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1CAN111002

November 18, 2010

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

SUBJECT: Response to Request for Additional Information
Regarding the 2010 Steam Generator Tube Inspections
Arkansas Nuclear One, Unit 1
Docket No. 50-313
License No. DPR-51

REFERENCES:

1. Entergy letter dated July 29, 2010, "Steam Generator Tube Inspection Report – 1R22," (1CAN071003)
2. Entergy letter dated April 29, 2010, "Clarification to Summary of Analyses Related to ANO-1 Once-Through Steam Generator Tube Thermal Loads" (1CAN041006)
3. NRC email dated October 29, 2010, "Request for Additional Information Regarding the 2010 Steam Generators Tube Inspections (TAC No. ME4503)"

Dear Sir or Madam:

In Reference 1, Entergy Operations, Inc. (Entergy) provided the results of the Arkansas Nuclear One, Unit 1 (ANO-1) steam generator (SG) tube inspections that were performed during the Spring 2010 refueling outage (1R22). The results were submitted to the NRC in accordance with ANO-1 Technical Specification 5.6.7. In addition, a conference call was held between the NRC and ANO-1 personnel on March 29, 2010, to clarify the summary of actions that addressed the once-through SG tube thermal loads due to breaks in the large-bore piping and SG tube integrity at ANO-1. A summary of this call was provided in Reference 2.

In Reference 3, the NRC stated they had reviewed the information provided and determined that additional information is required to complete their review. The request for this additional information was provided in Reference 3. The NRC requested this information be provided within 30 days. The attachment to this letter provides the requested information.

This letter contains no new commitments.

If you have any questions or require additional information, please contact me.

Sincerely,

Original signed by Stephenie L. Pyle

SLP/rwc

Attachment: Responses to Request for Additional Information 2010 ANO-1 Steam Generator
Tube Inspections

cc: Mr. Elmo Collins
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ATTACHMENT

1CAN111002

Responses to Request for Additional Information

2010 ANO-1 Steam Generator Tube Inspection

Responses to Request for Additional Information
2010 ANO-1 Steam Generator Tube Inspections

By letter dated July 29, 2010, Entergy Operations, Inc. (Entergy) submitted the results of the Arkansas Nuclear One, Unit 1 (ANO-1) steam generator (SG) tube inspections. These inspections were performed during the Spring 2010 refueling outage (1R22).

The NRC Staff has reviewed this information and determined that additional information is required to complete the review. A request for additional information (RAI) appears below. The Entergy response immediately follows each question.

- 1. Page 1 of the letter dated July 29, 2010, states that “The operating period for this report includes one refueling inspection outage (1R22), in March 2010, a non In-Service Inspection (ISI)” and that this was a non American Society of Mechanical Engineering Boiler Pressure Vessel Code (ASME Code) type inspection. Please clarify and confirm that your technical specification requirements pertaining to steam generator tube inspections (TS 5.5.9) were followed and that the applicable ASME Code requirements pertaining to the performance of inspections were followed.**

The intent of the statement was that this inspection was not required per the ANO-1 Technical Specifications (TS). The only degradation is tube support plate (TSP) wear and the bowing of the tie rods during cool down. The wear at the TSPs was justified for two operating cycles which includes Cycles 22 and 23 (the current operating cycle). Therefore, 1R22 was not a required ISI outage. However, the inspection was performed in accordance with all ASME Code requirements. The purpose of the inspection was to validate that the bowing of the tie rods was consistent with the models developed to predict future bowing only. All TS and ASME Code requirements were met.

- 2. On Table 3.7.1 on page 6 of the letter dated July 29, 2010, shows that some values of bowing were “Not Determinable.” Please clarify what is meant by “Not Determinable.”**

The bow of the tie rods in Rows 64 and 88 (outer ring) cannot be determined for 1R22 because the adjacent tubes were plugged in 1R21, making them unavailable for eddy current test examination.

- 3. On page 8 of the letter dated July 29, 2010, please clarify whether the 95th Percentile values for growth are based on 1RF22 or previous outage data (i.e., is Table 3.7.1 the previous operational assessment or the current operational assessment). Additionally, growth rates are in terms of %TW/effective full power year (EFPY) as indicated on page 9. Discuss why the growth rates were not multiplied by the cycle length (in EFPY).**

The 1R22 eddy current examination was performed mainly to identify any new proximity tubes and to monitor previous proximity growth. All new and previous TSP wear indications were reported for this outage to monitor for growth. There were a total of 63 TSP wear

indications in 53 tubes in SG "A". The growth rates were compared to the prediction from the previous operational assessment (OA) (1R21). The 95th percentile growth rates were developed from the previous OA, which remain valid for two cycles (Cycles 22 and 23) in that the 95th values were multiplied by 2.7 Effective Full Power Years (EFPY). The 2.7 EFPY value is the combined design cycle lengths for operating Cycles 22 and 23. The growth rates were also broken down into three zones with Zone 1 having the highest growth. The two cycle values were 25.3 % through wall (TW) for SG "A" and 21.1% TW for SG "B". The maximum growth in Zone 1 for SG "A" was 7% and in SG "B" was 16%. It is anticipated that these values will decrease next cycle as wear is typically self limiting. The average values were 0.59% TW for SG "A" and 1.76% TW for SG "B". Based on this information, the wear that was evaluated was within the predicted values from the previous OA (1R21).

- 4. Table 3.3.1 indicated that the site specific review for sizing with the X-probe was deemed unacceptable. Please clarify. Is this simply indicating that you were unable to qualify the X-probe for sizing indications at ANO-1?**

The X-Probe is the most widely used array probe in North America for performing SG tube inspections. There are numerous X-Probe industry qualifications for Outside Diameter Stress Corrosion Cracking and Pure Water Stress Corrosion Cracking. An X-Probe qualification (Examination Technical Specification Sheet 24044.1) for TSP wear was performed; however, the data was disqualified by EPRI due to having a mix of data from two different probe types. EPRI plans to re-qualify the X-Probe for TSP wear with one probe design in the near future. The X-Probe was used during 1R22 to confirm the presence and morphology of bobbin indications. For TSP wear, additional analysis included orientation with respect to the SG axis, length, number of indications, offset from the TSP edge, and basic morphology (flat or tapered).