



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

April 26, 2013

Site Vice President  
Entergy Nuclear Operations, Inc.  
Vermont Yankee Nuclear Power Station  
P.O. Box 250  
Governor Hunt Road  
Vernon, VT 05354

SUBJECT: VERMONT YANKEE NUCLEAR POWER STATION - ISSUANCE OF  
AMENDMENT TO RENEWED FACILITY OPERATING LICENSE RE:  
RECIRCULATION SYSTEM DISCHARGE BYPASS VALVE CHANGE  
(TAC NO. ME8437)

Dear Sir or Madam:

The Nuclear Regulatory Commission (NRC) has issued the enclosed Amendment No. 257 to Renewed Facility Operating License No. DPR-28 for the Vermont Yankee Nuclear Power Station (VYNPS), in response to your application dated April 17, 2012.

The licensee's application for the proposed amendment revised the VYNPS Technical Specification (TS) 3.5.A.5 and TS 4.5.A.5 to change the normal position of the recirculation pump discharge bypass valves from "open" to "closed"; therefore, the valves' safety function to close in support of accident mitigation is eliminated. The amendment also revised the TSs to require the valves to remain closed and their position to be verified once per operating cycle.

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

Sincerely,

A handwritten signature in black ink, appearing to read "R. Guzman".

Richard V. Guzman, Senior Project Manager  
Plant Licensing Branch 1-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-271

Enclosures:

1. Amendment No. 257 to License No. DPR-28
2. Safety Evaluation

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

ENERGY NUCLEAR VERMONT YANKEE, LLC

AND ENERGY NUCLEAR OPERATIONS, INC.

DOCKET NO. 50-271

VERMONT YANKEE NUCLEAR POWER STATION

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 257  
Renewed 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) dated April 17, 2012, 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 as indicated in the attachment to this license amendment, and paragraph 3.B of the Renewed 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. 257, 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



Sean C. Meighan, Acting Chief  
Plant Licensing Branch I-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the License and  
Technical Specifications

Date of Issuance: April 26, 2013

ATTACHMENT TO LICENSE AMENDMENT NO. 257

RENEWED FACILITY OPERATING LICENSE NO. DPR-28

DOCKET NO. 50-271

Replace the following page of the Renewed Facility Operating License with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

Remove Page

3

Insert Page

3

Replace the following page of Appendix A, Technical Specifications, with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

Remove Page

102

Insert Page

102

- D. Entergy Nuclear Operations, Inc., pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess, and use in amounts as required any Byproduct, source, or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components.
  - E. Entergy Nuclear Operations, Inc., pursuant to the Act and 10 CFR Parts 30 and 70, to possess, but not to separate, such byproduct and special nuclear material as may be produced by operation of the facility.
3. This renewed license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations: 10 CFR Part 20, Section 30.34 of 10 CFR Part 30, Section 40.41 of 10 CFR Part 40, Section 50.54 and 50.59 of 10 CFR Part 50, and Section 70.32 of 10 CFR Part 70; and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified below:
- A. Maximum Power Level

Entergy Nuclear Operations, Inc. is authorized to operate the facility at reactor core power levels not to exceed 1912 megawatts thermal in accordance with the Technical Specifications (Appendix A) appended hereto.
  - B. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 257 are hereby incorporated in the license. Entergy Nuclear Operations, Inc. shall operate the facility in accordance with the Technical Specifications.
  - C. Reports

Entergy Nuclear Operations, Inc. shall make reports in accordance with the requirements of the Technical Specifications.
  - D. This paragraph deleted by Amendment No. 226.
  - E. Environmental Conditions

Pursuant to the Initial Decision of the presiding Atomic Safety and Licensing Board issued February 27, 1973, the following conditions for the protection of the environment are incorporated herein:

    - 1. This paragraph deleted by Amendment No. 206, October 22, 2001.
    - 2. This paragraph deleted by Amendment 131, 10/07/91.

### 3.5 LIMITING CONDITION FOR OPERATION

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5. All recirculation pump discharge valves shall be operable or closed and all recirculation pump discharge bypass valves shall be closed prior to reactor startup.
6. If the requirements of Specifications 3.5.A cannot be met, an orderly shutdown of the reactor shall be initiated and the reactor shall be in a cold shutdown condition within 24 hours.

