

December 5, 1990

Docket No. 50-313

Mr. Neil S. Carns  
Vice President, Operations ANO  
Entergy Operations, Inc.  
Route 3 Box 137G  
Russellville, Arkansas 72801

Dear Mr. Carns:

SUBJECT: ISSUANCE OF AMENDMENT NO. 141 TO FACILITY OPERATING LICENSE  
NO. DPR-51 - ARKANSAS NUCLEAR ONE, UNIT NO. 1 (TAC NO. 79016)

The Commission has issued the enclosed Amendment No. 141 to Facility Operating License No. DPR-51 for the Arkansas Nuclear One, Unit No. 1 (ANO-1). This amendment consists of changes to the Technical Specifications (TSs) in response to your application dated November 14, 1990, as supplemented by letter dated November 29, 1990.

The amendment revises TS 5.3.1.1 regarding the composition of fuel assemblies, and allows the use of a stainless steel rod in place of a fuel rod.

Your letter dated November 14, 1990, requested that this amendment be treated as an emergency because insufficient time exists for the Commission's usual 30-day notice without preventing a normal ascension to power up to the plant's licensed power level.

A copy of our related Safety Evaluation is also enclosed. A Notice of Issuance and Final Determination of No Significant Hazards Consideration and Opportunity for Hearing will be included in the Commission's next biweekly Federal Register notice.

Sincerely,  
*/s/*

Thomas W. Alexion, Project Manager  
Project Directorate IV-1  
Division of Reactor Projects III, IV, and V  
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 141 to DPR-51
2. Safety Evaluation

cc w/enclosures:  
See next page

DISTRIBUTION

Docket File	NRC/Local PDR	PD4-1 Reading	OGC(MS15B18)
M. Virgilio	L. Berry	T. Alexion (2)	GPA/PA(MS2G5)
D. Hagan(MS3206)	G. Hill(4)	Wanda Jones(MS7103)	
J. Calvo(MS11F22)	PD4-1 Plant File	ACRS(10) (MSP315)	
ARM/LFMB(MS4503)	T. Westerman,RIV	T. Quay	

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OFC	:PD4-1/LA	:PD4-1/PM	:OGC	:PD4-1/D	: AD:DRP345	: D:DRP 345
NAME	:LBerry	:TAlexion	:MVirgilio	:TQuay	:MVirgilio	:BBoger
DATE	:11/29/90	:11/29/90	:12/3/90	:12/4/90	:12/4/90	:12/5/90



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

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Sincerely,

A handwritten signature in cursive script that reads "Thomas W. Alexion".

Thomas W. Alexion, Project Manager  
Project Directorate IV-1  
Division of Reactor Projects III, IV, and V  
Office of Nuclear Reactor Regulation

Enclosures:

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2. Safety Evaluation

cc w/enclosures:  
See next page

Mr. Neil S. Carns  
Entergy Operations, Inc.

Arkansas Nuclear One, Unit 1

cc:

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County Judge of Pope County  
Pope County Courthouse  
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Ms. Greta Dicus, Director  
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Little Rock, Arkansas 72201



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

ENERGY OPERATIONS INC.

DOCKET NO. 50-313

ARKANSAS NUCLEAR ONE, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 141  
License No. DPR-51

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Entergy Operations, Inc. (the licensee) dated November 14, 1990, as supplemented by letter dated November 29, 1990, 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.

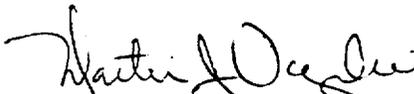
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and Paragraph 2.c.(2) of Facility Operating License No. DPR-51 is hereby amended to read as follows:

2. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 141, 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.

FOR THE NUCLEAR REGULATORY COMMISSION



Martin J. Virgilio, Assistant Director  
for Regions IV and V Reactors  
Division of Reactor Projects III, IV, and V  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: December 5, 1990

ATTACHMENT TO LICENSE AMENDMENT NO. 141

FACILITY OPERATING LICENSE NO. DPR-51

DOCKET NO. 50-313

Revise the following page of the Appendix "A" Technical Specifications with the attached page. The revised page is identified by Amendment number and contains a vertical line indicating the area of change.

