

September 20, 2005

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

SUBJECT: VERMONT YANKEE NUCLEAR POWER STATION - ISSUANCE OF
AMENDMENT RE: DRYWELL SPRAY HEADER AND NOZZLE AIR TEST
FREQUENCY (TAC NO. MC4603)

Dear Mr. Kansler:

The Commission has issued the enclosed Amendment No. 228 to Facility Operating License No. DPR-28 for the Vermont Yankee Nuclear Power Station, in response to your application dated October 6, 2004, as supplemented on February 16, and August 9, 2005.

The amendment revises Technical Specification surveillance requirement 4.5.B.1 related to air testing of the drywell spray headers and nozzles. Specifically, the amendment changes the test frequency 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/

Richard B. Ennis, Senior Project Manager, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-271

Enclosures: 1. Amendment No. 228 to
License No. DPR-28
2. Safety Evaluation

cc w/encls: See next page

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Vermont Yankee Nuclear Power Station

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Vermont Yankee Nuclear Power Station

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ENTERGY NUCLEAR VERMONT YANKEE, LLC
AND ENTERGY NUCLEAR OPERATIONS, INC.
DOCKET NO. 50-271
VERMONT YANKEE NUCLEAR POWER STATION
AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 228
License No. DPR-28

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment filed by Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc. (the licensee) on October 6, 2004, as supplemented on February 16, and August 9, 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 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.

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-28 is hereby amended to read as follows:

(B) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 228, 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 its date of issuance and shall be implemented within 60 days.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA by V. Nerses for/

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: September 20, 2005

ATTACHMENT TO LICENSE AMENDMENT NO. 228

FACILITY OPERATING LICENSE NO. DPR-28

DOCKET NO. 50-271

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

102

113

114

Insert

102

113

114

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 228 TO FACILITY OPERATING LICENSE NO. DPR-28
ENTERGY NUCLEAR VERMONT YANKEE, LLC
AND ENTERGY NUCLEAR OPERATIONS, INC.
VERMONT YANKEE NUCLEAR POWER STATION
DOCKET NO. 50-271

1.0 INTRODUCTION

By letter dated October 6, 2004, as supplemented on February 16, and August 9, 2005, Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc. (Entergy or the licensee) submitted a request to amend the Vermont Yankee Nuclear Power Station (VYNPS) Technical Specifications (TSs). The proposed amendment would revise TS surveillance requirement (SR) 4.5.B.1 related to air testing of the drywell spray headers and nozzles. Specifically, the amendment would change the test frequency from once every five years to following maintenance that could result in nozzle blockage.

The supplements dated February 16, and August 9, 2005, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on December 21, 2004 (69 FR 76492).

2.0 REGULATORY EVALUATION

The construction permit for VYNPS was issued by the Atomic Energy Commission (AEC) on December 11, 1967. The plant was designed and constructed 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 the "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 the "final GDC").

Differences between the draft GDC and the final GDC included a consolidation from 70 to 64 criteria. As discussed in the Nuclear Regulatory Commission (NRC or the Commission) Staff Requirements Memorandum for SECY-92-223 dated September 18, 1992 (Agencywide Documents Access and Management System (ADAMS), Accession No. ML003763736), the Commission decided not to apply the final GDC to plants with construction permits issued prior to May 21, 1971. At the time of promulgation of Appendix A to 10 CFR Part 50, the Commission stressed that the final GDC were not new requirements and were promulgated to

more clearly articulate the licensing requirements and practice in effect at that time. Each plant licensed before the final GDC were formally adopted had been evaluated on a plant-specific basis, determined to be safe, and licensed by the Commission.

As discussed in Appendix F of the VYNPS Updated Final Safety Analysis Report (UFSAR), the licensees for VYNPS have made changes to the facility over the life of the plant that may have invoked 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 VYNPS design and licensing basis documentation.

Based on a review of NUREG-0800, "Standard Review Plan," Section 6.2.2, "Containment Heat Removal Systems," dated October 1985, and the licensee's letters dated October 6, 2004, February 16, 2005, and August 9, 2005, the NRC staff identified the periodic testing attributes of final GDC 40 as being applicable to the types of changes proposed by this amendment request. Attachment 2 to Entergy letter Bvy 03-90, dated October 1, 2003 (ADAMS Accession No. ML032810447), provides a matrix of the draft GDC versus the corresponding final GDC. Based on Attachment 2 of letter Bvy 03-90, final GDC 40 corresponds to draft GDCs 59, 60, and 61. Based on the NRC staff's review of the requirements in these draft GDCs, the staff determined that the periodic testing attributes of final GDC 40 are contained in draft GDC 60 as follows:

- Draft GDC 60, "Testing of Containment Spray Systems (Category A)," requires that a capability shall be provided to test periodically the delivery capability of the containment spray system at a position as close to the spray nozzles as possible.

