



# ***NRC NEWS***

**U.S. NUCLEAR REGULATORY COMMISSION  
OFFICE OF PUBLIC AFFAIRS, REGION IV**

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No. IV-00-34

August 10, 2000

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## **NOTE TO EDITORS: ANO UNIT 2 INSPECTION REPORT**

The U.S. Nuclear Regulatory Commission's inspection report covering recent steam generator tube inspections conducted by Entergy Operations Inc. at its ANO Unit 2 nuclear power plant in Russellville, Arkansas, is complete and available to the public. Entergy performed the inspections between July 27 and August 8 to locate any defective tubes for repair or plugging. NRC inspectors concluded that the inspections were properly conducted and evaluated, and that repairs were completed as necessary. A total of 189 tubes were plugged in both steam generators. The number of tube defects found and tubes requiring plugging were consistent with expectations. NRC approval is not required for plant restart.

The full inspection report is attached.

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**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
611 RYAN PLAZA DRIVE, SUITE 400  
ARLINGTON, TEXAS 76011-8064**

August 10, 2000

Craig Anderson, Vice President  
Operations  
Arkansas Nuclear One  
Entergy Operations, Inc.  
1448 S.R. 333  
Russellville, Arkansas 72801-0967

**SUBJECT:** NRC's ARKANSAS NUCLEAR ONE INSPECTION REPORT NO. 50-313/00-14;  
50-368/00-14

Dear Mr. Anderson:

This refers to the inspection conducted on July 27 to August 8, 2000, at the Arkansas Nuclear One, Unit 2 facility. The enclosed report presents the results of this inspection. A technical debrief was discussed on July 28, 2000, with Mr. M. Smith and other members of your staff. The results of this inspection were discussed on August 8, 2000, with Mr. J. Vandergrift and other members of your staff.

The inspection was an examination of activities conducted under your licenses as they relate to safety and to compliance with the Commission's rules and regulations and with the conditions of your licenses. Within these areas, the inspection consisted of a selective examination of procedures and representative records, observations of activities, and interviews with personnel. Specifically, this inspection focused on reactor safety.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/NRC/ADAMS/index.html> (the Public Electronic Reading Room).

Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

*/RA/*

P. Harrell, Chief  
Project Branch D  
Division of Reactor Projects

## SUMMARY OF FINDINGS

Arkansas Nuclear One  
NRC Inspection Report 50-313/00-14; 50-368/2000-14

This report covers onsite inspection and in-office review of Unit 2 steam generator inservice inspection surveillance activities. In the Reactor Safety area, the cornerstones inspected included Mitigating Systems and Barrier Integrity.

There were no inspection findings identified in these areas.

### Report Details

#### Summary of Plant Status

Unit 2 was shutdown for steam generator inspection (Outage 2P00-1) during this inspection.

#### **1. REACTOR SAFETY** **Cornerstones: Mitigating Systems, Barrier Integrity**

##### 1R22 Surveillance Testing

###### a. Inspection Scope

The inspectors reviewed the implementation of the licensee's program for monitoring steam generator tube degradation. As part of this review the inspectors:

- Reviewed documents defining the scope of eddy current testing planned for steam generator tube examinations, including number of tubes, locations, scope expansion criteria, and specific eddy current probes.
- Reviewed the eddy current data collection, management and analysis methods.
- Observed a sample of in-progress eddy current data collection.
- Reviewed the licensee's selection criteria for determining which steam generator tubes were to be in-situ pressure tested.
- Reviewed the eddy current inspection results and the licensee's selection of tubes to be in-situ pressure tested.

- Reviewed the licensee's criteria for determining which steam generator tubes were to be plugged.

b. Findings

The licensee performed eddy current inspections of the Unit 2 steam generator tubes to determine which tubes were defective and required repair or plugging. In addition, the licensee performed in-situ pressure testing of a small number of defective tubes to evaluate their structural and leakage integrity.

The eddy current inspection scope consisted of bobbin coil probe inspections of all inservice tubes, and rotating pancake coil probe inspections of all indications identified by the bobbin coil inspection. The inspectors determined that the planned inspection scope was in accordance with the Technical Specifications and was being appropriately controlled by the eddy current data management group. In addition, the observed data collection, management and analysis methods were in accordance with plant procedures. The licensee indicated that the inspection equipment, data collection procedures, and data analysis techniques being used during this inspection were essentially the same as those used during the previous steam generator inspection (November 1999). The inspectors did not identify any activities contrary to this assertion, and therefore would expect the sensitivity of the Outage 2P00-1 inspection to be similar to the November 1999 inspection.

