

February 21, 2006

Mr. Jeffrey S. Forbes
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1448 S. R. 333
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SUBJECT: ARKANSAS NUCLEAR ONE, UNIT 1 - EVALUATION OF RESPONSE TO
GENERIC LETTER 2004-01, "REQUIREMENTS FOR STEAM GENERATOR
TUBE INSPECTIONS" (TAC NO. MC4798)

By letter dated October 28, 2004, as supplemented by letter dated October 21, 2005, Entergy Operations, Inc. (Entergy), the licensee for Arkansas Nuclear One, Unit 1 (ANO-1), submitted its response to Generic Letter (GL) 2004-01, "Requirements For Steam Generator Tube Inspections." The Nuclear Regulatory Commission (staff) has reviewed the Entergy response to GL 2004-01 for ANO-1. As discussed in the enclosed evaluation, the staff concludes that the licensee's overall response to the GL is acceptable.

By letter dated July 12, 2005, to Entergy, the NRC staff concluded that the licensee's response to GL 2004-01 with regard to Arkansas Nuclear One, Unit 2, was in compliance with existing tube inspection requirements.

If you have any questions regarding this matter, please contact me at (301)- 415-1436.

Sincerely,

/RA/

Drew Holland, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-313

Enclosure:
Evaluation of Response to
Generic Letter 2004-01

cc w/encl: See next page

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EVALUATION OF THE RESPONSE TO GENERIC LETTER 2004-01

ENTERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNIT 1,

DOCKET NO. 50-313

On August 30, 2004, the Nuclear Regulatory Commission (NRC) staff issued Generic Letter (GL) 2004-01, "Requirements For Steam Generator Tube Inspections," Agencywide Documents Access and Management System (ADAMS) Accession No. ML042370766. The purpose of GL 2004-01 was to obtain information that would enable the NRC staff to determine whether a licensee's steam generator tube inspection programs comply with the existing tube inspection requirements (the plant Technical Specifications) in conjunction with Appendix B to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50.

By letter dated October 28, 2004, ADAMS Accession No. ML043140261, as supplemented by letter dated October 21, 2005, ADAMS accession no. ML053050392, Entergy Operations, Inc. (Entergy), the licensee for Arkansas Nuclear One, Unit 1 (ANO-1), submitted its response to GL 200--01. By letter dated July 12, 2005 (ML051660175) to Entergy, the NRC staff concluded that the steam generator tube inspection practices for Arkansas Nuclear One, Unit 2, were in compliance with existing tube inspection requirements. The NRC staff has reviewed Entergy's response and concludes that the licensee's overall response to the GL, with regard to ANO-1, is acceptable. The staff has the following observations.

1. The licensee concluded that the inspection method used in the lower tubesheet (LTS) for the detection of tube end cracking is inconsistent with the NRC position outlined in GL 2004-01. Entergy documented this condition in their corrective action program and performed a safety assessment, which demonstrated the steam generator tubes maintain adequate tube structural and leakage integrity for the recently ended operating cycle. Entergy replaced the steam generators in the recent refueling outage, which will resolve the inspection practice inconsistency related to tube end cracking. The staff finds this corrective action acceptable.
2. A portion of the LTS is referred to as the sludge pile or kidney region. Although the NRC staff could not identify a uniform, quantitative definition of this region in terms of the radial extent (minimum sludge height and/or dent voltage) or axial extent above and below the top of the LTS, it is generally defined by the four Babcock and Wilcox (B&W) units with Alloy 600 tubing as the area bounded by dents and sludge at the LTS secondary face. The definition does not include the tube ends, the roll expanded region, or the roll transition which are addressed by separate inspections.

3. Based on industry operating experience (from the four currently operating B&W pressurized water reactors with Alloy 600 tubing in their steam generators), the sludge pile or kidney region is susceptible to intergranular attack (IGA) and stress corrosion cracking (SCC). IGA and axially-oriented SCC have been detected both above and below the top of the LTS at non-dented locations. In addition, IGA and circumferentially-oriented SCC have been detected at dented locations in the sludge pile or kidney region.
4. With respect to dented locations in the LTS region, the staff notes that Entergy performs separate inspections of these locations on a sampling basis with a rotating probe (i.e., specified by Entergy as separate inspections for the dented locations within the LTS region). The staff concludes that the examination of the dented locations in the LTS region are in compliance with the existing tube inspection requirements.

The NRC staff recognizes that Entergy concluded (based on site-specific validation) that the bobbin techniques may be used for detecting SCC and IGA in the sludge pile or kidney region. Based on the information provided in submittals regarding the site-specific validation, the staff could not conclude for non-dented locations that the bobbin coil technique is effective at finding the forms of degradation that could occur within the kidney or sludge pile region. The staff understands that Entergy has performed additional +Point™ probe examinations in this region. Historically, these rotating probe examinations have indicated that the bobbin coil has not missed any degradation at the non-dented locations in this region of the tube bundle. Based on the rotating probe inspections and the results of these inspections, the NRC staff concludes that Entergy's inspection practices at the non-dented locations within the LTS region are in compliance with the existing tube inspection requirements.

The NRC staff concludes that Entergy's overall response to GL 2004-01 is acceptable.

Arkansas Nuclear One

cc:

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