ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket Nos.:	50-313 50-368
License Nos.:	DPR-51 NPF-6
Report No.:	50-313/96-28 50-368/96-28
Licensee:	Entergy Operations, Inc.
Facility:	Arkansas Nuclear One, Units 1 and 2
Location:	Junction of Hwy. 64W and Hwy.333 South Russellville, Arkansas
Dates:	November 25 through December 13, 1996
Inspector:	I. Barnes, Technical Assistant
Accompanied By:	C. Dodd, NRC Consultant
Approved By:	Arthur T. Howell III, Director Division of Reactor Safety

ATTACHMENT: Supplemental Information

EXECUTIVE SUMMARY

Arkansas Nuclear One, Units 1 and 2
NRC Inspection Report 50-313/96-28; 50-368/96-28

Operations

- Licensee procedures provided appropriate guidance to chemistry and operations personnel on actions to be taken to identify, quantify, and mitigate the consequences of a steam generator tube leak (Section O1.2).

- Overall handling of the Unit 2 leakage event was considered excellent, with diverse methods used to assess leakage and conservative shutdown criteria adopted (Section O1.2).

Maintenance

- No evidence of the presence of a flaw in the leaking tube, Tube R16L60 in Steam Generator B, was observed in the 1992 and 1995 bobbin coil eddy current data, suggesting a high rate of defect propagation in the approximately 1 year of operation since Refueling Outage 2R11. A noncited violation was identified with respect to a 1995 error in the data analysis for Tube R16L56 in Steam Generator A (Section M1.2).

Engineering

- The licensee utilized an appropriate eddy current examination scope for bounding the extent and magnitude of degradation present in the steam generators (Section E1.1).

- The licensee bobbin coil eddy current data analysis guidelines contained inadequate criteria for determining whether bobbin coil signals were indicative of the presence of manufacturing buff marks on the tube surfaces (Section E1.1).

- An unresolved item was identified regarding whether the Technical Specifications permit the leaving in service of tubes that have imperfections (identified by bobbin coil eddy current examination) in excess of the plugging or repair limit based on acceptable motorized rotating pancake coil information (Section E.1.1).

- The results from in-situ pressure testing of the leaking Steam Generator B tube, Tube R16L60, did not meet the three times normal differential pressure structural integrity criterion of Regulatory Guide 1.121. The test results did, however, demonstrate a structural integrity in excess of the tube main steam line break pressure (Section E1.2).

- Establishment of a definitive root cause for the high apparent flaw growth rate in Tube R16L60 appeared to be strongly dependent on the nature of the information obtained during laboratory examination of the removed tube samples. An inspection followup item was identified regarding review of the laboratory examination results (Section E1.3).

Report Details

This inspection was performed in response to the identification during November 13-16, 1996, of increasing primary-to-secondary leakage in Unit 2 Steam Generator B. The inspection focused on: (1) the licensee response actions following initial identification of primary-to-secondary leakage, and (2) the approach utilized to determine the root cause of the leakage and the scope of steam generator tube degradation.

I. Operations

O1 Conduct of Operations

O1.1 Unit 2 Steam Generator B Leakage Chronology

On November 13, 1996, the Steam Generator B nitrogen-16 (N-16) monitor reading indicated an increase in leak rate to 1.38 gpd (for an assumed hot-leg side leak at the bottom of the steam generator) from previous values of below 1 gpd. Primary-to-secondary leak rate calculations were performed in response to the indicated increase in N-16 activity, using both condensate system tritium (H-3) and condenser vacuum pump argon (Ar)-41 values. These calculations did not confirm any change in primary-to-secondary leak rate had occurred. The duty chemist also sampled the main steam from each steam generator for H-3 concentration, with the levels found to be comparable with the other secondary systems.

On November 14, 1996, the Steam Generator B N-16 monitor reading showed a step increase from approximately 1.5 gpd to 14 gpd. The values for Ar-41 and H-3 continued to little change from prior weekly sample history (i.e., an indicated leakage range of 4-6 gpd).

