

January 30, 2004

Mr. Michael Kansler
President
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

SUBJECT: PILGRIM NUCLEAR POWER STATION - ISSUANCE OF AMENDMENT RE:
JET PUMP SURVEILLANCE REQUIREMENTS (TAC NO. MB7950)

Dear Mr. Kansler:

The Commission has issued the enclosed Amendment No. 205 to Facility Operating License No. DPR-35 for the Pilgrim Nuclear Power Station (Pilgrim). This amendment is in response to your application dated January 30, 2003, which replaced your original application dated December 10, 2002, and as supplemented by letter dated August 7, 2003.

This amendment changes the Technical Specifications (TSs) for Pilgrim by modifying TS 4.6.E for the jet pumps and the associated Bases. In addition, a change is also made to correct a reference in TS 4.11.C.1.

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

Sincerely,

/RA/

Travis L. Tate, Project Manager, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-293

Enclosures: 1. Amendment No. 205 to
License No. DPR-35
2. Safety Evaluation

cc w/encls: See next page

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Pilgrim Nuclear Power Station

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Pilgrim Nuclear Power Station

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ENTERGY NUCLEAR GENERATION COMPANY
ENTERGY NUCLEAR OPERATIONS, INC.
DOCKET NO. 50-293
PILGRIM NUCLEAR POWER STATION
AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 205
License No. DPR-35

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment filed by Entergy Nuclear Operations, Inc. (the licensee) dated December 10, 2002, as replaced by application dated January 30, 2003, and as supplemented by letter dated August 7, 2003, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations;
 - 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.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 3.B of Facility Operating License No. DPR-35 is hereby amended to read as follows:

B. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 205, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of issuance and shall be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Darrell Roberts, Acting Chief, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications

Date of Issuance: January 30, 2004

ATTACHMENT TO LICENSE AMENDMENT NO. 205

FACILITY OPERATING LICENSE NO. DPR-35

DOCKET NO. 50-293

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

3/4.6-7

3/4.11-2

B3/4.6-9

— —

Insert

3/4.6-7

3/4.11-2

B3/4.6-9

B 3/4.6-9a

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 205 TO FACILITY OPERATING LICENSE NO. DPR-35

ENTERGY NUCLEAR GENERATION COMPANY

ENTERGY NUCLEAR OPERATIONS, INC.

PILGRIM NUCLEAR POWER STATION

DOCKET NO. 50-293

1.0 INTRODUCTION

By application dated December 10, 2002 (Reference 1), Entergy Nuclear Operations, Inc. (the licensee) proposed changes to the Technical Specifications (TSs) for the Pilgrim Nuclear Power Station (Pilgrim). The licensee revised its request in a January 30, 2003, letter (Reference 2) that replaced the original submittal. The licensee submitted additional information in a letter dated August 7, 2003 (Reference 3). The replacement application dated January 30, 2003, and the supplement dated August 7, 2003, provided additional information that clarified the original application, did not expand the scope of the application as originally noticed, and did not change the Nuclear Regulatory Commission (NRC or the Commission) staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on June 10, 2003 (68 FR 34663).

The proposed changes would revise TS 4.6.E, for the jet pump Surveillance Requirements (SRs) and its Bases to specify when the surveillance is required to be performed, to change the flow imbalance margin from 15% to 10%, and to change the number of conditions required to occur from three to two. Additionally, TS 4.11.C.1 would be revised to correctly make reference to the limiting control rod pattern cited in Table 3.2.C.1, Note 5. Specifically, the proposed changes would make the following modifications:

1.1 TS 4.6.E

Notes 1 and 2 are proposed to be added to the surveillance as follows:

1. Not required to be performed until 4 hours after associated recirculation loop is in operation.
2. Not required to be performed until 24 hours after >25% Rated Thermal Power.

Additionally, a change is proposed to be made to verify jet pump operability whenever the two recirculation loops have flow imbalance of 10% or more, instead of the current margin of 15%. Also, a change is proposed to require that no two of three, instead of the current three conditions specified in TS 4.6.E, occur simultaneously.

The TS 4.6.E Bases is also proposed to be revised to incorporate the changes.

1.2 TS 4.11.C.1

TS 4.11.C.1 is proposed to be revised to state "...a limiting control rod pattern as specified in Table 3.2.C.1 Note 5," and delete the words "as described in the bases for Specification 3.3.B.5."

