

June 23, 2000

Mr. Craig G. Anderson
Vice President, Operations ANO
Entergy Operations, Inc.
1448 S. R. 333
Russellville, AR 72801

SUBJECT: ARKANSAS NUCLEAR ONE, UNIT 2 (ANO-2), REVIEW STATUS OF
THE RISK-INFORMED AMENDMENT REQUEST AND THE STAFF'S
POSITION ON STEAM GENERATOR OPERABILITY (TAC NO. MA8418)

Dear Mr. Anderson:

In November 1999, you conducted a mid-cycle maintenance outage (2P99) on Arkansas Nuclear One, Unit 2 (ANO-2) for the purpose of performing a steam generator tube inspection. As a result of this inspection, a number of tubes were determined to contain flaws and were subsequently removed from service. During the outage, you identified six tubes that contained the worst-case flaws that bounded the limiting operating conditions for the steam generators. These tubes were subjected to in-situ pressure testing, designed to demonstrate, in part, that the safety margin for structural integrity of the tube is sufficient to withstand 3 times the primary-to-secondary differential pressure (3 dP) across a steam generator tube at normal operating conditions. The 3 dP criterion has been established as a minimum requirement for steam generator tube structural integrity. You successfully demonstrated that five of the six tubes tested exceeded the 3 dP criterion. In-situ pressure testing did not demonstrate that the sixth tube (R72C72) satisfied the 3 dP criterion as leakage from the tube flaw exceeded the capacity of your test apparatus before the required pressure was achieved.

By letter dated December 21, 1999 (2CAN129911), you submitted a report, as required by the ANO-2 Technical Specifications, which summarized the results from the ANO-2 steam generator tube inspections performed during the 2P99 mid-cycle outage. In addition, you performed a preliminary evaluation to predict the period of operation allowable following restart from the outage before the worst-case tube could degrade to the point in which it would no longer satisfy the 3 dP criterion. Through the use of a deterministic analysis and conservative estimates for flaw growth rate, detection capability, and the actual burst pressure for tube R72C72, you concluded that ANO-2 would remain within its licensing bases through June 25, 2000.

Entergy Operations, Inc., continued to investigate the circumstances related to the steam generator tube degradation and the results of the inspection conducted during the 2P99 mid-cycle outage. You developed an evaluation titled, "Operational Assessment of Steam Generator Tubing for the Remainder of Cycle 14," in which you documented refinements you made in your ability to predict flaw growth rates and your detection capability. In addition, you performed an analysis, an option in NEI 97-06, "Steam Generator Program Guidelines," to demonstrate that tube R72C72 satisfied the 3 dP criterion despite the difficulties encountered during the in-situ pressure test. By letter dated February 11, 2000 (2CAN020005), you submitted this document to the U.S. Nuclear Regulatory

Commission (NRC) for information. In addition, you discussed your approach and provided supporting material during a public meeting conducted at NRC Headquarters on February 17, 2000. This Operational Assessment concluded that the ANO-2 steam generators would continue to satisfy the licensing basis until your next refueling outage, which is scheduled for September 2000.

Based on our review of your steam generator tube inspection summary report dated December 21, 1999, and your February 11, 2000, Operational Assessment, the staff decided to issue a request for additional information (RAI). This RAI raised a number of questions relating to your methodology for estimating the structural integrity of the limiting tube. Based on a review of the information provided as of May 2, 2000, the staff indicated its view that Entergy Operations, Inc., had not, at that point in time, demonstrated that the limiting ANO-2 steam generator tubes would continue to be within the licensing bases for operations after about June 25, 2000.

As an alternate means to justify continued operation until your September 2000 refueling outage, you pursued the use of a risk-informed approach to support an amendment to modify your licensing bases regarding steam generator tube structural integrity requirements. On March 9, 2000, you submitted a license amendment request (2CAN030003) to allow the use of this alternate methodology. You indicated that the risk-informed evaluation was submitted to reinforce the deterministic analysis provided in the February 11, 2000, Operational Assessment or as an alternative if the Operational Assessment was not accepted by the NRC staff. Notwithstanding your risk-informed amendment request, you have continued to state that the deterministic evaluation documented in your February 11, 2000, Operational Assessment adequately demonstrates that steam generator tube structural integrity continues to satisfy the requirements of your licensing bases.

Since May 2, 2000, you responded with your letter dated May 30, 2000 (2CAN050008), and provided considerable additional information to support both your deterministic and risk-informed approaches to justify operation through the end of the current cycle. The staff is continuing to review this information, which included actual inspection data. The staff notes that the degree of precision associated with your June 25, 2000, estimate is influenced by several factors (e.g., flaw growth rate predictions, initial flaw depth estimates, and parameter sensitivity treatment) and contains areas of conservatism. In addition, in your letter dated June 23, 2000 (2CAN060016), you have committed to implement a contingency plan that takes steps to minimize the potential for a steam generator tube failure and enhances the response capability of ANO-2 in the unlikely event that a tube failure were to occur.

The staff notes that steam generator tube degradation is a time-dependent mechanism. Based on your continued responsibility to demonstrate steam generator operability and our ongoing review of information you provided, the staff continues to accept your February 11, 2000, Operational Assessment in the near term and its conclusion that the tube structural integrity of the ANO-2 steam generators satisfies your plant's licensing

basis. However, the staff has not concluded that your Operational Assessment demonstrates that your steam generator tubes will continue to satisfy the licensing basis at the end of the current operating cycle, September 2000.

The staff continues to make progress in its review of your risk-informed amendment and will make a decision in the near term. The staff's review of your risk-informed amendment request is scheduled to be completed on or before July 14, 2000.

If you have any additional questions please feel free to call Tom Alexion at 301-415-1326.

Sincerely,

/RA/

Stuart A. Richards, Director
Project Directorate IV & Decommissioning
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-368

cc: See next page

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Arkansas Nuclear One

cc:

Executive Vice President
& Chief Operating Officer
Entergy Operations, Inc.
P. O. Box 31995
Jackson, MS 39286-1995

Director, Division of Radiation
Control and Emergency Management
Arkansas Department of Health
4815 West Markham Street, Slot 30
Little Rock, AR 72205-3867

Winston & Strawn
1400 L Street, N.W.
Washington, DC 20005-3502

Manager, Rockville Nuclear Licensing
Framatone Technologies
1700 Rockville Pike, Suite 525
Rockville, MD 20852

Senior Resident Inspector
U.S. Nuclear Regulatory Commission
P. O. Box 310
London, AR 72847

Regional Administrator, Region IV
U.S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-8064

County Judge of Pope County
Pope County Courthouse
Russellville, AR 72801

Vice President, Operations Support
Entergy Operations, Inc.
P. O. Box 31995
Jackson, MS 39286-1995

Wise, Carter, Child & Caraway
P. O. Box 651
Jackson, MS 39205