On November 15, 1996, following a 1-hour period in which Steam Generator B N-16 activity dropped to an indicated leak rate of 1-2 gpd, the N-16 activity returned to an indicated leakage rate of approximately 16 gpd. The condenser offgas monitor reading increased to a reading of 175 counts/minute from a normal range of 80-100 counts/minute. Additional leak rate samples were taken and analyzed for Ar-41 and H3. The Ar-41 and H3 methods showed indicated leakage rates, respectively, of 9.8 gpd and 8.9 gpd.

Early on November 16, 1996, the N-16 reading remained essentially unchanged at 17 gpd. Additional Ar-41 and H-3 samples showed respective leak rates of 16 gpd and 12 gpd. The condenser vacuum pump radmonitor count rate was noted to be higher each time it was placed in recycle for sampling. Later on November 16, 1996, at approximately 1400 hours, the Ar-41 value was measured to be equivalent to a leak rate of 18 gpd. At approximately 1800 hours on November 16, 1996, the Steam Generator B N-16 monitor spiked to 50 gpd and then returned to a

baseline value of approximately 20 gpd. Successive spiking on the N-16 monitor occurred during the next hour, with peak values reaching approximately 93 gpd and the baseline value remaining at approximately 20 gpd. At 2000 hours on November 16, 1996, the Steam Generator B N-16 monitor showed a further step increase and stabilized at approximately 56 gpd. Operations initiated plant shutdown at this time, with a maximum leak rate of 69 gpd measured on the Steam Generator B N-16 monitor during the down power. The condenser offgas monitor read 300 counts/minute and the H-3 level at the condensate pump discharge corresponded to a leak rate of approximately 40 gpd.

01.2 Licensee Response to Identified Primary-to Secondary Leakage

a. Inspection Scope (50002)

The inspector reviewed the effectiveness of the licensee's procedures, equipment, and practices for monitoring and responding to primary-to-secondary leakage. In particular, the inspector reviewed the capability of monitoring systems to provide early detection of primary-to-secondary leakage.

b. Observations and Findings

The inspector reviewed the procedures governing primary-to-secondary leak rate determination methods and response actions. A review was also performed of the chart readouts from the N-16 monitors for Steam Generators A and B. The inspectors noted that Procedure 2203.038, "Primary to Secondary Leak Rate," Revision 4, established a leak rate limit of 144 gpd, which was more conservative than the Technical Specifications limit of 720 gpd. The procedures were found to provide appropriate guidance to chemistry and operations personnel on actions to be taken to identify, quantify, and mitigate the consequences of a steam generator tube leak. The inspector noted from review of the chart readouts that the N-16 monitors provided early indication of steam generator tube leakage, with the detection capability appearing to be less than 1 gpd.

The licensee called together a primary-to-secondary leak team on November 15, 1996, to evaluate current conditions and determine appropriate response actions. The inspector considered this approach to be an effective method for obtaining timely multi-discipline review of leak data and response options. The team determined from its review to shutdown the unit if the N-16 leakage value exceeded 50 gpd provided a second method also verified leakage. The reason identified by the licensee for selection of the N-16 leak rate value was that it was the most conservative value that could be used which should still be large enough to allow detection of the leak location during cold shutdown. As noted in Section 01.1 above, actual shutdown was initiated when the N-16 indicated leakage exceeded 50 gpd and with both Ar-41 and H-3 readings confirming the presence of leakage. The inspector reviewed this information against the guidance contained in Electrical Power Research Institute Report TR-104788, "Primary-to-Secondary Leak

