

April 10, 2006

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

SUBJECT: PILGRIM NUCLEAR POWER STATION - ISSUANCE OF AMENDMENT  
RE: REVISED APPLICABILITY FOR CONTAINMENT OXYGEN AND  
DIFFERENTIAL PRESSURE LIMITS (TAC NO. MC7056)

Dear Mr. Kansler:

The Commission has issued the enclosed Amendment No. 218 to Facility Operating License No. DPR-35 for the Pilgrim Nuclear Power Station. The amendment consists of changes to the Technical Specifications (TSs) in response to your application dated May 24, 2005. Specifically, this amendment revises the TSs applicability requirements related to primary containment oxygen concentration and drywell-to-suppression chamber differential pressure limits.

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/*

James J. Shea, Project Manager  
Plant Licensing Branch I-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-293

Enclosures: 1. Amendment No. 218 to License No. DPR-35  
2. Safety Evaluation

cc w/encls: See next page

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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. 218  
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 May 24, 2005, 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 Chapter1;
  - 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. 218, 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 60 days.

FOR THE NUCLEAR REGULATORY COMMISSION

*/RA/*

Richard J. Laufer, Chief  
Plant Licensing Branch I-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: April 10, 2006

ATTACHMENT TO LICENSE AMENDMENT NO. 218

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

3/4.7-2  
3/4.7-3  
3/4.7-9  
3/4.7-10  
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Insert

3/4.7-2  
3/4.7-3  
3/4.7-9  
3/4.7-10  
3/4.7-10a

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 218 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 letter dated May 24, 2005 (ADAMS Accession No. ML051520474) Entergy Nuclear Operations, Inc. (the licensee) submitted a request for changes to the Pilgrim Nuclear Power Station (Pilgrim) Technical Specifications (TSs). The requested changes would revise applicability requirements related to primary containment oxygen concentration and drywell-to-pressure suppression chamber (torus) differential pressure limits to allow for enhanced operator flexibility and maintenance activities that are consistent with NUREG-1433, "Standard Technical Specifications - General Electric Plants, BWR/4, Revision 3" (NUREG-1433).

2.0 REGULATORY EVALUATION

The Nuclear Regulatory Commission (NRC or the Commission) regulations and review standards such as Appendix A, "General Design Criteria for Nuclear Power Plants," to Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, include requirements for containment design which considers containment structural integrity and combustible gas control. 10 CFR 50.44(b)(2)(i) requires an inerted atmosphere for the Pilgrim containment so that during and following an accident (i.e., loss-of-coolant accident (LOCA)) the possibility of a hydrogen combustion event within the containment cannot occur. Inerting is achieved by purging the primary containment with nitrogen until the oxygen concentration is less than 4 percent. Nitrogen is also used to maintain the drywell-to-torus differential pressure at greater than or equal to 1.17 psid. This differential pressure is necessary to reduce water slug forces on the torus and jet forces on the downcomer piping that could result during a LOCA.

Specific regulatory requirements for containment inerting and differential pressure at Pilgrim are found in TSs 3.7.A.5.a. and 3.7.A.1.i. Pilgrim TS Section 3.7.A.5.a requires the containment atmosphere to be less than 4 percent oxygen by volume with nitrogen gas during reactor power operation with coolant pressure above 100 psig. Pilgrim TS Section 3.7.A.1.i. requires the differential pressure between the drywell and torus to be maintained greater than 1.17 psid.

### 3.0 TECHNICAL EVALUATION

The proposed change to the Pilgrim primary containment oxygen concentration and drywell-to-torus differential pressure applicability, does not affect the design limits, plant equipment parameters or basic operational considerations for which these TSs are required. The change does affect the time when these TS limits are applicable to allow Pilgrim to perform critical inspections, maintenance and prevent potential spurious neutron monitoring instrumentation scrams. The current TSs already include plant operational flexibility realizing that the probability of an accident during these short periods of time is low and that the plant has vent and purge capabilities while at power operation. This proposed amendment would allow Pilgrim to marginally extend this operational flexibility in order to enhance overall plant reliability.

#### 3.1 Current Pilgrim TS Requirements

The Pilgrim containment oxygen concentration is currently required to be less than 4 percent within 24 hours after placing the reactor in the run mode with reactor coolant pressure above 100 psig during plant startups. Paragraph b. of Pilgrim TS 3.7.a.5 also allows de-inerting to commence 24 hours prior to a shutdown.

