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FACIL:50-250 Turkey Point Plant, Unit 3, Florida Power and Light C 05000250
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RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 93-006-00:on 930930,reactor trip signal & reactor trip breakers opened.Caused by faulty high voltage power supply. Faulty power supply replaced,source range channel recalibrated & channel returned to svc.W/931022 ltr.

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TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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FPL

OCT 22 1993

L-93-255
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: 93-006-00
**Reactor Trip During Shutdown Due to Excore Nuclear Instrument Source Range Failure**

The attached Licensee Event Report 250/93-006-00 is being provided in accordance with 10 CFR 50.73 (a)(2)(iv).

If there are any questions, please contact us.

Very truly yours,

T. F. Plunkett
Vice President
Turkey Point Nuclear

TFP/CLM/cm

enclosure

copies:

S. D. Ebneter, Regional Administrator, Region II, USNRC
T. P. Johnson, Senior Resident Inspector, USNRC, Turkey Point



IE22
1/1

# LICENSEE EVENT REPORT (LER)

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

TITLE (4) REACTOR TRIP DURING SHUTDOWN DUE TO EXCORE NUCLEAR INSTRUMENT SOURCE RANGE FAILURE

| EVENT DATE (5) | | | LER NUMBER(6) | | | RPT DATE (7) | | | OTHER FACILITIES INVOLVED (8) | |
|---|---|---|---|---|---|---|---|---|---|---|
| MON | DAY | YR | YR | SEQ # | R# | MON | DAY | YR | FACILITY NAMES | DOCKET # (S) |
| 09 | 30 | 93 | 93 | 006 | 00 | 10 | 22 | 93 | | |

| | | |
|---|---|---|
| OPERATING MODE (9) | 3 | 10 CFR 50.73(a)(2)(iv) |
| POWER LEVEL (10) | 0 | |

LICENSEE CONTACT FOR THIS LER (12)

| | TELEPHONE NUMBER |
|---|---|
| C. L. Mowrey, OEF Engineer/Analyst | 305-246-6204 |

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

| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | NPRDS? | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | NPRDS? |
|---|---|---|---|---|---|---|---|---|---|
| X | IG | RJX | W120 | Y | | | | | |

| SUPPLEMENTAL REPORT EXPECTED (14) NO ☒ YES ☐ | EXPECTED SUBMISSION DATE (15) | MONTH | DAY | YEAR |
|---|---|---|---|---|
| (If yes, complete EXPECTED SUBMISSION DATE) | | | | |


ABSTRACT (16)

On September 30, 1993, Turkey Point Unit 3 was shutting down to repair a steam leak on the pressurizer manway. At 2205 the excore nuclear instrument source range channel N31 spiked high when it was automatically re-energized. The spike generated a reactor trip signal, and the reactor trip breakers opened. At the time of the trip, the reactor was subcritical but all rods had not yet been fully inserted. All rods inserted on the trip, and all other plant equipment responded as expected. The reactor was stabilized in Mode 3.

The cause of the spike was a faulty high voltage power supply.

The faulty power supply was replaced, the source range channel was recalibrated, and the channel was returned to service upon successful completion of the surveillance test. Other methods of minimizing the risk of a preventable reactor trip from a faulty source range are being explored.

## I. DESCRIPTION OF THE EVENT

On September 30, 1993, Florida Power and Light Company's (FPL) Turkey Point Unit 3 was shutting down to repair a leak on the Reactor Coolant System pressurizer manway. At 2205, with the unit in Mode 3 (but some rods not yet fully inserted), the excore nuclear instrument source ranges were automatically re-energized as power decayed. Source Range channel N31 spiked high when it re-energized, satisfying the one out of two coincidence for a reactor trip signal. The reactor protection system actuated, and Unit 3 tripped. All control rods not previously inserted did insert as required, and all other safety systems responded as expected. The unit was stabilized in Mode 3, and troubleshooting was initiated. The NRC Operations Center was notified at 2245, in accordance with 10 CFR 50.72(b)(2)(ii).

## II. CAUSE OF THE EVENT

The cause of the source range failure was a faulty high voltage power supply. No physical damage to the power supply was readily discernible. We suspect that the power supply regulator circuit was faulted, but because troubleshooting of the power supply requires loading it to 15 milliamps at 1800 volts, FPL will return the failed power supply to the vendor for failure analysis.

## III. ANALYSIS OF THE EVENT

Failure of the high voltage power supply such that a high flux spike is generated results in a conservative action (reactor trip). If the power supply fails such that a source range channel is not automatically reinstated, the general operating procedure directs the operator to an off-normal operating procedure to ensure that at least one source range channel is operating properly. In practice, this particular point in the evolution of a normal shutdown is watched very closely by reactor operators because the reactor protection provided by the nuclear instrumentation changes automatically when the source ranges are energized automatically.

A reactor trip due to source range high flux is a previously analyzed event. As a result of the analysis, plant procedures are developed to provide operator guidance in responding to these transient conditions and to assure that the plant is stabilized in a safe condition in accordance with the plant Technical Specifications. The unit was stabilized in Mode 3 in accordance with these approved plant procedures. All safety related equipment operated per design. The health and safety of the public was not affected by the event.

## IV. CORRECTIVE ACTIONS

1. The high voltage power supply was replaced. The failed power supply is being returned to the vendor for further analysis, and repair.

2. The source range channel was recalibrated, and returned to service after the surveillance test was successfully completed.

3. An Event Response Team was formed to evaluate this failure and to investigate source range channel failures for generic implications.

4. Enhancements to help avoid future high voltage power supply failures are being investigated. Possibilities include periodic checks of the power supply if it is de-energized for a long time, application to this specific power supply of vendors' general recommendations regarding electrolytic capacitors, or placing the level trip bypass switch in Bypass during normal shutdowns, until the source range channel has been automatically re-energized.

## V. ADDITIONAL INFORMATION

Failure of source range detectors was reported in LER 250-92-11. The detectors failed due to moisture intrusion.

System and component identification described in this report:

| SYSTEM OR COMPONENT | EIIS CODE | IEEE 803a/83 |
|---|---|---|
| Reactor Coolant System | AB | N/A |
| Pressurizer | AB | PZR |
| Excore Nuclear Instruments | IG | N/A |
| Reactor Protection System | JC | N/A |
| Control Rods | JD | N/A |
| High Voltage Power Supply | IG | RJX |