NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Turkey Point Unit 3	0 5 0 0 0 2 5 0	1 OF 0 3

TITLE (4)
Technical Specification - Overtemperature ΔT and Overpower ΔT

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
1 0	3 0	8 4	8 4	— 0 2 8	— 0 0	1 1	3 0	8 4	N/A	0 5 0 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

OPERATING MODE (9)	N										
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)	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	TELEPHONE NUMBER (AREA CODE)
Roger L. Teuteberg, Regulation and Compliance Engineer	3 0 5 2 4 5 - 2 9 1 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

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)

On October 30, 1984, it was discovered that the minimum degree of redundancy for the Unit 3 Reactor Protection System overtemperature - delta temperature (OTΔT) and overpower - delta temperature (OPΔT) reactor trip features was less than that required by Technical Specification 3.5, Table 3.5-1. A monthly periodic functional test of the power range nuclear instrumentation indicated that one of three channels, Channel I, for each of the OTΔT and OPΔT reactor trip features had diminished operability due to incorrect variable setpoints. A subsequent investigation revealed that the incorrect variable setpoints resulted from the swapping of a pair of adjacent NIS cabinet output leads, transmitting processed input signals from the upper and lower excore ion detection chambers for the NIS power range channel N-41. The swapped leads would have allowed the core axial flux imbalance penalty function f(Δq) inputs to the OTΔT and OPΔT setpoints to vary in values outside those specified in Technical Specification 2.3. Upon discovery, the two swapped leads were correctly terminated and the NIS channel N-41 was successfully functionally tested and placed back into service. Additional precautions included functional testing for all other Unit 3 NIS channels and all Unit 4 NIS channels. No other swapped leads were discovered and all other NIS channels were successfully functionally tested to ensure proper setpoints. Long term corrective actions will involve: (1) clarification of the periodic NIS functional test procedure to specifically require that a channel be declared out of service if it fails any periodic test requirements; (2) the exercise of greater care during the periodic testing of NIS channels to enhance the accuracy of readings taken; (3) an evaluation of the human factors aspects of performing the periodic functional testing of power range nuclear instrumentation will be initiated; and (4) measures to ensure that wiring connection errors do not occur during maintenance activities. The health and safety of the public were not affected. Similar occurrences: None.

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6) YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	PAGE (3)
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TEXT (If more space is required, use additional NRC Form 366A's) (17)

On October 22, 1984, during the performance of the monthly power range nuclear instrumentation periodic test in accordance with operating procedure OP 12304.2 (Power Range Nuclear Instrumentation Periodic Channel Functional Test), it was discovered that the Unit 3 overpower-delta temperature (OPΔT) and overtemperature-delta temperature (OTΔT) reactor trip variable setpoints for Channel I did not respond correctly to the the reactor axial flux imbalance penalty function f(Δq) input. The axial flux imbalance penalty function f(Δq) inputs to the OPΔT and OTΔT reactor trip setpoints is a function of the indicated output current difference between the top and bottom chambers of the power-range nuclear ion detectors. It was noted that this correction factor did not begin penalizing the OPΔT and OTΔT trip setpoints at the proper percentages of flux imbalance, i.e., +10% and -14%. Initially, it was assumed that a component of the reactor protection system (RPS) Hagan instrument racks was out of calibration as was discovered earlier on July 23, 1984. In July, 1984 an investigation of a similar failure of the NIS Channel N-41 to pass the monthly testing procedure revealed that the problem stemmed from a slightly out of calibration summator, TM 412G. The summator was recalibrated and the NIS Channel successfully passed the next monthly functional test.

