

April 14, 1992

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. 159 TO FACILITY OPERATING LICENSE  
NO. DPR-51 - ARKANSAS NUCLEAR ONE, UNIT NO. 1 (TAC NO. M82123)

The Commission has issued the enclosed Amendment No. 159 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 7, 1991, as supplemented March 19, 1992.

The amendment applies the guidance of Generic Letter 88-16, "Removal of Cycle-Specific Parameter Limits from Technical Specifications," to remove the ANO-1 cycle-specific variables from the TS and control them under a new document called the ANO-1 Core Operating Limits Report.

A copy of our related Safety Evaluation is also enclosed. A Notice of Issuance will be included in the Commission's next biweekly Federal Register notice.

Sincerely,

Original signed by:

Sheri R. Peterson, Project Manager  
Project Directorate IV-1  
Division of Reactor Projects III/IV/V  
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 159 to DPR-51
2. Safety Evaluation

cc w/enclosures:  
See next page

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C. Grimes(MS11E22)	PD4-1 Plant File	ACRS(10) (MSP315)	
OC/LFMB(MS4503)	T. Westerman,RIV	J. Larkins	

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NAME	<i>[Signature]</i>	SPeterson	A. Gettemer	JLarkins
DATE	3/21/92	3/30/92	4/2/92	4/14/92

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

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A copy of our related Safety Evaluation is also enclosed. A Notice of Issuance will be included in the Commission's next biweekly Federal Register notice.

Sincerely,

A handwritten signature in cursive script that reads "Sheri R. Peterson".

Sheri R. Peterson, Project Manager  
Project Directorate IV-1  
Division of Reactor Projects III/IV/V  
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 159 to DPR-51
2. Safety Evaluation

cc w/enclosures:  
See next page

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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. 159  
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 7, 1991, as supplemented March 19, 1992, 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.

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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. 159, 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



John T. Larkins, Director  
Project Directorate IV-1  
Division of Reactor Projects III/IV/V  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: April 14, 1992

ATTACHMENT TO LICENSE AMENDMENT NO. 159

FACILITY OPERATING LICENSE NO. DPR-51

DOCKET NO. 50-313

Revise the following pages of the Appendix "A" Technical Specifications with the attached pages. The revised pages are identified by Amendment number and contain vertical lines indicating the area of change.

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1.10.8 Member(s) of the Public

Member(s) of the Public shall include all persons who are not occupationally associated with the plant. This category does not include employees of the utility, its contractors or vendors. Also excluded from this category are persons who enter the site to service equipment or to make deliveries. This category does include persons who use portions of the site for recreational, occupational or other purposes not associated with the plant.

1.10.9 Exclusion Area

The exclusion area is that area surrounding ANO within a minimum radius of .65 miles of the reactor buildings and controlled to the extent necessary by the licensee for purposes of protection of individuals from exposure to radiation and radioactive materials.

1.10.10 Unrestricted Area

An unrestricted area shall be any area beyond the exclusion area boundary.

1.11 CORE OPERATING LIMITS REPORT

The CORE OPERATING LIMITS REPORT is the ANO-1 specific document that provides core operating limits for the current operating reload cycle. These cycle-specific core operating limits shall be determined for each reload cycle in accordance with Technical Specification 6.12.3. Plant operation within these operating limits is addressed in individual specifications.

6. If a control rod in the regulating or axial power shaping groups is declared inoperable per Specification 4.7.1.2 operation above 60 percent of the thermal power allowable for the reactor coolant pump combination may continue provided the rods in the group are positioned such that the rod that was declared inoperable is contained within allowable group average position limits of Specification 4.7.1.2 and the withdrawal limits of Specification 3.5.2.5.3.

3.5.2.3 The worth of single inserted control rods during criticality are limited by the restrictions of Specification 3.1.3.5 and the Control Rod Position Limits defined in Specification 3.5.2.5.

