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10 CFR § 50.73
L-2011-040

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: 2010-008-00
Date of Event: December 9, 2010
Manual Reactor Trip Due to Condenser Tube Leak

The attached Licensee Event Report 05000251/2010-008-00 is being submitted pursuant to 10 CFR 50.73(a)(2)(iv)(A) due to a valid manual actuation of the reactor protection system and associated manual reactor trip. If there are any questions, please call Mr. Robert J. 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 (10-2010) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2013

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA/Privacy Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resourse@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 |
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| Turkey Point Unit 4 | 05000251 | 1 of 3 |

**4. TITLE**

Manual Reactor Trip Due to Condenser Tube Leak

| 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 |
| 12 | 9 | 2010 | 2010 | - 008 - | 00 | 2 | 4 | 2011 | FACILITY NAME | DOCKET NUMBER |

**9. OPERATING MODE**

1

**10. POWER LEVEL**

17.5%

**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 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 |
|---|---|---|---|---|---|---|---|---|---|
| B | SG | TBG | T310 | Y | | | | | |

**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)*


At 22:00 on December 9, 2010 Unit 4 had indication (high sodium) of a condenser tube leak. A rapid power reduction to less then 5% was commenced in accordance with plant procedures as the sodium levels increased to greater than 250 ppb (action level 3). Chemistry confirmed that the high sodium level was due to salt water intrusion from the 4BN Main Condenser tube bundle. A management decision was made to shutdown the reactor in accordance with plant procedures by manually opening the reactor trip breakers at about 22:58:13 from approximately 17.5% power. All systems functioned as designed and there was no impact on the health and safety of the public. The NRC was notified (Event Number 46471) at approximately 01:25 (EST) on December 10, 2010.

The direct cause of the condenser tube leak is considered to be a manufacturing defect (seam weld failure). Corrective actions involved plugging the failed tube and four other tubes with minimal indications. The failed tube will be removed during the next refueling outage (RFO PT4-26) and sent for analysis. Eddy Current Testing will be performed during RFO PT4-26 with conservative plugging criteria to plug all tubes with indications of greater than 50% wall-loss. Long term, the Unit 3 and Unit 4 condenser tube bundles are currently planned for replacement under the Extended Power Uprate Project.

# LICENSEE EVENT REPORT (LER)
# CONTINUATION SHEET

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**NARRATIVE**

## DESCRIPTION OF THE EVENT

At 22:00 on December 9, 2010 Unit 4 had indication (high sodium) of a condenser tube leak. A rapid power reduction was commenced in accordance with plant procedures 4-ONOP-100, "Fast Load Reduction", 4-ONOP-071.1, "Secondary Chemistry Deviation from Limits" and 0-ADM-651, "Nuclear Chemistry Parameters Manual" as the sodium levels increased to greater than 250 ppb (action level 3). Chemistry confirmed that the high sodium level was due to salt water intrusion from the 4BN Main Condenser tube bundle. A management decision was made to shutdown the reactor in accordance with plant procedures by manually opening the reactor trip breakers at about 22:58:13 from approximately 17.5% power. All systems functioned as designed and there was no impact on the health and safety of the public. The NRC was notified (Event Number 46471) at approximately 01:25 (EST) on December 10, 2010.

## CAUSE OF THE EVENT

The direct cause of the condenser tube leak is considered to be a manufacturing defect (seam weld failure). Corrective actions involved plugging the failed tube and four other tubes with minimal indications. The failed tube will be removed during the next refueling outage (RFO PT4-26) and sent for analysis. Eddy Current Testing will be performed during RFO PT4-26 with conservative plugging criteria to plug all tubes with indications of greater than 50% wall-loss. Long term, the Unit 3 and Unit 4 condenser tube bundles will be replaced under the Extended Power Uprate Project. A root cause analysis was performed of the Unit 4 event.

The power reduction to less then 5% was required because secondary chemistry parameters reached Action Level 3 (250 ppb) as defined in 0-ADM-651, "Nuclear Chemistry Parameters Manual," requiring an orderly power reduction to be initiated immediately as rapidly as other plant constraints permit.

## ANALYSIS OF THE EVENT

The seawater contamination event and sodium level increase led to the decision to shutdown the reactor in accordance with plant procedures and therefore is reportable under 10 CFR 50.73(a)(2)(iv)(A) as "any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B) of this section." The Reactor Protection System (RPS) including reactor scram or reactor trip is included in the systems listed. All systems operated as expected during the reactor shutdown and there was no impact on the health and safety of the public.

Review of the operating history of Units 3 and 4 revealed no tube leakage events in Unit 3; however, in Unit 4 there was at least one event in 1990 due to welded seam defects in tubes. Both units have had previous tube leaks due to other causes, e.g. damage from flashing, plug leakage, rolled joint failures, and vibration. The Units 3 and 4 condensers have some tube bundles from the same manufacturer.

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**NARRATIVE**

## CORRECTIVE ACTIONS

Corrective actions involved plugging the failed tube and four other tubes with minimal indications. The failed tube will be removed during the next refueling outage (RFO PT4-26) and sent for analysis. Eddy Current Testing will be performed during RFO PT4-26 with conservative plugging criteria to plug all tubes with indications of greater than 50% wall-loss. Long term, the Unit 3 and Unit 4 condenser tube bundles are currently planned for replacement under the Extended Power Uprate Project.

## ADDITIONAL INFORMATION

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

## SIMILAR EVENTS

There have been no similar Turkey Point LERs in the last five years. Based on internal operating experience review, the only similar tube leak event resulting from a tube manufacturing welded seam defect was back in 1990.