



Entergy Operations, Inc.  
1448 S.R. 333  
Russellville, AR 72802  
Tel 479-858-4888

Jeffery S. Forbes  
Vice President  
Operations ANO

2CAN090503

September 19, 2005

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555

SUBJECT: License Amendment Request  
To Modify Technical Specification 3.1.1.4, Surveillance Requirements as  
Allowed by WCAP-16011-P-A, *Startup Test Activity Reduction Program*  
Arkansas Nuclear One, Unit 2  
Docket No. 50-368  
License No. NPF-6

REFERENCES: 1. WCAP-16011-P-A, Revision 0, *Startup Test Activity Reduction Program* approved January 14, 2005

Dear Sir or Madam:

Pursuant to 10 CFR 50.90, Entergy Operations, Inc. (Entergy) hereby requests the following amendment to the Arkansas Nuclear One, Unit 2 (ANO-2) Technical Specifications (TSs). The proposed change will modify the Surveillance Requirements related to ANO-2 TS 3.1.1.4, Moderator Temperature Coefficient (MTC) and will allow the use of the *Startup Test Activity Reduction Program* (WCAP-16011-P-A) (Reference 1). A change to NUREG-1432, *Standard Technical Specifications Combustion Engineering Plants*, has been proposed in Technical Specification Task Force (TSTF) Improved Standard Technical Specification Change Traveler TSTF-486 to incorporate the allowance to use WCAP-16011-P-A. The traveler was submitted for NRC approval in June 2005. The differences between the proposed change to the ANO-2 TS and the proposed traveler are outlined in Attachment 1.

The proposed change has been evaluated in accordance with 10 CFR 50.91(a)(1) using criteria in 10 CFR 50.92(c) and it has been determined that this change involves no significant hazards consideration. The bases for these determinations are included in the attached submittal.

The proposed change includes new commitments. Similar TS changes for other plants have not been approved by the NRC.

A 001

Entergy requests approval of the proposed amendment by August 18, 2006. Once approved, the amendment shall be implemented within 30 days. Although this request is neither exigent nor emergency, your prompt review is requested.

If you have any questions or require additional information, please contact Dana Millar at 601-368-5445.

I declare under penalty of perjury that the foregoing is true and correct. Executed on September 19, 2005.

Sincerely,



JSF/DM

Attachments:

1. Analysis of Proposed Technical Specification Change
2. Proposed Technical Specification Changes (mark-up)
3. Changes to Technical Specification Bases Pages – For Information Only
4. List of Regulatory Commitments

cc: Dr. Bruce S. Mallett  
Regional Administrator  
U. S. Nuclear Regulatory Commission  
Region IV  
611 Ryan Plaza Drive, Suite 400  
Arlington, TX 76011-8064

NRC Senior Resident Inspector  
Arkansas Nuclear One  
P. O. Box 310  
London, AR 72847

U. S. Nuclear Regulatory Commission  
Attn: Mr. Drew Holland MS O-7D1  
Washington, DC 20555-0001

Mr. Bernard R. Bevill  
Director Division of Radiation  
Control and Emergency Management  
Arkansas Department of Health  
4815 West Markham Street  
Little Rock, AR 72205

**Attachment 1**

**2CAN090503**

**Analysis of Proposed Technical Specification Change**

## 1.0 DESCRIPTION

This letter is a request to amend Operating License NPF-6 for Arkansas Nuclear One, Unit 2 (ANO-2). The proposed change will revise the Operating License to modify the Surveillance Requirements (SR) associated with ANO-2 Technical Specification (TS) 3.1.1.4, Moderator Temperature Coefficient (MTC) and will allow the use of the *Startup Test Activity Reduction Program* (WCAP-16011-P-A) (Reference 1).

The proposed change is made, with minor differences noted below, using Technical Specification Task Force (TSTF) Improved Standard Technical Specification Change Traveler TSTF-486, *Revise MTC Surveillance for Startup Test Activity Reduction (STAR) Program* (WCAP-16011), which is currently under NRC review. The ANO-2 TSs are formatted to the Standard Technical Specifications for Combustion Engineering PWRs (NUREG-0212). Therefore, the wording of the TSTF has been modified to coincide with the original standard TS format while retaining the context of the TSTF. The projected approval date of the TSTF traveler is June 2006. The NRC's Safety Evaluation (SE) for Revision 0 of the Topical Report (WCAP-16011-P-A, *Startup Test Activity Reduction Program*) was approved on January 14, 2005.

ANO-2 requests the proposed change be approved by August 18, 2006 in order to support its fall 2006 refueling outage.

