

April 21, 1995

Mr. Ross P. Barkhurst  
Vice President Operations  
Entergy Operations, Inc.  
Post Office Box B  
Killona, LA 70066

SUBJECT: ISSUANCE OF AMENDMENT NO. 105 TO FACILITY OPERATING LICENSE  
NPF-38 - WATERFORD STEAM ELECTRIC STATION, UNIT 3 (TAC NO. M91924)

Dear Mr. Barkhurst:

The Commission has issued the enclosed Amendment No. 105 to Facility Operating License No. NPF-38 for the Waterford Steam Electric Station, Unit 3. The amendment consists of changes to the Technical Specifications (TSs) in response to your application dated April 4, 1995, as supplemented by letter dated April 5, 1995.

The amendment changes the Appendix A TSs by revising the TSs for moderator temperature coefficient. The amendment approves a one time deviation by excluding the two-thirds core burnup moderator temperature coefficient test requirement for Cycle 7. This amendment supersedes the notice of enforcement discretion issued on April 5, 1995, for Waterford 3.

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:

Chandu P. Patel, Project Manager  
Project Directorate IV-1  
Division of Reactor Projects - III/IV  
Office of Nuclear Reactor Regulation

Docket No. 50-382

Enclosures: 1. Amendment No. 105 to NPF-38  
2. Safety Evaluation

cc w/encls: See next page

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

April 27, 1995

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Entergy Operations, Inc.  
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*Chandu P. Patel*

Chandu P. Patel, Project Manager  
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Division of Reactor Projects - III/IV  
Office of Nuclear Reactor Regulation

Docket No. 50-382

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2. Safety Evaluation

cc w/encls: See next page

Mr. Ross P. Barkhurst  
Entergy Operations, Inc.

Waterford 3

cc w/encl:

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

ENERGY OPERATIONS, INC.

DOCKET NO. 50-382

WATERFORD STEAM ELECTRIC STATION, UNIT 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 105  
License No. NPF-38

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Entergy Operations, Inc. (the licensee) dated April 4, 1995, as supplemented by letter dated April 5, 1995, 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 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. NPF-38 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 105, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

*Chandu P. Patel*

Chandu P. Patel, Project Manager  
Project Directorate IV-1  
Division of Reactor Projects - III/IV  
Office of Nuclear Reactor Regulation

Attachment: Changes to the  
Technical Specifications

Date of Issuance: April 27, 1995

ATTACHMENT TO LICENSE AMENDMENT NO. 105

TO FACILITY OPERATING LICENSE NO. NPF-38

DOCKET NO. 50-382

Replace the following page of the Appendix A Technical Specifications with the attached page. The revised page is identified by Amendment number and contains vertical lines indicating the areas of change. The corresponding overleaf page is also provided to maintain document completeness.

REMOVE PAGE

3/4 1-4

INSERT PAGE

3/4 1-4

## REACTIVITY CONTROL SYSTEMS

### SHUTDOWN MARGIN - ALL FULL LENGTH CEAS FULLY INSERTED

#### LIMITING CONDITION FOR OPERATION

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3.1.1.2 The SHUTDOWN MARGIN shall be greater than or equal to that specified in the COLR.

APPLICABILITY: MODES 3, 4 and 5 with all full length CEAs fully inserted.

ACTION:

With the SHUTDOWN MARGIN less than that specified in the COLR, immediately initiate and continue boration at greater than or equal to 40 gpm of a solution containing greater than or equal to 1720 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored.

#### SURVEILLANCE REQUIREMENTS

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4.1.1.2 With all full length CEAs fully inserted, the SHUTDOWN MARGIN shall be determined to be greater than or equal to that specified in the COLR, at least once per 24 hours by consideration of the following factors:

1. Reactor Coolant System boron concentration,
2. CEA position,
3. Reactor Coolant System average temperature,
4. Fuel burnup based on gross thermal energy generation,
5. Xenon concentration, and
6. Samarium concentration.

## REACTIVITY CONTROL SYSTEMS

### MODERATOR TEMPERATURE COEFFICIENT

#### LIMITING CONDITION FOR OPERATION

3.1.1.3 The moderator temperature coefficient (MTC) shall be within the limits specified in the COLR. The maximum upper design limit shall be:

- a. Less positive than  $0.5 \times 10^{-4}$  delta k/k/°F whenever THERMAL POWER is  $\leq 70\%$  RATED THERMAL POWER, and
- b. Less positive than  $0.0 \times 10^{-4}$  delta k/k/°F whenever THERMAL POWER is  $> 70\%$  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

4.1.1.3.1 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.

4.1.1.3.2 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.
- b. At greater than 15% of RATED THERMAL POWER, prior to reaching 40 EFPD core burnup.
- c. At any THERMAL POWER, within 7 EFPD of reaching two-thirds of expected core burnup. #<sup>(1)</sup>

\*With  $K_{eff}$  greater than or equal to 1.0.

#See Special Test Exception 3.10.2.

#<sup>(1)</sup>This Surveillance test need not be performed for Cycle 7





UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 105 TO

FACILITY OPERATING LICENSE NO. NPF-38

ENTERGY OPERATIONS, INC.

