December 11, 1986

Docket No.: 50-368

Mr. T. Gene Campbell
Vice President
Nuclear Operations
Arkansas Power & Light Company
Post Office Box 551
Little Rock, Arkansas 72203

Dear Mr. Campbell:

Subject: Issuance of Amendment No. 81 to Facility Operating License NPF-6 - Arkansas Nuclear One, Unit No. 2

The Commission has issued the enclosed Amendment No. 81 to Facility Operating License No. NPF-6 for Arkansas Nuclear One, Unit No. 2. The amendment consists of changes to the Technical Specifications in partial response to your application dated April 25, 1986. The remainder of your request involving a more negative moderator temperature coefficient was approved in Amendment No. 80 issued September 10, 1986.

The amendment revises the Technical Specifications pertaining to the Refueling Water Tank (RWT) maximum solution temperature, the periodic verification of moderator temperature coefficient and the minimum shutdown margin for operating Modes 1 through 4.

A copy of the Safety Evaluation is also enclosed. The notice of issuance will be included in the Commission's Bi-Weekly Federal Register Notice.

Sincerely,

/S/

Robert S. Lee, Project Manager
PWR Project Directorate No. 7
Division of PWR Licensing-B

Enclosures:
1. Amendment No. 81 to NPF-6
2. Safety Evaluation

cc: See next page

PD7	PD7	OCG	BIR/PD7
RSLee/yt	JLee	No legal objection	GWKnighton
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ISSUANCE OF AMENDMENT NO. 81 TO FACILITY OPERATING LICENSE NPF-6 - ARKANSAS NUCLEAR ONE, UNIT NO. 2

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

ARKANSAS POWER & LIGHT COMPANY

DOCKET NO. 50-368

ARKANSAS NUCLEAR ONE, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 81
License No. NPF-6

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Arkansas Power & Light Company (the licensee) dated April 25, 1986, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's 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 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.

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 Appendices A and B, as revised through Amendment No. 81, 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 S. Lee, Project Manager
PWR Project Directorate No. 7
Division of PWR Licensing-B

Attachment:
Changes to the Technical
Specifications

Date of Issuance: December 11, 1986

ATTACHMENT TO LICENSE AMENDMENT NO. 81

FACILITY OPERATING LICENSE NO. NPF-6

DOCKET NO. 50-368

Replace the following pages of the Appendix "A" Technical Specifications with the enclosed pages. The revised pages are identified by amendment number and contain vertical lines indicating the areas of change. The corresponding overleaf pages are also provided to maintain document completeness.

Remove Page	Insert Page
3/4 1-1	3/4 1-1
3/4 1-5	3/4 1-5
3/4 1-15	3/4 1-15
3/4 5-7	3/4 5-7
B 3/4 1-1	B 3/4 1-1

3/4.1 REACTIVITY CONTROL SYSTEMS

3/4.1.1 BORATION CONTROL

SHUTDOWN MARGIN - T_{avg} > 200°F

LIMITING CONDITION FOR OPERATION

3.1.1.1 The SHUTDOWN MARGIN shall be $\geq$ 5.5% $\Delta k/k$.

APPLICABILITY: MODES 1, 2*, 3 and 4.

ACTION:

With the SHUTDOWN MARGIN < 5.5% $\Delta k/k$, immediately initiate and continue boration at > 40 gpm of 1731 ppm boric acid solution or equivalent until the required SHUTDOWN MARGIN is restored.

SURVEILLANCE REQUIREMENTS

4.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be $\geq$ 5.5% $\Delta k/k$:

a. Within one hour after detection of an inoperable CEA(s) and at least once per 12 hours thereafter while the CEA(s) is inoperable. If the inoperable CEA is immovable or untrippable, the above required SHUTDOWN MARGIN shall be increased by an amount at least equal to the withdrawn worth of the immovable or untrippable CEA(s).

b. When in MODES 1 or 2#, at least once per 12 hours by verifying that CEA group withdrawal is within the Transient Insertion Limits of Specification 3.1.3.6.

c. When in MODE 2##, within 4 hours prior to achieving reactor criticality by verifying that the predicted critical CEA position is within the limits of Specification 3.1.3.6.

d. Prior to initial operation above 5% RATED THERMAL POWER after each fuel loading, by consideration of the factors of e below, with the CEA groups at the Transient Insertion Limits of Specification 3.1.3.6.

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* See Special Test Exception 3.10.1.

\# With $K_{eff} \geq 1.0$.

\## With $K_{eff} < 1.0$.

REACTIVITY CONTROL SYSTEMS

MODERATOR TEMPERATURE COEFFICIENT

LIMITING CONDITION FOR OPERATION

3.1.1.4 The moderator temperature coefficient (MTC) shall be:

a. Less positive than 0.5×10^{-4} $\Delta k/k/^{o}F$ whenever THERMAL POWER is $\leq$70% of RATED THERMAL POWER,

b. Less positive than 0.0 $\Delta k/k/^{o}F$ whenever THERMAL POWER is >70% of RATED THERMAL POWER, and

c. Less negative than -3.4×10^{-4} $\Delta k/k/^{o}F$ at RATED THERMAL POWER.