2.0 REGULATORY EVALUATION

The NRC staff finds that the licensee, in section 4 of its submittal, identified the applicable regulatory requirements. The regulatory requirements for which the NRC staff based its acceptance are in Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.36(c)(2)(ii) which specifies that a TS limiting condition for operation of a nuclear reactor must be established for each item meeting one or more of a defined set of criteria. The criteria applicable to the proposed change is defined in 10 CFR 50.36(c)(2)(ii)(B) Criterion 2 which states:

A process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

Additionally, 10 CFR 50.36(c)(3) states the basis for SRs:

Surveillance requirements are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met.

Jet pump operability is an explicit assumption in the design-basis loss-of-coolant accident (LOCA) analysis. The jet pumps are part of the reactor coolant recirculation system and are designed to provide forced circulation through the core to remove heat from the fuel. The jet pumps are located in the annular region between the core shroud and the vessel inner wall. Because the jet pump suction elevation is at two-thirds core height, the vessel can be reflooded and the coolant level maintained at two-thirds core height even with the complete break of the recirculation loop pipe that is located below the jet pump elevation.

The capability of reflooding the core to two-thirds core height is dependent upon the structural integrity of the jet pumps. If the structural system, including the beam holding the jet pump in place, fails, jet pump displacement and performance degradation could occur, resulting in an increased flow area through the jet pump and a lower core flooding elevation. This could adversely affect the water level in the core during the reflood phase of a LOCA as well as the assumed blowdown flow during a LOCA.

The purpose of TS 4.6.E is to provide reasonable assurance that the jet pumps can meet their design function pursuant to 10 CFR 50.36(c)(2)(ii)(B) Criterion 2, in accordance with 10 CFR 50.36(c)(3).

3.0 TECHNICAL EVALUATION

3.1 TS 4.6.E

The purpose of TS 4.6.E is to allow detection of significant degradation in jet pump performance before jet pump failure occurs. The surveillance is required to be performed when the loop has forced circulation since the surveillance checks and measurements can only be performed during jet pump operation. Jet pump failure can occur with a complete mixer displacement due to jet pump beam failure. Jet pump plugging is also a concern since it increases flow resistance in the recirculation loop. Jet pump degradation is indicated if the specified criteria in TS SR 4.6.E confirm unacceptable deviations from established flow patterns or relationships. The allowable flow deviations from the established patterns have been developed based on the variations experienced at plants during normal operation and with jet pump assembly failures. A change in flow rate of a failed jet pump produces a change in the indicated flow rate of that pump relative to the other jet pumps in the loop. Comparison of the data with a normal relationship or pattern also provides the indication necessary to detect a failed jet pump. In addition, the jet pump flow deviation pattern derived from the diffuser-to-lower-plenum differential pressure readings can be used to evaluate jet pump operability.

The current requirements in TS 4.6.E are as follows:

Whenever there is recirculation flow with the reactor in the startup or run modes, jet pump operability shall be checked daily by verifying that the following conditions do not occur simultaneously.

1. The two recirculation loops have a flow imbalance of 15% or more when the pumps are operated at the same speed.
2. The indicated value of core flow rate varies from the value derived from loop flow measurements by more than 10%.
3. The diffuser to lower plenum differential pressure reading on an individual jet pump varies from established jet pump delta P characteristics by more than 10%.

As currently written, all three conditions would have to occur simultaneously to declare a jet pump inoperable. The proposed change would declare the jet pump inoperable if two out of three of the conditions occur simultaneously. This proposed change is more restrictive than the current requirements for monitoring jet pump operability since fewer conditions are required to be met to declare a jet pump inoperable. Therefore, the NRC staff finds the proposed change acceptable.

The SRs proposed are in accordance with NUREG-1434, "Standard Technical Specification [STS], General Electric Plants, BWR [Boiling Water Reactor]/6," Revision 2. Pilgrim is a BWR 3/4 design. The licensee referenced NUREG-1434, STS for BWR/6 instead of the requirements in NUREG-1433, "Standard Technical Specification, General Electric Plants,

BWR/4," Revision 2, because the format and content of Pilgrim's current SRs are similar to the SRs in the STS for BWR/6 plants, rather than BWR/4 STS. In the BWR/6 design, flow control valves govern recirculation flow in contrast to the BWR/4 design which utilizes variable speed pumps to govern recirculation flow. Pilgrim utilizes a variable speed pump design for recirculation flow control. The proposed SRs were chosen to prevent modifying the surveillance methodology, while resolving the non-conservative acceptance criteria in the TSs.