Similarly, the Pilgrim drywell-to-torus differential pressure currently must be equal to or greater than 1.17 psid 24 hours following a plant startup after placing the reactor in the run mode. Paragraph j. of Pilgrim TS 3.7.A.1. also allows the differential pressure to be reduced to less than 1.17 psid 24 hours prior to a shutdown.

The purpose of these TS restrictions is to prevent primary containment damage, due to a possible ignition of hydrogen and to reduce dynamic loading forces on the containment following a loss-of-coolant accident (LOCA). In addition, maintaining the differential pressure would lower peak containment pressure by reducing the water level in the downcomers and, therefore, reduce the time to begin the pressure suppression process in the torus.

Following a LOCA combined with a degraded emergency core cooling system (ECCS) response, hydrogen may be produced by the postulated zirconium (fuel cladding) water reaction. In the presence of sufficient stoichiometric quantities of oxygen, which is produced in small quantities by radiolysis of reactor coolant, a potential ignition of hydrogen could lead to leakage integrity failure of containment. To prevent this from occurring, Pilgrim TSs require that the containment be maintained with less than 4 percent oxygen concentration to minimize the potential of hydrogen combustion following a LOCA.

The primary containment for Pilgrim contains a drywell and connected torus. The drywell is connected to the torus by eight circular vent pipes that are then connected to a vent header in the air space of the torus. Projecting downward from the torus vent header are 96 downcomer pipes, each 24 inches in diameter, terminating approximately 3 feet in the torus water space. The drywell-to-torus pressure differential is applied to lower the water in the downcomer to reduce the potential dynamic loading on containment and to allow the remaining water level to clear the downcomer faster reducing the potential peak drywell pressure in the event of a LOCA.

### 3.2 Proposed Changes to the Pilgrim TS Requirements

The licensee proposed TS changes to require the containment oxygen concentration and drywell-to-torus differential pressure be within limits of 4 percent oxygen and greater than 1.17 psid within 24 hours of exceeding 15 percent of rated thermal power during startups while in the run mode and to allow these limits to be exceeded up to 24 hours prior to lowering reactor power to less than 15 percent of rated thermal power prior to a plant shutdown. TS 3.7.a.6.b. would also state that if oxygen concentration is greater than or equal to 4 percent and cannot be restored within 24 hours, while in the run mode, then reactor power shall be less than 15 percent rated thermal power within the next 8 hours. Similarly, if the drywell-to-torus differential pressure cannot be restored while in the run mode following 4 hours for maintenance activities allowed by the proposed TS 3.7.A.8.b., then it must be restored within the subsequent 8-hour period or reactor power will be less than 15 percent of rated thermal power within the next 12 hours in accordance with proposed TS 3.7.A.8.c.

These changes were requested by the licensee to increase overall plant reliability and capacity. The licensee has stated that the requested changes will allow operators to place the reactor mode switch in the run position sooner during startups. This will reduce the probability of spurious startup neutron monitoring instrument scrams. The licensee has also stated that the proposed changes will allow additional time for plant personnel to perform work and inspections in the drywell such as main steam isolation valve (MSIV) testing, MSIV limit switch adjustments, motor-operated valve testing, and leak inspections, before the containment is inerted.

The licensee has also proposed changes to the conditional action statements associated with these TS changes. Currently, there is no allowed time to restore the primary containment oxygen concentration limit prior to entering the default shutdown action. Current TS 3.7.A.6, requires an orderly shutdown to cold shutdown conditions within 24 hours if current TS 3.7.A.5 is not met. The licensee has proposed a conditional action statement that allows 24 hours to restore oxygen concentration to within limits followed by a requirement to reduce power to less than 15 percent rated thermal power within the next 8 hours for a total time of 32 hours.

The current Pilgrim TS 3.7.A.1.k. allows 4 hours for maintenance activities on the drywell-to-torus differential pressure control system and 4 hours to perform required operability testing on specified systems. In addition, if Pilgrim cannot restore drywell-to-torus differential pressure in a subsequent 6-hour period, an orderly shutdown shall be initiated and the reactor shall be in cold shutdown condition in 24 hours (TS 3.7.A.1.l.). The licensee has proposed a change that would allow an 8-hour period to restore drywell-to-torus differential pressure or would require reactor thermal power to be less than 15 percent rated thermal power within the next 12 hours.