All flaws identified during the Outage 2P00-1 inspection were axial outside diameter stress corrosion cracking at the eggcrate supports. The licensee identified 64 flaws in 58 tubes in Steam Generator A and 148 flaws in 131 tubes in Steam Generator B. These results were within the range projected by the licensee.

The licensee performed in-situ pressure testing on a small number of defective steam generator tubes to evaluate their structural and leakage integrity. They developed selection criteria for determining which steam generator tubes were to be in-situ pressure tested. The selection criteria were documented in Revision 1 of Engineering Report ER-974855-E205, and consisted of a combination of estimated flaw length, maximum depth, and average depth. The inspectors reviewed the in-situ selection criteria as well as the licensee's selection of tubes to be in-situ pressure tested.

One tube in Steam Generator A and seven tubes in Steam Generator B were selected to be pressure tested for leakage integrity at main steam line break (MSLB) pressure differentials. One Steam Generator A tube and three Steam Generator B tubes leaked a minimal amount at MSLB conditions. Five tubes were selected to be pressure tested for structural integrity at three times the normal operating pressure differential (3dp), four of which had leaked at MSLB conditions. Four of the five tubes were tested to approximately 500 psi above 3dp with no failure. The licensee indicated that the fifth tube (Tube 40/108) passed the 3dp pressure, but estimated that it burst at less than

100 psi above 3dp. Tube 40/108 had not met the selection criteria for pressure testing at 3dp (the flaw was estimated to be too short to burst), but the licensee elected to perform this test because the tube leaked when tested at MSLB pressure differentials.

Based on the 3dp pressure test results, the inspectors concluded that it appeared possible that this flaw might have burst at less than 3dp if the flaw had been deeper. This was a concern, because a flaw of this length would not have met the licensee's selection criteria for pressure testing regardless of its depth. Based on the inspector's concerns, the licensee reevaluated the selection criteria and determined that nondestructive evaluation uncertainties had not been appropriately considered when calculating the selection criteria. The selection criteria were modified and the licensee evaluated the inspection results to determine whether any additional tubes required in-situ pressure testing. The licensee concluded that no additional tubes required testing. The safety significance of this finding was considered very low based on the absence of adverse consequences. The inspectors determined that the appropriate tubes were in-situ pressure tested.

There were no significant findings identified during this inspection.

#### **4. OTHER ACTIVITIES (OA)**

##### **4OA6 Management Meetings**

###### **.1 Exit Meeting Summary**

A technical debrief was discussed on July 28, 2000, with Mr. M. Smith and other members of your staff. The results of this inspection were discussed on August 8, 2000, with Mr. J. Vandergrift and other members of your staff. The managers acknowledged the findings presented and also informed the inspectors that no proprietary material was examined during the inspection.

## ATTACHMENT 1

### PARTIAL LIST OF PERSONS CONTACTED

#### Licensee

S. Bennet, Licensing Specialist  
M. Cooper, Licensing Specialist  
M. Smith, Engineering Programs and Component Manager  
D. Harrison, Engineering Programs Supervisor  
J. Vandergrift, Director, Nuclear Safety

### DOCUMENTS REVIEWED

Unit 2 Engineering Report ER-974855-E205	Steam Generator Pre-Outage Degradation Assessment and Repair Criteria for 2P00	Revisions 1
Unit 2 Training Manual ANO-2-OTH-ESP-SGMAN	Steam Generator Eddy Current Training Manual	Revision 4
Engineering Standard HES-28	ANO-2 Steam Generator Eddy Current Examination Guidelines	Revision 12
Procedure/Work Plan 5120.500	Steam Generator Integrity Program Implementation	Change 008-03-0
Procedure/Work Plan 5120.509	Steam Generator Inservice Inspection Implementation Plan	Change 001-00-0

### LIST OF ACRONYMS AND INITIALS USED

MSLB - main steam line break  
3dp - three times normal operating pressure differentials