3.5.2.4 Quadrant Power Tilt:

1. Except for physics tests, if quadrant power tilt exceeds the tilt limit set in the CORE OPERATING LIMITS REPORT, reduce power so as not to exceed the allowable power level for the existing reactor coolant pump combination less at least 2% for each 1% tilt in excess of the tilt limit.
2. Within a period of 4 hours, the quadrant power tilt shall be reduced to less than the tilt limit except for physics tests, or the following adjustments in setpoints and limits shall be made:
  - a. The protection system maximum allowable setpoints (Figure 2.3-2) shall be reduced 2% in power for each 1% tilt in excess of the tilt limit.
  - b. The control rod group and APSR withdrawal limits shall be reduced 2% in power for each 1% tilt in excess of the tilt limit.
  - c. The reactor power imbalance setpoints shall be reduced 2% in power for each 1% tilt in excess of the tilt limit.
3. If quadrant power tilt is in excess of 25%, except for physics tests or diagnostic testing, the reactor will be placed in the hot shutdown condition. Diagnostic testing during power operation with a quadrant power tilt is permitted provided the thermal power allowable for the reactor coolant pump combination is restricted as stated in 3.5.2.4.1 above.
4. Quadrant power tilt shall be monitored on a minimum frequency of once every two hours during power operation above 15% of rated power.

3. Except for physics tests or exercising control rods, the control rod position setpoints are specified in the CORE OPERATING LIMITS REPORT for 4, 3, and 2 pump operation. If the applicable control rod position setpoints are exceeded, corrective measures shall be taken immediately to achieve an acceptable control rod position. Acceptable control rod positions shall be attained within 4 hours.
4. Except for physics tests or exercising axial power shaping rods (APSRs), the limits for APSR position are specified in the CORE OPERATING LIMITS REPORT.

With the APSRs outside the specified limit provided in the CORE OPERATING LIMITS REPORT, corrective measures shall be taken immediately to achieve the correct position. Acceptable APSR positions shall be attained within 4 hours.

#### 3.5.2.6 Reactor Power Imbalance:

1. Reactor power imbalance shall be monitored on a frequency not to exceed 2 hours during power operation above 40% rated power.
2. Except for physics tests, reactor power imbalance shall be maintained within the envelope defined by the CORE OPERATING LIMITS REPORT.
3. If the reactor power imbalance is not within the envelope defined by the CORE OPERATING LIMITS REPORT, corrective measures shall be taken to achieve an acceptable reactor power imbalance.
4. If an acceptable reactor power imbalance is not achieved within 4 hours, reactor power shall be reduced until reactor power imbalance setpoints are met.

3.5.2.7 The control rod drive patch panels shall be locked at all times with limited access to be authorized by the Superintendent.

#### Bases

The reactor power imbalance envelope defined in the CORE OPERATING LIMITS REPORT is based on LOCA analyses which have defined the maximum linear heat rate (see CORE OPERATING LIMITS REPORT), such that the maximum cladding temperature will not exceed the Final Acceptance Criteria. Corrective measures will be taken immediately should the indicated quadrant power tilt, control rod position, or reactor power imbalance be outside their specified boundaries. Operation in a situation that would cause the Final Acceptance Criteria to be approached should a LOCA occur is highly improbable because all of the power distribution parameters (quadrant power tilt, rod position, and reactor power imbalance) must be at their limits while

The quadrant power tilt limits set forth in the CORE OPERATING LIMITS REPORT have been established within the thermal analysis design base using the definition of quadrant power tilt given in Technical Specifications, Section 1.6. These limits in conjunction with the control rod position setpoints in the CORE OPERATING LIMITS REPORT, ensure that design peak heat rate criteria are not exceeded during normal operation when including the effects of potential fuel densification.

The quadrant power tilt limits and reactor power imbalance setpoints in the CORE OPERATING LIMITS REPORT, apply when using the plant computer to monitor the limits. The 2-hour frequency for monitoring these quantities will provide adequate surveillance when the computer is out of service. Additional uncertainty is applied to the limits when other monitoring methods are used.

During the physics testing program, the high flux trip setpoints are administratively set as follows to ensure that an additional safety margin is provided:

<u>Test Power</u>	<u>Trip Setpoint, %</u>
0	<5
15	50
40	50
50	60
75	85
>75	105.5

#### REFERENCES

- (1) FSAR, Section 3.2.2.1.2
- (2) FSAR, Section 14.2.2.2

6.12.3 CORE OPERATING LIMITS REPORT

6.12.3.1 The core operating limits shall be established and documented in the CORE OPERATING LIMITS REPORT prior to each reload cycle or prior to any remaining part of a reload cycle.

