

July 26, 2000

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

SUBJECT: ARKANSAS NUCLEAR ONE, UNIT NO. 2 - ISSUANCE OF AMENDMENT RE:
SPECIAL STEAM GENERATOR INSPECTION (TAC NO. MA9493)

Dear Mr. Anderson:

The U.S. Nuclear Regulatory Commission (NRC) has issued the enclosed Amendment No. 217 to Facility Operating License No. NPF-6 for Arkansas Nuclear One, Unit No. 2. This amendment consists of changes to the Technical Specifications (TSs) in response to your application dated July 13, 2000, as supplemented by letters dated July 14 and 21, 2000.

The amendment permits a one-time change to TS 4.4.5.0 and allows alternate inspection scope and expansion criteria for steam generator tube inspections to be implemented during the mid-cycle outage scheduled for summer 2000 (2P00).

A copy of our related Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's next biweekly *Federal Register* notice.

Sincerely,
/RA/

Thomas W. Alexion, Project Manager, Section 1
Project Directorate IV & Decommissioning
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-368

Enclosures:

1. Amendment No. 217 to NPF-6
2. Safety Evaluation

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UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

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Thomas W. Alexion, Project Manager, Section 1
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cc w/encls: See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

ENTERGY OPERATIONS, INC.

DOCKET NO. 50-368

ARKANSAS NUCLEAR ONE, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 217
License No. NPF-6

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Entergy Operations, Inc. (the licensee), dated July 13, 2000, as supplemented by letters dated July 14 and 21, 2000, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this license amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

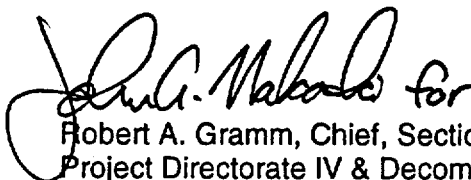
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-6 is hereby amended to read as follows:

2. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 217, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. The license amendment is effective as of its date of issuance and shall be implemented within 30 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in black ink, appearing to read "R. A. Gramm", is written over the typed name and title.

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

Attachment: Changes to the Technical
Specifications

Date of Issuance: July 26, 2000

ATTACHMENT TO LICENSE AMENDMENT NO. 217

FACILITY OPERATING LICENSE NO. NPF-6

DOCKET NO. 50-368

Replace the following page of the Appendix A Technical Specifications with the attached revised page. The revised page is identified by amendment number and contains a marginal line indicating the area of change.

Remove

3/4 4-6

Insert

3/4 4-6

STEAM GENERATORS

LIMITING CONDITION FOR OPERATION

3.4.5 Each steam generator shall be OPERABLE.

APPLICABILITY: MODES 1,2, 3 and 4.

ACTION:

With one or more steam generators inoperable, restore the inoperable generator(s) to OPERABLE status prior to increasing Tav_g above 200°F.

SURVEILLANCE REQUIREMENTS

4.4.5.0 Each steam generator shall be demonstrated OPERABLE by performance of the following augmented inservice inspection program and the requirements of Specification 4.0.5.

Note: The surveillance requirements of Specification 3.4.5 do not apply to the special steam generator tube inspection to be performed during the 2P00 outage scheduled for the Summer 2000. The scope and expansion criteria for the inspection are specified in correspondence to the NRC submitted under separate cover. The scope and expansion criteria shall be approved by the NRC prior to entering Mode 4. The results of the special inspection shall be reviewed by the Plant Safety Committee prior to entering Mode 4 and reported to the NRC within 30 days of entering Mode 4.

4.4.5.1 Steam Generator Sample Selection and Inspection - Each steam generator shall be determined OPERABLE during shutdown by selecting and inspecting at least the minimum number of steam generators specified in Table 4.4-1.

