

March 31, 2008

Vice President, Operations
Arkansas Nuclear One
Entergy Operations, Inc.
1448 S.R. 333
Russellville, AR 72802

SUBJECT: ARKANSAS NUCLEAR ONE, UNIT NO. 2 – ISSUANCE OF AMENDMENT
RE: MODERATOR TEMPERATURE COEFFICIENT SURVEILLANCES (TAC
NO. MD5515)

Dear Sir or Madam:

The Commission has issued the enclosed Amendment No. 279 to Renewed Facility Operating License No. NPF-6 for Arkansas Nuclear One, Unit No. 2 (ANO-2). The amendment consists of changes to the Technical Specifications (TS) in response to your application dated May 8, 2007, as supplemented by letter dated March 27, 2008.

The amendment modifies ANO-2 TS 3.1.1.4, "Moderator Temperature Coefficient (MTC)." Specifically, the change will modify the surveillance frequency to be based on effective full power days instead of boron concentration.

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/

Alan B. Wang, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-368

Enclosures: 1. Amendment No. 279 to NPF-6
2. Safety Evaluation

cc w/encls: See next page

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ADAMS Accession No.: Pkg ML080710003 (Amdt. ML080710004, License/TS Pgs ML080710005) (*) See previous concurrence

OFFICE	NRR/LPL4/PM	NRR/LPL4/LA	DSS/SXRB/BC	OGC - NLO	NRR/LPL4/BC
NAME	AWang (*)	JBurkhardt	GCranston (*)	RHolmes (*)	THiltz
DATE	3/24/08	3/31/08	3/25/08	3/26/08	3/31/08

OFFICIAL RECORD COPY

Arkansas Nuclear One

(2/25/08)

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ENTERGY OPERATIONS, INC.

DOCKET NO. 50-368

ARKANSAS NUCLEAR ONE, UNIT NO. 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 279
Renewed 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 May 8, 2007, as supplemented by letter dated March 27, 2008, 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 Renewed 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. 279, are hereby incorporated in the renewed 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 60 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Thomas G. Hiltz, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the Renewed Facility
Operating License No. NPF-6
Technical Specifications

Date of Issuance: March 31, 2008

ATTACHMENT TO LICENSE AMENDMENT NO. 279

RENEWED FACILITY OPERATING LICENSE NO. NPF-6

DOCKET NO. 50-368

Replace the following pages of the Renewed Facility Operating License No. NPF-6 and Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Operating License

REMOVE

-3-

INSERT

-3-

Technical Specifications

REMOVE

3/4 1-5

INSERT

3/4 1-5

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 279 TO

RENEWED FACILITY OPERATING LICENSE NO. NPF-6

ENTERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNIT NO. 2

DOCKET NO. 50-368

1.0 INTRODUCTION

By application dated May 8, 2007 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML071370312), as supplemented by letter dated March 27, 2008 (ADAMS Accession No. MLxxxxxxx¹), Entergy Operations, Inc. (the licensee), requested changes to the Technical Specifications (TS) for Arkansas Nuclear One, Unit No. 2 (ANO-2). The proposed changes would revise TS 3.1.1.4, "Moderator Temperature Coefficient (MTC)." Specifically, the change will modify the surveillance frequency to be based on effective full power days (EFPD) instead of boron concentration.

The supplemental letter dated March 27, 2008, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on June 5, 2007 (72 FR 31099).

2.0 REGULATORY EVALUATION

In Section 50.36, "Technical specifications," of Title 10 of the *Code of Federal Regulations* (10 CFR), the Commission established the requirement that each applicant for a license authorizing operation of a production or utilization facility shall include proposed TSs. Pursuant to 10 CFR 50.36(d), TSs are required to include items in the following five specific categories related to station operation: (1) safety limits, limiting safety system settings, and limiting control settings; (2) limiting conditions for operation; (3) surveillance requirements (SR); (4) design features; and (5) administrative controls. This amendment is within the safety limits, limiting safety system settings, and limiting control settings category (10 CFR 50.36(d)(1)).

The proposed changes have been evaluated against the following to determine whether applicable regulations and requirements continue to be met.

General Design Criterion 11 of Appendix A to 10 CFR Part 50, the reactor core and its interaction with the Reactor Coolant System (RCS) must be designed for inherently stable power

¹ As of the date of issuance of this amendment, document has not yet been placed into ADAMS.

operation, even in the possible event of an accident. In particular, the net reactivity feedback in the system must compensate for any unintended reactivity increases.

3.0 TECHNICAL EVALUATION

The MTC relates a change in core reactivity to a change in reactor coolant temperature. A positive MTC means that reactivity increases with increasing moderator temperature; conversely, a negative MTC means that reactivity decreases with increasing moderator temperature. The reactor is designed to operate with a negative MTC over the largest possible range of fuel cycle operation. Therefore, a coolant temperature increase will cause a reactivity decrease, so that the coolant temperature tends to return toward its initial value. Reactivity decrease that causes a coolant temperature increase will thus be self limiting and stable power operation will result.

