

April 11, 1979

Docket No. 50-313

Mr. William Cavanaugh, III  
Vice President, Generation  
and Construction  
Arkansas Power & Light Company  
P. O. Box 551  
Little Rock, Arkansas 72203

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Dear Mr. Cavanaugh:

The Commission has issued the enclosed Amendment No. 41 to Facility Operating License No. DPR-51 for Arkansas Nuclear One, Unit No. 1 (ANO-1). The amendment consists of changes to the Technical Specifications in response to your license amendment request dated January 19, 1979, as supplemented March 13, 1979, and staff discussions.

The amendment revises the Technical Specifications for Steam Generator Tube Surveillance.

Copies of the Safety Evaluation and Notice of Issuance are also enclosed.

Sincerely,

Robert W. Reid, Chief  
Operating Reactors Branch #4  
Division of Operating Reactors

Enclosures:

1. Amendment No. 41 to DPR-51
2. Safety Evaluation
3. Notice

cc w/enclosures: See next page

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

April 11, 1979

Docket No. 50-313

Mr. William Cavanaugh, III  
Vice President, Generation  
and Construction  
Arkansas Power & Light Company  
P. O. Box 551  
Little Rock, Arkansas 72203

Dear Mr. Cavanaugh:

The Commission has issued the enclosed Amendment No. 41 to Facility Operating License No. DPR-51 for Arkansas Nuclear One, Unit No. 1 (ANO-1). The amendment consists of changes to the Technical Specifications in response to your license amendment request dated January 19, 1979, as supplemented March 13, 1979, and staff discussions.

The amendment revises the Technical Specifications for Steam Generator Tube Surveillance.

Copies of the Safety Evaluation and Notice of Issuance are also enclosed.

Sincerely,

A handwritten signature in cursive script, appearing to read "Robert W. Reid".

Robert W. Reid, Chief  
Operating Reactors Branch #4  
Division of Operating Reactors

Enclosures:

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cc w/enclosures: See next page

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Honorable Ermil Grant  
Acting County Judge of Pope County  
Pope County Courthouse  
Russellville, Arkansas 72801

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Region VI Office  
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cc w/enclosure(s) and incoming  
dtd.: 1/19/79 & 3/13/79

Director, Bureau of Environmental  
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Little Rock, Arkansas 72201



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

ARKANSAS POWER & LIGHT COMPANY

DOCKET NO. 50-313

ARKANSAS NUCLEAR ONE - UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 41  
License No. DPR-51

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Arkansas Power & Light Company (the licensee) dated January 19, 1979, as supplemented March 13, 1979, 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 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.

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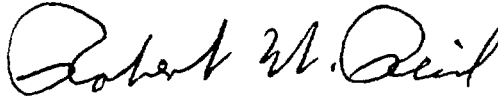
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-51 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 41, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Robert W. Reid, Chief  
Operating Reactors Branch #4  
Division of Operating Reactors

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: April 11, 1979

ATTACHMENT TO LICENSE AMENDMENT NO. 47

FACILITY OPERATING LICENSE NO. DPR-51

DOCKET NO. 50-313

Revise Appendix A Technical Specifications as follows:

Remove Pages

110j - 110m

110o

Insert Pages

110j - 110m

110o

Changes on the revised pages are identified by marginal lines.

## 4.18 STEAM GENERATOR TUBING SURVEILLANCE

### Applicability

Applies to the surveillance of tubing of each steam generator.

### Objective

To ensure integrity of the steam generator tubing through a defined inservice surveillance program, and to minimize exposure of personnel to radiation during performance of the surveillance program.

### Specification

#### 4.18.1 Baseline Inspection

The first steam generator tubing inspection performed according to Specifications 4.18.2 and 4.18.3.a shall be considered as constituting the baseline condition for subsequent inspections.

#### 4.18.2 Examination Methods

Inservice inspection of steam generator tubing shall include non-destructive examination by eddy-current testing or other equivalent techniques. The inspection equipment shall provide a sensitivity that will detect defects with a penetration of 20 percent or more of the minimum allowable as-manufactured tube wall thickness.