4.4.5.2 Steam Generator Tube Sample Selection and Inspection - The steam generator tube minimum sample size, inspection result classification, and the corresponding action required shall be as specified in Tables 4.4-2 and 4.4-3. The inservice inspection of steam generator tubes shall be performed at the frequencies specified in specification 4.4.5.3 and the inspected tubes shall be verified acceptable per the acceptance criteria of Specification 4.4.5.4. The tubes selected for each inservice inspection shall include at least 3% of the total number of tubes in all steam generators and at least 20% of each type of installed sleeves; the tubes selected for these inspections shall be selected on a random basis except:

- a. Where experience in similar plants with similar water chemistry indicates critical areas to be inspected, then at least 50% of the tubes inspected shall be from these critical areas.
- b. The first sample of tubes selected for each inservice inspection (subsequent to the preservice inspection) of each steam generator shall include:



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 217 TO

FACILITY OPERATING LICENSE NO. NPF-6

ENTERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNIT NO. 2

DOCKET NO. 50-368

1.0 INTRODUCTION

By letter dated July 13, 2000, as supplemented by letters dated July 14 and 21, 2000, Entergy Operations, Inc. (the licensee) submitted a request for changes to the Arkansas Nuclear One, Unit 2 (ANO-2), Technical Specifications (TSs). The requested change would permit a one-time change to TS 4.4.5.0 and would allow alternate inspection scope and criteria for expanding the area of tubes inspected (expansion criteria) for steam generator tube inspections to be implemented during the mid-cycle outage scheduled for summer 2000 (2P00). The proposed steam generator tube inspection for the 2P00 mid-cycle outage would monitor the impact of axial cracking at the eggcrate supports on steam generator tube structural integrity.

The July 14 and 21, 2000, letters provided clarifying information that did not change the scope of the original application and the initial proposed no significant hazards consideration determination.

2.0 BACKGROUND

ANO-2 is a Combustion Engineering plant with two Model 2815 steam generators with mill annealed Alloy 600 tubing that is explosively expanded along the full depth of the tubesheet. Each steam generator contains 8411 tubes. There are seven full eggcrate-type tube supports, two partial eggcrate tube supports, and two partial drilled hole tube support plates. ANO-2 plans to replace its steam generators during the next refueling outage, which is scheduled for the fall of the year 2000. Thus, the current operating fuel cycle (Cycle 14) is the last cycle of operation for these Model 2815 steam generators.

Beginning with a 1996 forced outage, axial cracking of tubes at the eggcrate supports has resulted in mid-cycle inspections in 1998 and 1999. The steam generator tube inspection scope and inspection expansion criteria planned for the 2P00 mid-cycle outage are the subject of the proposed TS amendment.

3.0 PROPOSED REVISIONS TO THE TSs

The licensee has requested a one-time change to the ANO-2 TSs because the 2P00 mid-cycle outage steam generator inspection planned for summer 2000 would not be consistent with ANO-2 TSs for the following reasons:

- The current TSs prohibit steam generator tube inservice inspections at a frequency of less than 12 months. The licensee plans to perform the 2P00 mid-cycle outage inspections approximately 8 months after the previous inspection performed during the 2P99 mid-cycle outage.
- The current TSs require the first sample of tubes to be inspected from the point of entry on the hot leg side completely around the U-bend to the top support of the cold leg. Based on past inspection results, the licensee has determined the specific area of interest for the 2P00 mid-cycle outage inspection includes only the straight portion of the tubes in the hot leg.

The licensee proposes the following revision to the TSs, which would allow for a steam generator tube inspection at a shorter frequency and use different scope and expansion criteria than currently specified. The current Note in TS 4.4.5.0 would be modified as follows:

The applicable outage number and date are revised from 2P99 to 2P00 and November 1999 to summer 2000, respectively. The requirements contained in the Note are not modified.

The Note would then read as follows:

The surveillance requirements of Specification 3.4.5 do not apply to the special steam generator tube inspection to be performed during the 2P00 outage scheduled for the [s]ummer 2000. The scope and expansion criteria for the inspection are specified in correspondence to the NRC [Nuclear Regulatory Commission] submitted under separate cover. The scope and expansion criteria shall be approved by the NRC prior to entering Mode 4. The results of the special inspection shall be reviewed by the Plant Safety Committee prior to entering Mode 4 and reported to the NRC within 30 days of entering Mode 4.

