

## LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)  
Joseph M. Farley - Unit 2

DOCKET NUMBER (2)  
0 5 0 0 0 3 6 4

PAGE (3)  
1 OF 0 4

TITLE (4)  
Unit Shut Down to Plug Steam Generator Tubes

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)		
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)	
0 8	3 1	8 4	8 4	0 0 8	0 0	0 9	2 7	8 4		0 5 0 0 0	
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OPERATING MODE (9) 1

POWER LEVEL (10) 1 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 6 (Check one or more of the following) (11)

20.402(b)	20.405(e)	90.73(a)(2)(iv)	73.71(b)
20.405(a)(1)(i)	90.36(a)(1)	90.73(a)(2)(v)	73.71(c)
20.405(a)(1)(ii)	90.36(a)(2)	90.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 306A)
20.405(a)(1)(iii)	90.73(a)(2)(i)	90.73(a)(2)(vii)(A)	
20.405(a)(1)(iv)	90.73(a)(2)(ii)	90.73(a)(2)(vii)(B)	
20.405(a)(1)(v)	90.73(a)(2)(iii)	90.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME J. D. Woodard

TELEPHONE NUMBER

AREA CODE 2 0 5

8 9 9 - 5 1 5 6

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) X NO

EXPECTED SUBMISSION DATE (15)

MONTH DAY YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

At 1045 on 8-31-84, Alabama Power Company was notified by Westinghouse that the analysis of eddy current data performed prior to startup following the Cycle II-III refueling outage had failed to identify two tubes in Steam Generator 2B with defects exceeding the limit for tube plugging. These defects were identified during a second analysis of these same data using a technique different from that applied during the earlier analysis. Actions were initiated immediately to comply with Technical Specification 3.0.3 action statements. The plant was shut down. During the outage the two defective tubes in Steam Generator 2B were plugged and one defective tube identified by leak testing was plugged in Steam Generator 2A. Additional eddy current examinations required by Technical Specifications were completed with no additional defective or degraded tubes being identified. The unit returned to power on 9-15-84. Health/Safety of the public were not affected.

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## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES 8/31/85

FACILITY NAME (1)  Joseph M. Farley - Unit 2	DOCKET NUMBER (2)  0 5 0 0 0 3 6 4 8 4	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
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TEXT (If more space is required, use additional NRC Form 386A's) (17)

Eddy current examinations were performed on selected tubes in all three steam generators during the Unit 2 cycle II-III refueling outage. There were no reportable indications identified by analysis of the eddy current data. On 5-8-84 and 7-1-84, steam generator tube leakages, well within Technical Specification limits, were detected by radioactivity measurements in Steam Generators 2A and 2B, respectively. These leakages gradually increased and were closely monitored to verify that leakage remained well within the Technical Specification limits.

Based on the tube roll transition cracking found just above the steam generator tubesheet in several French plants, Alabama Power Company requested that Westinghouse review the Unit 2 eddy current tapes for evidence of a similar condition. At 1045 on 8-31-84, Westinghouse notified Alabama Power Company that this review had revealed two previously unidentified defective tubes in Steam Generator 2B. These tubes were located on the tube bundle periphery and identified as tubes R31 C16 and R32 C16 containing defects penetrating approximately 70% and 68% of nominal tube wall thickness, respectively. Both indications were located slightly above the top of the tubesheet on the hot leg side of the steam generator.

Immediately following the Westinghouse notification actions were initiated to comply with Technical Specification 3.0.3 action statements. The unit was operating at 100% power at the time of notification.

Unit 2 was shut down for purposes of plugging two defective tubes in Steam Generator 2B and completing the inservice inspection requirements by performing the second sample inspection required in Technical Specification Table 4.4-2. Discovery of the two defective tubes resulted in a reclassification of the first sample inspection results to Category C-2. The action requirement for these results requires plugging the defective tubes and inspecting a minimum of an additional 2S tubes (204) in the steam generator containing the defective tubes.

Because of the indications of steam generator tube leakage, additional inspections, tests, and examinations were planned and performed as described in this report. All three steam generators were leak tested with helium resulting in identification of one leaking tube at location R32 C40 in Steam Generator 2A and one leaking tube at location R32 C16 in Steam Generator 2B.

A full length eddy current examination of the leaking tube (R32 C40) in Steam Generator 2A was performed revealing a defect penetrating approximately 81% of nominal tube wall thickness located 48.8 inches above the sixth tube support plate on the hot leg side. The indication originated on the outside diameter of the tube, but the probable nature or cause of the indication could not be determined. The eight tubes surrounding tube R32 C40 were examined full length with no additional indications or other imperfections being found. Following the eddy current examination, tube R32 C40 in Steam Generator 2A was mechanically plugged.