#### 4.18.3 Selection and Testing

The steam generator sample size is specified in Table 4.18.1. The steam generator tube minimum sample size, inspection result classification, and the corresponding action required shall be as specified in Table 4.18.2. The inservice inspection of steam generator tubes shall be performed at the frequencies specified in Specification 4.18.4 and the inspected tubes shall be verified acceptable per the acceptance criteria of Specification 4.18.5. The tubes selected for each inservice inspection shall include at least 3% of the total number of tubes in both steam generators; the tubes selected for these inspections shall be selected on a random basis except:

- a. The first sample inspection during each inservice inspection (subsequent to the baseline inspection) of each steam generator shall include:
  1. All nonplugged tubes that previously had detectable wall penetrations (>20%), and
  2. At least 50% of the tubes inspected shall be in those areas where experience has indicated potential problems.

A tube inspection (pursuant to Specification 4.18.5.a.8) shall be performed on each selected tube. If any selected tube does not permit the passage of the eddy current probe for a tube inspection, this shall be recorded and an adjacent tube shall be selected and subjected to a tube inspection.

3. Tubes in the following groups may be excluded from the first random sample if all tubes in a group in both steam generators are inspected. No credit will be taken for these tubes in meeting minimum sample size requirements.

(1) Group A-1: Tubes within one, two or three rows of the open inspection lane.

(2) Group A-2: Tubes having a drilled opening in the 15th support plate.

b. The second and third sample inspections during each inservice inspection as required by Table 4.18.2 may be less than a full tube inspection by concentrating the inspection on those areas of the tube sheet array and on those portions of the tubes where tubes with imperfections were previously found.

The results of each sample inspection shall be classified into one of the following three categories:

<u>Category</u>	<u>Inspection Results</u>
C-1	Less than 5% of the total tubes inspected are degraded tubes and none of the inspected tubes are defective.
C-2	One or more tubes, but not more than 1% of the total tubes inspected are defective, or between 5% and 10% of the total tubes inspected are degraded tubes.
C-3	More than 10% of the total tubes inspected are degraded tubes or more than 1% of the inspected tubes are defective.

NOTES: (1) In all inspections, previously degraded tubes must exhibit significant (>10%) further wall penetrations to be included in the above percentage calculations.

(2) Where special inspections are performed pursuant to 4.18.3.a.3, defective or degraded tubes found as a result of the inspection shall be included in determining the Inspection Results Category for that special inspection but need not be included in determining the Inspection Results Category for the general steam generator inspection.

#### 4.18.4 Inspection Intervals

The above required inservice inspections of steam generator tubes shall be performed at the following frequencies:

a. The baseline inspection shall be performed during the first refueling shutdown. Subsequent inservice inspections shall be performed at intervals of not less than 10 nor more than 24 calendar months after the previous inspection. If the results of two consecutive inspections for a given group\* of tubes following service under all volatile treatment (AVT) conditions fall into the C-1 category or if two consecutive inspections demonstrate that previously observed



degradation has not continued and no additional degradation has occurred, the inspection interval for that group may be extended to a maximum of 40 months.

- b. If the results of the inservice inspection of a steam generator performed in accordance with Table 4.18.2 at 40 month intervals for a given group\* of tubes fall in Category C-3, subsequent inservice inspections shall be performed at intervals of not less than 10 nor more than 20 calendar months after the previous inspection. The increase in inspection frequency shall apply until a subsequent inspection meets the conditions specified in 4.18.4.a and the interval can be extended to 40 months.
- c. Additional, unscheduled inservice inspections shall be performed on each steam generator in accordance with the first sample inspection specified in Table 4.18.2 during the shutdown subsequent to any of the following conditions:
  1. Primary-to-secondary leakage in excess of the limits of Specification 3.10 (inservice inspection not required if leaks originate from tube-to-tube sheet welds),
  2. A seismic occurrence greater than the Operating Basis Earthquake,
  3. A loss-of-coolant accident requiring actuation of the engineered safeguards, or
  4. A main steam line or feedwater line break.

