



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

January 20, 2010

Vice President, Operations
Arkansas Nuclear One
Entergy Operations, Inc.
1448 S.R. 333
Russellville, AR 72802

SUBJECT: ARKANSAS NUCLEAR ONE, UNIT NO. 1 - EVALUATION OF FALL 2008
REFUELING OUTAGE (1R21) STEAM GENERATOR TUBE INSPECTIONS
(TAC NO. ME1009)

Dear Sir or Madam:

By letter dated March 30, 2009, Entergy Operations Inc. (Entergy, the licensee), submitted information pertaining to its 2008 steam generator (SG) tube inspections at the Arkansas Nuclear One, Unit 1 (ANO-1) during the fall 2008 refueling outage (1R21).

In addition, the licensee and the U.S. Nuclear Regulatory Commission (NRC) staff held a conference call on November 8, 2008, and a Category 1 public meeting on December 15, 2009, to discuss the SG inspection results during past outages and to address issues related to bowed tie rods and tube support plate wear. Summaries of the conference call on November 8, 2008, and the public meeting on December 15, 2009, are available in the Agencywide Documents Access and Management System in ADAMS Accession Nos. ML083380334 and ML093520058, respectively.

The NRC staff has completed its review of these reports and concludes that the licensee provided the information required by its technical specifications and that no additional follow-up is required at this time. The staff's review of the reports is enclosed.

If you have any questions, please contact me at (301) 415-1480 or by e-mail at kaly.kalyanam@nrc.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "N. Kaly Kalyanam", with a horizontal line underneath.

N. Kaly Kalyanam, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-313

Enclosure:
As stated

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SUMMARY OF REVIEW BY THE OFFICE OF NUCLEAR REACTOR REGULATION

ARKANSAS NUCLEAR ONE, UNIT 1

EVALUATION OF THE STEAM GENERATOR INSPECTIONS

PERFORMED DURING THE FALL 2008 REFUELING OUTAGE (1R21)

DOCKET NO. 50-313

By letter dated March 30, 2009 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML090920254), Entergy Operations, Inc., the licensee, submitted information summarizing the results of its fall 2008 refueling outage (1R21) steam generator (SG) tube inspections at Arkansas Nuclear One, Unit 1 (ANO 1). In addition, the licensee and the U.S. Nuclear Regulatory Commission (NRC) staff held a conference call on November 8, 2008, and a Category 1 public meeting on December 15, 2009, to discuss the SG inspection results during past outages and to address issues related to bowed tie rods and tube support plate wear. Summaries of the November 8, 2008, conference call and the December 15, 2009, public meeting are available in ADAMS Accession Nos. ML083380334 and ML093520058, respectively.

The SGs at ANO-1 were replaced in 2005 with enhanced once-through steam generators manufactured by AREVA. The vertical SGs are straight shell-and-tube heat exchangers, each containing 15,597 thermally treated Alloy 690 tubes. Each tube has a nominal outside diameter of 0.625 inches and a nominal wall thickness of 0.037 inches. The tubes were hydraulically expanded for the full depth of the tubesheet and are supported by 15 tube support plates (TSPs). The TSPs are constructed of SA 240 Type 410 stainless steel and contain broached trefoil shaped holes.

The licensee provided the scope, extent, methods, and results of its SG tube inspections in its March 30, 2009, letter. In addition, the licensee described corrective actions (i.e., tube plugging) taken in response to the inspection findings. The 2008 inspections were performed during refueling outage 21 (1R21) and marked the second inservice inspection of the SGs since replacement.

As a result of its review of the reports, the NRC staff has the following comments and observations:

- Tie rod bowing, due to one or more locked TSPs, was detected in SG A. The amount of bowing increased slightly from 1R20 to 1R21. The possible causes, consequences, and corrective actions were discussed in detail in the public meeting on December 15, 2009 (see ADAMS Accession No. ML093500503 for the proprietary version and ADAMS Accession No. ML093500565 for the non-proprietary version of the meeting handouts).

Enclosure

- During 1R21, 990 indications of wear were detected in SG A at the TSPs and 1,029 indications of wear were detected in SG B at the TSPs. The average depth of these indications is less than 10 percent through wall.
- Eight tubes in SG A were plugged, which included four tubes due to TSP wear and four tubes (preventively plugged) due to tube bowing. Five tubes in SG B were plugged due to TSP wear.

Based on a review of the information provided, the NRC staff concludes that the licensee provided the information required by its technical specifications. In addition, the staff concludes that there are no technical issues that warrant follow-up action at this time since the inspections appear to be consistent with the objective of detecting potential tube degradation. The staff will continue to monitor the licensee's assessment of the tie rod bowing issue.

January 20, 2010

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(TAC NO. ME1009)**

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Sincerely,
/RA/

N. Kaly Kalyanam, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-313

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As stated

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KKarwoski, DCI/CSGB

AJohnson, DCI/CSGB

*memo dated

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|--------|-------------|-------------|------------|-------------|-------------|
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| DATE | 1/15/10 | 1/15/10 | 1/14/10 | 1/20/10 | 1/20/10 |

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