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10 CFR § 50.73
L-2010-005
January 25, 2010

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555-0001

Re: Turkey Point Unit 4
Docket No. 50-251
Reportable Event: 2010-001-00
Date of Event: November 26, 2009
Two Shutdown Bank Rods Were Dropped from Fully Withdrawn Position

The attached Licensee Event Report 05000251/2010-001-00 is being submitted pursuant to 10 CFR 50.73(a)(2)(iv) to provide notification of the subject event.

If there are any questions, please call Mr. Robert Tomonto at 305-246-7327.

Very truly yours,

Michael Kiley
Vice President
Turkey Point Nuclear Plant

Attachment

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

IE22
NRR

NRC FORM 366 (9-2007) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 08/31/2010

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Turkey Point Unit 4	05000251	1 of 4

4. TITLE

Two Shutdown Bank Rods Were Dropped from Fully Withdrawn Position

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
11	26	2009	2010	- 001 -	00	1	25	2010	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE

3

10. POWER LEVEL

0

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: *(Check all that apply)*

- ☐ 20.2201(b)
- ☐ 20.2201(d)
- ☐ 20.2203(a)(1)
- ☐ 20.2203(a)(2)(i)
- ☐ 20.2203(a)(2)(ii)
- ☐ 20.2203(a)(2)(iii)
- ☐ 20.2203(a)(2)(iv)
- ☐ 20.2203(a)(2)(v)
- ☐ 20.2203(a)(2)(vi)
- ☐ 20.2203(a)(3)(i)
- ☐ 20.2203(a)(3)(ii)
- ☐ 20.2203(a)(4)
- ☐ 50.36(c)(1)(i)(A)
- ☐ 50.36(c)(1)(ii)(A)
- ☐ 50.36(c)(2)
- ☐ 50.46(a)(3)(ii)
- ☐ 50.73(a)(2)(i)(A)
- ☐ 50.73(a)(2)(i)(B)
- ☐ 50.73(a)(2)(i)(C)
- ☐ 50.73(a)(2)(ii)(A)
- ☐ 50.73(a)(2)(ii)(B)
- ☐ 50.73(a)(2)(iii)
- ☒ 50.73(a)(2)(iv)(A)
- ☐ 50.73(a)(2)(v)(A)
- ☐ 50.73(a)(2)(v)(B)
- ☐ 50.73(a)(2)(v)(C)
- ☐ 50.73(a)(2)(v)(D)
- ☐ 50.73(a)(2)(vii)
- ☐ 50.73(a)(2)(viii)(A)
- ☐ 50.73(a)(2)(viii)(B)
- ☐ 50.73(a)(2)(ix)(A)
- ☐ 50.73(a)(2)(x)
- ☐ 73.71(a)(4)
- ☐ 73.71(a)(5)
- ☐ OTHER

Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (Include Area Code)
Ronald L. Everett	305-246-6190

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

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

On November 26, 2009 at approximately 2018 hours, during performance of Rod Position Indication System Replacement Testing (in Mode 3) and while withdrawing A and B control rod banks, the New Analog Rod Position Indication (NARPI) System indicated rods H6 and H10 dropped from fully withdrawn Shutdown Bank B (Group 2). Annunciator B-9/3 "Shutdown Rod Off Top" annunciated and the associated "Rod Bottom Lights" illuminated. The NARPI Testing was stopped. Troubleshooting began to determine whether the problem was with NARPI or the Rod Control System. Instrumentation and Control personnel checked voltages, recorded current traces, and reported that both rods dropped. ONOP-028.3, "Dropped RCC" was entered and the reactor was manually tripped at 2340 inserting all rods. At the time of the trip, the reactor was in mode 3 (K_{eff} less than 0.99). A 10 CFR 50.72 8-hour report (EN# 45522) was made to the NRC. The RCS boron concentration was maintained at or above the Minimum Shutdown Boron Concentration specified in the NARPI test procedure (4-PTP-028.2). The apparent cause of the failure was a high resistance connection.

This event is considered to be reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A), due to manual actuation of the Reactor Protection System to trip the reactor, inserting all rods.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Turkey Point Unit 4	05000251	2010	- 001	- 00	2 of 4

NARRATIVE

DESCRIPTION OF THE EVENT

On November 26, 2009 at approximately 2018 hours, during performance of Rod Position Indication System Replacement Testing (Mode 3 tests) while withdrawing A and B control rod banks, the New Analog Rod Position Indication (NARPI) System indicated rod [EIIS: AA, ROD] H6 and H10 dropped from fully withdrawn Shutdown Bank B (Group 2). Annunciator B-9/3 "Shutdown Rod Off Top" annunciated and the associated "Rod Bottom Lights" illuminated. The NARPI System Replacement Testing was stopped.

