v)				73.71(a)									
		20.406(a)(1)(ii)				80.73(a)(2)(vi)																	
		20.406(a)(1)(iii)				80.73(a)(2)(vii)																	
		20.406(a)(1)(iv)				<input checked="" type="checkbox"/> 80.73(a)(2)(i)				80.73(a)(2)(viii)(A)				OTHER (Specify in Abstract below and in Text, NRC Form 365A)									
		20.406(a)(1)(v)				80.73(a)(2)(ii)				80.73(a)(2)(viii)(B)													
		20.406(a)(1)(vi)				80.73(a)(2)(iii)				80.73(a)(2)(ix)													
LICENSEE CONTACT FOR THIS LER (12)																							
NAME												TELEPHONE NUMBER											
David R. Powell, Regulation and Compliance Supervisor												AREA CODE		3 0 5 2 4 6 - 6 5 5 9									
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																							
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC													
X	E, J	B, L, K	G, O, 8, 0	Y																			
SUPPLEMENTAL REPORT EXPECTED (14)												EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR							
<input checked="" type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)														0	3	2	3	9	0				
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ABSTRACT Limit to 1400 spaces (i.e. approximately fifteen single-spaced typewritten lines) (16)

At 2314, on December 23, 1989, with Unit 4 in Mode 1 at 94 percent power, a reactor trip occurred due to closure of the 4A Main Steam Isolation Valve (MSIV). The sudden loss of steam flow from the 4A steam generator caused an increase in pressure in that steam generator. The pressure increase caused the steam generator level to "shrink" to the low-low level setpoint of 15 percent. The Auxiliary Feedwater System responded as designed. Corrosion across terminal block contacts supplying vital 125 VDC power to one of two 4A MSIV opening solenoid valves caused a fuse to blow. Upon de-energization, the opening solenoid failed to the vent position. This allowed air to bleed from the bottom of the MSIV piston. The MSIV disc dropped down into the steam flow, resulting in rapid closure of the MSIV. The cause of the accelerated corrosion is being evaluated. Upon inspection of the terminal blocks supplying vital 125 VDC power to the opening and closing solenoid valves for the 3A, 3B and 3C MSIVs, corrosion was identified on one of the two terminal blocks for each the 3B and 3C MSIVs. The 3B and 3C MSIVs were declared inoperable and Unit 3 entered Technical Specification (TS) 3.0.1 at 2300 on December 24, 1989. The two terminal blocks were replaced, the 3B and 3C MSIVs were declared operable, and Unit 3 exited TS 3.0.1 at 0455 on December 25, 1989. Interim corrective actions are in place.

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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Turkey Point Units 3 and 4	0 5 0 0 0 2 5 0 8 9 -	0 2 0	- 0 0	0 2	OF 0 4	

TEXT: If more space is required, use additional NRC Form 366A's, 7/1

DESCRIPTION OF THE EVENTUnit 4

At 2314, on December 23, 1989, with Unit 4 in Mode 1 (Power Operation) at 94 percent power, a reactor trip occurred due to closure of the 4A Main Steam Isolation Valve (MSIV) (EIIS:SB, Component:ISV). The sudden loss of steam flow from the 4A steam generator caused a pressure increase in that steam generator. The increased pressure resulted in "shrink" of the 4A steam generator level to the low-low level setpoint of 15 percent. The Auxiliary Feedwater System and one Code Safety Valve on the 4A steam generator responded as designed and the Unit was stabilized in Mode 3 (Hot Standby).

At 0013, on December 24, 1989, the NRC was notified of the Unit 4 reactor trip in accordance with 10CFR50.72(b)(2)(ii).

Instrument Air is provided to each MSIV through two solenoid valves for opening and maintaining the MSIV open and through two different solenoid valves for closing the MSIV. Vital 125 VDC power is supplied to the opening and closing solenoid valves. Train A power from one terminal box feeds one opening and one closing solenoid valve for a MSIV. Train B power from another terminal box feeds the other opening and closing solenoid valve for the same MSIV.

An investigation into the unexpected closure of the 4A MSIV revealed corrosion buildup between terminal block contacts in one of the two terminal boxes (EIIS:EJ, Component:JBX) providing 125 VDC vital power to the MSIV opening and closing solenoid valves. The corrosion created a short circuit which, in turn, caused the fuse to an opening solenoid valve to blow. Upon loss of power, the de-energized solenoid valve failed to the vent position, allowing air to bleed from the bottom of the MSIV air piston. The MSIV disc dropped down into the steam flow, resulting in rapid closure of the MSIV.

