

April 1, 2002

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: RELOCATION OF TECHNICAL SPECIFICATION ASSOCIATED WITH
THE 175 HOUR DELAY REQUIREMENT PRIOR TO MOVING A FULL CORE
OFFLOAD (TAC NO. MB3133)

Dear Mr. Anderson:

The Commission has issued the enclosed Amendment No. 240 to Facility Operating License No. NPF-6 for Arkansas Nuclear One, Unit No. 2 (ANO-2). This amendment consists of changes to the Technical Specifications (TSs) in response to your application dated October 2, 2001.

The amendment relocates the TS requirement that the reactor core be subcritical for a minimum of 175 hours prior to discharge of more than 70 assemblies to the spent fuel pool, to the technical requirements manual.

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 by R A Gramm for/

Michael K. Webb, Project Manager, Section 1
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-368

Enclosures:

1. Amendment No. 240 to NPF-6
2. Safety Evaluation

cc w/encls: See next page

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ENTERGY OPERATIONS, INC.

DOCKET NO. 50-368

ARKANSAS NUCLEAR ONE, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 240
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 October 2, 2001, 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. 240, 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

/RA/

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

Attachment: Changes to the Technical
Specifications

Date of Issuance: April 1, 2002

ATTACHMENT TO LICENSE AMENDMENT NO. 240

FACILITY OPERATING LICENSE NO. NPF-6

DOCKET NO. 50-368

Replace the following pages of the 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.

Remove

3/4 9-3
B 3/4 9-1

Insert

3/4 9-3
B 3/4 9-1

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 240 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 October 2, 2001, Entergy Operations, Inc. (the licensee), submitted a request for changes to the Arkansas Nuclear One, Unit No. 2 (ANO-2), Technical Specifications (TSs). The requested changes relocate the TS requirement that the reactor core be subcritical for a minimum of 175 hours prior to discharge of more than 70 assemblies to the spent fuel pool (SFP), to the Technical Requirements Manual (TRM).

2.0 BACKGROUND

Section 182a of the Atomic Energy Act of 1954, as amended, requires applicants for nuclear power plant operating licenses to include TSs as part of the license. The Nuclear Regulatory Commission's (NRC's) regulatory requirements related to the content of TSs are set forth in Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.36, which requires that the TSs include items in five specific categories, including (1) safety limits, limiting safety system settings and limiting control settings; (2) limiting conditions for operation (LCO); (3) surveillance requirements (SRs); (4) design features; and (5) administrative controls.

System design parameters, components or systems, which meet the following four criteria described in 10 CFR 50.36(c)(2)(ii), are required to specify the LCOs in the TSs:

- Criterion 1. Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of reactor coolant pressure boundary;
- Criterion 2. A process variable, design feature, or operating restriction that is an initial condition of a design-basis accident (DBA) or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier;
- Criterion 3. A structure, system, or component (SSC) that is part of the primary success path and which functions or actuates to mitigate a DBA or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier; or

Criterion 4. An SSC which operating experience or probabilistic risk assessment has shown to be significant to public health and safety.

Therefore, existing TS LCOs and related SRs that fall within or satisfy any of these criteria must be retained in the TSs, while those TS requirements that do not fall within or satisfy these criteria may be located to licensee controlled documents.

3.0 DISCUSSION

The amendment proposes to relocate TS Section 3.9.3.b, LCO and its associated Action Statement; SR Section 4.9.3.b; and their associated Bases Section 3/4.9.3, to the administratively controlled plant TRM. These TSs and SRs require that, in the event of a complete core offload, a full core (177 fuel assemblies) to be discharged shall be subcritical for a minimum of 175 hours prior to discharge of more than 70 assemblies to the SFP.