In addition to the changes described, the licensee has made a small number of administrative changes to the format of their containment systems TS Section 3.7. Primarily, the licensee proposed to add a new section to place the conditions required for the drywell-to-torus differential pressure requirements (TS Section 3.7.A.8.), to facilitate use and application by the operators. Also, the licensee is proposing to delete the sections of the TSs where the torus-to-drywell differential pressure requirements had existed along with their respective conditional requirements and action statements. Specifically, TS Sections 3.7.A.1.i.,j.,k. and l. would be deleted and a new TS Section 3.7.A.8.a, b, and c would be created to contain the revised torus-drywell differential pressure TS requirements.

### 3.3 Staff Evaluation

The proposed change to the Pilgrim TS applicability requirement for TS 3.7.A.5.a. oxygen concentration and 3.7.A.1.i. for drywell-to-torus differential pressure will not change the current limits for these parameters, but would only minimally increase the applicability time for when these parameters would not be within limits during plant startup and shutdown. The licensee performs a number of inspections and maintenance activities to safety related components and systems during plant startup and shutdown that can only be done while the plant is at a low thermal power level. It is important for personnel protection and efficiency to perform these activities with a de-inerted atmosphere. It is also desirable to place the mode switch to run as soon as practical during startup conditions to prevent a spurious neutron monitoring instrumentation reactor scram. Basing the applicability of the oxygen concentration and drywell differential pressure TSs on 15 percent thermal power level rather than the run mode, the licensee will be able to complete the maintenance activities and inspections required at startup and shutdown without the concern of a spurious reactor scram.

The primary containment is required to be inert at thermal power greater than 15 percent in the run mode, since this is the condition with the highest probability for an event that could produce hydrogen. It is also the condition with the highest probability of an event that could impose large loads on the primary containment.

The additional time while the containment is not inerted or the time when the drywell-to-torus differential pressure does not meet the differential pressure requirement will not have a significant affect on the risk of plant operations. As long as reactor power is less than 15 percent rated thermal power, the potential for an event that generates significant hydrogen is low and the primary containment need not be inert. Furthermore, the probability of an event that generates hydrogen within the first 24 hours of a startup, or within the last 24 hours before a shutdown, is low enough to justify the time when containment is not inerted to control oxygen concentration and differential pressure. The 24-hour time period allowed by TSs is a reasonable amount of time for plant personnel to perform inerting or de-inerting evolutions.

The drywell-to-torus differential pressure can only be controlled when the primary containment is inert. Again, as with the oxygen concentration requirements, the probability of an event within the first 24 hours of a startup, or within the last 24 hours before a shutdown, is low enough to justify the time when drywell-to-torus differential pressure is less than 1.17 psid.

These proposed changes are also consistent with NUREG-1433, and with TS requirements that have been approved by the NRC staff for other plants. These proposed changes are, therefore, acceptable.

The proposed changes to the action requirements for oxygen concentration will correct a Pilgrim TS deficiency that does not allow a restoration of the oxygen concentration if the TS requirement of less than 4 percent is not met. In the case of the proposed drywell-to-torus differential pressure action statements, the licensee has maintained its allowed 4-hour time period to complete maintenance activities and operability testing and added to that a restoration time period of 8 hours from the previous 6-hour time and replaced the current shutdown condition within 24 hours to a 12-hour power reduction to 15 percent rated thermal power. The total time allowed for reactor power reduction to 15 percent rated thermal power if the proposed drywell-to-torus differential pressure action statements are followed is 4 hours greater than the

improved standard TS would suggest in NUREG-1433, Section 3.6.2.5 Actions A and B. (combined time for shutdown allowed is 20 hours). However, the licensee's current TS Section 3.7.A.1.k. and l allow for as much as 34 hours to be in cold shutdown condition for a differential pressure less than 1.17 psid. Therefore, by adopting portions of the improved standard TSs in NUREG-1433, the licensee has reduced its time allowed for a power reduction to less than 15 percent which is a more restrictive change than following the current Pilgrim TSs. As discussed above, these proposed changes will not have a significant affect on the risk of plant operations and are mostly consistent with NUREG-1433, and with TS requirements that have been approved by the NRC staff for other plants. These proposed changes are, therefore, acceptable.

There were a small number of administrative changes associated with these proposed TS changes. The NRC staff confirmed that these proposed changes were administrative and, therefore, are 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. 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 (70 FR 51380; August 30, 2005). 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.

Principal Contributor: J. Shea

Date: April 10, 2006

Pilgrim Nuclear Power Station

cc:

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