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1CAN060601

June 14, 2006

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Subject: Steam Generator Tubing Inspection Report
Arkansas Nuclear One – Unit 1
Docket No. 50-313
License No. DPR-51

Dear Sir or Madam:

Arkansas Nuclear One, Unit 1 (ANO-1) Technical Specification (TS) 5.6.7 requires the results of ANO-1 steam generator (SG) tubing inspections to be submitted to the NRC within 180 days after the initial entry into mode 4 following completion of the inspection. Attached is the Steam Generator Tubing Inspection Report which presents the results from ANO-1's scheduled refueling outage (1R19) baseline inspection of the replacement SGs. These inspections were conducted during December 2005.

The 1R19 inspection performed on both SGs involved an initial full-length bobbin coil examination of 100%.

Should you have any questions regarding this issue, please contact Mr. Fred Van Buskirk of my staff at (479) 858-3155. This submittal contains no commitments.

Sincerely,

Dale E. James
Manager, Licensing

DEJ/fpv

Attachment

A001

cc: Dr. Bruce S. Mallett
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Attachment 1

1CAN060601

Steam Generator Tubing Pre-Service Inspection Report

ARKANSAS NUCLEAR ONE, UNIT 1
STEAM GENERATOR TUBING INSPECTION REPORT

1 INTRODUCTION

Arkansas Nuclear One, Unit 1 (ANO-1) Technical Specification (TS) 5.6.7 requires Entergy Operations to submit a 180 day report to the NRC that presents the details of the steam generator (SG) tubing inspections that were performed during the reporting period. The report shall include:

1. The scope of inspections performed on each steam generator.
2. Active degradation mechanisms found.
3. Nondestructive examination techniques utilized for each degradation mechanism.
4. Location, orientation (if linear), and measured sizes (if available) of service induced indications.
5. Number of tubes plugged during the inspection outage for each active degradation mechanism.
6. Total number and percentage of tubes plugged to date.
7. The results of condition monitoring, including the results of tube pulls and in-situ testing.

The operating period for this report includes one outage, a refueling inspection (1R19) in December 2005 which was the steam generator replacement outage. This report details the result of the baseline inspection performed prior to placing the generators in service.

2 DESIGN

The replacement steam generators for 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 with bottom supports and such emergency supports as required to accommodate normal and accident loads. The tubing consists of Inconel 690 thermally treated tubing that is 5/8" in diameter with a 0.037" wall thickness. The tubes are expanded full depth hydraulically in the tubesheet. There are 15 tube supports that are constructed of stainless steel (SA 240 type 410) and are a broached trefoil-hole design.

3 REPORT REQUIREMENTS

3.1 The scope of inspections performed on each steam generator.

Table 3.1
1R19 Inspection Scope

SG "A"

Examination Type	Inspections Conducted	% Scope	Extent Tested
Bobbin Initial	15595	100	TEC to TEH
Bobbin I-Codes	0	N/A	N/A
X-Probe Full Length	15595	100	TEC to TEH

SG "B"

Examination Type	Inspections Conducted	% Scope	Expansion Req'd
Bobbin Initial	15597	100	TEC to TEH
Bobbin I-Codes	0	N/A	N/A
X-Probe Full Length	15597	100	TEC to TEH

3.2 Active degradation mechanisms found.

This was the initial baseline inspection prior to operation of the generators. The only mechanisms identified were fabrication induced. These are listed in Table 3.2.1 for SG "A" and 3.2.2 for SG "B".

TABLE 3.2.1
SG "A" INDICATION LIST FOR 1R19

Item No.	Row	Tube	Percent Through Wall	Location	Mechanism
1	6	22	N/A	LTE +16.54	BLG
2	19	34	N/A	14S + 13.05	MBM
3	74	118	N/A	LTS + 0.60	BLG

Legend:

LTE – Lower Tube End
BLG – Bulge
14S – 14th Tube Support Plate
MBM – Manufacturing Burnish Mark
LTS – Lower Tubesheet

TABLE 3.2.2
SG "B" INDICATION LIST FOR 1R19

Item No.	Row	Tube	Percent Through Wall	Location	Mechanism
1	45	22	N/A	LTS +5.22	MBM
2	10	27	N/A	15S + 38.79	MBM

Legend:

LTS – Lower Tubesheet
15S – 15th Tube Support Plate
MBM – Manufacturing Burnish Mark

3.3 Nondestructive examination techniques utilized for each degradation mechanism.

Mechanism Location	Probe	Detection ETSS	POD @ 90% CL	Sizing ETSS	RMSE (%TW)	NDE Technique Uncertainty (%TW)
MBM/BLG	Bobbin	96010.1 Rev. 6	0.886@0-4%TW 0.848@5-11%TW	96010.1 Rev. 6	0.92	1.14

Legend:

ETSS – Examination Technique Specification Sheet
RMSE – Root Mean Square Error

3.4 Location, orientation (if linear), and measured sizes (if available) of service induced indications.

There were no service induced indications identified.

3.5 Number of tubes plugged during the inspection outage for each active degradation mechanism.

There were no plugs installed during the baseline inspection. There were 2 tubes plugged as a preventive measure during fabrication in SG "A" due to failed expander tooling. These are listed in Table 3.5.1

Table 3.5.1 Tubes Plugged

		SG "A"		SG "B"	
Year	Outage	Installed	Cumulative	Installed	Cumulative
2005	Fabrication	2	2	0	0
2005	Baseline	0	2	0	0

3.6 Total number and percentage of tubes plugged to date.

This information is listed in Table 3.6.1.

Table 3.6.1
Cumulative Plugs and Sleeves in Service

	SG "A"	SG "B"
Pre-service Sleeves	0	0
1R19 Sleeves Installed	0	0
Total Sleeves Installed	0	0
Pre-service I-690 Welded	2	0
1R19 Plugs Installed	0	0
Total Plugged	2	0
Percent Plugged	0.012 %	0.000 %

3.7 The results of condition monitoring, including the results of tube pulls and in-situ testing.

Since this was the baseline inspection, there were no service induced indications identified that would challenge the performance criteria and no in-situ test required. There were a total of five manufacturing induced indications identified. This included three MBMs, 1 bulge and 1 over expansion also characterized as a bulge. The MBMs were very small and had a bobbin voltage of approximately 0.5 volts each. One of the bulges was identified within the tubesheet and had a bobbin voltage of 3.89 volts. Profilometry was performed and resulted in a change in diameter of 0.0006 inches or 0.6 mils. The second bulge which would be considered the most limiting was at the top of the tubesheet at the expansion transition on the lower tubesheet. Profilometry was performed and the result was a change in diameter of 0.0005 inches or 0.5 mils. None of these indications would challenge the structural integrity of the tubing. Therefore, all performance criteria were met so condition monitoring was acceptable. There were no tube pulls performed.