Guidelines," and determined that the licensee shutdown criteria were both conservative and minimized the potential for a steam generator tube rupture. The inspector viewed staff awareness of a change in N-16 indicated leakage from less than 1 gpd to 1.38 gpd as indicative of good leakage monitoring practices. Overall handling of the leakage event was considered excellent and consistent with the findings of the initial inspection (NRC Inspection Report 50-313; 368/94-17) of the effectiveness of licensee programs and actions for monitoring and response to steam generator tube leakage.

c. Conclusions

Licensee procedures provided appropriate guidance to chemistry and operations personnel on actions to be taken to identify, quantify, and mitigate the consequences of a steam generator tube leak. Overall handling of the Unit 2 leakage event was considered excellent, with diverse methods used to assess leakage and conservative shutdown criteria adopted.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Determination of Leak Location

The licensee planned two approaches for identifying the location of the steam generator tube leakage. The initial approach to be used consisted of placing cameras in the hot-leg and cold-leg side of the primary side of Steam Generator B, filling the secondary side of the steam generator with water, and then applying a nitrogen overpressure of 200 psig to the secondary side. In the event this method did not disclose the identity of the leaking tube, the licensee then planned to drain and dry the steam generator and then utilize helium leak detection as a second approach for finding the location of the leakage.

Licensee staff telephonically informed NRC staff on November 22, 1996, that nitrogen overpressure of the filled secondary side had successfully identified a leaking tube in Steam Generator B (i.e., Row 16, Line 60). Subsequent references to tube identities in this inspection report use the letters R and L, respectively, to denote row and line in the steam generator. Bobbin coil eddy current examination of Tube R16L60 detected an axial outside diameter flaw indication in the tube, which was located at the first eggcrate support on the hot-leg side of the steam generator (i.e., 01H). Analysis of the bobbin coil data indicated that the flaw indication was approximately 1 inch in length with a predicted through-wall dimension of 87 percent. Confirmatory motorized rotating pancake coil examination found the length of the flaw indication to be 1.28 inches, with its location being in the region of contact between the tube and the eggcrate.

M1.2 Review of Tube Examination Data

a. Inspection Scope (50002)

A limited independent assessment was performed of eddy current data obtained during the 2F96 forced outage and in prior outage examinations. The primary focus of this assessment was the eddy current examination history for both the leaking tube in Steam Generator B and for the tube found during Outage 2F96-1 with the next largest defect flaw indication at an eggcrate support location.

b. Observations and Findings

A detailed review was performed by the NRC consultant of the eddy current examination history for the leaking tube, R16L60 (i.e., Row 16, Line 60). In addition to the results from the current 2F96 outage, prior bobbin coil examination results were available from both 1992 and 1995 outages. No degradation was identified by eddy current contractor personnel in this tube during the 1992 and 1995 examinations. As part of this review, the NRC consultant optimized the detection capability for the 1995 data by utilization of a "turbo mix" on the absolute channels of 400, 200, and 100 kHz. Use of this mix allowed effective suppression from the bobbin coil data of the interfering signals from the adjacent carbon steel eggcrate. No evidence of the presence of a defect was found in the data from the prior outages, with also no indication of any change in data characteristics noted at the 01H eggcrate location between the 1992 and 1995 examinations. The inspector ascertained that Unit 2 had operated for approximately 1 year from startup from Refueling Outage 2R11 in 1995 to the November 1996 leakage event. The bobbin coil eddy current data thus indicated that the defect had propagated in 1 year from a size that was not detectable to through wall.

Tube R16L56 in Steam Generator A was ascertained to be the tube containing the next largest bobbin coil flaw indication (to the leaking tube) at an eggcrate location and was thus selected for review by the NRC consultant. The flaw in this tube also appeared to have exhibited a significant growth rate in the 1 year of operation since Refueling Outage 2R11. As noted in Section E1.3 below, Tube R16L56 was selected by the licensee for removal and laboratory examination of the flaw. Initial bobbin coil examination of Tube R16L56 resulted in the identification of a distorted support indication (3.1 volts) at the 01H eggcrate support. Motorized rotating pancake coil (MRPC) examination confirmed the presence of a 1.13 inch long axial flaw with an estimated depth of 78 percent through wall. The NRC consultant agreed with the determination made during 2F96 by the eddy current data analysts for Tube R16L56, with the minor exception of recording a slightly smaller voltage for the bobbin coil signal (i.e., 2.7 volts versus 3.1).

