April 12, 2005

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

SUBJECT: PILGRIM NUCLEAR POWER STATION - ISSUANCE OF AMENDMENT RE: REVISION TO SURVEILLANCE REQUIREMENT FREQUENCY FOR CONTAINMENT AND SUPPRESSION POOL SPRAY HEADERS AND NOZZLES (TAC NO. MC4311)

Dear Mr. Kansler:

The Commission has issued the enclosed Amendment No. 214 to Facility Operating License No. DPR-35 for the Pilgrim Nuclear Power Station. This amendment is in response to your application dated September 2, 2004.

This amendment revises the surveillance frequency in Technical Specification 4.5.B.2.2 for air testing the drywell and suppression pool spray headers and nozzles from “once every five years” to “following maintenance that could result in nozzle blockage.”

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/

John P. Boska, Sr. 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. 214 to License No. DPR-35
2. Safety Evaluation

cc w/encls: See next page

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DRoberts	CAnderson, RI	OGC	PUBLIC	PDI-2 R/F
CRaynor	JBoska	BVaidya	GHill (2)	ACRS
RDennig	JPulsipher			

Accession Number: ML050810006 *no significant change to SE input

OFFICE	PDIV-1/PM	PDI-2/PM	PDI-2/LA	SPSB-C\SC*	IROB-A/SC	OGC	PDI-2/SC
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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. 214
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 September 2, 2004, 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. 214, 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/

Darrell J. Roberts, 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: April 12, 2005

ATTACHMENT TO LICENSE AMENDMENT NO. 214

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	Insert
3/4.5-4	3/4.5-4
B3/4.5-9	B3/4.5-9
B3/4.5-10	B3/4.5-10

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 214 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 September 2, 2004, (Agencywide Documents and Managment System (ADAMS) Accession Number ML042590566), Entergy Nuclear Operations, Inc. (the licensee) submitted a request for changes to the Pilgrim Nuclear Power Station (PNPS) Technical Specifications (TSs). The proposed changes would revise TS Surveillance Requirement (SR) 4.5.B.2.2, “Residual Heat Removal (RHR) Containment Spray,” to change the SR frequency for air testing the drywell and suppression pool spray headers and nozzles from “once per 5 years” to “following maintenance that could result in nozzle blockage.”

Specifically, the proposed change would revise TS 4.5.B.2.2 as follows:

> Current Requirement
>
> The current TS 4.5.B.2.2 states: "Air test drywell and suppression pool (torus) headers and nozzles once per 5 years.”
>
> Proposed Requirement
>
> The proposed TS 4.5.B.2.2 states: "Air test drywell and suppression pool (torus) headers and nozzles following maintenance that could result in nozzle blockage."

The licensee stated that: “The proposed TS change would reduce the outage radiation exposure, improve personnel safety, and reduce overall cost of the outage. ...The surveillance requires alignment of systems, staging of testing equipment, and use of operations and maintenance staff in a high radiation area. The surveillance evolution, which typically requires up to 18 hours with 4 to 5 operations and maintenance personnel, impacts refueling outage schedule and resources, presents personnel safety risk, and results in cumulative radiological exposure between 0.5 R [rem] to 1.0 R with little or no benefits, in light of the existing system design and programs and practices to prevent blockage of spray nozzle heads.”

2.0 REGULATORY EVALUATION

The construction permit for PNPS was issued by the Atomic Energy Commission (AEC) on August 26, 1968, a low-power license was issued on June 8, 1972, and a full-power license was issued on September 15, 1972. The plant was originally licensed based on the proposed General Design Criteria (GDC) published by the AEC in the *Federal Register* (32 FR 10213) on July 11, 1967 (hereinafter referred to as "draft GDC"). The AEC published the final rule that added Appendix A to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "General Design Criteria for Nuclear Power Plants," in the *Federal Register* (36 FR 3255) on February 20, 1971 (hereinafter referred to as "final GDC").

Differences between the draft GDC and final GDC included a consolidation from 70 to 64 criteria. In accordance with a staff requirements memorandum from S. J. Chilk to J. M. Taylor, "SECY-92-223 - Resolution of Deviations Identified During the Systematic Evaluation Program," dated September 18, 1992 (ADAMS Accession No. ML003763736), the Nuclear Regulatory Commission (NRC or the Commission) decided not to apply the final GDC to plants with construction permits issued prior to May 21, 1971, which includes PNPS. The PNPS Updated Final Safety Analysis Report (UFSAR), Appendix F, provides an evaluation of the design bases of PNPS against the draft GDC.