WATERFORD STEAM ELECTRIC STATION, UNIT 3

DOCKET NO. 50-382

1.0 INTRODUCTION

By application dated April 4, 1995, as supplemented by letter dated April 5, 1995, Entergy Operations, Inc. (the licensee), submitted a request for changes to the Waterford Steam Electric Station, Unit 3, Technical Specifications (TSs). The requested changes would exclude, for the current Cycle (7) only, the TS 4.1.1.3.2.C surveillance requirement to measure the moderator temperature (reactivity) coefficient (MTC) at two-thirds through the operating cycle. The measurement is intended to assist in determining that the end-of-cycle (EOC) MTC will meet the TS 3/4.1.1.3 limit, which is used in several safety analyses. In addition the amendment would remove a footnote tied to Mode 1 of TS Limiting Condition for Operation 3.1.1.3, MTC. The removal of the footnote is purely an administrative change as it was only applicable for Cycle 2.

2.0 BACKGROUND

The measurement of MTC, which is done near full power, is performed by producing changes to the reactor power level and primary system coolant temperature. In attempting the measurement during this cycle, the required changes to the primary system and concomitant changes to the secondary systems, as well as changes related to the turbine system, revealed a problem associated with apparent turbine rotor movement and thrust bearing oil pressure rise, leading to an approach to turbine trip which would have resulted in a reactor scram. The licensee has requested that Waterford 3 be permitted to continue to the EOC without shutting down to repair the turbine problem, which would be necessary to conduct the MTC test during this cycle.

In an April 4, 1995, letter the licensee also requested that the NRC exercise enforcement discretion not to enforce compliance with the actions requiring EOC MTC surveillance test in TS Surveillance Requirement (SR) 4.1.1.3.2.c for Waterford 3. The staff approved this request on April 5, 1995. The enforcement discretion is effective for 23 days or until the staff processes licensee's TS change request, whatever occurs first.

### 3.0 EVALUATION

The Entergy submittal included proposed changes to TS 3.1.1.3. These changes are (1) the removal of footnote #(1) in the "Applicability" section for Mode 1, and (2) the addition of footnote #(1) to Surveillance Section 4.1.1.3.2.C. Change (1) refers to a Test Exemption in Cycle 2 and is no longer applicable. Its removal is acceptable. Change (2) states that the near EOC measurement of the MTC need not be performed in Cycle 7. As discussed below, this is acceptable.

A primary benefit from the introduction of a near EOC MTC measurement into pressurized water reactor (PWR) TS in about 1980 was the gathering of information on how well the EOC MTC was calculated by the vendor methodologies. A significant amount of information has been gathered.

The generic ABB-CE information on MTC (and in particular near EOC MTC) calculation/measurement comparison for all ABB-CE reactors (including Waterford 3) was recently submitted to the NRC in a topical report, CE NPSD-911, by the CE Owners Group (Reference 1) along with a proposed generic TS change to remove the requirement for the near EOC MTC measurement if near beginning of cycle (BOC) measurements fall within a specified limit. The report is under review by the staff.

The licensee justification of its proposed TS change for Waterford 3 is based primarily on (1) the calculated EOC MTC for Cycle 7 and the margin to the TS limit, (2) the exhibited accuracy of the calculation methodology, both generic and for Waterford 3, (3) Cycle 7 core characteristics similarity to past cycles, and (4) meeting, for Cycle 7, the criteria of CE NPSD-911 for MTC measurements near BOC.

The EOC MTC value calculated for Waterford 3 for Cycle 7 is  $-2.88 \times 10^{-4}$  delta k/k/°F. (This is conservatively large since it includes a 26 full power days extension beyond end of full power reactivity.) The MTC calculations are done by ABB-CE (and checked by Entergy) using standard ABB-CE methodology and, ROCS and DIT codes. The TS limit is  $-3.3 \times 10^{-4}$  delta k/k/°F. Entergy has examined the uncertainty of the calculation based on (1) the ABB-CE Topical Report generic calculation/measurement data comparisons and (2) using only Waterford 3 data from previous and current cycles.

The Waterford 3 data for calculation/measurement differences from relevant MTC measurements fall within the generic ABB-CE data base. The generic data uncertainty analysis indicated that an appropriate criterion of uncertainty is  $0.16 \times 10^{-4}$  delta k/k/°F. This applies to all MTC measurements from beginning through EOC. The Waterford 3 difference between the calculated and TS limit values of EOC MTC is  $0.42 \times 10^{-4}$  delta k/k/°F (TS more negative), and the beginning and early in Cycle 7 measurement fall within the proposed generic criterion. That would permit bypass of the EOC MTC measurement within the generic system.

To augment the generic comparison, because it has not been approved by the NRC, Entergy used only the Waterford 3 information to develop an uncertainty value compatible with the topical report methodology. Although falling within the generic data base, the uncertainty result with Waterford 3 data alone is larger because of the reduced data base. The appropriate uncertainty criterion was determined to be  $0.25 \times 10^{-4}$  delta k/k/°F and is well within the available margin to the TS limit.