## 2.0 PROPOSED CHANGE

The proposed change revises ANO-2 SR 4.1.1.4.1 and SR 4.1.1.4.2.a by adding the following note:

*Note 1: For fuel cycles that meet the applicability requirements given in WCAP-16011-P-A, the verification prior to entering MODE 1 may be made using the predicted MTC as adjusted for the measured boron concentration.*

The existing Note 1, which is associated with SR 4.1.1.4.2.c, will be designated as Note 2 and will be modified as follows:

*For cycles that meet the applicability requirements given in WCAP-16011-P-A, the MTC determination of surveillance 4.1.1.4.2.c is not required if the result of the test required in surveillance 4.1.1.4.2.b is within a tolerance of  $\pm 0.16 \times 10^{-4} \Delta k/k/^{\circ}F$  from the corresponding design value.*

The TS Bases will also be changed in accordance with the ANO-2 TS Bases Control Program per TS 6.5.14.

In summary, a change is proposed that: 1) allows the MTC determination, which is required prior to initial operation above 5% of Rated Thermal Power after each fuel loading, to be made by using the predicted MTC as adjusted for the measured boron concentration when the applicability requirements given in WCAP-16011-P-A are met; and 2) allows the elimination of the end of cycle (EOC) MTC measurement when the applicability requirements given in WCAP-16011-P-A are met and the result of the MTC determination performed prior to reaching a Rated Thermal Power equilibrium boron concentration of 800 ppm is within a tolerance of  $\pm 0.16 \times 10^{-4} \Delta k/k/^{\circ}F$  from the corresponding design value.

### 3.0 BACKGROUND

The limitations on MTC are provided to ensure the assumptions used in the accident and transient analysis remain valid throughout each fuel cycle. The SRs confirm that the MTC remains within acceptable values.

Westinghouse Topical Report (TR) WCAP-16011-P-A, Revision 0, *Startup Test Activity Reduction Program*, proposed changes to reactor reload startup testing. The NRC approved TR describes a method to reduce the time required for startup testing.

### 4.0 TECHNICAL ANALYSIS

The TR justifies the elimination of certain startup testing requirements, including the control element assembly (CEA) worth and isothermal temperature coefficient (ITC) measurements at hot zero power (HZP). The TR also proposed to substitute the measured value of the MTC at HZP with an alternate MTC value consisting of the predicted (calculated) MTC as adjusted for the measured critical boron concentration at HZP.

STAR program applicability requirements for implementing this change are included in WCAP-16011-P-A. The NRC's Final Safety Evaluation (SE) for WCAP-16011-P-A dated January 14, 2005 includes the following conditions and limitations. Entergy's method of compliance with these is also included.

1. The STAR program is applicable only to the participating plants as defined in Table 3-1 of the TR.

ANO-2 was a participating plant as identified in Table 3-1 of the TR.

2. Should any of the STAR test result fall outside the test criteria, either ascertain that the safety analysis and STAR applicability requirements are satisfied, or discontinue use of the STAR program for that fuel cycle.

Entergy will include verification of the applicability requirements in appropriate site startup testing procedures. Entergy will include guidance in the procedures to ensure that the safety analysis and STAR applicability requirements are satisfied when STAR test results fall outside the test criteria. If the safety analysis or STAR applicability requirements are not satisfied, the STAR program for the affected fuel cycle will not be used.

3. The Staff requires each licensee using STAR to submit a summary report following the first application, either successful or not, of STAR to its plant. The report should (a) identify the core design method used, (b) compare the measured and calculated values and the differences between these values to the corresponding core design method uncertainties and (c) show compliance with the STAR applicability requirements. If the application of STAR is unsuccessful, identify the reasons why the STAR application failed.

Entergy will submit a summary report following the first application of STAR at ANO-2 that will: (a) identify the core design method used, (b) compare the measured and calculated values and the differences between these values to the corresponding core design method uncertainties and (c) show compliance with the STAR applicability requirements.

If the application of STAR is unsuccessful, Entergy will identify the reasons why the STAR application failed.

The following differences exist between the proposed traveler TSTF-486, which was submitted for NRC approval in June 2005, and the proposed change to the ANO-2 TS:

- The TSTF traveler added the following additional requirement to verify MTC is within the upper limit specified in the COLR: "Each fuel cycle within 7 effective full power days (EFPD) of reaching 40 EFPD core burnup." The new SR proposed in the traveler is required only when the MTC determination prior to entering Mode 1 is verified using the measured boron concentration. ANO-2 currently has a Mode 1 SR to verify MTC is within both the upper and lower limits by confirmatory measurements (SR 4.1.1.4.2.b) prior to reaching an equilibrium boron concentration of 800 ppm. No change is proposed to the existing ANO-2 SR. Therefore, the proposed change that is reflected in the traveler is not necessary for ANO-2.
- The traveler did not specify the conditions and limitations included in the NRC's Final Safety Evaluation for the TR. Entergy's responses to the conditions are provided.
- The traveler does not include the option to eliminate the EOC MTC measurement.