6.12.3.2 The analytical methods used to determine the core operating limits addressed by the individual Technical Specification shall be those previously reviewed and approved by the NRC for use at ANO-1, specifically:

1. Babcock & Wilcox Topical Report BAW-10122A Rev. 1, "Normal Operating Controls," May 1984.
2. Babcock & Wilcox Topical Report BAW-10116-A "Assembly Calculations and Fitted Nuclear Data," May 1977.
3. Babcock & Wilcox Topical Report BAW-10117P-A, "Babcock & Wilcox Version of PDQ User's Manual," January 1977.
4. Babcock & Wilcox Topical Report BAW-10118A, "Core Calculational Techniques and Procedures," December 1979.
5. Babcock & Wilcox Topical Report BAW-10124A, "FLAME 3-A Three-Dimensional Nodal Code for Calculating Core Reactivity and Power Distributions," August 1976.
6. Babcock & Wilcox Topical Report BAW-10125A, "Verification of Three-Dimensional FLAME Code," August 1976.
7. Babcock & Wilcox Topical Report BAW-10119P-A, "Power Peaking Nuclear Reliability Factors," February 1979.
8. Babcock & Wilcox, Topical Report BAW-10103A, Rev. 3, "ECCS Analysis of B&W's 177-FA Lowered Loop NSS," July 1977.
9. Babcock & Wilcox, Topical Report BAW-10162P-A, "TAC03 Fuel Pin Thermal Analysis Computer Code," November 1989.
10. Babcock & Wilcox, Report BAW-1915PA, "Bounding Analytical Assessment of NUREG-0630 Models on LOCA kW/ft Limits With Use of FLECSET," November 1988.
11. Babcock & Wilcox, Topical Report BAW-10104PA Revision 5, "B&W ECCS Evaluation Model," November 1988.

6.12.3.3 The core operating limits shall be determined so that all applicable limits (e.g. fuel thermal-mechanical limits, core thermal-hydraulic limits, ECCS limits, nuclear limits such as shutdown margin, and transient and accident analysis limits) of the safety analysis are met.

6.12.3.4 The CORE OPERATING LIMITS REPORT, including any mid-cycle revisions or supplements thereto, shall be provided upon issuance for each reload cycle to the NRC Document Control Desk with copies to the Regional Administrator and Resident Inspector.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 159 TO

FACILITY OPERATING LICENSE NO. DPR-51

ENTERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNIT NO. 1

DOCKET NO. 50-313

1.0 INTRODUCTION

By letter dated November 7, 1991, as supplemented March 19, 1992, Entergy Operations, Inc. (the licensee) proposed changes to Technical Specifications (TS) for Arkansas Nuclear One, Unit No. 1 (ANO-1). The changes would revise specifications that have cycle-specific parameter limits, removing the values of those limits and referencing the Core Operating Limits Report (COLR) for the values of those limits. The proposed changes also include the addition of the COLR to the Definitions section and to the reporting requirements of the Administrative Controls section of the TS. Guidance on the proposed changes was developed by NRC and provided to all power reactor licensees and applicants by Generic Letter (GL) 88-16, "Removal of Cycle-Specific Parameter Limits from Technical Specifications," dated October 4, 1988.

2.0 EVALUATION

The proposed changes to the TS are in accordance with the guidance provided by GL 88-16 and are addressed below.

- (1) The Definition section of the TS was modified to include a definition of the COLR that requires cycle/reload-specific parameter limits to be established on a unit-specific basis in accordance with NRC-approved methodologies that maintain the limits of the safety analysis. The definition notes that plant operation within these limits is addressed by individual specifications.
- (2) The following specifications were revised to replace the values of cycle-specific parameter limits with a reference to the COLR that provides these limits:

(a) Specification 3.5.2.4.1

The quadrant power tilt limit for this specification is specified in the COLR.

(b) Specification 3.5.2.5.3

The control rod position limits for operation with 4, 3, and 2 pumps are specified in the COLR for this specification.

(c) Specification 3.5.2.5.4

The axial power shaping rods (APSRs) position limit for this specification is specified in the COLR .