The inspector was informed by licensee personnel that review of the 1995 (Refueling Outage 2R11) bobbin coil eddy current data for Tube R16L56 had identified that a personnel error had occurred during the data analysis. No problem was identified by the primary analyst, with the secondary analyst identifying a distorted support indication was present at the 01H eggcrate support. If the resolution process (for resolving differences in calls by analysts) had concurred with the secondary analyst call, the licensee program would have required performance of an MRPC examination to confirm whether the bobbin coil indication was indicating the presence of an actual defect. The resolution call for Tube R16L56 was, however, "NDD" (i.e., no detectable degradation). Licensee personnel concluded from their review of the 1995 data that the NDD resolution call was in error. The NRC consultant concurred with the licensee evaluation of the 1995 eddy current results for Tube R16L56, but also noted that the signal at the 01H location was 0.9 volts, which was close to the noise level, and was thus not too apparent. Use of the "turbo mix" referenced above for analysis of the 1995 data for Tube R16L56 resulted in a good indication above the noise, allowing easy detection from the strip chart. The licensee initiated a number of corrective actions and process improvements to address the personnel error. These actions included review of training and oversight criteria for data analysts, making improvements to the data analysis guidelines, and evaluation of the use of a larger bobbin probe to improve the probability of detection. A summary of the planned corrective action scope was subsequently provided to the NRC staff in a March 25, 1997, meeting on the Outage 2F96-1 results.

The inspector considered the licensee's corrective actions to be appropriate. The failures of the primary and resolution analysts in 1995 to identify Tube R16L56 in Steam Generator A as requiring additional examination (to confirm whether a defect was present at the 01H eggcrate support), is a violation of 10 CFR Part 50, Appendix B, Criterion V, which requires that activities affecting quality be accomplished in accordance with prescribed procedures. This licensee identified violation is being treated as a noncited violation, consistent with Section VII.B.1 of the NRC Enforcement Policy (50-368/9628-01).

c. Conclusions

No evidence of the presence of a flaw in Tube R16L60 in Steam Generator B was observed in the 1992 and 1995 bobbin coil eddy current data, suggesting a high rate of defect propagation in the approximately 1 year of operation since Refueling Outage 2R11. A noncited violation was identified with respect to a 1995 error in the data analysis for Tube R16L56.

III. Engineering

E1 Conduct of Engineering

E1.1 Review of Outage 2F96-1 Tube Examination Activities

a. Inspection Scope (50002)

The inspector reviewed the eddy current examination scope that was used by the licensee to identify the extent and locations of degradation in the steam generators. In addition, a review was performed of in-process data and applicable eddy current examination program requirements.

b. Observations and Findings

The licensee performed a full-length bobbin coil examination of 100 percent of the active tubes in both steam generators using a 0.580 inches diameter probe. In addition, MRPC examinations (using a probe containing a 0.115 inches pancake coil, a circumferential sensitive coil, and an axial sensitive coil) were performed of 100 percent of the active tubes at the top of the tube sheet on the hot-leg side of the steam generators. Any indications detected by bobbin coil examination in the freespan region of the U-tubes were stipulated to be also examined by MRPC, with positive confirmation of the presence of a flaw requiring plugging of the tube. For eggcrate locations, the licensee developed additional plugging criteria to the 40 percent through-wall requirement of the Technical Specifications (i.e., tubes showing an indication growth of greater than 30 percent through wall and/or 0.5 volts). All tube flaws detected at the top of the tube sheet were required to be removed from service.

