CATEGORY 1

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FACIL:50-250 Turkey Point Plant, Unit 3, Florida Power and Light C 05000250
AUTH.NAME AUTHOR AFFILIATION
HOVEY,R.J. Florida Power & Light Co.
MOWREY,C. Florida Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 98-004-00:on 980921,automatic reactor trip occurred. Caused by inadequate re-correlation of intermediate range neutron flux instrumentation reactor trip bistable. Applicable plant procedures enhanced.With 981016 ltr.

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OCT 16 1998

L-98-261
10 CFR 50.73

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

Re: Turkey Point Unit 3
Docket No. 50-250
Reportable Event: 1998-004-00
Date of Event: September 21, 1998
Automatic Reactor Trip During Planned Shutdown for Refueling.

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

Very truly yours,

R. J. Hovey
Vice President
Turkey Point Plant

GSS

Attachment

cc: Regional Administrator, USNRC, Region II
Senior Resident Inspector, USNRC, Turkey Point Nuclear Plant

NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION (6-1998)

LICENSEE EVENT REPORT (LER)

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

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
TURKEY POINT UNIT 3	05000250	1 OF 4

TITLE (4)

Automatic Reactor Trip During Planned Shutdown for Refueling

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
9	21	1998	1998	- 004 -	00	10	16	1998	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
POWER LEVEL (10)	08	20.2201(b)	20.2203(a)(2)(v)	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)(ii)	20.2203(a)(4)	X 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)
CRAIG MOWREY - COMPLIANCE SPECIALIST	305-246-6204

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

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 15 single-spaced typewritten lines) (16)

During a routine shutdown to begin the Unit 3 Cycle 17 refueling outage, an automatic reactor trip occurred at approximately 8 percent Rated Thermal Power (RTP). The reactor trip was initiated by one of two Intermediate Range Neutron Flux Instrumentation (IR NI) channels. The high flux reactor trip signal (set for 25 percent RTP) occurred when the IR NI high flux reactor trip was automatically unblocked at 8 percent RTP. The IR NI high flux reactor trip bistable for Channel N-35 had not reset prior to unblocking the IR NI high flux reactor trip below the P-10 reset point of 8 percent RTP which initiated a reactor trip signal when unblocked. The IR NI high flux reactor trip bistables should have automatically reset at approximately 19 percent RTP.

The causes of this event are: 1) inadequate calibration of the IR NI high flux reactor trip bistable, 2) inadequate supervisory oversight of the IR NI high flux reactor trip reset before reducing power below the P-10 reset point, and 3) inadequate guidance in the plant shutdown procedure regarding verification of the IR NI high flux reactor trip reset prior to decreasing power below the P-10 reset point.

Corrective actions include improved calibration of IR NI channels, enhanced applicable plant procedures, and operator and technical training on this event.

I. DESCRIPTION OF THE EVENT

On September 21, 1998, at 0003 EDT, during a routine shutdown of Florida Power and Light's Turkey Point Nuclear Plant Unit 3 to begin the Unit 3 Cycle 17 refueling outage, an automatic reactor trip occurred at approximately 8 percent Rated Thermal Power (RTP). This event was reported to the NRC at 0128 EDT on September 21, 1998, as a non-emergency event pursuant to 10CFR50.72(b)(2)(ii), automatic actuation of the Reactor Protection System [JC]. The reactor trip was initiated by one of two Intermediate Range Neutron Flux Instrumentation (IR NI) [IG] channels. The high flux reactor trip signal (set for 25 percent RTP) occurred when the IR NI high flux reactor trip was automatically unblocked at 8 percent RTP. The IR NI reactor trip bistable for Channel N-35 had not reset prior to unblocking the IR NI high flux reactor trip below the P-10 reset setpoint of 8 percent RTP which initiated a reactor trip signal when unblocked. The IR NI reactor trip bistables should have automatically reset at approximately 19 percent RTP.

The IR NI high flux reactor trip is not explicitly credited in any accident analysis. The IR NI high flux reactor trip provides back-up core protection during reactor startup to mitigate the consequences of an uncontrolled rod control cluster assembly bank withdrawal from a subcritical condition. This reactor trip is manually blocked above 10 percent RTP and is automatically unblocked when three of four Power Range Nuclear Instrumentation (PR NI) channels drop below the P-10 reset value of 8 percent RTP. The automatic unblocking ensures that the transition to a more restrictive reactor trip setpoint occurs when decreasing reactor power levels. The IR NI channels are normally set to initiate a reactor trip at an IR NI detector current level equivalent to approximately 25 percent RTP. The IR NI reactor trip reset point is 70 percent of the detector current trip value, or approximately 19 percent RTP.

The PR NI detectors N-41, N-42, N-43, and N-44 are uncompensated ion chambers designed to operate in the 'Power Range' of 1-120 percent RTP. The IR NI detectors N-35 and N-36 are compensated ion chambers designed for multiple decade use. The primary function of the IR NI is to provide a relative indication of reactor power when transiting from the source range through the power range. The PR NI channels provide a Hi Flux Low Setpoint reactor trip at 25 percent RTP increasing, which resets at 23 percent RTP. Both the IR reactor trip and PR low power reactor trip functions may be manually bypassed once reactor power is above 10 percent RTP. The manually actuated reactor trip bypass is enabled by permissive P-10. Logic for P-10 requires two out of four PR channels to be above 10 percent to obtain the permissive to block, and three out of four PR channels to be less than 8 percent RTP to unblock. While the blocking function during power ascent requires manual action by the operator, the unblocking function during power descent occurs automatically.