APPLICABILITY: MODES 1 and 2*.

ACTION:

With the moderator temperature coefficient outside any one of the above limits, be in at least HOT STANDBY within 6 hours.

SURVEILLANCE REQUIREMENTS

4.1.1.4.1 The MTC shall be determined to be within its limits by confirmatory measurements. MTC measured values shall be extrapolated and/or compensated to permit direct comparison with the above limits.

4.1.1.4.2 The MTC shall be determined at the following frequencies and THERMAL POWER conditions during each fuel cycle:

a. Prior to initial operation above 5% of RATED THERMAL POWER, after each fuel loading.

b. At any THERMAL POWER, prior to reaching a RATED THERMAL POWER equilibrium boron concentration of 800 ppm.

c. At any THERMAL POWER, within 14 EFPD after reaching a RATED THERMAL POWER equilibrium boron concentration of 300 ppm.

*With $K_{eff} \geq 1.0$.

REACTIVITY CONTROL SYSTEMS

BORATED WATER SOURCES - OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.8 Each of the following borated water sources shall be OPERABLE:

a. At least one boric acid makeup tank and one associated heat tracing circuit per tank with the contents of the tank in accordance with Figure 3.1-1, and

b. The refueling water tank with:

1. A contained borated water volume of between 464,900 and 500,500 gallons (equivalent to an indicated tank level of between 91.7% and 100%, respectively),

2. Between 1731 and 2250 ppm of boron,

3. A minimum solution temperature of 40°F, and

4. A maximum solution temperature of 110°F.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a. With the above required boric acid makeup tank inoperable, restore the make up tank to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and borated to a SHUTDOWN MARGIN equivalent to at least 5% $\Delta k/k$ at 200°F; restore the above required boric acid makeup tank to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours.

b. With the refueling water tank inoperable, restore the tank to OPERABLE status within one hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.1.2.8 Each of the above required borated water sources shall be demonstrated OPERABLE:

EMERGENCY CORE COOLING SYSTEMS

REFUELING WATER TANK

LIMITING CONDITION FOR OPERATION

3.5.4 The refueling water tank shall be OPERABLE with:

a. A contained borated water volume of between 464,900 and 500,500 gallons (equivalent to an indicated level between 91.7% and 100%, respectively),

b. Between 1731 and 2250 ppm of boron,

c. A minimum solution temperature of 40°F, and

d. A maximum solution temperature of 110°F.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With the refueling water tank inoperable, restore tank to OPERABLE status within 1 hour or be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.5.4 The RWT shall be demonstrated OPERABLE:

a. At least once per 7 days by:

1. Verifying the contained borated water volume in the tank, and

2. Verifying the boron concentration of the water.

b. At least once per 24 hours by verifying the RWT temperature.

3/4.1.1 BORATION CONTROL

3/4.1.1.1 and 3/4.1.1.2 SHUTDOWN MARGIN

A sufficient SHUTDOWN MARGIN ensures that 1) the reactor can be made subcritical from all operating conditions, 2) the reactivity transients associated with postulated accident conditions are controllable within acceptable limits, and 3) the reactor will be maintained sufficiently subcritical to preclude inadvertent criticality in the shutdown condition.

SHUTDOWN MARGIN requirements vary throughout core life as a function of fuel depletion, RCS boron concentration, and RCS T_{avg}. The most restrictive condition occurs at EOL, with T_{avg} at no load operating temperature, and is associated with a postulated steam line break accident and resulting uncontrolled RCS cooldown. In the analysis of this accident, a minimum SHUTDOWN MARGIN of 5.5% $\Delta k/k$ is required to control the reactivity transient. Accordingly, the SHUTDOWN MARGIN requirement is based upon this limiting condition and is consistent with FSAR safety analysis assumptions. With $T_{avg} \leq 200°F$, the reactivity transients resulting from any postulated accident are minimal and a 5% $\Delta k/k$ shutdown margin provides adequate protection.

3/4.1.1.3 BORON DILUTION

A minimum flow rate of at least 3000 GPM provides adequate mixing, prevents stratification and ensures that reactivity changes will be gradual during boron concentration reductions in the Reactor Coolant System. A flow rate of at least 3000 GPM will circulate an equivalent Reactor Coolant System volume of 9,975 cubic feet in approximately 25 minutes. The reactivity change rate associated with boron concentration reductions will therefore be within the capability of operator recognition and control.

