

November 17, 2000

Mr. Michael A. Balduzzi
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SUBJECT: VERMONT YANKEE NUCLEAR POWER STATION - ISSUANCE OF
AMENDMENT RE: EMERGENCY CORE COOLING SYSTEM
REQUIREMENTS DURING COLD SHUTDOWN AND REFUELING (TAC NO.
MB0048)

Dear Mr. Balduzzi:

The Commission has issued the enclosed Amendment No. 195 to Facility Operating License DPR-28 for the Vermont Yankee Nuclear Power Station, in response to your application dated September 19, 2000.

The amendment revises the Technical Specifications to establish operability requirements to ensure that adequate reactor coolant inventory and sufficient heat removal capability exist during cold shutdown and refueling conditions.

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 P. Croteau, Sr. 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. 195 to
License No. DPR-28
2. Safety Evaluation

cc w/encls: See next page

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VERMONT YANKEE NUCLEAR POWER CORPORATION

DOCKET NO. 50-271

VERMONT YANKEE NUCLEAR POWER STATION

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 195
License No. DPR-28

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment filed by the Vermont Yankee Nuclear Power Corporation (the licensee) dated September 19, 2000, 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. 195 , 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/

James W. Clifford, 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: November 17, 2000

ATTACHMENT TO LICENSE AMENDMENT NO. 195

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 vertical lines in the margin indicating the area of change.

Remove

108

109

-

111a

112

Insert

108

109

109a

111a

112

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 195 TO FACILITY OPERATING LICENSE NO. DPR-28

VERMONT YANKEE NUCLEAR POWER CORPORATION

VERMONT YANKEE NUCLEAR POWER STATION

DOCKET NO. 50-271

1.0 INTRODUCTION

By letter dated September 19, 2000, the Vermont Yankee Nuclear Power Corporation (the licensee) submitted a request to amend the Vermont Yankee Nuclear Power Station (VY) Technical Specifications (TSs). The licensee proposed to establish operability requirements to ensure that adequate reactor coolant inventory and sufficient heat removal capability exist during cold shutdown and refueling conditions.

2.0 BACKGROUND

Emergency core cooling system (ECCS) performance is evaluated for the entire spectrum of break sizes for a postulated loss of coolant accident (LOCA). Only one low pressure ECCS injection/spray subsystem is required for long term cooling, post LOCA. The low pressure ECCS injection/spray subsystems consist of two core spray and two low pressure coolant injection (LPCI) subsystems. Each core spray subsystem requires one motor driven pump, piping, and valves to transfer water from the suppression pool or condensate storage tank to the reactor pressure vessel (RPV). In addition, during cold shutdown and refueling conditions, each LPCI subsystem requires one motor driven pump, piping, and valves to transfer water from the suppression pool to the RPV.

TS 3.5, "Core and Containment Cooling Systems," provides the requirements for these systems. TSs 3.5.H.3 and 3.5.H.4 address requirements for these systems when irradiated fuel is in the reactor vessel and the reactor is in the cold shutdown or refueling condition. The licensee only proposed changes affecting the requirements when irradiated fuel is in the reactor vessel and the reactor is in the cold shutdown or refueling condition.

With irradiated fuel in the reactor vessel and with the reactor in the cold shutdown or refueling condition, it is necessary to ensure that the fuel remains covered with water to minimize any potential fission product release to the environment. An ECCS system may be needed to inject water to keep the fuel covered when operations with a potential for draining the reactor vessel (OPDRV) are being conducted.

3.0 EVALUATION

The licensee proposed changes to TS 3.5.H, "Minimum Core and Containment Cooling System Availability."

3.1 TS 3.5.H.3

The licensee proposed revising TS 3.5.H.3 by adding "either a refueling or" to the following, as indicated by underline:

When irradiated fuel is in the reactor vessel and the reactor is in either a refueling or cold shutdown condition, all Core and Containment Cooling subsystems may be inoperable provided no work is permitted which has the potential for draining the reactor vessel.

