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PLUNKETT,T.F. Florida Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 92-011-00:on 921008,Unit 3 source range neutron detector N-31 declared out of svc.Caused by lack of design info/plant procedures which dictate proper gasket matl.Source range neutron dectors N-31 & N-32 replaced.W/921112 ltr.

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NOV 12 1992

L-92-309
10 CFR 50.73

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

Gentlemen:

Re: Turkey Point Unit 3
Docket No. 50-250
Reportable Event: 92-011
Date of Event: October 14, 1992
Failure of Source Range Neutron Detectors

The attached Licensee Event Report 250-92-011 is provided pursuant to the requirements of 10 CFR 50.73, to provide information on the subject event.

Very truly yours,

for TFP

T. F. Plunkett
Vice President
Turkey Point Nuclear

TFP\RJT\rt

Attachment

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

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LICENSEE EVENT REPORT (LER)

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

TITLE (4) FAILURE OF SOURCE RANGE NEUTRON DETECTORS

EVENT DATE (5)				LER NUMBER (6)			RPT DATE (7)				OTHER FACILITIES INV. (8)	
MON	DAY	YR		YR	SEQ #	R#	MON	DAY	YR		NAME	DOCKET # (8)
10	14	92		92	011	00	11	12	92			

OPERATING MODE (9)	6	10 CFR 50.73(a)(2)(B)
POWER LEVEL (10) Refueling		(Specify in Abstract below and in text)

LICENSEE CONTACT FOR THIS LER (12)

Robert J. Tomonto, Licensing Engineer	TELEPHONE NUMBER
	305-246-7327

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	NPRDS
B	IG	DET	W120	Y						

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES	(If yes, complete EXPECTED SUBMISSION DATE)	NO X				

ABSTRACT (16)

On October 8, 1992 at approximately 0425 EDT, with Turkey Point Unit 3 in Mode 6 (REFUELING) and Unit 4 in Mode 5 (COLD SHUTDOWN), Unit 3 source range neutron detector N-31 was declared out-of-service due to high count rate greater than 1500 counts per second (cps). Primary source range detector N-32 was used for audio and one backup source range flux monitor was used to meet the minimum equipment requirements of Technical Specification (T.S.) 3.9.2. At approximately 0606 EDT on October 9, 1992, Unit 3 completed the core offload. At approximately 0814 EDT on October 9, 1992, primary source range detector N-32 was declared out-of-service, due to a continued high count rate (> 400 cps) following offload.

On October 14, 1992, FPL determined that both primary source range neutron detectors had degraded to the point of failure. Degradation of the N-32 detector was gradual over several days, raising the possibility that during the last steps in the core offload procedure, Unit 3 had performed CORE ALTERATIONS not in accordance with T.S. 3.9.2.

I. DESCRIPTION OF THE EVENT

The following sequence of events was derived from the Reactor Operator's log, the equipment out-of-service log and the Emergency Response Data Acquisition and Display System (ERDADS) log.

0300 10/07/92 Unit 3 in Mode 6 (REFUELING) and Unit 4 in Mode 5 (COLD SHUTDOWN)

Unit 3 initiated core offload

0425 10/08/92 With fuel offload in progress, the Unit 3 "Source Range High Flux at Shutdown" alarm and the Unit 3 "Containment Evacuation" alarm experienced spurious annunciation. FPL declared primary source range detector N-31 out-of-service due to high count rate (> 1500 cps).

No change was observed in either N-32 or the backup source range neutron flux monitors (gammametrics). N-32 was used for audio and one backup source range flux monitor was used to meet the minimum equipment requirements of Technical Specification 3.9.2.

0109 10/09/92 Fuel Assembly DD-16 with secondary source assembly (SS-1) is offloaded from the core

0130 10/09/92 FPL noticed no audio count rate and could not re-establish an audio indication. Fuel movement was suspended.

0156 10/09/92 Performed procedure 3-OSP-59.6, Hi Flux at Shutdown.

0215 10/09/92 Audio count rate was re-established, recommenced fuel movement.

0606 10/09/92 Unit 3 enters defueled mode

0814 10/09/92 Primary source range detector N-32 was declared out-of-service due to high count rate (> 400 cps) reading when < 10 cps expected following core offload.

Technical Specification 3.9.2, Refueling Operations Instrumentation, LIMITING CONDITION OF OPERATION states the following:

> "As a minimum, one primary Source Range Neutron Flux Monitor with continuous visual indication in the control room and audible indication in the containment and control room, and one of the remaining three Source Range Neutron Flux Monitors (one primary or one of the two backup monitors) with continuous visual indication in the control room shall be OPERABLE.

The corresponding ACTION statements are as follows:

a. With one of the above required monitors inoperable or not operating, immediately suspend all operations involving CORE ALTERATIONS or positive reactivity changes.

b. With both of the above required monitors inoperable or not operating, determine the boron concentration of the Reactor Coolant System at least once per 12 hours.

