



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

January 18, 2018

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

SUBJECT: ARKANSAS NUCLEAR ONE, UNIT 1 – REVIEW OF THE FALL 2016 STEAM
GENERATOR TUBE INSPECTIONS DURING REFUELING OUTAGE 1R26
(CAC NO. MF9493; EPID L-2017-LRO-0007)

Dear Sir or Madam:

By letter dated March 22, 2017 (Agencywide Documents Access and Management System Accession No. ML17081A486), Entergy Operations, Inc. (the licensee) submitted information to the U.S. Nuclear Regulatory Commission (NRC) summarizing the results of the fall 2016 steam generator tube inspections performed during refueling outage 1R26 at Arkansas Nuclear One, Unit 1.

The NRC staff has completed its review of the submittal and concludes that the licensee provided the information required by its technical specifications. No additional followup is required at this time. The results of the NRC staff's review are enclosed.

If you have any questions, please contact me at (301) 415-4037 or by e-mail at Thomas.Wengert@nrc.gov.

Sincerely,

A handwritten signature in black ink, reading "Thomas J. Wengert", is positioned above the typed name.

Thomas J. Wengert, Senior Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-313

Enclosure:
Review of the Steam Generator Tube
Inspection Report

cc: Listserv

STAFF REVIEW OF FALL 2016 STEAM GENERATOR TUBE
INSERVICE INSPECTIONS PERFORMED DURING REFUELING OUTAGE 1R26
ENTERGY OPERATIONS, INC.
ARKANSAS NUCLEAR ONE, UNIT 1
DOCKET NO. 50-313

By letter dated March 22, 2017 (Agencywide Documents Access and Management System Accession No. ML17081A486), Entergy Operations, Inc. (the licensee) submitted information summarizing the results of the fall 2016 steam generator (SG) tube inspections performed during refueling outage 1R26 at Arkansas Nuclear One, Unit 1 (ANO-1).

The SGs at ANO-1 are Enhanced Once-Through Steam Generators (EOTSG) manufactured by AREVA. The EOTSG is a straight shell-and-tube type heat exchanger installed in a vertical position. The Alloy 690 thermally treated tubing has a 0.625-inch diameter and a 0.037-inch wall thickness. The tubes were hydraulically expanded for the full depth of the tubesheet and are supported by 15 Type 410 stainless steel tube support plates (TSPs) with broached trefoil-shaped holes.

The licensee provided the scope, extent, methods, and results of its SG tube inspections in the submittal dated March 22, 2017. In addition, the licensee described corrective actions (i.e., tube plugging) taken in response to the inspection findings. The tubes in both SGs A and B were inspected during this outage.

After reviewing the information provided by the licensee, the U.S. Nuclear Regulatory Commission (NRC) staff has the following comments/observations:

- The licensee detected two new tie-rods that experienced bowing in SG B during the previous cycle. No new tie-rod bowing was detected in SG A. The licensee stated that a pattern is developing in SG A, in which the tie-rods bow to a point and then stagnate. This pattern is most evident in the first span tie-rods. The NRC staff notes that this pattern is not present in SG B; however, the tie-rod bowing in SG B appears to have initiated several cycles later than the tie-rod bowing in SG A and, as a result, this pattern may manifest in SG B over the next several cycles.
- There were 536 and 531 new TSP wear indications in SG A and SG B, respectively. The largest TSP wear indications detected were 41 percent and 44 percent through-wall in SG A and SG B, respectively.

Based on a review of the information provided, the NRC staff concludes that the licensee provided the information required by the ANO-1 technical specifications. In addition, the staff concludes that there are no technical issues that warrant followup action at this time, since the inspections appear to be consistent with the objective of detecting potential tube degradation and the inspection results (with the exception of tie-rod bowing) appear to be consistent with industry operating experience at similarly designed and operated units.

SUBJECT: ARKANSAS NUCLEAR ONE, UNIT 1 – REVIEW OF THE FALL 2016 STEAM
GENERATOR TUBE INSPECTIONS DURING REFUELING OUTAGE 1R26
(CAC NO. MF9493; EPID L-2017-LRO-0007) DATED JANUARY 18, 2018

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A. Huynh, NRR

ADAMS Accession No. ML18012A148

*via memorandum

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