Although the original licensing basis for PNPS was the draft GDC, the licensees for PNPS have made changes to the facility over the life of the plant that may have invoked some of the final GDC. The extent to which the final GDC have been invoked can be found in specific sections of the UFSAR and in other PNPS design and licensing basis documentation. For convenience, the licensee and the NRC staff usually refer to the final GDC rather than the draft GDC when discussing licensing actions.

The licensee's application dated September 2, 2004, discussed PNPS's conformance with the provisions of several GDC for the containment spray and cooling system; specifically: GDC 38, "Containment Heat Removal;" GDC 39, "Inspection of Containment Heat Removal System;" GDC 40, "Testing of Containment Heat Removal System;" and GDC 50, "Containment Design Basis." In particular, GDC 40 specifies that the containment heat removal system shall be designed for "appropriate" periodic pressure and functional testing to assure operability of the system. The proposed revision of the SRs does not impact conformance with the provisions of these GDCs.

Further, the drywell and torus spray system, part of the residual heat removal (RHR) system, is designed to reduce containment pressure following an accident in order to meet the requirements of 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Nuclear Power Reactors," and 10 CFR 50.49, "Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants."

NUREG-1433, Revision 3, "Standard Technical Specifications - General Electric Plants, BWR [boiling-water reactor]/4," does not require a flow surveillance test for the containment spray nozzles. However, the current PNPS TS, in SR 4.5.B.2.2, requires an air flow test of the drywell and suppression pool (torus) headers and nozzles once every 5 years, to verify that the spray headers and nozzles are unobstructed.

3.0 TECHNICAL EVALUATION

3.1 System Design

The PNPS drywell and suppression pool (torus) spray systems are part of the RHR system and consist of two drywell spray loops and one torus spray loop. The drywell spray loops consist of an upper spray header, sparger A, and a lower spray header, sparger B. The lower sparger has 196 spray nozzles and the upper sparger has 208 spray nozzles mounted symmetrically. The torus spray loop consists of six spray nozzles within the torus space.

The drywell and torus spray system supplements the suppression pool cooling mode of the RHR system. The spray system is manually initiated and is designed to provide, if required, 1000 gallons per minute (gpm) to the drywell spray and 240 gpm to the torus spray, in addition to the 3260 gpm delivered to the suppression pool by the suppression pool-cooling mode, for a total of 4500 gpm with one RHR pump in operation. The drywell and torus spray provides spray capability as an alternate method for controlling containment pressure following a loss-of-coolant accident (LOCA). The primary method for reducing the containment pressure and temperature following a LOCA is provided by the suppression pool-cooling mode of the RHR system.

The drywell spray spargers A and B are two 100% capacity loops. Thus, redundancy is designed into the drywell spray to ensure containment spray is available, even if one sparger is not available during an accident. In addition, the primary method (suppression pool-cooling mode) is available, providing additional redundancy.

The current TS SR requires an airflow test of the drywell and torus headers and nozzles to be performed once every 5 years. The air test is performed by draining the water from a portion of the piping to the header of the selected spray loop and injecting compressed air into the nozzle header. Spray nozzles are then checked to ensure that the header and nozzles are unobstructed. A remote visual examination is also performed by removing four nozzles from each drywell spray header and inserting an inspection device to examine the header piping to ensure there is no blockage.

This surveillance requires operation and verification of equipment both from the control room and locally at the equipment. After the airflow test is satisfactorily completed, the spray header supply piping is filled and vented to prevent subsequent water hammer events.

The two potential modes of blockage are by corrosion products or by debris (foreign material), and are discussed in Sections 3.3 and 3.4 of this Safety Evaluation.

3.2 Testing Experience

3.2.1 Industry Testing Experience

NUREG-1366, “Improvements to Technical Specifications Surveillance Requirements” (May 1992), reported on an NRC staff review of industry experience which indicated that containment spray systems of similar design are highly reliable and are not subject to plugging after testing following construction. The staff reviewed industry experience and found that, in general, once tested after construction, containment spray systems have not been subject to blockage. There have been several exceptions identified in containment spray and fire protection systems in which water leakage resulted in corrosion which resulted in some, but not complete, blockage.