#### 4.18.5 Acceptance Criteria

- a. As used in this specification:
  1. Imperfection means an exception to the dimensions, finish or contour of a tube from that required by fabrication drawings or specifications. Eddy-current testing indications below 20% of the nominal tube wall thickness, if detectable, may be considered as imperfections.
  2. Degradation means a service-induced cracking, wastage, wear or general corrosion occurring on either the inside or outside of a tube.
  3. Degraded Tube means a tube containing imperfections  $> 20\%$  of the nominal wall thickness caused by degradation.
  4. % Degradation means the percentage of the tube wall thickness affected or removed by degradation.
  5. Defect means an imperfection of such severity that it exceeds the plugging limit. A tube containing a defect is defective.

\*A group of tubes means: (a) All tubes inspected pursuant to 4.18.3.a.3, or  
(b) All tubes in a steam generator less those inspected pursuant to 4.18.3.a.3.

6. Plugging Limit means the imperfection depth at or beyond which the tube shall be removed from service because it may become unserviceable prior to the next inspection; it is equal to 40% of the nominal tube wall thickness.
7. Unserviceable describes the condition of a tube if it leaks or contains a defect large enough to affect its structural integrity in the event of an Operating Basis Earthquake, a loss-of-coolant accident, or a steam line or feedwater line break as specified in Specification 4.18.4.c.
8. Tube Inspection means an inspection of the steam generator tube from the point of entry completely to the point of exit.
  - b. The steam generator shall be determined operable after completing the corresponding actions (plug all tubes exceeding the plugging limit and all tubes containing through-wall cracks) required by Table 4.18.2.

#### 4.18.6 Reports

Following each inservice inspection of steam generator tubes, the complete results of the inspection shall be reported to the NRC. This report, to be submitted within 45 days of inspection completion, shall include:

- a. Number and extent of tubes inspected;
- b. Location and percent of wall-thickness penetration for each indication of an imperfection; and
- c. Identification of tubes plugged.

This report shall be in addition to the report of results of steam generator tube inspections which fall into Category C-3 and which require prompt notification of the NRC per Specification 6.12.3.

#### Bases

The surveillance requirements for inspection of the steam generator tubes ensure that the structural integrity of this portion of the RCS will be maintained. The program for inservice inspection of steam generator tubes is based on a modification of Regulatory Guide 1.83, Revision 1. Inservice inspection of steam generator tubing is essential in order to maintain surveillance of the conditions of the tubes in the event that there is evidence of mechanical damage or progressive degradation due to design, manufacturing errors, or inservice conditions that lead to corrosion. Inservice inspection of steam generator tubing also provides a means of characterizing the nature and cause of any tube degradation so that corrective measures can be taken.

TABLE 4.18-2

STEAM GENERATOR TUBE INSPECTION<sup>(2)</sup>

1ST SAMPLE INSPECTION			2ND SAMPLE INSPECTION		3RD SAMPLE INSPECTION	
Sample Size	Result	Action Required	Result	Action Required	Result	Action Required
A minimum of S Tubes per S. G. (1)	C-1	None	N/A	N/A	N/A	N/A
	C-2	Plug defective tubes and inspect additional 2S tubes in this S. G.	C-1	None	N/A	N/A
			C-2	Plug defective tubes and inspect additional 4S tubes in this S. G.	C-1	None
			C-3	Perform action for C-3 result of first sample	C-2	Plug defective tubes
					C-3	Perform action for C-3 result of first sample
	C-3	Inspect all tubes in this S. G., plug defective tubes and inspect 2S tubes in other S.G.  Prompt notification to NRC pursuant to specification 6.12.3.	Other S.G. is C-1	None	N/A	N/A
			Other S.G. is C-2.	Perform action for C-2 result of second sample	N/A	N/A
			Other S.G. is C-3	Inspect all tubes in each S. G. and plug defective tubes. Prompt notification to NRC pursuant to specification 6.12.3., and request NRC approval of remedial action	N/A	N/A

Notes: (1)  $S = 3 \frac{N}{n} \%$  Where N is the number of steam generators in the unit, and n is the number of steam generators inspected during an inspection

(2) For tubes inspected pursuant to 4.18.3.a.4: No action is required for C-1 results. For C-2 results in one or both steam generators plug defective tubes. For C-3 results in one or both steam generators, plug defective tubes and provide prompt notification of NRC pursuant to specification 6.12.3.