4.0 EVALUATION

4.1 Timing of the Mid-cycle Inspection

The current TSs prohibit steam generator tube inservice inspections at a frequency of less than 12 months. The licensee plans to perform the 2P00 mid-cycle inspections approximately 8 months after the previous inspection, which was conducted during mid-cycle outage 2P99 (November 1999). The staff finds this acceptable because the shorter run time between inspections will improve the licensee's ability to detect and repair degraded tubes before there is a challenge to tube structural or leakage integrity.

4.2 Inspection Scope and Expansion Criteria

The current TSs require the first sample of tubes be inspected from the point of entry on the hot leg side completely around the U-bend to the top support of the cold leg. Based on past inspection results, the licensee determined the specific areas of interest for the 2P00 mid-cycle outage inspection. These areas differ from the TSs requirements, and thus the licensee requests staff approval of its inspection scope. Also, the current TSs require expansions of the steam generator tube inspections based on the results of the previous sample. The licensee plans to specifically limit the expansion criteria for the bobbin inspection. This would differ from the TSs requirements, and thus the licensee requests staff approval of its expansion criteria. The staff's evaluation of the inspection scope and expansion criteria is discussed in detail below.

Recent inspection results indicate that axial cracking at the hot leg eggcrate supports is the limiting degradation mode for ANO-2. Thus, the licensee plans to perform a 100% inspection of tubes in both the "A" and "B" steam generators using a bobbin coil probe from the hot leg tube end to one inch above the seventh tube support plate on the hot leg side. For tubes that have been previously sleeved, the bobbin coil probe inspection will be from the cold leg side and will cover the expanse from one inch above the seventh support plate on the hot leg side down to the top of the sleeve. The licensee will inspect all bobbin indications using a rotating pancake coil probe and will repair all confirmed indications. The licensee supplied information that demonstrated its inspection scope is biased to the most susceptible location in the steam generators, in terms of both size and number of axial indications. This is consistent with staff experience that degradation is most significant in tubes on the hot leg side of the steam generator in the lower support plates due to the higher temperatures. The staff finds the inspection scope acceptable because it is suitably biased to inspect the most susceptible locations of the steam generator tubes for axial cracking at the eggcrate supports.

The initial inspection scope is comprehensive in that the licensee plans to inspect nearly the entire hot leg length of 100% of the tubes in both steam generators. The one area the licensee does not plan to inspect initially is the hot leg tubesheet portion of sleeved steam generator tubes. However, the licensee will expand its inspection scope to include this area if one confirmed indication is found within the tubesheet of a nonsleeved tube. If that occurs, the inspection will be expanded to include the length of tube below the installed sleeves in the affected steam generator. Given the comprehensive initial inspection scope and sensitive expansion criteria, the staff finds the expansion criteria for axial cracking to be acceptable.

In a letter dated July 21, 2000, the licensee documented its commitment to testing flaw indications that meet the in situ pressure test criteria described in Electric Power Research Institute's "In situ Pressure Test Guideline," Revision 1, Technical Report No. TS-107620, April 1999. The licensee will also perform condition monitoring and an operational assessment per the Nuclear Energy Institute's 97-06, "Steam Generator Program Guidelines" and will submit these assessments to the NRC within 30 days of entering Mode 4. The licensee's plans for in situ pressure testing, condition monitoring, and operational assessment are consistent with industry guidelines. Such actions serve to ensure that adequate inspections have been performed such that degraded tubes are identified and removed from service or otherwise repaired before there is a challenge to tube structural and/or leakage integrity.

5.0 EVALUATION SUMMARY

Based on the evaluation provided above, the staff finds the proposed changes to the TSs to be acceptable. Furthermore, the staff finds the proposed inspection scope and expansion criteria for the 2P00 mid-cycle inspection to be acceptable.

6.0 EXIGENT CIRCUMSTANCES

On February 11, 2000, the licensee submitted to the NRC a deterministic operational assessment of steam generator tubing to justify continued operation for the remainder of Cycle 14. The emphasis of the operational assessment was to evaluate approximately one half-cycle of operation for eggcrate axial flaws on the hot leg portion of the steam generators. Cycle 14 is scheduled to end in September 2000, at which time ANO-2 will enter its refueling outage. The licensee intends to replace the steam generators during this refueling outage. On March 9, 2000, the licensee also submitted a license amendment request to allow the use of a risk-informed approach to justify operation of ANO-2 for the remainder of Cycle 14.