The SFP at ANO-2 was initially designed to store 485 spent fuel assemblies (SFAs) and subsequently expanded to store 988 SFAs. The SFP cooling system, which primarily consists of two pumps and one heat exchanger cooled by the service water, was designed to maintain the SFP water temperature at or below 150 °F. This SFP water temperature assumes the maximum heat load associated with a full-core offload, a design service water inlet temperature of 85 °F, and fuel assemblies in-reactor vessel decay time (time after reactor shutdown and prior to movement of fuel assemblies in the reactor vessel) of 100 hours¹.

In 1983, the licensee re-racked the ANO-2 SFP with new high density storage racks² which increased the ANO-2 SFP storage capacity from 485 SFAs to 988 SFAs. As a result of the increase in SFAs to be stored in the SFP, the decay heat load in the SFP would increase. The licensee performed SFP thermal-hydraulic analysis to reflect the increase in decay heat load, using the decay heat load associated with a full core-offload and the design service water inlet temperature of 85 °F. Results of the analysis showed that, in order to maintain the SFP water at or below the temperature limit of 150 °F, fuel assemblies must be held in the reactor vessel for a minimum duration of 175 hours after reactor shutdown and prior to being discharged to the SFP.

Consequently, in addition to TS Section 3.9.3.a, the licensee added TS Section 3.9.3.b, SR Section 4.9.3.b, and Bases Section 3/4.9.3, to the ANO-2 TSs to require that the reactor must be subcritical for at least 175 hours prior to a full core to be discharged to the SFP. This fuel assemblies in-reactor vessel decay duration of 175 hours will ensure that the time has elapsed

¹ TS 3.9.3.a states: "The reactor shall be subcritical for at least 100 hours. With the reactor subcritical for less than 100 hours, suspend all operations involving movement of irradiated fuel in the reactor pressure vessel." The 100-hour decay time is assumed in the radiological consequences analysis of a fuel handling accident.

² The SFP re-rack application was approved by the NRC staff per Amendment No. 43 (dated April 15, 1983) to Facility Operating License NPF-6 for ANO-2.

such that the heat generated by the SFAs in the SFP will not exceed the heat removal capability of the SFP cooling system.

In June 2001, the NRC staff issued NUREG-1432, Revision 2 (Standard Technical Specifications for CE Plants) which does not require this "fuel assemblies in-reactor vessel decay time" to be included in the TS regarding SFP cooling. To be consistent with NUREG-1432, the licensee proposed to relocate the TS Section 3.9.3.b, SR Section 4.9.3.b and Bases Section 3/4.9.3 to the plant TRM.

The proposed relocation of these TSs, SRs, and Bases Sections to the plant TRM will allow the licensee to adjust the "fuel assemblies in-reactor vessel decay time" resulting from cycle specific thermal-hydraulic analyses based on the (as is)³ service water temperature and, thus, will provide the licensee with more flexibility during future outages. The licensee stated that, following this TS relocation, any future changes to TRM 3.9.3.b will be assessed under the guidance of 10 CFR 50.59. The ANO 50.59 process will provide an evaluation to ensure that the heat load transferred will be within the cooling capacity of the SFP cooling system. This will also eliminate the unnecessary burden on the licensee and the NRC staff associated with future revisions to the fuel assemblies in-reactor vessel decay time and spent fuel storage specification.

4.0 EVALUATION

With regard to requests for relocating existing plant TS sections and SR sections to plant TRMs, the NRC staff's position is that existing TS sections and SR sections that fall within or satisfy any of the criteria discussed in Section 2.0 must be retained in the TSs, while those TS sections and SR sections that do not fall within or satisfy these criteria may be relocated to the licensee's administratively controlled documents, such as plant TRMs.