Unit 3

An inspection of the terminal boxes feeding vital 125 VDC power to the 3A, 3B and 3C MSIV opening and closing solenoid valves was conducted on December 24, 1989. Corrosion buildup was found on one terminal block (EIIS:EJ, Component:BLK) associated with the 3B MSIV and one terminal block associated with the 3C MSIV. Since the operability of the 3B and 3C MSIVs was in question, a decision was made to declare both MSIVs inoperable.

Technical Specification (TS) 3.8.1.b requires the MSIVs to be operable and capable of closing in 5 seconds or less. If an inoperable MSIV cannot be restored to an operable status within 48 hours, TS 3.8.3 requires the reactor to be shut down in accordance with TS 3.0.1. With more than one MSIV inoperable, TS 3.0.1 is entered at the time inoperability is declared. TS 3.0.1 requires that within one hour action shall be initiated to place the unit(s) in Mode 3 (Hot Standby) within the next six hours.

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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		-E-#	SEQUENCE NUMBER	REVISION NUMBER		
		8 9	0 1 2	0	0 0 0	1 3 OF 0 4

\*E-# If more space is required use additional NRC Form 366A's.

At 2300, on December 24, 1989, with Unit 3 operating at 100 percent power, the 3B and 3C MSIVs were declared inoperable. Unit 3 entered TS 3.0.1 and steps were taken to shut down the unit. Mode 2 (reactor critical with reactor power less than 5 percent) was achieved at approximately 0135 and repair work was initiated. At approximately 0455, on December 25, 1989, the two affected terminal blocks had been replaced, the 3B and 3C MSIVs were declared operable, and Unit 3 exited TS 3.0.1.

At 2347, on December 24, 1989, the NRC was notified of the Unit 3 shutdown in accordance with 10CFR50.72(b)(1)(i)(A).

### CAUSE OF THE EVENT

The cause for accelerated corrosion rate of the terminal blocks is being evaluated. The terminal boxes and terminal blocks providing vital 125 VDC power to the MSIV opening and closing solenoid valves were installed approximately a year ago as part of the MSIV Air Accumulator Modifications.

The terminal box on the 4A MSIV and some additional terminal boxes have been found with loose covers. The affected terminal boxes also contained varying amounts of accumulated water. No "weep" holes were provided to allow for drainage of accumulated water from the affected terminal boxes. A correlation between these conditions and the rapid terminal block corrosion has not been established.

### ANALYSIS OF THE EVENT

The MSIVs are 26 inch air operated isolation valves. These full flow valves are held open against spring pressure by air from the plant Instrument Air System. The air pressure must overcome the weight of the valve disc and spring tension to hold the valve open. The MSIV disc opens into the steam flow such that steam flow acts to close and seat the valve.

Loss of vital 125 VDC power to an opening solenoid valve caused it to fail in the vent position. This allowed air to bleed from the bottom of the MSIV piston. The MSIV disc dropped into the steam flow, resulting in rapid closure of the MSIV. The sudden loss of steam flow from the 4A steam generator caused an increase in pressure in that steam generator. The pressure increase resulted in "shrink" of steam generator level to the low-low level setpoint of 15 percent. The Auxiliary Feedwater System and one Code Safety Valve on the 4A steam generator responded as designed and the Unit was stabilized in Mode 3 (Hot Standby). The health and safety of the public were not affected by this event.

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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\*EX\* If more space is required use additional NRC Form 366A's.

CORRECTIVE ACTIONS

1. A terminal block in one of the two terminal boxes supplying vital 125 VDC power to the opening and closing solenoid valves for the 4A, 4B, 3B and 3C MSIVs has been replaced.
2. Walkdowns of outdoor areas of the plant have been conducted to identify terminal boxes with evidence of moisture intrusion or terminal block corrosion. Terminal boxes identified as having a problem are being inspected on a periodic basis until the root cause of the rapid terminal block corrosion is established.
3. Several terminal boxes located inside the Unit 4 containment building were inspected for evidence of moisture intrusion or terminal block corrosion. No deficient conditions were noted.
4. Walkdowns of plant areas have been performed to ensure that terminal box cover fasteners are installed and tightened.
5. Methods of inhibiting the accumulation of water in terminal boxes are being evaluated. Providing "weep" holes in terminal boxes will be considered as part of the evaluation. This evaluation will be completed by February 28, 1990. Appropriate long-term corrective actions will be implemented based on the results of the evaluation.
6. Accelerated corrosion tests will be performed on the General Electric Co. Model EB25 terminal block to determine the cause of the unexpected rapid corrosion. This testing will be completed by February 28, 1990. Appropriate long-term corrective actions will be implemented based on the results of the corrosion testing. The terminal block corrosion problem is being evaluated in conjunction with Item 5 above.

ADDITIONAL INFORMATION

The terminal blocks are General Electric Co. Model EB25.

No similar Licensee Event Reports have been issued for Turkey Point Units 3 or 4.