In the Unit 3 shutdown procedure 3-GOP-103, "Power Operation to Hot Standby," Step 5.19 reduces the power to approximately 15 percent for transfer to feedwater bypass valves. Step 5.20 requires the operator to verify that the IR Hi Level Trip bistable lights are off (reset). Operators were cognizant of the critical nature of this step. Power had been stabilized at about 17 percent, and they did verify that N-36 had reset. They were aware that N-35 had not reset and that it needed to reset prior to the P-10 reset value of 8 percent RTP. The Nuclear Plant Supervisor (senior operator charged with command and control of the evolution) had his crew refer to the off-normal procedure for bypassing a failed IR NI channel, but opted to give N-35 more time to clear. Power reduction continued with turbine unloading and xenon buildup. About five minutes after noting the N-36 high flux trip bistable reset, the Unit 3 reactor operator noted that the N-35 bistable had not reset, but before any action could be taken, the unit tripped. The trip on N-35 occurred six minutes after N-36 had reset.

II. CAUSE OF THE EVENT

1. Inadequate re-correlation of the IR NI reactor trip bistable was the root cause of the event. The N-35 detector trip bistable setpoint did not correlate with RTP as measured by the PR NI. This was due to higher IR NI detector currents experienced during shutdown after a long period of power operation during which the IR was not re-correlated to calorimetric power. During power operations, PR NI channels are calibrated periodically using calorimetric data as a basis for the adjustment. The IR NI channel bistables are calibrated only during power ascension by comparing IR detector currents to calorimetric power. Due to power redistribution as a function of core burn up, the IR detectors will see a larger neutron flux at end of core life than at the beginning of core life. Consequently, the IR NI will produce a higher current at the end of core life. This causes the IR high flux reactor trip bistable reset to occur at a lower power than displayed by the PR NI. The cumulative effects of (1) using Low Leakage Loading Pattern cores, (2) the recent thermal uprate, and (3) the (relatively) very long run at power created the potential for a larger than usual disparity between PR NI and IR NI indication, and FPL did not recognize the increased importance of a periodic re-correlation of the IR NIs during such a long at-power period.

2. This event was caused in part by cognitive error on the part of a utility licensed senior operator. Although operators knew that N-35 had not reset, and that it needed to reset prior to P-10, the senior operator charged with command and control of the evolution did not take sufficient action to prevent the trip. N-36 was verified reset, and the off-normal procedure for an intermediate range failure was obtained and checked. The procedure was not implemented immediately because of an appropriate reluctance to unnecessarily defeat an automatic trip channel. However, the senior operator did not assign anyone to specifically monitor the N-35 bistable; did not direct operators to stabilize power at a lower level, still high enough to prevent the trip; and the senior operator did not predetermine a power level at which the power level trip would be bypassed.

3. Lack of detail in the plant shutdown procedure was also a contributing cause. Procedure 3-GOP-103 provides the correct sequences. However, the procedure does not point out that P-10 resets at about 8 percent RTP, and that step 5.20 must be completed prior to the P-10 reset to prevent a reactor trip. A plant shutdown, as with many other complicated plant evolutions, proceeds as a continuous evolution that is procedurally described in a stepwise fashion. The operator actions required in step 5.19 such as maintaining Tavg and going to the feedwater bypass valves, as well as effects such as Xenon production, caused reactor power to continue to decrease. Operators expected that decreasing power level would automatically reset the N-35 reactor trip bistable, and therefore, took no manual actions to prevent the trip.

   It is a established plant practice to insert hold points, notes and/or cautions in procedures to ensure critical steps/evolutions are completed prior to continuing into a potentially unsafe or unreliable condition. A caution statement would have been appropriate between steps 5.19 and 5.20, including a hold point in step 5.20. Additionally, the Precautions and Limitations Section of Procedure 3-GOP-103 should have addressed this issue. The lack of a critical hold point and associated caution in the plant shutdown procedure contributed to the failure of the operators to prevent the reactor trip.

III. SAFETY CONSEQUENCES OF THE EVENT

There were no adverse safety consequences as a result of this event. The IR NI high flux reactor trip is not explicitly credited in any accident analysis. The response to the reactor trip and subsequent recovery actions by plant operators were determined to be correct. The plant system responses were normal and all control rods fully inserted into the core.

IV. CORRECTIVE ACTIONS

1. The frequency and timing of performing the IR bistable correlation and calibration of the IR NI reactor trip bistable will be assessed. Improvements to provide the operator with additional information for bistable setpoints and reset points will be evaluated.

2. Operations Department Instruction ODI-CO-026, "Major Evolution Pre-Briefs" will be revised. The revision will emphasize management expectations with regard to the responsibilities of the control room operating crew to ensure proper verification of the IR NI high flux reactor trip reset before reducing power below the P-10 reset point.

3. Units 3 and 4 procedures GOP-103, "Power Operation to Hot Standby," ONOP-100, "Fast Load Reduction," ONOP-047.1, "Loss of Charging Flow in Modes 1 Through 4," and ONOP-059.7, "Intermediate Range Nuclear Instrumentation Malfunction" will be revised to include appropriate hold points and caution statements.

4. Special training on this event and expected IR characteristics will be provided to Control Room Operations personnel and Shift Technical Advisors.

5. The Nuclear Plant Supervisor, and his operating crew, were counseled on their activities and decisions which contributed to this trip.

V. ADDITIONAL INFORMATION

EIIS Codes are shown in the format [EIIS SYSTEM: IEEE component function identifier, second component identifier (if appropriate)].

SIMILAR EVENTS

There have been no previous automatic reactor trips on IR high flux at Turkey Point Nuclear Units 3 & 4.

MANUFACTURING DATA

None