The following are the NRC staff's findings after having reviewed the licensee's proposal against each of the criteria discussed in Section 2.0:

1. Movement of fuel into the SFP does not involve a reactor coolant pressure boundary or control room instrumentation that is used to detect a significant abnormal degradation of the reactor pressure boundary. Therefore, TS 3.9.3.b does not fall within or satisfy the above Criterion 1.
2. A potential fuel handling accident is considered during movement of fuel into the SFP. However, with regard to the concern of radiological consequences resulting from a fuel handling accident, TS 3.9.3.a prohibits the movement of fuel until 100 hours of decay time has elapsed for the fuel assemblies in the reactor vessel. The radiological consequences analysis does not assume any further delay in fuel movement following the initial 100-hour decay period. Relocation of TS 3.9.3.b (which is established only to ensure that the heat generated by the SFAs stored in the SFP will not exceed the heat removal capability of the SFP cooling system) to the plant TRM will have no impact on the fuel handling accident radiological consequences analysis. Therefore, TS 3.9.3.b is not required to meet the above Criterion 2.

³ Refueling at ANO-2 is typically scheduled during the cooler months of the year.

3. TS 3.9.3.b specifies the minimum time required for the reactor to be subcritical prior to any fuel assemblies discharged from the reactor vessel to the SFP. The time specified is only to ensure that sufficient time has elapsed such that the decay heat generated from the SFAs will not exceed the cooling capacity of the SFP system. TS 3.9.3.b does not provide or affect a primary success path to mitigate a DBA or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. Therefore, TS 3.9.3.b does not satisfy the requirements as described in Criterion 3 above.
4. TS 3.9.3.a continues to restrict fuel handling operations until 100 hours of decay time have elapsed from time of shutdown. No change is proposed to this specification. This time will ensure that, if an accident were to occur, any offsite release would remain well below the 10 CFR 100 limits. Public health and safety is not affected by the timing of the fuel movement after 100-hour decay time has elapsed. The timing of the heat load associated with a full core-offload, currently specified in TS 3.9.3.b, has not been shown to be significant to public health and safety. Also, relocating TS 3.9.3.b to the plant TRM does not change the design aspects and operations of the SFP cooling system. Therefore, TS 3.9.3.b does not satisfy the above Criterion 4.

In addition, the heat removal capability of the SFP cooling system is dependent on the service water temperature, which varies throughout the year, and the decay heat load is a function of the "fuel assemblies in-reactor vessel decay time" prior to being discharged from the reactor. For actual shutdowns, offload can start prior to 175 hours and the SFP water temperature still can be maintained below 150 °F. The licensee stated that a cycle-specific analysis will be performed to determine the fuel assemblies in-reactor vessel decay time for core offload based on the actual service water temperature.

During the review of SFP re-rack application requests for other plants (e.g., Nine Mile Point Unit 1, Millstone Nuclear Power Station, Unit 3, etc.), the NRC staff accepted licensees' approaches to perform cycle-specific SFP thermal-hydraulic evaluations prior to planned or unplanned core offload outages using the expected/actual conditions at the time of the core offloads (typically performed in the late fall, winter or early spring, when heat sink temperatures for SFP cooling systems are usually below the design temperatures). The fuel assemblies in-reactor vessel decay time for core offload can be adjusted accordingly, as long as it is not shorter than what is assumed for the radiological consequences analysis of a fuel handling accident.

The ANO-2 Safety Analysis Report (SAR), Section 13.8.2, states that the TRM is administered as part of the SAR, changes to the TRM are subject to the criteria of 10 CFR 50.59, and administrative controls for processing TRM changes are included in the site procedure. Therefore, the NRC staff finds that sufficient regulatory controls exist for the TRM.

Evaluation Summary

Based on its review of the licensee's rationale, the evaluation discussed above, and that the licensee has provisions in the administratively controlled plant operating procedures to require that a cycle-specific SFP thermal-hydraulic evaluation be performed prior to core offload, the NRC staff finds that the licensee's proposal to relocate TS Section 3.9.3.b, SR 4.9.3.b, and its associated Bases Section 3/4.9.3 to the TRM, is acceptable.

5.0 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.

6.0 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 a surveillance requirement. 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 (66 FR 55016, dated October 31, 2001). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9) and (c)(10). 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.

7.0 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: D. Shum

Date: April 1, 2002

Arkansas Nuclear One

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