On October 30, 1984, an investigation by maintenance personnel revealed that two NIS cabinet output leads, transmitting processed signals from the NIS Channel N-41 upper and lower core ion detector chambers, were reversed on the adjacent isolation amplifiers NM 306 and NM 307 in the power range B drawer. These two cables output NIS cabinet signals to the reactor protection system Hagan instrument racks and then to the OPΔT and OTΔT setpoint indicators located on control room vertical panel A. The two swapped leads would have allowed the variable OTΔT and OPΔT reactor trip setpoints to vary nonconservatively, with the axial flux imbalance correction factor starting at an axial flux imbalance of +14% and varying to smaller values than those required by Technical Specification 2.3. Additionally, the diminished operability of the Channel I OTΔT and OPΔT reactor trip setpoints left Unit 3 with a minimum degree of redundancy less than that required by Technical Specification 3.5, Table 3.5-1. Upon discovery, the two swapped leads were correctly terminated and the NIS Channel N-41 was successfully functionally tested and placed back into service at 11:15 AM on October 31, 1984. Additional precautions included functional testing for all other Unit 3 NIS channels and all Unit 4 NIS channels in accordance with periodic functional test procedure OP 12304.2. Also, a series of special voltage readings were taken to ensure proper cable terminations. No other swapped or incorrectly terminated leads were found and all other NIS channels were successfully functionally tested to ensure proper setpoints.

An evaluation of the events surrounding this discovery revealed that the swapped leads most likely occurred during the last replacement of the NIS Channel N-41 power range drawer B on February 23, 1983. The cause of the swapped leads appears to have been a personnel oversight, since both the cable leads and termination blocks are similarly labeled to ensure correct terminations are performed. The post-maintenance testing and the subsequent monthly functional test failed to detect this wiring error for several reasons. The post-maintenance functional testing procedure, which includes an as-installed calibration of the Westinghouse NIS cabinet drawers and calibration of the applicable reactor protection system Hagan rack instrumentation, does not include tests of the cabling between these two cabinets. The monthly functional tests of the OTΔT and OPΔT reactor trip set points also did not include tests of the inter-connecting cabling between the Westinghouse NIS cabinets and the RPS Hagan racks until March 1984, when a revision in this plant Operating Procedure 12304.2 was processed. The revisions to OP12304.2 made in March 1984 arose from a systematic review of safety related procedures and were the result of a more conservative interpretation of the plant technical Specification 4.1. Those revisions in OP12304.2 concerning the OTΔT and OPΔT instrumentation were designed to enhance the functional testing already being

performed. After March 1984, the failure of the NIS periodic functional testing to detect the wiring error can be attributed to the difficulty in reading one set of axial flux imbalance indicators on the control room main console while at the same time detecting the response of the OTΔT and OPΔT indicators located on a second panel, that is, vertical Panel A which is behind the main console. This visual verfication of instrumentation must be performed from the NIS cabinet power range drawers while adjusting the test signal control potentiometers. This difficulty in performing the periodic functional testing relates to a human factors concern that was not previously recognized.

Westinghouse was consulted about the significance of the axial flux imbalance input to the differential temperature trip setpoints. They advised that values as high as +28% axial flux imbalance would have had no adverse affect on the departure from nucleate boiling (DNB) core safety analysis. Additionally, this variable axial flux imbalance correction factor is part of a defense-in-depth design which includes an axial flux deviation alarm and target flux requirements. There is no indication that any core safety limits were exceeded and no transients were experienced which would have had to have been terminated by the axial flux imbalance input. Additionally, both Channel II and Channel III circuitry have been fully operationally and properly calibrated during the period since February 1983.

Long term corrective actions which will ensure the prevention of similar events described above are as follows: (1) clarification of the periodic NIS functional test procedure to specifically require that a channel be declared out of service if it fails any periodic test requirements; (2) the exercise of greater care during the periodic testing of NIS channels to enhance the accuracy of readings taken; (3) an evaluation of the human factors aspects of performing the periodic functional testing of power range nuclear instrumentation will be initiated; and (4) measures, such as proceduralized verifications. to ensure that wiring connection errors do not occur during maintenance activities.

FLORIDA POWER & LIGHT COMPANY

November 30, 1984
L-84-357

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

Gentlemen:

Re: Reportable Event 84-28
Turkey Point Unit 3
Date of Event: October 30, 1984
Overtemperature ΔT and Overpower ΔT

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,

D. N. Paduano Jr.
for J. W. Williams, Jr.
Group Vice President
Nuclear Energy

JWW/JEM/cas

Attachment

cc: J. P. O'Reilly, Region II, USNRC
Harold F. Reis, Esquire
File 933.1
PNS-LI-84-432-1

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