



APR 04 2011

L-2011-047  
10 CFR § 50.73

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

Re: Turkey Point Units 3 and 4  
Docket No. 50-250 and 50-251  
Reportable Event: 2010-004-01  
Date of Event: October 1, 2010  
Inoperable Main Steam Line High Range Noble Gas Accident Monitoring  
Instrumentation -Supplement

The attached Licensee Event Report Supplement 05000250/2010-004-01 is being submitted pursuant to 10 CFR 50.73(a)(2)(i)(B). Revision bars indicate changes associated with this supplement.

If there are any questions, please call Mrs. Olga Hanek, Acting Licensing Manager at 305-246-6607.

Very truly yours,

Michael Kiley  
Vice President  
Turkey Point Nuclear Plant

Attachment

SM

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

JE22  
NRK

**LICENSEE EVENT REPORT (LER)**

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.resource@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.

|  |                                     |                          |
|--|-------------------------------------|--------------------------|
| <b>1. FACILITY NAME</b><br>Turkey Point Unit 3 | <b>2. DOCKET NUMBER</b><br>05000250 | <b>3. PAGE</b><br>1 OF 5 |
|--|-------------------------------------|--------------------------|

**4. TITLE**  
Inoperable Main Steam Line Accident Monitoring Instrumentation-Supplement

| 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 |
| 10            | 01  | 2010 | 2010           | 004               | 01      | 04                           | 04  | 2011 | Turkey Point Unit 4 | 05000251      |
|               |     |      |                |                   |         |                              |     |      | FACILITY NAME       | DOCKET NUMBER |

**9. OPERATING MODE**  
6

**10. POWER LEVEL**  
0%

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

|   |   |   |   |
|---|---|---|---|
| <input type="checkbox"/> 20.2201(b)         | <input type="checkbox"/> 20.2203(a)(3)(i)             | <input type="checkbox"/> 50.73(a)(2)(i)(C)  | <input type="checkbox"/> 50.73(a)(2)(vii)     |
| <input type="checkbox"/> 20.2201(d)         | <input type="checkbox"/> 20.2203(a)(3)(ii)            | <input type="checkbox"/> 50.73(a)(2)(ii)(A) | <input type="checkbox"/> 50.73(a)(2)(viii)(A) |
| <input type="checkbox"/> 20.2203(a)(1)      | <input type="checkbox"/> 20.2203(a)(4)                | <input type="checkbox"/> 50.73(a)(2)(ii)(B) | <input type="checkbox"/> 50.73(a)(2)(viii)(B) |
| <input type="checkbox"/> 20.2203(a)(2)(i)   | <input type="checkbox"/> 50.36(c)(1)(i)(A)            | <input type="checkbox"/> 50.73(a)(2)(iii)   | <input type="checkbox"/> 50.73(a)(2)(ix)(A)   |
| <input type="checkbox"/> 20.2203(a)(2)(ii)  | <input type="checkbox"/> 50.36(c)(1)(ii)(A)           | <input type="checkbox"/> 50.73(a)(2)(iv)(A) | <input type="checkbox"/> 50.73(a)(2)(x)       |
| <input type="checkbox"/> 20.2203(a)(2)(iii) | <input type="checkbox"/> 50.36(c)(2)                  | <input type="checkbox"/> 50.73(a)(2)(v)(A)  | <input type="checkbox"/> 73.71(a)(4)          |
| <input type="checkbox"/> 20.2203(a)(2)(iv)  | <input type="checkbox"/> 50.46(a)(3)(ii)              | <input type="checkbox"/> 50.73(a)(2)(v)(B)  | <input type="checkbox"/> 73.71(a)(5)          |
| <input type="checkbox"/> 20.2203(a)(2)(v)   | <input type="checkbox"/> 50.73(a)(2)(i)(A)            | <input type="checkbox"/> 50.73(a)(2)(v)(C)  | <input type="checkbox"/> OTHER                |
| <input type="checkbox"/> 20.2203(a)(2)(vi)  | <input checked="" type="checkbox"/> 50.73(a)(2)(i)(B) | <input type="checkbox"/> 50.73(a)(2)(v)(D)  | Specify in Abstract below or in NRC Form 366A |

**12. LICENSEE CONTACT FOR THIS LER**

|                             |  |
|-----------------------------|--|
| NAME<br>Stavroula Mihalakea | TELEPHONE NUMBER (Include Area Code)<br>305-246-6454 |
|-----------------------------|--|