Troubleshooting began to determine whether the problem was with NARPI or the Rod Control System. Instrumentation and Control personnel checked voltages, recorded current traces, and reported that control room indication showed that both rods were dropped. ONOP-028.3, "Dropped RCC" was entered and the reactor was tripped at 2340 inserting all rods. At the time of the trip, the reactor was in mode 3 (K_{eff} less than 0.99). A 10 CFR 50.72 8-hour report (EN# 45522) was made to the NRC. The RCS boron concentration was maintained at or above the Minimum Shutdown Boron Concentration specified in the NARPI test procedure (4-PTP-028.2).

This event is considered to be reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A), due to manual actuation of the Reactor Protection System to trip the reactor, inserting all rods on November 26, 2009.

CAUSE OF THE EVENT

Shortly after the event, troubleshooting was conducted on the rod control system, wherein the 2BD cabinet was instrumented with a Dewetron recorder, the reactor trip breakers were closed, and the shutdown rods were again stepped out of the core. The current traces taken were sent off to the vendor for their evaluation. The vendor reported that they were uncertain due to the unusual characteristics of the traces. The plant personnel performed an inspection of the 2BD cabinet, where it was found that the neutral bus connection for the sampling resistor bank assembly A24 was slightly loose. Once this connection was disassembled, an inspection revealed a thin oxide coating between the lug and the copper bus bar. No indications of anomalies had been found during the recently performed preventive maintenance.

A loose connection being oxidized would result in an increased resistance, leading to a higher voltage being dropped for a lower current. The vendor determined that a current as low as 2.7 amps could lead to dropped rods due to insufficient holding power developed by the stationary grippers. The oxide layer observed combined with the loose connection was considered more than sufficient to provide the increased resistance that could lead to a reduced current. With the current reduced, the stationary gripper would not have been holding at the required tension, so that when subjected to the vibrations created by an adjacent lift mechanism, the control rod would be able to fall. The vendor recommended replacement of the circuit cards responsible for the regulation of current in this group of rods. The circuit cards (firing card, regulating card, and input/output AC card) were replaced as recommended. Electrical connections of all cabinets were inspected and loose connections were tightened (WO 39024029). Once the connections were cleaned and tightened and new cards installed, the system was re-energized and tested satisfactorily with acceptable current traces. The vendor concurred no further repairs were necessary. The apparent cause of the failure was a high resistance connection.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Turkey Point Unit 4	05000251	2010	- 001	- 00	3 of 4

NARRATIVE

ANALYSIS OF THE EVENT

Background

The Rod Control System [EIIS, JD] performs the following functions:

1. Controls the motion of the control rods within the core, in response to signals from the In-Hold-Out switch or the reactor control unit.
2. Maintains programmed reactor coolant system temperature, by regulating reactivity within the core, to within a programmed temperature range.

The regulation circuit for this operation is controlled from the sampling registers within the Rod Control System cabinets. The Rod Cluster Control Assembly (RCCA) drop event is an analyzed event in Section 14.1.4 of the Updated Final Safety Analysis Report.

Reportability

The event was reported to the NRC in accordance with 10 CFR 50.72(b)(3) on November 26, 2009. A review of the reporting requirements of 10 CFR 50.72 and 10 CFR 50.73 and NRC guidance provided in NUREG-1022, Revision 2, Event Reporting Guidelines 10 CFR 50.72 and 10 CFR 50.73, was performed for the subject condition. As a result of this review, the condition was deemed reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A), due to manual actuation of the Reactor Protection System to trip the reactor, inserting all rods November 26, 2009.

Analysis of Safety Significance

At the time of the rod drop event, the reactor was in Mode 3 (Hot Standby) and the plant was performing post-modification testing of the NARPI system. The Technical Specifications for Rod Misalignment are applicable in Modes 1 and 2 and did not apply. Plant procedures directed the reactor to be manually tripped due to the unexpected rod drop condition. At the time of the test, the boron concentration was high enough to maintain the shutdown margin with all rods out. As the reactor was sub-critical with adequate shutdown margin, and since the reactor trip function was available, the safety significance of this event is considered to be minimal. Upon manually opening the reactor trip breakers, the rods that were withdrawn from the core were fully inserted.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Turkey Point Unit 4	05000251	2010	- 001	- 00	4 of 4

NARRATIVE

CORRECTIVE ACTIONS

Corrective actions include the following:

1. Corrective actions included cleaning and tightening of the Unit 4 affected connections followed by an inspection of all the connections of the neutral buses. Unit 3 uses the same model rod control cabinets and is subject to similar loose connections. Any additional troubleshooting on Unit 3 will be performed at the first available opportunity when the unit is offline.
2. The preventive maintenance procedure (applicable to both units) is to be revised prior to the next Unit 3 refueling outage to include a more thorough inspection and cleaning of the feedback sensor resistor bank connections.

ADDITIONAL INFORMATION

EIIS Codes are shown in the format [IEEE system identifier, component function identifier, second component function identifier (if appropriate)]. Condition Report 2009-33606 was initiated due to this event.

FAILED COMPONENTS IDENTIFIED: None

PREVIOUS SIMILAR EVENTS: None – However, rod H6 dropped again November 27, 2009 due to the conditions described in this event report, prior to the corrective actions being completed. Condition Report 2009-33607 was initiated due to this event.