In general, there are two classes of changes to TSs: (1) changes needed to reflect modifications to the design basis (TSs are derived from the design basis), and (2) changes to take advantage of the evolution in policy and guidance as to the required content and preferred format of TSs over time. In determining the acceptability of such changes, the staff interprets the requirements of 10 CFR 50.36, using as a model the accumulation of generically-approved guidance in the improved Standard Technical Specifications. For this review, the staff used NUREG-1433, Revision 3, "Standard Technical Specifications, General Electric Plants BWR [boiling-water reactor]/4." NUREG-1433, does not require a flow surveillance test for the containment spray nozzles. However, the current VYNPS TSs, in SR 4.5.B.1, "Containment Spray Cooling Capability," require an air flow test of the drywell headers and nozzles during each 5-year period to verify that the spray headers and nozzles are unobstructed.

License amendments, similar to the proposed VYNPS amendment, have been issued for the Perry, Clinton, North Anna, Pilgrim, South Texas, Calvert Cliffs, Beaver Valley, Byron/Braidwood, H. B. Robinson, Palisades, Salem, and Surry Power Stations.

3.0 TECHNICAL EVALUATION

3.1 Introduction

The VYNPS residual heat removal (RHR) system has a containment cooling mode of operation. In the containment cooling mode of operation, the RHR system can be used for suppression pool cooling or containment spray. The drywell spray portion of the containment cooling mode of the RHR system is designed to provide a means to control both temperature and pressure inside the primary containment under post-accident conditions. For drywell spraying, flow can

be manually directed through two spray headers. Each drywell spray header is capable of providing approximately 6650 gpm of spray flow. The licensee indicated that each header has 140 fog-type spray nozzles capable of being supplied by the respective RHR subsystem. The spray nozzles are made of corrosion-resistant brass and each nozzle assembly consists of seven individual spray caps. The header and spray nozzles are normally maintained dry and isolated from the water sources in the RHR systems by motor-operated valves. Further, the primary containment is inerted with nitrogen during plant operation, thus minimizing the potential for corrosion product formation.

The proposed SR is designed to verify that the spray nozzles are not obstructed. The licensee indicated that the periodic air tests currently performed in accordance with this surveillance every five years are hazardous to the personnel performing this surveillance from an industrial safety perspective, as the workers must access the upper regions of the drywell. Also, workers are exposed to high levels of radiation while performing this surveillance. The two potential modes of blockage are by corrosion products or by debris (foreign material). This safety evaluation will address these blockage modes as well as a discussion of industry and plant-specific testing experience.

3.2 Industry and Plant-Specific 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 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 some exceptions identified in containment spray and fire protection systems in which water leakage resulted in corrosion which resulted in some, but not complete, blockage.

The licensee indicated that a review of VYNPS historical surveillance records dating from 1986 to present, identify only one instance (April 1995) of blockage of three individual drywell spray caps due to rust. The rust particulars were characterized as <1/16" in size and would likely have passed through the 1/8" spray nozzle orifices at actual system operating pressures. There are 140 nozzles with seven spray caps per nozzle, or 980 spray caps in each drywell spray loop. This condition constituted a 0.3 percent failure rate for this particular spray header surveillance. Surveillance testing conducted in 2001 did not detect any blockages at all. Considering the margin in the system design, that this occurred in only one of the redundant spray loops during one surveillance interval, it is considered insignificant to the operation of the sprays.

3.3 Materials and Corrosion

The drywell spray nozzles are made of corrosion-resistant brass 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. The headers are also equipped with a drain line to remove any water that enters the headers as a result of periodic valve surveillance testing. The upper header is considered self-draining due to the location and orientation of the spray nozzles. 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 air atmosphere during refueling operations. Accordingly, the NRC 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 Exclusion

The licensee indicated that the foreign material exclusion (FME) program at VYNPS requires that breaches of system boundaries be protected from the intrusion of foreign materials. The FME program provides guidelines that establish cleanliness requirements and accounting of materials, tools and parts to preclude the introduction of foreign materials into systems and components during maintenance, modification, test or inspection activities. The FME controls include covers/barriers for open pipes, in-process and closeout inspections, and accounting for all materials. These FME program controls are sufficient to ensure that material is not inadvertently introduced. This requirement applies to all work and inspection activities performed on safety-related systems and components such as the RHR system.

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 amendment, is sufficient to confirm the nozzles are free of blocking substance. 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. Consequently, the potential for unidentified nozzle obstruction or introduction of foreign material following maintenance is low. Also, due to the location and orientation of the spray headers and nozzles, introduction of foreign materials into the system through the nozzles is unlikely.

3.5 Conclusion

As a result of reviewing the licensee's request to revise the testing frequency for the drywell spray header and nozzle air test frequency from "during each 5-year period" 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 VYNPS containment spray cooling system and the foreign materials controls, 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 staff finds the proposed amendment request to be acceptable. The proposed change does not impact conformance with the requirements of draft GDC 60.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Vermont 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 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 76492). 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 Contributors: R. Goel
R. Ennis

Date: September 20, 2005