The inspector considered the scope of licensee examination to be appropriate for bounding the extent and magnitude of degradation present in the steam generators. The selected MRPC probe appeared to the inspector to reduce the flaw detection capability at the top of the tube sheet, when compared to the Plus Point probe that was used in the prior Refueling Outage 2R11. The MRPC probe was considered, however, to be capable of detecting flaws before they reached a structurally significant size.

During review of Engineering Standard HES-28, "ANO-2 Steam Generator Bobbin ECT Data Analysis Guidelines," Revision 4, the inspector noted a programmatic concern pertaining to manufacturing buff marks. Because the bobbin coil probe cannot fully differentiate between stress corrosion cracking and volumetric indications such as manufacturing buff marks, additional inspections and/or a review of prior inspection data is appropriate prior to disposition of such signals. Section 8.1.7 of HES-28, Revision 4, instructed the analyst, however, to report free span indications as manufacturing buff marks without review of history required, if the estimated through-wall dimension was less than 20 percent. For free span

indications estimated to be 20-39 percent through wall, the analysts were required to report the through-wall percentages of the indications without review of history required. This approach appeared to the inspector to have little technical basis and was discussed with licensee personnel. Licensee personnel concurred that the program requirements should be strengthened and stated that the subject would be addressed in conjunction with other planned revisions. The programmatic concern had no specific impact on Outage 2F96-1 bobbin coil examinations, in that, as noted above, the licensee had previously decided to perform MRPC examination of all free span indications identified by the bobbin coil.

During review of in-process data for Steam Generator A, the inspector noted an instance where a Steam Generator A tube (i.e., Tube R40L46) was planned to be left in service despite the identification during bobbin coil data analysis of the presence of a 45 percent through-wall defect in the sludge pile region. The licensee stated that this determination was made as a result of a subsequent MRPC examination indicating no flaw was present at this location. The inspector questioned whether the current Technical Specifications permitted the licensee to disregard data which exceeded the 40 percent plugging or repair limit defined in Section 4.4.5.4.1.7 of the Technical Specifications. Licensee review of Outage 2F96-1 eddy current data identified a total of five tubes (four in Steam Generator A, one in Steam Generator B) which exhibited free span bobbin coil signals that corresponded to a through-wall range of 40-53 percent, and for which subsequent MRPC examinations indicated no defect was present. The inspector concurred with the licensee's technical position that the MRPC probe was more reliable than the bobbin coil in determining whether a defect was present, but considered the matter to be a compliance issue that needed resolution. The licensee was informed that the appropriateness of disregarding rejectable bobbin coil values was considered an unresolved item pending review of the matter by the Office of Nuclear Reactor Regulation (50-368/9628-02).

c. Conclusions

The licensee utilized an appropriate eddy current examination scope for bounding the extent and magnitude of degradation present in the steam generators. The licensee bobbin coil eddy current data analysis guidelines contained inadequate criteria for determining whether bobbin coil signals were indicative of the presence of manufacturing buff marks on the tube surfaces. An unresolved item was identified regarding whether the Technical Specifications permit the leaving in service of tubes that have imperfections (identified by bobbin coil eddy current examination) in excess of the plugging or repair limit based on subsequent examination using a different eddy current examination probe.

E1.2 In-Situ Pressure Test of Leaking Steam Generator B Tube R16L60

a. Inspection Scope

The inspector reviewed the results from the in-situ pressure test of Steam Generator B Tube R16L60 against the criteria contained in Regulatory Guide 1.121.

b. Observations and Findings

The licensee established three in-situ pressure test values for demonstrating compliance with the structural integrity requirements of Regulatory Guide 1.121 (i.e., 1650 psig, normal operating pressure; 2950 psig, main steam line break; 4750 psig, three times normal differential pressure). These values reflect adjustment of actual operating pressure to compensate for temperature and instrumentation effects.