The proposed change also includes the option to eliminate the EOC MTC measurement when the applicability requirements given in WCAP-16011-P-A are met and the result of the MTC determination performed prior to reaching a Rated Thermal Power equilibrium boron concentration of 800 ppm is within a tolerance of  $\pm 0.16 \times 10^{-4} \Delta k/k/^{\circ}F$  from the corresponding design value.

In evaluating the impact of test program changes (Section 4.2.2.5), WCAP-16011-P-A concludes that: "The impact of the change on the detection of MTC noncompliance is determined to be acceptable based on the evaluation performed in Section E.2.2.5 of Appendix E."

Section 5.2.1 of WCAP-16011-P-A presents final conclusions on acceptability of the STAR program for participating plants and states that: "The continued elimination of the MOC [middle of cycle] at power ITC measurement to verify EOC MTC Technical Specification compliance is acceptable for plants that have already eliminated this measurement in accordance with Reference 2 [Amendment 1 of CE NPSD 911-P-A]. For these plants it is acceptable to rely on the BOC MTC Surveillance test at power to determine if the criteria for eliminating the MOC MTC Surveillance test are satisfied. This is based on the conclusion in Appendix B that the ITC startup test data between different operating conditions is poolable."

In the SE for WCAP-16011-P-A, the NRC endorsed the above conclusions by stating: "The ITC poolability was extended to different core burnups to demonstrate that the data provided the same information for all of the core conditions examined. This justifies the elimination of the ITC measurements at MOC and EOC, which verify MTC compliance with the COLR and technical specification requirements. This supports the conclusion of CE NPSD-911-P-A in eliminating MOC and EOC measurements to validate technical specification requirements for MTC." The NRC further stated in the SE that: "The elimination of the middle-of-cycle (MOC) at power ITC measurement to verify end-of-cycle (EOC) MTC compliance with the technical specification is acceptable for plants that eliminated this measurement using the methodology

in Amendment 1 of TR CE-NPSD-911-P-A." The NRC approved the elimination of the EOC MTC determination for ANO-2 by letter dated November 16, 2001 (ANO-2 TS Amendment No. 236). The basis for the change was TR CE-NPSD-911-P-A, Amendment 1.

## 5.0 REGULATORY ANALYSIS

### 5.1 Applicable Regulatory Requirements/Criteria

The proposed changes have been evaluated to determine whether applicable regulations and requirements continue to be met. Entergy has determined that the proposed changes do not require any exemptions or relief from regulatory requirements, other than the Technical Specifications, and do not affect conformance with any General Design Criterion (GDC) differently than described in the Safety Analysis Report (SAR.)

### 5.2 No Significant Hazards Consideration

The proposed change will revise the Arkansas Nuclear One, Unit 2 (ANO-2) Technical Specification (TS) associated with the performance of the Moderator Temperature Coefficient (MTC) verification. The proposed change will allow the MTC verification that is performed after each refueling outage and prior to initial operation above 5 percent of Rated Thermal Power to consist of the adjustment of the predicted MTC for the measured reactor coolant system (RCS) boron concentration. This will only be allowed when Startup Test Activity Reduction (STAR) program applicability requirements, which are described in WCAP-16011-P-A, Revision 0, *Startup Test Activity Reduction Program*, are satisfied for the fuel cycle. The proposed change will also allow the elimination of the end of cycle (EOC) MTC measurement when the applicability requirements given in WCAP-16011-P-A are met and the result of the MTC determination performed prior to reaching a Rated Thermal Power equilibrium boron concentration of 800 ppm is within a tolerance of  $\pm 0.16 \times 10^{-4} \Delta k/k/^{\circ}F$  from the corresponding design value. The NRC's Safety Evaluation for WCAP-16011-P-A is dated January 14, 2005.

Entergy Operations, Inc. has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

The MTC is not an initiator of any previously evaluated accidents. As an input into accident analyses, the MTC is used to predict plant behavior in the event of an accident. It was demonstrated in WCAP-16011-P-A that the modified MTC verification (i.e., measured RCS boron concentration) is adequate to ensure that the MTC remains within the limits provided the STAR applicability requirements are met. It was also demonstrated in WCAP-16011-P-A that the elimination of the EOC MTC measurement is acceptable when the applicability requirements given in WCAP-16011-P-A are met and the result of the MTC determination performed prior to

reaching a Rated Thermal Power equilibrium boron concentration of 800 ppm is within a tolerance of  $\pm 0.16 \times 10^{-4} \Delta k/k/^{\circ}F$  from the corresponding design value.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

The proposed change does not involve a physical alteration to the plant (i.e., no new or different type of structure, system, or component will be installed). The methods governing normal plant operations are not altered by the proposed change.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

Response: No.