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
Joseph M. Farley - Unit 2	05000364	84	008	00	03	CF	04

TEXT (If more space is required, use additional NRC Form 365A's) (17)

The two tubes reported as defective in Steam Generator 2B were re-examined by eddy current. Examination results confirmed that tube R32 C16 was a leaking tube as previously identified by helium leak tests. Tube R31 C16 was found to contain a defect penetrating approximately 73% of nominal tube wall thickness and tube R32 C16 was found to contain a 100% through wall penetration. These indications were located at 0.6 inch and 0.5 inch above the top of the tubesheet on the hot leg side of the generator for tubes R31 C16 and R32 C16 respectively. Tubes R31 C16 and R32 C16 were mechanically plugged.

A complete annular search of the secondary side of the tubesheet using fiber optics was performed on each steam generator. During performance of the secondary side visual inspection of the Steam Generator 2B tubesheet area, a foreign object was found to be wedged approximately one inch above the tubesheet between tubes R35 C17 and R36 C18, which are located three and four tubes respectively from the leaking tube, R32 C16. The object was removed and identified as a 3/4 inch deep well socket approximately 2.5 inches long and 7/8 inch diameter. As a precautionary measure, a total of 51 peripheral tubes (including tubes R35 C17 and R36 C18) located in a forty-five degree arc centered on the leaking tube were examined by eddy current to the first tube support plate. No indications were detected in these 51 tubes and no foreign objects were found in the other steam generators.

Pursuant to Technical Specification requirements for inspection results classified as Category C-2 in Technical Specification Table 4.4-2, a second sample inspection consisting of the full length eddy current examination of 218 tubes was performed in Steam Generator 2B. No reportable indications, degraded tubes, or defective tubes were identified by this examination.

To determine the reason for the missed indications in Steam Generator 2B, eddy current data and analysis techniques were reviewed. Eddy current strip charts were used throughout the inspection for screening; if an unexpected signal was noted on the strip chart, a more detailed review was performed by viewing the Lissajous display. This procedure for screening eddy current data to identify indications to be evaluated is recognized as an accepted practice within the industry. The indications in 2B Steam Generator which were missed by this screening process were in close proximity to the tube roll transition at the top of the tubesheet. As viewed from the strip chart, signal distortion within this area causes detection of indications to be extremely difficult. To the analyst, the two defective tubes may have exhibited only a slightly wider pen trace as the probe entered the tubesheet as compared to adjacent tubes with no degradation, but the difference was so slight that it was not readily discernable. Discrimination of the signals is possible when viewing the Lissajous display and the indications were identified in the second analysis of this data by viewing the Lissajous display. It is concluded that the major cause for the missed indications was the proximity of the indication to the tubesheet roll transition at the top of the tubesheet in combination with the industry practice of reliance upon strip chart data for detection of indications.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

To minimize the possibility of missed indications during future eddy current examinations, methods for data analysis will be evaluated to determine if improved analysis techniques can be utilized for identifying indications in areas where distortions mask the strip chart data to the extent that the ability to identify reportable indications is affected.

The characteristics of the defects in the two tubes plugged in Steam Generator 2B are typical of those produced by foreign object wear. As a result of the secondary inspection performed in the first refueling outage, a nail was removed from the hot leg side of 2B Steam Generator. The nail was double headed, 1/8 inch diameter, 3 inches long, and located in the peripheral area between rows 30 and 35, the same general area as the leak in 2B Steam Generator. The nail is considered the most likely cause of the defects observed in 2B Steam Generator tubes. The deep well socket removed from the 2B Steam Generator was determined not to have been a possible cause of the observed defects. During the Unit 2 second refueling outage, a complete annular search of the tubesheets of all steam generators was performed using fiber optics. The deep well socket was not found in the 2B Steam Generator at this time; however, the defects in the two tubes were recorded on eddy current tapes during this outage.

The deep well socket was determined to be a tool typically used for installation and removal of steam generator tube lane blocking devices. Control measures for prevention and detection of entry of foreign objects into steam generators will be reviewed for improvement.



**Mailing Address**

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**R. P. McDonald**  
Senior Vice President  
Flintridge Building



Alabama Power  
the southern electric system

September 27, 1984

Docket No. 364

Document Control Desk  
U. S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Sir:

Joseph M. Farley Nuclear Plant, Unit 2, Licensee Event Report No. LER 84-008-00 is forwarded in accordance with 10CFR50.73 to provide 30 day written notification of the occurrence.

If you have any questions, please advise.

Yours very truly,

R. P. McDonald

RPM/DSM:sam

Enclosure

xc: IE, Region II

IE22  
1/1