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114

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## 5.3 REACTOR

### Specification

#### 5.3.1 Reactor Core

- 5.3.1.1 The reactor core contains approximately 93 metric tons of slightly enriched uranium dioxide pellets. The pellets are encapsulated in Zircaloy-4 tubing to form fuel rods. The reactor core is made up of 177 fuel assemblies. Each fuel assembly is fabricated with 208 fuel rods. (1,2) Starting with Batch 11, a reconstitutable fuel assembly design is implemented. This design allows the replacement of up to 208 fuel rods in the assembly. For Cycle 10 operation only, fuel assembly NJ0539 will contain one stainless steel filler rod in place of one fuel rod.
- 5.3.1.2 The reactor core approximates a right circular cylinder with an equivalent diameter of 128.9 inches and an active height of 144 inches. The active fuel length is approximately 142 inches.(2)
- 5.3.1.3 The average enrichment of the initial core is a nominal 2.62 weight percent of 235U. Three fuel enrichments are used in the initial core. The highest enrichment is less than 3.5 weight percent 235U.
- 5.3.1.4 There are 60 full-length control rod assemblies (CRA) and 8 axial power shaping rod assemblies (APSRA) distributed in the reactor core as shown in FSAR Figure 3-60. The full-length CRA contain a 134-inch length of silver-indium-cadmium alloy clad with stainless steel. Each APSRA contains a 63-inch length of Inconel-600 alloy.(3)
- 5.3.1.5 The initial core has 68 burnable poison spider assemblies with similar dimensions as the full-length control rods. The cladding is Zircaloy-4 filled with alumina-boron and placed in the core as shown in FSAR Figure 3-2.
- 5.3.1.6 Reload fuel assemblies and rods shall conform to the design and evaluation described in FSAR and shall not exceed an enrichment of 3.5 percent of 235U.

#### 5.3.2 Reactor Coolant System

- 5.3.2.1 The reactor coolant system is designed and constructed in accordance with code requirements.(4)



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 141 TO

FACILITY OPERATING LICENSE NO. DPR-51

ENERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNIT NO. 1

DOCKET NO. 50-313

INTRODUCTION

By letter dated November 14, 1990, as supplemented November 29, 1990, Entergy Operations, Inc. (the licensee) requested an amendment to the Technical Specifications (TSs) appended to Facility Operating License No. DPR-51 for Arkansas Nuclear One, Unit No. 1 (ANO-1). The proposed amendment would revise TS 5.3.1.1 regarding the composition of fuel assemblies to allow the use of a stainless steel rod in place of a fuel rod. The November 29, 1990 supplement provided additional information in response to questions from the NRC staff.

DISCUSSION

During the end of Cycle 9 inspections of fuel assemblies at ANO-1, a leaking fuel rod was identified. The licensee desires to replace this rod with a stainless steel rod using the recaging process. The current ANO-1 TS 5.3.1.1 covering fuel assemblies in the reactor core does not allow the replacement of a fuel rod with anything other than another fuel rod. Therefore, by letter 1CAN119005 to the NRC dated November 14, 1990, the licensee proposed a change to TS 5.3.1.1 allowing the replacement, for Cycle 10 operation only, of one fuel rod in recaged assembly NJ0539 with one stainless steel filler rod.

In response to the NRC staff's request, additional information describing the proposed core location of the recaged assembly, the minimum thermal margin available, compared to that of the limiting assembly, and the various factors which the licensee will evaluate to justify that existing safety criteria and design limits will be met, was submitted to the NRC by letter 1CAN119015 dated November 29, 1990. The November 29, 1990 letter further indicated that the recaging process will also result in the change of assembly grids from Inconel to Zircaloy.

EVALUATION

The replacement of damaged fuel rods with non-fuel stainless steel rods has been previously implemented at other facilities. It is considered acceptable provided the substitutions are limited to those fuel designs that have been analyzed with applicable NRC staff approved codes and methods and shown by tests or analyses to comply with all fuel safety design bases.

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The licensee has evaluated the effects of the stainless steel rod and the change from Inconel grids to Zircaloy grids on the assembly and the Cycle 10 core. This evaluation addressed the effect of the actual recaging on core performance parameters such as reactivity, power peaking, margin to departure from nuclear boiling (DNB) for the surrounding fuel rods, and mechanical design to show that existing safety criteria and design limits will still be met. The licensee has stated that the thermal-hydraulic analysis of the proposed fuel configuration is supported by test data which includes 5x5 rod bundles with both heated and unheated center rods.

