

March 5, 2001

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

SUBJECT: ARKANSAS NUCLEAR ONE, UNIT 2 - OPERATIONAL ASSESSMENTS OF  
STEAM GENERATOR TUBING FOR CYCLE 14 (TAC MA1951)

Dear Mr. Anderson:

There are three open issues related to the Arkansas Nuclear One, Unit 2 (ANO-2) operational assessments of steam generator tubing for Cycle 14. The Nuclear Regulatory Commission (NRC) staff does not plan to pursue these issues. Below is a brief summary of the reasoning for this.

The NRC staff reviewed a steam generator Operational Assessment for ANO-2 submitted by Entergy Operations, Inc. (Entergy) on June 2, 1999. The Operational Assessment justified operation until the November 1999 mid-cycle outage. The NRC staff issued a request for additional information (RAI), dated October 18, 1999, on the deterministic aspects of the Operational Assessment, and Entergy responded to the RAI on November 5, 1999. Shortly thereafter, ANO-2 was shut down for a mid-cycle outage in order to perform a steam generator tube inspection. Insights that were provided in Entergy's November 5, 1999, RAI response were utilized by NRC staff in their assessment of Entergy's Operational Assessment for the remainder of the operating cycle after the November 1999 mid-cycle outage. However, the NRC staff does not intend to formally respond to the November 5, 1999, RAI response, because Entergy has already performed an additional steam generator inspection (July 2000) and subsequently shut down ANO-2 to replace the steam generators (September 2000).

On March 17, 2000, the NRC issued a second RAI related to Entergy's June 2, 1999, steam generator Operational Assessment. The staff requested additional details and inputs related to the probabilistic model for leakage and burst used by Entergy to justify operation until November 1999. The staff requested this information, primarily in order to be able to understand and assess the probabilistic model for generic purposes (i.e., staff expected the model to be utilized by other licensees). However, the efforts that would have been expended on this review have been superseded by higher priority efforts such as Indian Point, Unit 2 review activities, Steam Generator Action Plan activities, and review of Nuclear Energy Institute (NEI) 97-06, "Steam Generator Program Guidelines." Therefore, the staff does not expect a response to the March 17, 2000, RAI from Entergy. If, in the future, the staff decides to pursue this issue, we will consider a range of possible sources, including Entergy, from which to request the necessary information.

On February 11, 2000, Entergy submitted an Operational Assessment which provided justification for operation until September 2000. Entergy's February 2000 letter addressed, in part, their assessment of the burst capability of tube R72C72 in steam generator "B." Tube R72C72 contained a significant flaw that was in-situ pressure tested during the November 1999

outage to demonstrate, in part, that the safety margin for structural integrity of the tube was sufficient to withstand 3 times the primary-to-secondary differential pressure (3dP) across a steam generator tube at normal operating conditions. However, in-situ pressure testing did not demonstrate that the tube satisfied the 3dP criterion, as leakage from the tube flaw exceeded the capacity of the test apparatus before the required pressure was achieved. The staff documented its concerns, in a letter dated May 2, 2000, related to Entergy's assessment of the burst capability of tube R72C72. Entergy then presented additional analyses and test results regarding the burst capability of tube R72C72 in letters dated May 30 and June 6, 2000. This issue was further discussed in a meeting on June 8, 2000. The staff did not respond, on the docket, to the information provided by Entergy after the staff's May 2, 2000, letter. However, in the meeting on June 8, the staff made it clear that it did not believe that the comparisons (i.e., test results and analyses) of the resulting shape of the partially burst flaw in tube R72C72 to other partially burst test sample tubes containing electric-discharge-machine notches provide a credible basis for demonstrating that tube R72C72 would have met the "factor of three against burst" strength requirement before fully bursting. The staff concluded that the results of the tests and analyses did not provide adequate justification for operation until September 2000. In future activities associated with steam generator tube integrity, Entergy should perform a more rigorous assessment of their engineering analyses, uncertainties and assumptions to ensure technical robustness and credibility. At this point, the staff does not intend to respond to this issue in more detail, because Entergy has already performed an additional steam generator inspection (July 2000) and subsequently shut down ANO-2 to replace the steam generators (September 2000).

With this letter, the staff considers TAC MA1951 closed.

Sincerely,

**/RA/**

Robert A. Gramm, Chief, Section 1  
Project Directorate IV & Decommissioning  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-368

cc: See next page

outage to demonstrate, in part, that the safety margin for structural integrity of the tube was sufficient to withstand 3 times the primary-to-secondary differential pressure (3dP) across a steam generator tube at normal operating conditions. However, in-situ pressure testing did not demonstrate that the tube satisfied the 3dP criterion, as leakage from the tube flaw exceeded the capacity of the test apparatus before the required pressure was achieved. The staff documented its concerns, in a letter dated May 2, 2000, related to Entergy's assessment of the burst capability of tube R72C72. Entergy then presented additional analyses and test results regarding the burst capability of tube R72C72 in letters dated May 30 and June 6, 2000. This issue was further discussed in a meeting on June 8, 2000. The staff did not respond, on the docket, to the information provided by Entergy after the staff's May 2, 2000, letter. However, in the meeting on June 8, the staff made it clear that it did not believe that the comparisons (i.e., test results and analyses) of the resulting shape of the partially burst flaw in tube R72C72 to other partially burst test sample tubes containing electric-discharge-machine notches provide a credible basis for demonstrating that tube R72C72 would have met the "factor of three against burst" strength requirement before fully bursting. The staff concluded that the results of the tests and analyses did not provide adequate justification for operation until September 2000. In future activities associated with steam generator tube integrity, Entergy should perform a more rigorous assessment of their engineering analyses, uncertainties and assumptions to ensure technical robustness and credibility. At this point, the staff does not intend to respond to this issue in more detail, because Entergy has already performed an additional steam generator inspection (July 2000) and subsequently shut down ANO-2 to replace the steam generators (September 2000).

With this letter, the staff considers TAC MA1951 closed.

Sincerely,

**/RA/**

Robert A. Gramm, Chief, Section 1  
Project Directorate IV & Decommissioning  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-368

cc: See next page

DISTRIBUTION:

PUBLIC

PDIV-1 r/f

RidsAcrsAcnwMailCenter

RidsRgn4MailCenter (K. Brockman)

RidsNrrDlpmLpdiv1 (RGramm)

RidsNrrPMTAlexion

RidsNrrLADJohnson

ESullivan

CKhan

RidsOgcRp

Accession No.: ML010650193

\*date of input memo

OFFICE	PDIV-1/PM	PDIV-1/LA	EMCB/SC	PDIV-1/SC
NAME	TAlexion:	DJohnson	ESullivan	RGramm
DATE	03/01/01	03/01/01	02/12/01*	3/1/01

OFFICIAL RECORD COPY

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

Mike Schoppman  
Framatome ANP, Inc.  
Suite 705  
1911 North Fort Myer Drive  
Rosslyn, VA 22209

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