The proposed change will not affect the margin of safety. The MTC limits are unaffected and an acceptable method will be used to demonstrate that MTC is within its limits.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, Entergy concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

### 5.3 Environmental Considerations

The proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.



**Attachment 2**

**2CAN090503**

**Proposed Technical Specification Changes (mark-up)**

## REACTIVITY CONTROL SYSTEMS

### MODERATOR TEMPERATURE COEFFICIENT

#### LIMITING CONDITION FOR OPERATION

---

- 3.1.1.4 The moderator temperature coefficient (MTC) shall be within the limits specified in the CORE OPERATING LIMITS REPORT. The maximum upper design limit shall be:
- a. Less positive than  $+0.5 \times 10^{-4} \Delta k/k/^\circ F$  whenever THERMAL POWER is  $\leq 70\%$  of RATED THERMAL POWER, and
  - b. Less positive than  $0.0 \Delta k/k/^\circ F$  whenever THERMAL POWER is  $> 70\%$  of 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. (Note 1)
- 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. (Note 1)
  - 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. (Note 42)

---

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

# See Special Test Exception 3.10.2.

Note 1: For fuel cycles that meet the applicability requirements given in WCAP-16011-P-A, the verification prior to entering MODE 1 may be made using the predicted MTC as adjusted for the measured boron concentration.

Note 42: The MTC determination of surveillance 4.1.1.4.2.c is not required if the results of the tests required in surveillances 4.1.1.4.2.a and 4.1.1.4.2.b are within a tolerance of  $\pm 0.16 \times 10^{-4} \Delta k/k/^\circ F$  from the corresponding design values. For cycles that meet the applicability requirements given in WCAP-16011-P-A, the MTC determination of surveillance 4.1.1.4.2.c is not required if the result of the test required in surveillance 4.1.1.4.2.b is within a tolerance of  $\pm 0.16 \times 10^{-4} \Delta k/k/^\circ F$  from the corresponding design value.

**Attachment 3**

**2CAN090503**

**Changes to Technical Specification Bases Pages  
For Information Only**

## REACTIVITY CONTROL SYSTEMS

### BASES

---

#### 3/4.1.1.4 MODERATOR TEMPERATURE COEFFICIENT (MTC) (continued)

For fuel cycles that meet the applicability requirements of WCAP-16011-P-A, Revision 0, "Startup Test Activity Reduction Program," SR 4.1.1.4.2.a may be met prior to exceeding 5% of RATED THERMAL POWER after each fuel loading by confirmation that the predicted MTC, when adjusted for the measured RCS boron concentration, is within the MTC limits. WCAP-16011-P-A also provides the basis for using only the near 800 ppm surveillance test result to justify elimination of the near 300 ppm surveillance when applicability requirements are met. Performance of only one measurement at power is justified based on the WCAP-16011-P-A conclusion that ITC startup test data between different operating conditions is poolable.

The applicability requirements in WCAP-16011-P-A ensure core designs are not significantly different than those used to benchmark predictions and require that the measured RCS boron concentration meets specific test criteria. This provides assurance that the MTC obtained from the adjusted predicted MTC is accurate.

For fuel cycles that do not meet the applicability requirements in WCAP-16011-P-A, the verification of MTC required prior to entering MODE 1 after each fuel loading is performed by measurement of the isothermal temperature coefficient.

#### 3/4.1.1.5 MINIMUM TEMPERATURE FOR CRITICALITY

This specification ensures that the reactor will not be made critical with the Reactor Coolant System average temperature less than 525°F. This limitation is required to ensure 1) the moderator temperature coefficient is within its analyzed temperature range, 2) the protective instrumentation is within its normal operating range, 3) the pressurizer is capable of being in an OPERABLE status with a steam bubble, and 4) the reactor pressure vessel is above its minimum  $RT_{NDT}$  temperature.

**Attachment 4**

**2CAN090503**

**List of Regulatory Commitments**

### List of Regulatory Commitments

The following table identifies those actions committed to by Entergy in this document. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments.

COMMITMENT	TYPE (Check one)		SCHEDULED COMPLETION DATE (If Required)
	ONE- TIME ACTION	CONTINUING COMPLIANCE	
Entergy will include verification of the applicability requirements in appropriate site startup testing procedures. Entergy will include guidance in the procedures to ensure that the safety analysis and STAR applicability requirements are satisfied when STAR test results fall outside the test criteria. If the safety analysis or STAR applicability requirements are not satisfied, the STAR program for the affected fuel cycle will not be used.		X	
Entergy will submit a summary report following the first application of STAR at ANO-2 that will: (a) identify the core design method used, (b) compare the measured and calculated values and the differences between these values to the corresponding core design method uncertainties and (c) show compliance with the STAR applicability requirements. If the application of STAR is unsuccessful, Entergy will identify the reasons why the STAR application failed.	X		