Based on this, the staff concurs that the use of the BWC CHF correlation is applicable to the recaged assembly. Although the DNB margin calculations for Cycle 10 are still in progress, the recaged assembly will be inserted into a non-limiting core location with an estimated 20% of margin compared to the limiting fuel assembly. The staff considers this margin to be sufficient. The mechanical design of the recaged assembly with Zircaloy Spacer grids is identical to the Mark BZ fuel assemblies which have been previously approved and already reside in the core. The staff's approval of co-resident Mark BZ fuel included consideration of the effects of combined seismic and LOCA loads which enveloped the ANO-1 plant design requirements. Based on the information supplied by the licensee and our approval of the evaluation methods and acceptance criterion for the analyses being performed prior to startup of the Cycle 10 core, the staff approves the proposed revision to TS 5.3.1.1. Further, based on the information provided in the November 14 and 29, 1990 letters, the staff finds that the proposed change to page 115 regarding Note 1 is unnecessary.

#### EMERGENCY CIRCUMSTANCES

In its letter dated November 14, 1990, the licensee requested that this amendment application be treated as an emergency because unless approved, the TS would not allow the replacement of a fuel rod with a stainless steel rod. Consequently, reactor startup would be prohibited. Reactor startup is scheduled for early December 1990.

In accordance with 10 CFR 50.91(a)(5), the licensee has explained that this emergency situation occurred due to the vague wording contained in TS 5.3.1.1 and current NRC guidelines and interpretation in this area.

The NRC staff agrees that the current wording in TS 5.3.1.1 is vague. Although the current TS says that each fuel assembly is fabricated with 208 fuel rods, it goes on to say that starting with Batch 11, a reconstitutable fuel assembly design is implemented. Unfortunately, the TS does not also define a reconstitutable fuel assembly, nor does it discuss the composition of a reconstitutable fuel assembly.

Regarding the timeliness of the licensee's submittal, the NRC staff began focusing on the issue of fuel reconstitution at ANO-1 with respect to TS 5.3.1.1 in early November 1990. On November 8, 1990, after substantial internal discussion, the NRC staff contacted the licensee and informed them that a license amendment request was needed. On November 14, 1990, the

licensee submitted the amendment request. Considering the vague wording in this TS as discussed above, and the recent (November 8, 1990) NRC interpretation of this TS as it applies to fuel reconstitution, the NRC staff finds that the licensee made a timely application for the requested amendment. In addition, failure to act promptly on the amendment would result in preventing a resumption of plant operation. Accordingly, pursuant to 10 CFR 50.91(a)(5) the Commission has determined that there are emergency circumstances warranting prompt approval by the Commission.

#### FINAL NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

The Commission's regulations in 10 CFR 50.92 state that the Commission may make a final determination that a license amendment involves no significant hazards considerations, if operation to that facility, in accordance with the amendment would not:

- (1) Involve a significant increase in the probability or consequences of any accident previously evaluated; or
- (2) Create the possibility of a new or different kind of accident from any accident previously evaluated; or
- (3) Involve a significant reduction in a margin of safety.

This amendment has been evaluated against the standards in 10 CFR 50.92. It does not involve a significant hazards consideration because the changes would not:

1. Involve a significant increase in the probability or consequences of an accident previously evaluated. The change involves replacement of one fuel rod with one stainless steel rod. The effect of this change has been evaluated with respect to reactivity, power peaking, thermal-hydraulic design and mechanical design, to show that existing safety criteria and design limits are met. Further, the evaluation methodology and acceptance criterion used are acceptable to the staff. Therefore, this change does not involve an increase in the probability or consequences of an accident previously evaluated.
2. Create the possibility of a new or different accident from any previously evaluated. This change does not affect functions of systems or setpoints. It does not result in any significant changes to the operation of the unit (there will be 36,815 fuel rods instead of 36,816). Therefore, this proposed change will not create the possibility of a new or different kind of accident from any previously evaluated.

3. Involve a significant reduction in a margin of safety. The recaged assembly will be inserted into a non-limiting core location with an estimated 20% of margin between its maximum pin power peak and that of the limiting fuel assembly. The mechanical design of the recaged assembly is identical to other fuel assemblies which already reside in the core and have been previously approved by the staff. Therefore, the margin of safety will not be reduced.

Accordingly, the Commission has determined that this amendment involves no significant hazards consideration.

#### STATE CONSULTATION

In accordance with the Commission's regulations, efforts were made to contact the Arkansas State representative. The state representative was contacted and had no comments.

#### ENVIRONMENTAL CONSIDERATION

The amendment involves a change in a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes in surveillance requirements. 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 exposures. The Commission has made a final no significant hazards consideration finding with respect to this amendment. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR Section 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.

#### CONCLUSION

The staff 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, 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.

Date: December 5, 1990

Principal Contributor: L. Kopp, Reactor Systems Branch