The RCS boron concentrations associated with the current SRs were included in the original ANO-2 TS. The fuel cycle length was 12 months at that time with a beginning of cycle (BOC) RCS boron concentration of approximately 1000 ppm (parts per million). The 800 ppm RCS boron concentration corresponded to a BOC measurement of the MTC. The 300 ppm RCS boron concentration corresponded to reaching approximately two-thirds of the expected core burnup. When the cycle length was changed to 18 months, the 800 ppm RCS boron concentration still provided an MTC measurement early in the cycle and the 300 ppm RCS boron concentration still provided a middle of cycle measurement. The proposed change will continue to require MTC measurement at approximately the same intervals.

MTC values are predicted at selected times during the safety evaluation analysis and are confirmed to be acceptable by measurement. The intent of the SRs is to assure the MTC response is as predicted. The SRs for measurement of the MTC are required prior to entering Mode 1 and at the beginning and middle of each fuel cycle for confirmation of the limiting MTC values. The SR 4.1.1.4.2(a) prior to Mode 1 is unchanged. The proposed change will associate the interval for the SRs 4.1.1.4.2(b) and (c) with EFPD rather than RCS boron concentration. The interval of the surveillances will not change but the timing of SRs 4.1.1.4.2(b) and (c) may change slightly. The MTC changes smoothly from the most positive (least negative) to the most negative value during fuel cycle operation, as the RCS boron concentration is reduced to compensate for fuel depletion. The requirement for measurement prior to operation greater than 5 percent rated thermal power (RTP) satisfies the confirmatory check on the most positive (least negative) MTC value.

The licensee originally proposed TS Action 4.1.1.4.2.b to be performed "prior to reaching" 40 EFPD to be consistent with the Waterford Steam Electric Station, Unit 3 TSs. However, the Standard Technical Specification (STS) wording is "within 7 EFPD" of reaching 40 EFPD. Following a teleconference discussion of this difference with the licensee, the licensee agreed that adoption of the STS wording was acceptable. Therefore, by letter dated March 27, 2008, the licensee proposed to change TS 4.1.1.4.2.b to use the STS wording of "within 7 EFPD of reaching 40 EFPD." This is an administrative change from the originally proposed TS and has no impact on the intent of MTC testing requirements.

The revised SRs 4.1.1.4.2(b) and (c) provide for measurements of MTC, within 7 EFPD of reaching 40 EFPD and two-thirds of expected core burnup. This provides the confirmatory check of the most negative MTC value. The licensee proposes to perform these measurements

at any thermal power level greater than 5 percent, so that the projected end of cycle (EOC) MTC may be evaluated before the reactor actually reaches the EOC condition. MTC values may be extrapolated and compensated to permit direct comparison to the specified MTC limits. The STS are worded to allow a plant to perform these tests at any power; however, the licensee stated that it is not prudent to perform these tests or induce plant transients at low-power levels because such testing could result in entering/exiting Modes 1 and 2 inadvertently. Mode 2 governs plant operation at less than or equal to 5 percent power with the reactor critical. Mode 1 governs plant operation at all power levels above 5 percent. Oftentimes, there are different TS requirements depending on which mode of operation a plant is in; therefore, the 40 EFPD and two-thirds core-life MTC tests are modified to be performed at greater than 5 percent RTP to avoid unnecessary mode changes and/or performing the tests during relatively unstable, lower power levels of operation. The licensee has proposed that the current TS 5 percent limitation be maintained in the proposed SR revisions, which is more restrictive than the STS.

The TS change continues to provide assurance that the MTC is measured at specific intervals in the fuel cycle regardless of the fuel design (i.e., at the beginning and middle of the fuel cycle). The measurement is performed at any RTP level greater than 5 percent which is consistent with the current TS applicability statement. In addition, the proposed surveillances are consistent with NUREG-1432. The proposed change assures the original intent of the current SRs. With the addition of Integral Fuel Burnable Absorbers (i.e., zirconium diboride) fuel design, peak RCS boron concentration occurs later in the fuel cycle. As such, the proposed change is necessary to ensure the MTC measurement is performed at the appropriate intervals. The nuclear design of the core ensures that the combined response of all reactivity coefficients in the power operating range to an increase in reactor thermal power yields a net decrease in reactivity. Therefore, the intent of the current TSs are met and the NRC staff concludes that the proposed TS changes are acceptable.

4.0 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.

5.0 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. 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 previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding published in the *Federal Register* on June 5, 2007 (72 FR 31099). 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.

6.0 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: A. Wang

Date: March 31, 2008