#### B. Containment Spray Cooling Capability

1. Both containment cooling spray loops are required to be operable when the reactor water temperature is greater than 212°F except that a Containment Cooling Subsystem may be inoperable for thirty days.
2. If this requirement cannot be met, an orderly shutdown shall be initiated and the reactor shall be in the cold shutdown condition within 24 hours.

### 4.5 SURVEILLANCE REQUIREMENT

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5. Operability testing of recirculation pump discharge valves shall be in accordance with Specification 4.6.E. The recirculation pump discharge bypass valves shall be verified closed once per operating cycle.

#### B. Containment Spray Cooling Capability

1. Surveillance of the drywell spray loops shall be performed as follows. An air test shall be performed on the drywell spray headers and nozzles following maintenance that could result in nozzle blockage.
2. Deleted.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 257 TO

RENEWED FACILITY OPERATING LICENSE NO. DPR-28

ENERGY NUCLEAR VERMONT YANKEE, LLC

AND ENERGENCY NUCLEAR OPERATIONS, INC.

VERMONT YANKEE NUCLEAR POWER STATION

DOCKET NO. 50-271

1.0 INTRODUCTION

By letter dated April 17, 2012 (Agencywide Documents Access and Management System Accession No. ML12110A414) Entergy Nuclear Operations, Inc. (Entergy, the licensee) submitted a license amendment request (LAR) for changes to the Vermont Yankee Nuclear Power Station (VYNPS) Technical Specifications (TSs).

The proposed change would revise TSs 3.5.A.5 and 4.5.A.5 to change the requirements for the recirculation pump discharge bypass valves. The proposed requirements will be that they are closed prior to reactor startup and that they are verified closed once per operating cycle.

The licensee discovered issues with the "A" recirculation pump discharge bypass valve when they performed valve testing. The licensee evaluated dose and technical aspects of repairing the valve and decided to change the valve's normal position from open to closed. The licensee then declared the discharge bypass valve inoperable and closed it along with the "B" valve as the current TS allows.

2.0 REGULATORY EVALUATION

The regulatory requirements and guidance which the NRC staff considered in assessing the proposed TS change are as follows:

Section 182a of the Atomic Energy Act requires applicants for nuclear power plant operating licenses to include TSs as part of the license. In Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.36, "Technical Specifications," the Commission established its regulatory requirements related to the content of TSs. Pursuant to 10 CFR 50.36(c), TSs are required to include items in the following categories: (1) safety limits, limiting safety system settings and control settings, (2) limiting conditions for operation (LCOs), (3) Surveillance Requirements (SRs), (4) design features, (5) administrative controls, (6) decommissioning, (7) initial notification, and (8) written reports.

As stated in 10 CFR 50.36(c)(2)(i), the "Limiting conditions for operation are the lowest functional capability or performance levels of equipment required for safe operation of the facility. When a limiting condition for operation of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the technical specification..." Criterion 3 of 10 CFR 50.36(c)(2)(ii) requires an LCO to be established for a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design-basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

### 3.0 TECHNICAL EVALUATION

#### 3.1 Licensee's Proposed Change

TS 3.5.A.5 currently reads:

All recirculation pump discharge valves and bypass valves shall be operable or closed prior to the reactor startup.

The proposed TS 3.5.A.5 would read:

All recirculation pump discharge valves shall be operable or closed and all recirculation pump discharge bypass valves shall be closed prior to reactor startup.

TS 4.5.A.5 currently reads:

Operability testing of recirculation pump discharge valves and bypass valves shall be in accordance with Specification 4.6.E.

The proposed TS 4.5.A.5 would read:

Operability testing of recirculation pump discharge valves shall be in accordance with Specification 4.6.E. The recirculation pump discharge bypass valves shall be verified closed once per operating cycle.

#### 3.2 Background

As stated in the licensee's LAR:

The reactor recirculation system consists of two recirculation pump loops external to the reactor vessel which provide the driving flow of water to the reactor vessel jet pumps. Each external loop consists of a downcomer, a motor-operated pump suction valve, a high capacity motor-driven pump, a motor-operated discharge valve with a motor-operated discharge bypass valve, a discharge riser containing a venture-type flow meter nozzle and a ring header which supplies five jet pump risers each with two jet pumps (for a total of ten per loop).

The water pumped through the external loops becomes the driving force for twenty jet pumps located in the reactor vessel annulus between the vessel wall and the core shroud. The water in the reactor annulus becomes the driven flow

of the jet pumps which is accelerated by and mixed with the driving flow. The two flows are discharged below the core and provide core coolant flow up through the cooling channels.