The inspector reviewed the in-situ pressure test information for Tube R16L60 and ascertained that a leakage rate of 0.01 gpm was obtained at the normal operating pressure step, with an actual test pressure of 1750 psig attained. On attempting to achieve the main steam line break pressure of 2950 psig, the leakage rate increased to the maximum pump capacity of 0.4 gpm at a pressure of 2250 psig which stopped the test. The test tool bladder was then placed over the flaw location and the test restarted. The 2950 psig value was attained and the tube successfully held at pressure for 2 minutes. During pressurization to the final 4750 psig step, three times normal differential pressure, a rapid depressurization occurred at a test pressure of 3975 psig. Subsequent bobbin coil examination estimated the flaw length to be 1.69 inches, indicating growth from the pre-pressure test bobbin coil prediction of approximately 1 inch flaw length. Visual inspection confirmed that a "fish mouth" failure had occurred at the flaw location.

c. Conclusions

The results from in-situ pressure testing of the leaking Steam Generator B tube, Tube R16L60, did not meet the three times normal differential pressure structural integrity criterion of Regulatory Guide 1.121. The test results did, however, demonstrate a structural integrity in excess of the tube main steam line break pressure.

E1.3 Root Cause Analysis for Tube R16L60

a. Inspection Scope

The inspector reviewed the approach used by the licensee for defining probable root cause of a leak initiating in Tube R16L60 during Cycle 12 of commercial operation.

b. Observations and Findings

The inspector reviewed the preliminary root cause analysis information that was available for Tube R16L60. The main areas currently addressed were the secondary chemistry restrictions created by the presence of copper alloys in the balance of plant, chemistry problems created by a loss of condenser vacuum during Cycle 12 startup, and demineralizer operational problems. It was concluded from this review that establishment of a definitive root cause was strongly dependent on the nature of the information obtained during laboratory examination of the two tube samples that were removed in Outage 2F96-1.

The "fish mouth" failure of Tube R16L60 in Steam Generator B during in-situ pressure testing prevented removal of the tube from the steam generator for laboratory examination. Accordingly, the licensee selected for removal for examination the tube containing the next largest bobbin coil flaw indication at an eggcrate location, Tube R16L56 in Steam Generator A. The flaw in this tube also appeared to have exhibited significant growth in the one year of operation since Refueling Outage 2R11. A second tube sample (Tube R70L98) containing an axial flaw indication at the 01H eggcrate support was also removed for laboratory examination. This flaw indication had a lower bobbin coil voltage than Tube R16L56 (i.e., 1.59 versus 2.7), but was estimated to have a through-wall depth of 99 percent by bobbin coil and 81 percent by MRPC examination. Review of the laboratory examination results from these tube samples is considered an inspection followup item (50-368/9628-03).

c. Conclusions

Establishment of a definitive root cause for the high apparent flaw growth rate in Tube R16L60 appeared to be strongly dependent on the nature of the information obtained during laboratory examination of the removed tube samples. An inspection followup item was identified regarding review of the laboratory examination results.

E8 Miscellaneous Engineering Issues (92902)

E8.1 (Closed) Inspection Followup Item 50-313; 368/9417-01: Licensee actions to address program requirements for loose parts in steam generators. During initial followup of this item in 1995 (Inspection Report 50-313; 368/95-14), the inspectors ascertained that the licensee had issued Procedure HES-41, "Steam Generator Secondary Side Potential Loose Parts Tracking," Revision 0, in response to the issue. The inspectors noted from review of this procedure that it did not include any specific administrative requirements to assure some level of data screening by eddy current data analysts for identification of potential loose parts. The inspectors were informed by licensee personnel during the current inspection that specific loose part screening requirements had been included in Procedure HES-27, "ANO-1 Steam Generator ECT Data Analysis Guidelines," with similar requirements to be included in the Unit 2 data analysis guidelines prior to

performance of the Refueling Outage 2R12 steam generator tube examinations. The inspectors confirmed by review of Procedure HES-27, Revision 4, that Section 4.5 contained appropriate screening criteria and that requirements had been established for reporting quantifiable tube degradation and performing examinations of surrounding tubes to bound the affected area. Review of Attachment 1 to Procedure HES-41, Revision 1, confirmed that the licensee had utilized the Procedure HES-27 loose parts criteria in October 1996 during Refueling Outage 1R13 examinations. The inspectors concluded that the licensee Unit 1 actions were equally appropriate for Unit 2.