As of 0425 EDT on October 8, 1992, the monitoring capability was maintained by N-32 primary Source Range Neutron Flux Monitor and backup gammametric-B Source Range Neutron Flux Monitor.

During some point in the offload, the N-32 source range indication increased to approximately 500 cps. This value was less than the setpoint limit on the "SOURCE RANGE HI FLUX AT SHUTDOWN" alarm, and as a result the alarm did not annunciate. The fact that the detector had failed was only discovered after the offload was completed and the detector count rate had not dropped off.

Following the offload, the Source Range Flux Monitor data was trended. The ERDADS trend report from 1023 EDT on October 6, 1992 to 1024 EDT on October 8, 1992 showed N-32 gradually trending upward from approximately 250 cps to approximately 500 cps. N-31 shows a similar increase in detector response. N-32 count rate leveled off at approximately 500 cps at approximately 1000 EDT on October 8, 1992. The count rate remained at approximately 500 cps during the remainder of the fuel offload.

Based on the fact the audio indication on detector N-32 was lost almost immediately after the only fuel assembly in the core with a secondary source assembly (Fuel assembly DD-16) was discharged, FPL believes that the N-32 detector was operable up to this point. Therefore, the period from 0215 EDT on October 9, 1992 to 0606 EDT on October 9, 1992, represents the only time interval the operability of the N-32 detector is in question. Based on the core offload pattern and the relative assembly power and burnup conditions of the remaining assemblies, minimum reactivity changes would be expected during that interval.

II. CAUSE OF THE EVENT

Following the offload, the N-31 and N-32 detectors were removed from their wells, inspected and tested. Both detectors were found to be wet as a result of the failure of the detector cover gaskets during the refueling operation. In addition, evidence of some boric acid crystals were present. The presence of moisture in the detector assembly is believed to be the cause for the detector failure.

FPL has determined that the gaskets to the Nuclear Instrumentation System (NIS) access covers had been installed with the wrong gasket material. The material used was EPDM Rubber with Aramid Fiber/Synthetic, which was too hard a material to seal effectively. The material which should have been installed was EPDM Rubber Gasket material.

The root cause of the event was a lack of design information/plant procedures which dictate the proper gasket material and gasket installation procedures (i.e., mounting hardware, torque requirements, RTV applications) and a failure by plant personnel to specify the proper gasket material.

III. ANALYSIS OF THE EVENT

Testing included electrical checks, neutron source checks, integral bias curves and preamplifier gain per procedure MP 12707.1, Excore Nuclear Instrumentation Pre-Installation and Post-Installation Inspections and Test of Detectors. The electrical continuity and insulation checks were reported satisfactory. The Integral Bias curves indicated very high energy level pulses from each detector whether or not in the presence of a neutron field. The vendor was contacted and based upon the symptoms, initially postulated that the most likely failure mode was a pin hole air in-leakage to the detectors caused by failure of the detector aluminum housings due to exposure to the corrosive effects of boric acid.

Upon reviewing the results of Proportional Counter D.C. Current Characteristic Tests which were performed on each detector, the vendor revised his root cause determination to be moisture ingress into the cable or detectors. The detector failures were non-catastrophic, taking place over a period of several days due to the wet condition of the detector. As the performance of the detector degraded, the noise level increased and the detectors' sensitivity to neutrons decreased.

Technical Specification 3/4.9.2 Bases, Refueling Operations - Instrumentation, states that "the OPERABILITY of the Source Range Neutron Flux Monitors ensures that redundant monitoring capability is available to detect changes in the reactivity condition of the core." Since the detector degradation was gradual over several days, FPL is unable to definitively state that N-32 was unable to perform its intended function of detecting changes in reactivity. During the time interval when the operability of the N-32 detector was in question, both backup source range neutron flux monitors (gammametrics) were operable.

Since during the time interval in question the backup source range gammametric detectors were operable and no positive reactivity changes were possible, the health and safety of the public were not adversely affected.

IV. CORRECTIVE ACTIONS

1. Source range neutron detectors N-31 and N-32 were replaced prior to the Unit 3 core reload. In addition, the NIS detector access covers were installed with the proper EPDM rubber gasket material.

2. Revise plant procedure MP 12707.2, Excore Nuclear Instrumentation - Installation of Detectors, to reflect proper gasket material, mounting hardware, torque requirements, RTV application and RTV cure time. The procedure revision will be completed by February 1, 1993.

3. Revise plant drawing 5610-C-209, Reactor Refueling Pit Liner Plate Details, to reflect proper gasket material, mounting hardware, torque requirements, RTV application and RTV cure time. The drawing revision will be completed by February 1, 1993.

V. ADDITIONAL INFORMATION

No similar LERs have been identified.