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

| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO EPIX | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO EPIX |
|-------|--------|-----------|--------------|--------------------|-------|--------|-----------|--------------|--------------------|
|       |        |           |              |                    |       |        |           |              |                    |

|  |  |
|--|--|
| <b>14. SUPPLEMENTAL REPORT EXPECTED</b><br><input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO | <b>15. EXPECTED SUBMISSION DATE</b><br>MONTH:      DAY:      YEAR: |
|--|--|

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

On October 1, 2010, Turkey Point Unit 3 was in Mode 6 due to refueling outage, and Turkey Point Unit 4 was operating in Mode 1. Radiation Monitor RAD-6426, with Eberline Data Acquisition Monitor (DAM-1) and High Range Noble Gas Detector Assembly SA-9, common to Turkey Point Units 3 and 4, is required to be OPERABLE in Modes 1 through 3, in accordance with Technical Specification (TS) 3.3.3.3. During the process of researching the design basis for a replacement monitor, it was identified that insufficient levels of noble gases are transported to the RAD-6426 detector to provide a detectable concentration of noble gases. On October 1, 2010, it was determined that RAD-6426 was unable to be restored to an OPERABLE status within 7 days as specified by the TS. The sampling transport system does not deliver a representative sample of noble gases released at the main steam line safety valves and/or atmospheric dump valves and has not since the original installation of the monitor in 1981, and as such it has not met the intent of the TS requirements. The latent design deficiency associated with the sample transport system is due to inadequate DAM-1 design, design verification, and functional testing. This condition is reportable pursuant to 10 CFR 50.73(a)(2)(i)(B) due to any operation or condition which is prohibited by the plant's TSs. Turkey Point complied with the TS action requirements by initiating the preplanned alternate monitoring method of appropriate parameters and by submitting a Special Report within the required TS action time. Corrective actions include actions to replace this monitor.

**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**

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**NARRATIVE**

**DESCRIPTION OF THE EVENT**

On October 1, 2010, Turkey Point Unit 3 was in Mode 6 due to refueling outage, and Turkey Point Unit 4 was operating in Mode 1.

Radiation Monitor RAD-6426, with Eberline [E070] Data Acquisition Monitor (DAM-1) and High Range Noble Gas Detector Assembly SA-9, common to Turkey Point Units 3 and 4, is required to be OPERABLE in Modes 1 through 3, in accordance with Technical Specification (TS) 3.3.3.3, Table 3.3-5, Accident Monitoring Instrumentation, Instrument 19.d, High Range-Noble Gas Effluent for Main Steam Lines. RAD-6426 is a single detector, which receives a condensed steam sample from the piping tied into each of the six main steam lines, upstream of the main steam isolation valves. The sample is used to determine noble gas activity for quantifying accident release rates through the main steam safety valves and/or the atmospheric steam dump valves.

Florida Power & Light Company (FPL) is currently planning the replacement of RAD-6426 due to performance issues associated with obsolescence of this monitor. During the process of researching the design basis for a replacement monitor, it was identified that insufficient levels of noble gases are transported to the RAD-6426 detector to provide a detectable concentration of noble gases.

On September 24, 2010, based on concerns regarding the monitor's ability to perform its design function, RAD-6426 was placed in the equipment out of service log and the TS preplanned alternate monitoring method of appropriate parameters was initiated within 72 hours in accordance with Turkey Point TS 3.3.3.3, Table 3.3-5, Action 34 requirements. After subsequent evaluation, it was identified that the sampling transport system of RAD-6426 does not deliver a representative sample of noble gases released at the main steam line safety valves and/or the atmospheric dump valves and has not since the original installation of the monitor in 1981.

On October 1, 2010, RAD-6426 was declared inoperable and unable to be restored to an OPERABLE status within 7 days as specified by the TS allowed outage time. FPL complied with the TS 3.3.3.3, Table 3.3-5 Action 34 requirements by initiating the preplanned alternate monitoring method of appropriate parameters and by preparing and submitting a Special Report to the Commission within the required TS action time.

TS 3.3.3.3 Limiting Condition for Operation (LCO) does not require a shutdown for the inoperability of RAD-6426. Furthermore, TS 3.3.3.3 Action b. states that the provisions of Specification 3.0.4 are not applicable to actions in Table 3.3-5. The TS LCO 3.0.4 states: "Entry into an OPERATIONAL MODE or other specified condition shall not be made when the conditions for the Limiting Conditions are not met and the associated ACTION requires a shutdown if they are not met within a specified time interval. Entry into an OPERATIONAL MODE or specified conditions may be made in accordance with ACTION requirements when conformance to them permits continued operation of the facility for an unlimited period of time. This provision shall not prevent passage through or to OPERATIONAL MODES as required to comply with ACTION requirements. Exceptions to these requirements are stated in the individual specifications." Accordingly, on November 9, 2010 Turkey Point Unit 3 returned to power from its scheduled refueling outage without any operational mode restrictions related to the inoperability of RAD-6426. Both units continue to remain in the action statement (TS 3.3.3.3, Table 3.3-5, Action 34), which requires the use of the preplanned alternate monitoring method while the designated TS instrument for accident monitoring for High-Range Noble Gas Effluent for the Main Steam Lines will be repaired/replaced.