Amendment No. 24, 41

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
SUPPORTING AMENDMENT NO. 41 TO FACILITY OPERATING LICENSE NO. DPR-51  
ARKANSAS POWER AND LIGHT COMPANY  
ARKANSAS NUCLEAR ONE, UNIT NO. 1  
DOCKET NO. 50-313

Introduction

By letter dated January 19, 1979, supplemented by letter dated March 13, 1979, Arkansas Power and Light Company (AP&L or the licensee) requested amendment to Facility Operating License No. DPR-51 for Arkansas Nuclear One, Unit 1 (ANO-1). The amendment would modify the Technical Specifications (TS) governing steam generator tube inspection at ANO-1 to: (1) provide for test sampling on the basis of previous test experience at ANO-1, (2) provide for special test provisions for certain defined groups of steam generator tubes, and (3) provide inspection interval requirements based upon the results of inspections of defined groups of steam generator tubes. The amendment would also remove the wording from Table 4.18-2 which requires reporting to NRC as "Action Required" for Category C-2 inspection results. We discussed with the licensee, and he agreed to, our proposed change in the objective of the TS on Steam Generator Tube Surveillance.

Background

With respect to item (1), above, the current TS provide for test sampling of steam generator tubes on the basis of experience in similar plants. The proposed change would determine the sampling on the basis of experience at ANO-1.

With respect to item (2), above, operating experience to date with Babcock and Wilcox designed steam generators indicates that most tube degradation occurs in localized areas adjacent to the tube inspection lane and in the vicinity of the 15th tube support plate where tubes pass through drilled, as opposed to broached, holes\*. It is believed that degradation preferentially occurs in these areas because of the local combination of flow conditions and fluid properties. The current TS for steam generator tubes require, and the proposed TS change would require, that 50% of the first sample of tubes selected for inspection (3% of the total number of tubes in all steam generators) be from this area

\* A broached hole is typically a fluted circle rather than a plain circle.

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(where experience indicates critical areas to be inspected). As an alternative to this requirement, the licensee proposed to define one or more areas in the steam generators where experience has indicated that degradation is most likely, and to optionally perform an inspection of all of the tubes in these areas in both steam generators. In addition, the licensee would inspect the tubes not so inspected in accordance with the general provisions of the proposed TS. According to the licensee's proposal, the number of tubes inspected in the defined potential problem area(s) would not reduce the number of tubes examined in the associated general inspection; but at the same time, degraded or defective tubes identified in the defined potential problem areas would not be used in determining the results category for the general inspection and vice versa.

As for item (3), above, the licensee's proposed change to the TS would base the criteria for the second and third sample inspections for the general steam generator tube group on the result of the general steam generator tube group inspection, independent of the defined group inspection results when the defined group would be 100% inspected.

### Evaluation

As for item (1), the licensee has accumulated enough data from the ANO-1 steam generators from previous inspections to determine the critical areas unique to ANO-1 steam generators. Therefore, we find it more acceptable to provide for test sampling on the basis of experience at ANO-1.

As for item (2), the licensee is proposing that the tubes in the steam generators be classified into two groups: (1) a group of tubes in well-defined areas where experience has indicated that tube degradation is most likely (the defined group) and (2) the balance of the tubes in the steam generators. The licensee is also proposing that, at their option, these groups may be subject to different inspection requirements. Specifically, the licensee may or may not elect to perform an inspection of every tube in the defined group in both steam generators. If they elect to perform such an inspection, the balance of the steam generator tubes will be subject to the normal inspection requirements with no reduction of sample size. At the same time, degraded or defective tubes identified within the defined group will only be used to establish the results category for that group and not for the overall population of tubes.