V. Management Meetings

X1 Exit Meeting Summary

The inspector presented the inspection results to members of licensee management at the conclusion of the inspection on December 13, 1996. The licensee acknowledged the findings presented. No proprietary information was identified.

ATTACHMENT 1

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

C. Anderson, Plant Manager, Unit 2
M. Bourgeois, Outages, Unit 2
B. Converse, Supervisor, Engineering Programs
B. Day, Manager, Engineering Support
D. Denton, Director, Support
R. Edington, General Manager
D. Fowler, Supervisor, Quality Assurance
M. Harris, Maintenance Manager, Unit 2
D. Harrison, Senior Lead Engineer, Engineering Programs
R. Hutchinson, Vice President, Operations
R. Lane, Director, Design Engineering
D. Lomax, Manager, Engineering Programs
B. McKelvy, Chemistry Superintendent
D. McKinney, Acting Operations Manager, Unit 2
D. Meatheany, Technical Specialist, Engineering Programs
D. Mims, Director, Licensing
S. Pyle, Licensing Specialist

Other Organizations

R. Maurer, Manager, Nondestructive Examination Technology, ABB Combustion Engineering

NRC

K. Kennedy, Senior Resident Inspector
K. Salehi, Acting Project Manager

INSPECTION PROCEDURES USED

IP 50002	Steam Generators
IP 92903	Followup-Engineering

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-368/9628-01	NCV	Failure to follow procedure (Section M1.1)
50-368/9628-02	URI	Use of motorized rotating pancake coil eddy current data to override previously acquired bobbin coil eddy current data which exhibited steam generator tube defect indications in excess of Technical Specification repair limits (Section E1.1)
50-368/9628-03	IFI	Review of laboratory examination results for tube samples removed during Outage 2F96-1 (Section E1.3)

Closed

50-368/9628-01	NCV	Failure to follow procedure (Section M1.1)
50-313;368/9417-01	IFI	Licensee actions to address program requirements for loose parts (Section E8.1)

DOCUMENTS REVIEWED

Procedures/Documents

2203.038, "Primary to Secondary Leakage," Revision 4

2602.001, "Primary to Secondary Leakage," Revision 1

1604.013, "Measurement of Primary to Secondary Leak Rate," Revision 8

2409.529, "Steam Generator Tube In-Situ Pressure Test," Revision 0

ABB Combustion Engineering Procedure STD-100-204, "Procedure for the Checkout and Operation of the Steam Generator Tube In-Situ Hydrostatic Test Tool," Revision 6

Unit 2 In-Situ Pressure Test History

HES-27, "ANO-1 Steam Generator ECT Data Analysis Guidelines," Revision 4

HES-28, "ANO-2 Steam Generator Bobbin ECT Data Analysis Guidelines," Revision 4

HES-41, "Steam Generator Secondary Side Potential Loose Parts Tracking," Revisions 0 and 1

Aptech Report AES95102556-1-1, "An Analysis of ODSCC/IGA at Eggcrate Support Locations at Arkansas Nuclear One (ANO) Unit 2," Revision 2

MPR Associates Report "Evaluation of Arkansas Nuclear One Unit 2 Steam Generator Tube Wall Degradation," dated August 26, 1992

ABB Combustion Engineering Report CR-9417-CSE92-1102, Evaluation of Circumferential Defects at the Expansion Transition in Arkansas Nuclear One Unit 2 Steam Generator Tubes," Revision 0