This condition is reportable pursuant to 10 CFR 50.73(a)(2)(i)(B) due to any operation or condition which is prohibited by the plant's Technical Specifications. The following condition reports were entered in the site's corrective action program to address this condition: AR 572823, AR 585330, AR 596361.

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**NARRATIVE**

**CAUSE OF THE EVENT**

The latent design deficiency associated with the sample transport system was determined to be inadequate design change provided by the vendor and inadequate design verification and functional testing performed by Florida Power & Light Company (FPL), and the vendor.

The programmatic weaknesses in vendor oversight that led to this condition existed over 30 years ago. Programmatic changes and initiatives that would effectively prevent significant design errors, similar to those that occurred during the design of DAM-1, have been addressed in the station's corrective action program.

**ANALYSIS OF THE EVENT**

NUREG-0578 recommendations identified the need to provide improved instrumentation to follow the course of an accident. In response to regulatory requirements for monitoring activity released from the secondary side of the Turkey Point Units, FPL committed to determine noble gas activity released from the main steam line safeties and atmospheric dump valves by collecting condensed steam samples from the main steam sample lines. Noble gas release rates would be determined from curves, which relate noble gas activity in the steam samples to the flow rate out of the Main Steam Lines.

In order to meet NUREG-0578 accident monitoring [IP] requirements, Main Steam Line High Range Noble Gas Effluent Monitor RAD 6426 was installed at Turkey Point in 1981. RAD-6426 is a single detector, which receives a condensed steam sample from the piping tied into each of the six steam lines, upstream of the main steam isolation valves to determine Main Steam Line noble gas activity for quantifying the release rates through the main steam safety valves [SB,C24] and/or the atmospheric steam dump valves.

FPL is in the process of replacing RAD-6426 due to performance issues associated with the obsolescence of this monitor. In the process of researching the design basis for a replacement monitor, a concern was raised that there was no design basis discussion or available calculation found in the records that correlates activity measured at the monitor to the noble gas activity released from the main steam line safeties or atmospheric dump valves as required by previous NUREG-0578 commitments.

An engineering study was performed to determine the amount of noble gases delivered to the monitor. Preliminary results of the study indicated that with the existing sampling system, the various loops in the lines to the sample coolers provide a trap such that the noble gases that enter the sample system would not be representative of the sampled steam at the RAD-6426 detector. Sample flows are very low (1-2 gallons per hour), which would result in a long transport time during which radioactive isotopes may no longer represent the main steam bulk stream.

Additional concerns were raised during subsequent evaluation regarding the ability of the monitor's current design to meet the functional requirements as required by regulatory commitments. Subsequent evaluation concluded that insufficient levels of noble gases are transported to the RAD-6426 detector, to provide a detectable concentration. The sampling transport system does not deliver a representative sample of noble gases released at the main steam line safeties and/or atmospheric dump valves and has not since the original installation of the monitor in 1981.

Based on these results, it was concluded that RAD 6426 does not provide monitoring to support calculation of the release rates through the main steam safeties and the atmospheric dump valves. This condition is identified as a non conforming condition that prevents RAD-6426 from performing its specified TS function as a High Range-Noble Gas Effluent Monitor for the Main Steam Lines.

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**NARRATIVE**

**REPORTABILITY**

RAD-6426 is considered inoperable from its original installation in 1981 and as such, unable to meet the intent of TS 3.3.3.3 requirements. Although TS preplanned alternate monitoring methods could have been available to restore compliance with the TS LCO, this condition was not previously recognized as a non compliance with the TS requirements and as such there was no entry into the TS action statements. It is determined that this condition is reportable per 10 CFR 50.73(a)(2)(i)(B), which requires the reporting of:

Any operation or condition which was prohibited by the plant's Technical Specifications except when

- (1) The Technical specification is administrative
- (2) The event consisted solely of a case of a late surveillance test where the oversight was corrected, the test was performed, and the equipment was found to be capable of performing its specified safety functions; or
- (3) The Technical Specification was revised prior to discovery of the event such that the operation or condition was no longer prohibited at the time of discovery of the event.