By letter dated July 14, 2000, the NRC made the licensee aware of concerns with both of these approaches. As stated in the letter, these concerns had been discussed in a telephone conversation between the NRC staff and the licensee on July 13, 2000. Due to these concerns, by application dated July 13, 2000, as supplemented by letters dated July 14 and 21, 2000, the licensee proposed to perform a special mid-cycle inspection of the steam generators during an outage that is scheduled to begin on July 21, 2000. The licensee requested approval of the application by July 26, 2000, so that the scope of the inspection will be known. Due to the short time interval between the submission of this request and the actual performance of the proposed special steam generator inspection, insufficient time remains for normal NRC processing and notification. Therefore, the licensee requested that this proposed TS change be considered as submitted under exigent circumstances as described in 10 CFR 50.91(a)(6).

Based on the above circumstances, the NRC finds that the licensee used its best efforts to make a timely application as soon as it was informed that the NRC had concerns with both the deterministic operational assessment and the risk-informed application to justify continued operation for the remainder of Cycle 14, and could not have avoided the need for the exigency. The NRC also finds that, in light of these circumstances, the licensee and the Commission must act quickly and time does not permit the Commission to publish a *Federal Register* notice allowing 30 days for prior public comment. As set forth below, the NRC has determined that this amendment involves no significant hazards consideration. Based on the foregoing, the NRC finds that exigent circumstances exist as defined in 10 CFR 50.91(a)(6), with regard to the license amendment requested by the licensee's application dated July 13, 2000, as supplemented by letters dated July 14 and 21, 2000.

7.0 FINAL NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

The Commission's regulations in 10 CFR 50.92 state that the Commission may make a final determination that a license amendment involves no significant hazards consideration if operation of the facility, in accordance with the amendment, would not (1) involve a significant increase in the probability or consequences of an accident previously evaluated, or (2) create

the possibility of a new or different kind of accident from any accident previously evaluated, or (3) involve a significant reduction in a margin of safety. As required by 10 CFR 50.91(a), the licensee has provided its analysis of the issue. The staff's analysis is set forth below.

The accident previously evaluated is the double-ended break of one steam generator tube. This change allows the performance of a special steam generator tubing inspection during the 2P00 mid-cycle outage utilizing NRC-approved scope and expansion criteria that are different than that specified in the TSs. This special inspection is in addition to, and does not modify the content or frequency of the inservice inspection program specified in the ANO-2 TSs.

The change does not increase the probability of an accident previously evaluated because the increased inspection frequency reduces the probability that a flaw in a steam generator tube could grow to a size that would affect the leakage or structural integrity of the tube. The change does not increase the consequences of an accident because it does not modify any parameter that will increase radioactivity in the primary system or increase the amount of radioactive steam released from the secondary safety valves or atmospheric dump valves in the event of a tube rupture.

The change allows an alternate inspection criteria for a special inspection that is in addition to the periodic inservice inspections specified in the TSs. The equipment used in the special inspection will not affect any plant components differently than those used for the previous TS-required inspections. The change does not establish a new accident precursor, nor does it affect the method or manner in which the plant is operated.

Since the 2P00 special inspection is in addition to the inservice inspection program defined in the ANO-2 TSs, since it uses scope and expansion criteria that are appropriate for the degradation mode of concern, and since leakage detection capability is not being modified, performance of this special inspection will increase the margin of safety when compared to the margin of safety associated with not performing the special inspection.

Based on the above considerations, the NRC staff concludes that the amendment meets the three criteria of 10 CFR 50.92. Therefore, the staff has made a final determination that the proposed amendment does not involve a significant hazards consideration.

8.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Arkansas State official was notified of the proposed issuance of the amendment. The State official had no comments.

9.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has made a final finding that the amendment involves no significant hazards consideration. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to

10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

10.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: C. Beardslee-Khan

Date: July 26, 2000