On the other hand, if the licensee elects to not inspect every tube in the defined group in both steam generators, the specifications would require that the normal inspection be performed. In this case, the specifications would require that at least 50% of the tubes inspected be in areas where experience has indicated potential problems. Accordingly, with either option, inspection of tubes in potential problem areas is emphasized. Under the provisions of the licensee's proposed revision, however, all of the tubes in these areas may be inspected. Therefore, we conclude that with the proposed revision the extent of the inspection of tubes in potential problem areas is not diminished and may be increased. In addition, we conclude that the extent of the inspection of the balance of the steam generator tubes is not reduced.

Upon completion of steam generator inspection, the results are classified into one of three categories (Specification 4.18.3) depending upon the number of defective or degraded tubes discovered. This results category determines the repairs that must be performed; the additional inspection required at that outage, if any; whether prompt reporting of the results to the NRC is required and the maximum permissible interval until the next inspection is conducted.

As for item (3), we find the proposed requirements governing inspection intervals of the inspection of a defined group of tubes would increase the number of inspections of a problem area, yet not reduce the general steam generator tube inspections.

Based on the foregoing, we conclude that the inclusion in the TS of provisions for (1) electively inspecting all tubes in defined areas and (2) determining the inspection intervals for the defined areas from the inspection results of the respective defined areas, as requested by the licensee, does not reduce the effectiveness of the overall steam generator tube inspection program and is therefore acceptable.

The licensee has proposed to remove from Table 4.18-2, the "Action Required" statement to notify the NRC of Category C-2 inspection results. We agree with the licensee that prompt notification of the NRC is unwarranted for results in this category, and we find that this requirement is redundant to the general reporting requirement stipulated in TS 4.18.6; therefore its removal from Table 4.18-2 is acceptable. As to the proposed change in the objective of the TS for Steam Generator Tube Surveillance, we find the proposed wording to be more in line with the purpose of the TS, and therefore we find it acceptable.

#### Environmental Consideration

We have determined that the amendment does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR §51.5(d)(4), that an environmental impact statement, or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

Conclusion

We have concluded, based on the considerations discussed above, that: (1) because the amendment does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the amendment does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Dated: April 11, 1979

UNITED STATES NUCLEAR REGULATORY COMMISSIONDOCKET NO. 50-313ARKANSAS POWER & LIGHT COMPANYNOTICE OF ISSUANCE OF AMENDMENT TO FACILITY  
OPERATING LICENSE

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 41 to Facility Operating License No. DPR-51, issued to Arkansas Power & Light Company (AP&L or the licensee), which revised the Technical Specifications for operation of Arkansas Nuclear One, Unit No. 1 (ANO-1 or the facility) located in Pope County, Arkansas. The amendment is effective as of the date of issuance.

This amendment revises the Technical Specifications for Steam Generator Tube Surveillance.

The application for the amendment complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act); and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendment. Prior public notice of this amendment was not required since the amendment does not involve a significant hazards consideration.

The Commission has determined that the issuance of this amendment will not result in any significant environmental impact and that pursuant to 10 CFR §51.5(d)(4) an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with issuance of this amendment.

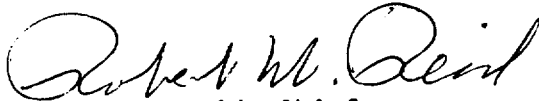
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For further details with respect to this action, see (1) the licensee's application for amendment dated January 19, 1979, as supplemented March 13, 1979, (2) Amendment No. 41 to License No. DPR-51, and (3) the Commission's related Safety Evaluation. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, N. W., Washington, D. C. and at the Arkansas Polytechnic College, Russellville, Arkansas. A copy of items (2) and (3) may be obtained upon request addressed to the U. S. Nuclear Regulatory Commission, Washington, D. C. 20555, Attention: Director, Division of Operating Reactors.

Dated at Bethesda, Maryland, this 11th day of April 1979.

FOR THE NUCLEAR REGULATORY COMMISSION



Robert W. Reid, Chief  
Operating Reactors Branch #4  
Division of Operating Reactors