As none of these three exceptions apply in this case, the non-compliance with Turkey Point Units 3 and 4 TS 3.3.3.3, Table 3.3-5, Instrument 19.d requirements is reportable in accordance with 10 CFR 50.73(a)(2)(i)(B).

**ANALYSIS OF SAFETY SIGNIFICANCE**

The FSAR describes RAD-6426 as follows:

“The Main Steam Line Monitor detects radiation passing through the main steam lines. The monitor was installed to meet the requirements of NUREG-0578. This monitor is required to be operable in accordance with Technical Specifications and is used to meet the requirements of Regulatory Guide 1.97 for post accident monitoring. The monitor receives a steam sample from piping tied into each steam line, upstream of the main steam isolation valves, and can be isolated using the outlet isolation valves for the main steam line sample coolers. The thermal and jet impingement effects of a break in the tubing at this monitor would neither affect accessibility to the outlet isolation valves nor impact any safety related equipment. A Geiger-Muller tube is used to monitor the gaseous radiation level. It covers a range from 1.0 to 10E5 microcuries/cc for Xe-133. Indication and alarms are provided locally and the parameter is displayed by ERDADS.”

The Offsite Dose Calculation Manual (ODCM) does not include the RAD-6426 (accident monitoring instrument) in the list of the ODCM Radioactive Liquid or Gaseous Effluent Monitoring Instrumentation. ODCM Bases state that the radioactive gaseous effluents from Turkey Point Units 3 and 4 are released through four monitored release points: The common Plant Vent via a stack above the containment building, the Unit 3 Spent Fuel Pit Vent, and the Condenser Steam Jet Air Ejector Vents from each Unit. Unmonitored radioactive airborne releases can also occur from the secondary steam systems of each unit if primary to secondary leakage is occurring. Accounting for the quantity of these unmonitored airborne releases, during periods of primary to secondary leakage, is performed using plant procedures and the most accurate means available.

The Design Basis Document (DBD) includes monitor RAD-6426 as one of the instruments that are required to meet Regulatory Guide 1.97 requirements for post-accident monitoring. The DBD states that RAD-6426 has no safety related functions. The quality related functions for RAD-6426 are:

1. Shall provide wide range monitoring of the activity passing through the main steam lines. This will allow determination of the main steam system activity even during severe accidents. This would allow calculation of the released rates through the main steam safety valves and/or the atmospheric dump valves.

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**NARRATIVE**

- Shall serve as back up to the SG sampling monitor, R-19 in identifying RCS leakage through the steam generator tubes.

As discussed, RAD-6426 does not perform the design basis quality related function of providing wide range monitoring of the activity passing through the main steam lines to support calculation of the release rates through the main steam safety valves and/or the atmospheric dump valves. Compensatory measures for when RAD-6426 is not operable include monitoring the preplanned alternate radiation instruments with the ODCM Radioactive Gaseous Effluent Monitoring Instrumentation on the Steam Jet Air Ejectors (R-15) and on Steam Generator Blowdown (R-19) grab sampling. Chemistry plant procedures include choices based on the monitors available. The Steam Jet Air Ejector radiation monitor R-15 can not assess the main steam line activity during a severe accident with the main steam safety valves and/or atmospheric steam dump valves open. However, using the Steam Generator Blowdown Monitor R-19 data and taking grab samples from the blowdown sample lines is still a viable alternative to determine released activity during an event.

A permanent replacement of the main steam line radiation monitor is expected during the second quarter of 2012. In the interim, and in the case of a primary to secondary leak, the preplanned alternate monitoring provides input for offsite dose calculations until the steam generators are isolated. In accordance with emergency planning implementing procedure 0-EPIP-20126, Offsite Dose Calculations, after the steam generators are isolated, conservative default release rates will be used to determine offsite dose rates until additional data (such as Reactor Coolant System grab samples) become available. Based upon this information, the dose assessment calculation will continue to be assessed in accordance with approved emergency planning implementing procedures and as such, this condition has minimal safety implication to the health and safety of the public.

**CORRECTIVE ACTIONS**

Corrective actions include:

- Preplanned Alternate Monitoring was initiated in accordance with TS requirements per plant procedures.
- Submitted a Special Report to the Commission.
- Issued Training Brief to Emergency Response Organization for utilizing Default release rates in the Dose Assessment Calculations.
- Design and install replacement monitor.

**ADDITIONAL INFORMATION**

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

FAILED COMPONENTS IDENTIFIED: None.

PREVIOUS SIMILAR EVENTS: Turkey Point Unit 4, LER 05000251/2004-001-00, Inadequate Calibration Renders Radiation Process Effluent Monitor Inoperable.