Currently, TS 4.6.E considers the condition in which the two recirculation loops have a flow imbalance of less than 15% when the pumps are operated at the same speed. Based on plant experience, the change in recirculation pump flow rate can be < 15% when a jet pump mixer is displaced. The licensee proposed to change the flow imbalance criteria from 15% to 10%. Pilgrim TS 4.6.E considers a comparison of recirculation loop flows to one another at the same pump speed, whereas the BWR/6 STS considers comparisons of established relationships among the flow control valve position, recirculation flow, and pump speed. Pilgrim does not have flow control valves and operates with both gate valves in the recirculation loop in their full open position. With both gate valves full open and the recirculation pumps operating at the same speed, a significant difference in flow between the recirculation loops could indicate a jet pump failure. TS 4.6.E.1 is performed with a comparison of recirculation loop flows to each other at the same pump speeds with full open gate valves. Based on the operating experience, the licensee is proposing to incorporate the more restrictive criteria related to the flow imbalance to ensure jet pump integrity. In addition, the proposed imbalance criteria of 10% is suggested by the vendor and is consistent with the STS. Therefore, the NRC staff finds the more restrictive changes provide reasonable assurance of jet pump operability and are acceptable.

The licensee also proposed to add new notes to TS 4.6.E as follows:

- Not required to be performed until 24 hours after 25% Rated Thermal Power.
- Not required to be performed until 4 hours after the associated recirculation loop is in operation.

Since the surveillance can only be performed during jet pump operation, based on engineering judgement, the proposed four hours is an acceptable time to establish appropriate conditions for data collection and evaluation.

The 24 hour delay prevents the surveillance from being performed when thermal power is less than 25% of Rated Thermal Power. During low-flow conditions, jet pump noise approaches the threshold response of the associated flow instrumentation and precludes the collection of repeatable and meaningful data. The 24-hour delay has been shown, by operating experience, to be enough time to detect jet pump degradation, and is consistent with the surveillance for recirculation loop operability verification. The proposed notes are also consistent with the STS for determining when the surveillance is required to be performed. Therefore, the NRC staff finds the proposed change is acceptable.

Additionally, the licensee proposed to modify the associated TS Bases 3/4.6.E. The NRC staff does not object to the proposed changes to the TS Bases.

The NRC staff has reviewed the proposed TS changes as they apply to the jet pump SRs and concludes that the requirements of 10 CFR 50.36(c)(2)(ii)(B) Criterion 2 and

10 CFR 50.36(c)(3) will continue to be met when the plant is operated consistent with the proposed TS changes. The proposed changes are more conservative than the current requirements and are consistent with the STS. Thus, the NRC staff finds the proposed changes acceptable.

3.2 TS 4.11.C.1

The proposed change to TS 4.11.C.1 consists of making a reference to the limiting control rod pattern cited in Table 3.2.C.1, Note 5. The proposed revision would state "...a limiting control rod pattern as specified in Table 3.2.1.C.1 Note 5," and would delete the words "as described in the bases for Specification 3.3.B.5," that are currently in the TS.

The NRC staff has reviewed the proposed change and determined that prior to License Amendment No. 186, TS 4.11.C.1 made reference to the Bases of TS 3.3.B.5 for the limiting control rod pattern description. Upon issuance of License Amendment No. 186, TS 3/4.3 and its Bases were completely revised; however, the reference included in TS SR 4.11.C.1 was not corrected. The proposed change corrects the TS to make the proper reference to the existing Table 3.2.C.1, Note 5. The NRC staff further agrees with the licensee that the proposed changes to TS 4.11.C.1 are administrative in nature and do not add nor remove any requirements. Thus, the NRC staff finds the proposed changes acceptable.

4.0 STATE CONSULTATION

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

5.0 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 SRs. 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 (68 FR 34663). 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.

6.0 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.

7.0 REFERENCES

- 1 Letter from Charles M. Dugger to NRC, "Request for Amendment to the TS, Jet Pump Operability Surveillance Requirements and Correction to Reference Cited in TS 4.11.C.1," dated December 10, 2002.
2. Letter from Charles M. Dugger to NRC, "Request for Amendment to the TS, Jet Pump Operability Surveillance Requirements and Correction to Reference Cited in TS 4.11.C.1, Revision 1," dated January 30, 2003.
3. Letter from Michael A. Balduzzi to NRC, "Response to NRC Request for Additional Information in Support of Proposed Changes to Jet Pump Operability Surveillance Requirements (TAC NO. MB7950)," dated August 7, 2003.

Principal Contributor: George Thomas

Date: January 30, 2004