(d) Specifications 3.5.2.6.2 and 3.5.2.6.3

The reactor power imbalance limit for these specifications is specified in the COLR.

The bases of these specifications have been revised by the licensee to include appropriate references to the COLR. In particular, the maximum linear heat rate defined by the LOCA analyses to support the analysis for the reactor power imbalance limit is specified in the COLR. Based on its review, the staff concludes that the changes to the bases are acceptable.

- (3) Specification 6.12.3 is revised to include the COLR under the reporting requirements of the Administrative Controls section of the TS. This specification requires that the COLR be submitted, upon issuance, to the NRC Document Control Desk with copies to the Regional Administrator and Resident Inspector. The report provides the values of cycle-specific parameter limits that are applicable for the current fuel cycle. Furthermore, this specification requires that NRC-approved methodologies be used in establishing the values of these limits for the relevant specifications and that the values be consistent with all applicable limits of the safety analysis. The approved methodologies are the following:

- (a) Babcock & Wilcox, Topical Report BAW-10122A, Rev. 1, "Normal Operating Controls," May 1984.
- (b) Babcock & Wilcox, Topical Report BAW-10116-A, "Assembly Calculations and Fitted Nuclear Data," May 1977.
- (c) Babcock & Wilcox, Topical Report BAW-10117P-A, "Babcock & Wilcox Version of PDQ User's Manual," January 1977.
- (d) Babcock & Wilcox, Topical Report BAW-10118A, "Core Computational Techniques and Procedures," December 1979.
- (e) Babcock & Wilcox, Topical Report BAW-10124A, "FLAME 3 - A Three-Dimensional Nodal Code for Calculating Core Reactivity and Power Distributions," August 1976.

- (f) Babcock & Wilcox, Topical Report BAW-10125A, "Verification of Three-Dimensional FLAME Code," August 1976.
- (g) Babcock & Wilcox, Topical Report BAW-10119P-A, "Power Peaking Nuclear Reliability Factors," February 1979.

[Methodology for Specifications:

3.5.2.4 (Quadrant Tilt)

3.5.2.5 (Control Rod Positions)

3.5.2.6 (Reactor Power Imbalance)

Note: Specification 3.5.2.5 is applicable to regulating rod positions and APSR positions. Applies to References a-g.]

- (h) Babcock & Wilcox, Topical Report BAW-10103A, Rev. 3, "ECCS Analysis of B&W's 177-FA Lowered Loop NSS," July 1977.
- (i) Babcock & Wilcox, Topical Report BAW-10162P-A, "TACO3 Fuel Pin Thermal Analysis Computer Code," November 1989.
- (j) Babcock & Wilcox, Topical Report BAW-1915PA, "Bounding Analytical Assessment of NUREG-0630 Models on LOCA kW/ft Limits With Use of FLECSET," November 1988.
- (k) Babcock & Wilcox, Topical Report BAW-10104PA, Rev. 5, "B&W ECCS Evaluation Model," November 1988

[Methodology for Specifications:

3.5.2 Bases (LOCA Limited Maximum Allowable Linear Heat Rate figure)

Note: Applies to References h-k]

Finally, Specification 6.12.3 requires that all changes in cycle-specific parameter limits be documented in the COLR before each reload cycle or remaining part of a reload cycle and submitted upon issuance to NRC, prior to operation with the new parameter limits.

As part of the implementation of GL 88-16, the staff has also reviewed a sample COLR provided by the licensee and concludes that the format and content of the sample COLR are acceptable.

On the basis of its review, the NRC staff concludes that the licensee provided an acceptable response to the items in GL 88-16 on modifying cycle-specific parameter limits in TS. Because plant operation continues to be limited in accordance with the values of cycle-specific parameter limits that are established using NRC-approved methodologies, the NRC staff concludes that this change is administrative in nature and that there is no impact on plant safety as a consequence. Accordingly, the staff finds that the proposed changes are acceptable.

### 3.0 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.

### 4.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change to 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 or a change to a surveillance requirement. 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 issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9) (57 FR 709). This amendment also involves changes in recordkeeping, reporting or administrative procedures or requirements. Accordingly, with respect to these items, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR §51.22(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 this amendment.

### 5.0 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.

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