3/4.1.1.4 MODERATOR TEMPERATURE COEFFICIENT (MTC)

The limitations on MTC are provided to ensure that the assumptions used in the accident and transient analysis remain valid through each fuel cycle. The surveillance requirements for measurement of the MTC during each fuel cycle are adequate to confirm the MTC value since this coefficient changes slowly due principally to the reduction in RCS boron concentration associated with fuel burnup. The confirmation that the measured MTC value is within its limit provides assurances that the coefficient will be maintained within acceptable values throughout each fuel cycle.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO FACILITY OPERATING LICENSE NO. NPF-6

ARKANSAS POWER AND LIGHT COMPANY

ARKANSAS NUCLEAR ONE, UNIT 2

DOCKET NO. 50-368

1.0 INTRODUCTION

By letter dated April 25, 1986, Arkansas Power and Light Company (AP&L) submitted a request to amend Facility Operating License No. NPF-6 for the Arkansas Nuclear One, Unit No. 2 (ANO-2). The request was for proposed changes to the Technical Specifications involving an increase in the refueling water tank (RWT) maximum solution temperature, an increase in the required shutdown margin for Modes 1 through 4, the verification of moderator temperature coefficient (MTC) and a more negative MTC. This Safety Evaluation (SE) addresses the first three of the above stated changes. The proposed change involving a more negative MTC was addressed in an SE associated with Amendment No. 80 issued September 10, 1986.

2.0 EVALUATION

The proposed change to Technical Specifications 3.1.2.8.b and 3.5.4 will increase the required maximum solution temperature for the borated water in the RWT from 100°F to 110°F. The maximum solution temperature is specified to assure that the maximum borated water injection temperature assumed in the ANO-2 Final Safety Analysis Report (FSAR) emergency core cooling systems (ECCS) evaluation is not exceeded. The RWT maximum solution temperature assumed in the ANO-2 FSAR is 120°F. Under the current Technical Specifications, whenever the RWT solution temperature approaches 100°F due to direct solar heating, the RWT is cooled using a containment spray pump and shutdown cooling heat exchanger. The proposed change is expected to reduce frequent use of ECCS system required to cool the RWT during the summer months. We have reviewed the proposed change and found it acceptable based on the fact that the proposed change is bounded by the existing accident analysis results in Chapter 15 of the ANO-2 FSAR since the proposed maximum solution temperature is within the assumptions of the FSAR accidents analysis and that there still would be sufficient margin between the proposed maximum solution temperature and that assumed in the FSAR accident analysis and ECCS functional analysis.

The proposed change to Technical Specification 3.1.1.1 will increase the required minimum shutdown margin for Modes 1 through 4 from 5.0% delta k/k to 5.5% delta k/k. The purpose of the proposed change is to assure that future operating cycles comply with the accident analysis limits specified in Chapter 15 of the ANO-2 FSAR. For the current operating cycle, Cycle 6, the proposed change will provide additional shutdown margin and thus, will not reduce the reactivity control system's capability for controlling the reactivity transients associated with postulated accident conditions within acceptable limits. Further, the proposed change will not reduce the systems capability for making the reactor subcritical from all operating conditions and for maintaining the reactor sufficiently subcritical to preclude inadvertent criticality in the shutdown condition. Based on the foregoing discussion, we have found the proposed change acceptable.

The proposed change to Technical Specification Surveillance Requirement 4.1.1.4.2 pertains to the periodic verification of MTC values. MTC can be described as the change in reactivity that results from a change in the temperature of the water in the core. The MTC limit is an input parameter in various transients and accident analysis. To ensure that the assumptions used in the transient and accident analysis remain valid throughout each fuel cycle since MTC changes slowly due principally to the reduction in reactor coolant system boron concentration associated with fuel burnup, the MTC measurements are required by Surveillance Requirement 4.1.1.4.2. Under the proposed change, MTC measurement frequencies will be revised from within 7 EFPD after reaching a RATED THERMAL POWER equilibrium boron concentration of 800 ppm and 300 ppm to a frequency of prior to and within 14 EFPD after reaching a RATED THERMAL POWER equilibrium boron concentration of 800 ppm and 300 ppm respectively. The purpose of the proposed change is to allow greater operational flexibility in the performance of MTC measurements. We have reviewed the proposed change and found it acceptable based on the fact that the proposed change will not reduce the number of required MTC measurements but it will merely expand the periods during which MTC measurements have to be performed and that it will not significantly affect the confidence in the MTC measurements since the MTC changes slowly.

2.0 EVALUATION SUMMARY

Based on the staff evaluation described above, the proposed changes to ANO-2 Technical Specifications 3.1.2.8.b, 3.5.4, 3.1.1.1 and 4.1.1.4.2 are acceptable.

3.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The 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 previously published a proposed finding that the amendment involves no significant hazards consideration and there has been no public comment on such finding. 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.

4.0 CONCLUSION

We have 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, and (2) such activities will be conducted in compliance with the Commission's regulations, and 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 contributors to this SE was L. Kopp and R. Lee.

Dated: December 11, 1986