An increase in recirculation flow temporarily reduces the steam void volume in the core by removing the steam at a faster rate and replacing it with water. Since voids act as negative reactivity, this increase in removal rate adds positive reactivity to the core, which in turn causes reactor power level to increase. The increased steam generation rate increases the steam void volume in the core with a subsequent negative reactivity effect, and thereby, a new higher power level is established. When recirculation flow is reduced, the power level is reduced in a similar manner, i.e., by the formation of voids.

### 3.3 NRC Staff Evaluation

The licensee's Updated Final Safety Analysis Report (UFSAR) in section 4.3.4, currently states,

There is a 4-inch bypass line around each pump discharge gate valve in the recirculation loop. The bypass discharge gate valve is maintained in the closed position. The bypass line is used to preheat an idle loop by reverse flow prior to returning a pump to service by keeping the discharge valve partially open. The pump is started at slow speed with the main discharge valve closed. The discharge valve is jogged open with the nuclear system at full pressure. (Reference 4.3.7.7) Pump speed cannot be increased until after the main valve has been opened.

The licensee's engineering change provides for the discharge bypass valve to remain closed. The discharge valve would then be jogged open during the recirculation system startup. When the pump starts, the inactive loop discharge valve would be jogged open while the discharge bypass valve would remain closed.

The safety function of the recirculation discharge bypass valves and discharge valves are also explained in the licensee's UFSAR. The valves are required to be closed to support Low Pressure Coolant Injection (LPCI) following a Loss of Coolant Accident (LOCA). For the startup of a cold loop, the licensee provided reference to General Electric (GE) safety analysis. The analysis concluded that operating the recirculation system with the discharge bypass valve open has a negligible effect on the primary coolant system flow. They also concluded that the position of the discharge bypass valve does not affect core characteristics such as void fraction. The change would have the startup of a cold loop occur with the discharge bypass valve closed as opposed to open in the current assumptions. The licensee stated that the GE analysis showed that the TS change would not affect the current safety analysis. The NRC staff reviewed the conclusions and found them to be acceptable and that no change in the safety analysis occurs.

The NRC staff reviewed the proposed change to TS 3.5.A.5 to leave the recirculation pump discharge bypass valve closed as well as the proposed change to TS 4.5.A.5 to verify that it is closed once per operating cycle. The NRC staff has concluded that the proposed TS changes will not affect the current accident analysis. The valve has a safety related function to close during accident scenarios that include LPCI operation following a LOCA. Placing the valves into the closed position and taking steps to ensure that they remain closed puts the valve in a position that satisfies their safety related function. Therefore, the NRC staff finds the proposed changes to be acceptable and that the current accident analysis remains valid.

### 3.3 NRC Staff Conclusion

The NRC staff has reviewed the proposed TS changes to TSs 3.5.A.5 and 4.5.A.5 regarding changing the requirement of the recirculation pump discharge bypass valves from "operable or closed prior to reactor startup" to "closed prior to reactor startup." The NRC staff concludes that the recirculation pump discharge bypass valves remaining closed put the valves into their safety related position. Operation in this position would allow the plant to continue to operate in a safe configuration and meet its current accident analysis. Therefore, the NRC staff has concluded that the proposed TS changes are acceptable.

### 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. 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 (77 FR 60150). 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) there is reasonable assurance that 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. Miller, NRR/DSS/SRXB

Date: April 26, 2013

April 26, 2013

Vice President, Operations  
Entergy Nuclear Operations, Inc.  
Vermont Yankee Nuclear Power Station  
P.O. Box 250  
Governor Hunt Road  
Vernon, VT 05354

**SUBJECT: VERMONT YANKEE NUCLEAR POWER STATION - ISSUANCE OF  
AMENDMENT TO RENEWED FACILITY OPERATING LICENSE RE:  
RECIRCULATION SYSTEM DISCHARGE BYPASS VALVE CHANGE  
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Sincerely,  
*/ra/*  
Richard V. Guzman, Senior Project Manager  
Plant Licensing Branch 1-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

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**Accession No.: ML13105A175** \*SE Input via memo. No substantial changes made. NRR-106

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DATE	4/17/13	4/17/13 4/26/13	3/7/13	4/24/13	4/22/13	4/26/13

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