In addition, because of the similarity of the current core design to previous cores, the correlation data from MTC vs. boron concentration in the moderator indicates the current cycle should have a EOC MTC of about  $-2.6 \times 10^{-4}$  delta k/k/°F, well within the TS limit.

As an added precaution Waterford 3 has instituted several compensatory measures related to operations and monitoring. These include (1) control room instructions on precautions associated with the turbine problem, (2) operator instructions on event consequences with a more negative MTC late in cycle, (3) weekly surveillances on core reactivity and boron concentration as a function of burnup.

These analyses and actions provide a reasonable basis for concluding that for Waterford 3, Cycle 7, the EOC MTC is unlikely to be more negative than the TS limit.

We have reviewed the information submitted by Entergy for Waterford 3 to justify the proposed exigent TS change to exclude, for Cycle 7, the SR to measure the MTC near EOC. Based on this review, we have concluded that a sufficient examination of data and analyses of past relevant measurements and calculations have been presented to reasonably demonstrate that for this cycle the calculated MTC, and safety analysis using this MTC, will fall within specified limits. We have concluded that appropriate information was submitted and the proposed changes to the TS are acceptable.

#### 4.0 EXIGENT CIRCUMSTANCES

The Commission's regulation, 10 CFR 50.91, contains provisions for issuance of amendments when the usual 30-day public notice period cannot be met. One type of special exception is an exigency. An exigency is a case where the staff and licensee need to act promptly and the staff has determined that the amendment involves no significant hazards considerations.

Under such circumstances, the Commission notifies the public in one of two ways: by issuing a Federal Register notice providing an opportunity for hearing and allowing at least two weeks for prior public comments, or by issuing a press release discussing the proposed changes, using the local media. In this case, the Commission used the first approach.

The licensee submitted the request for amendment on April 4, 1995, as supplemented by letter dated April 5, 1995. It was noticed in the Federal Register on April 11, 1995 (60 FR 18431) at which time the staff proposed a no significant hazards consideration determination. In its letter of April 4, 1995, the licensee requested the staff to exercise enforcement discretion not to enforce compliance with the requirement of SR 4.1.1.3.2-C for Waterford 3, and that the staff process the license amendment on an exigent basis. The staff approved the request for an enforcement discretion on April 5, 1995. This enforcement discretion is effective only up to 23 days or until the staff process the amendment, whichever comes first. Due to time constraints, sufficient time was not available to permit the customary 30-day public notice in advance of this action.

Accordingly, pursuant to 10 CFR 50.91(a)(6), the Commission has determined that an exigent situation exists in that failure to act in a timely way will result in unnecessary plant transient or may require plant shutdown, if licensee could not perform the required test by midnight April 28, 1995. Further, the Commission has determined that the exigent situation is not due to the failure of the licensee to act in a timely manner.

There were no public comments in response to the notice published in the Federal Register.

#### 5.0 FINAL NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

The Commission's regulations in 10 CFR 50.92, states that the Commission may make a final determination that a license amendment involves no significant hazards considerations if operation of the facility in accordance with the amendment would not (1) involve a significant increase in the probability or consequences of an 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.

Waterford 3 is currently analyzed for a EOC limiting value of  $-3.3 \times 10^{-4}$  delta k/k/°F. Under the proposed change, compliance with this TS Limit is assured by supporting data and analysis. The analysis demonstrates that the predicted EOC 7 best estimate MTC value is  $-2.88 \times 10^{-4}$  delta k/k/°F. This is a conservative value because it includes a 26 effective full power days extension beyond the actual end of full power reactivity. The margin to the TS limit is thus  $0.42 \times 10^{-4}$  delta k/k/°F.

The probability and consequences of an accident previously evaluated will not be increased because this change does not modify any assumptions used in the input to the safety analyses. The current safety calculations will remain valid because the allowed range of MTC values will not change. Therefore, the proposed change will not involve any increase in the probability or consequences of any accident previously evaluated.

Plant operation and plant parameter TS limits will remain unchanged. There are no new changes in plant design nor are any new failure modes introduced. Therefore, the proposed change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

The margin of safety will not be reduced because the range of allowed temperature coefficients will not be changed. The surveillance program consisting of BOC measurements was not affected. Explicit EOC 7 MTC predictions have ensured that the MTC is and will remain within the range of specified values. Therefore, the proposed change will not involve any reduction in a margin of safety.

Based upon the above consideration the staff concludes that the amendment meets the three criteria of 10 CFR 50.92. Therefore, the staff has made a final determination that the proposed amendment does not involve a significant hazards consideration.

#### 6.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Louisiana State official was notified of the proposed issuance of the amendment. The State official had no comments.

#### 7.0 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 changes surveillance requirements. 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 (60 FR 18431). 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.

#### 8.0 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.

## 9.0 REFERENCE

1. CE NPSD-911, May 1993, "Analysis of Moderator Temperature Coefficient in Support of a change in the Technical Specification End of Cycle Negative MTC Limit.

Principal Contributor: H. Riching

Date: April 27, 1995