3.2.2 PNPS Testing Experience

The most recent airflow test at PNPS was performed in 1999 during Refueling Outage (RFO)-12 and identified no operational or obstruction issues. Prior airflow tests also had no findings, except for the RFO-07 airflow test. During the RFO-07 airflow test, rust particles of 1/16 to 1/4 inch were observed in the headers. A licensee investigation confirmed that the particles were introduced in 1984 as a result of construction to replace the recirculation system piping followed by inadvertent actuation of containment spray nozzles. The licensee found that, in spite of the presence of particles, the operability of containment spray was assured. Following this incident, PNPS implemented significant procedural controls to ensure headers and spray nozzles remain free of flow-obstructing materials. These are discussed below in section 3.4.

3.3 Materials and Corrosion

The drywell and torus spray nozzles are made of corrosion-resistant bronze materials and are threaded into the spray headers. The header pipe is made of carbon steel. The header pipe, spray headers, and spray nozzles are maintained dry and isolated from the water in the RHR system by motor-operated valves in each header, except when the isolation valves are tested during RFOs. The dry nozzles, spray headers, and header pipe are not expected to rust significantly in the inert (nitrogen-filled) containment atmosphere during normal operations and brief normal air atmosphere during refueling operations. Accordingly, the staff finds that it is unlikely that corrosion products generated within the system will cause significant blockage of the spray system.

3.4 Foreign Materials

3.4.1 Foreign Material Exclusion (FME) Program

The licensee describes the FME program as follows:

> The PNPS FME program describes the measures to be taken to ensure foreign material is not introduced into a component or system, or to recover the foreign material if it is introduced. The FME program requires that any breaches of system boundaries during maintenance activities be protected from intrusion of foreign material into the system. Examples of FME controls include covers for open pipes, in-process and closeout inspections, and accounting for tools, material and parts. The inventory of materials used and capture of all foreign material created (such as from grinding, welding, and machining) are important aspects of this program. If control of foreign material is lost, the material is required to be recovered. If the foreign material is not recovered, it must be evaluated to determine its impact on system operability. The FME program requires that, when closing a system or component, an inspection be performed to ensure that all foreign material is removed. This requirement applies to all work and inspection activities performed on plant systems and components. If required FME is not maintained, a Condition Report is initiated requiring assessment of the circumstances and implementation of appropriate corrective actions.

Due to the location and orientation of the spray headers and nozzles at the top of the drywell and within the torus, introduction of foreign materials into the system through the nozzles is unlikely.

3.4.2 Post-Maintenance Testing (PMT)

The proposed SR change is supported by the existing requirement to verify system operability after system maintenance or repair. Foreign material introduced as a result of maintenance is the most likely cause of obstruction; therefore, verification to confirm the nozzles are free of blockage following maintenance activities that could result in nozzle blockage, as in the proposed SR, is sufficient to confirm the nozzles are free of blocking substances. The current post-maintenance testing procedure provides this verification, which requires testing of the system and components following maintenance activities as necessary to demonstrate operability. Also, the spray headers and nozzles are located at the top of the drywell and the torus, which are areas not normally impacted by maintenance activities. Consequently, the potential for unidentified nozzle obstruction or introduction of foreign material following maintenance is low.

Normal plant operation and maintenance practices are not expected to trigger the SR as proposed. Only an unanticipated circumstance would initiate this surveillance, such as an inadvertent spray actuation or loss of foreign material control when working within the affected boundary of the system. Procedures will require performance of an evaluation to determine whether a containment spray nozzle test would be required to ensure the nozzles remain unobstructed to support system operability following these events.

3.5 Conclusion of the Technical Aspects

As a result of reviewing the licensee's request to revise the testing frequency for the containment spray nozzles from "once per 5 years" to "following maintenance that could result in nozzle blockage," and reviewing and assessing the information provided by the licensee, the NRC staff concludes that the design of the PNPS containment spray system, and the foreign materials controls, including PMT, provide reasonable assurance that the potential for nozzle obstruction is acceptably low. The foreign materials controls provide protection from introduction of foreign materials into open piping during maintenance, and require post-maintenance verification of system cleanliness and freedom. Therefore, the NRC staff finds the amendment request to be acceptable, since the change does not impact conformance with the provisions of the applicable GDCs.

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 (69 FR 76490). 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. Pulsipher

Date: April 12, 2005

Pilgrim Nuclear Power Station

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