The licensee presented the following justification for the change. During cold shutdown the energy in the reactor core is significantly decreased and the low heat generation rate places the reactor in a safer condition. If all activities having a potential for inadvertently draining the reactor vessel are halted, there is no significant safety need for operation of core and containment cooling subsystems under these conditions. The addition of "refueling conditions" to the applicability does not significantly change shutdown risk already applicable to a "cold shutdown condition." Because the purpose for requiring ECCS capability during refueling and cold shutdown conditions is to provide core reflood capability in the unlikely event of an inadvertent vessel draindown, ECCS operability is not necessary when OPDRVs are not in progress.

The expanded applicability of TS 3.5.H.3 to "refueling conditions" also applies to the availability of containment cooling systems. The licensee stated that because containment cooling systems serve no safety function during refueling conditions, such systems are not required to be operable.

The staff finds the proposed change to TS 3.5.H.3 acceptable because the ECCS system requirements for "cold shutdown" and "refueling" are the same and the current VY TSs do not require ECCS systems when in cold shutdown and no OPDRVs occurring. In addition, containment cooling systems are not necessary in these conditions because containment cooling systems serve no safety function during refueling or cold shutdown conditions.

3.2 TS 3.5.H.4

The licensee also proposed changing TS 3.5.H.4 from:

When irradiated fuel is in the reactor vessel and the reactor is in the refueling condition, both LPCI subsystems, or both Core Spray systems, or one diesel generator may be inoperable provided that a source of water of greater than 300,000 gal. is available to the operable core cooling subsystem.

to:

When (1) irradiated fuel is in the reactor vessel; (2) the reactor is in either a cold shutdown or refueling condition; and (3) operations with a potential for draining the reactor vessel are in progress:

- a. Two low pressure ECCS injection/spray subsystems and one diesel generator associated with one of the ECCS subsystems shall be operable.
- b. A source of water >300,000 gallons shall be available to the operable ECCS subsystems. With <300,000 gallons available, all ECCS injection/spray subsystems shall be considered inoperable.
- c. With Specification 3.5.H.4.a not met, but with one low pressure ECCS injection/spray subsystem operable, restore compliance within 4 hours.
- d. If the required action and associated completion time of Specification 3.5.H.4.c are not met, or if no low pressure ECCS injection/spray subsystems are operable, immediately initiate action to suspend operations with a potential for draining the reactor vessel.

The licensee stated that the primary focus of TSs 3.5.H.3 and 3.5.H.4 is to ensure adequate reactor coolant inventory during refueling and cold shutdown conditions. This safety objective is unchanged and continues to be supported by the proposed change.

As previously discussed, TS 3.5.H.3 will address the circumstances of no OPDRVs during cold shutdown and refueling, and TS 3.5.H.4 will address the circumstances with OPDRVs during cold shutdown and refueling conditions to minimize the potential for confusion.

The licensee stated that TS 3.5.H.4 is being restructured to specifically state the operability requirements, rather than inoperability allowances and inferred requirements. By restating the TS in this manner, ambiguity and potential confusion will be reduced. In addition, actions and associated completion times are included in the revised TSs to address instances when limiting conditions for operation are not met.

As an alternative to the current TS requirements, a third combination of two low pressure ECCS subsystems is being added to TS 3.5.H.4 to satisfy the operability requirements regarding the reflood function during cold shutdown and refueling operations. As proposed, the revised TS may be satisfied through the operability of any of the following three combinations of low pressure ECCS injection/spray subsystems (and one associated emergency power supply):

- Two LPCI subsystems
- Two core spray subsystems; or
- One LPCI subsystem and one core spray subsystem.

The licensee stated that the intent of TS 3.5.H.4 is to establish operability requirements for low pressure ECCS (and associated emergency power supplies) during refueling operations when operations having the potential for inadvertently draining the reactor vessel are in progress. By having a source of vessel reflood capability available, coolant inventory makeup can be provided in the event of an unintended draindown. The proposed change expands the applicability of TS 3.5.H.4 to include a "cold shutdown condition." The potential for inadvertent

vessel draindown during the cold shutdown condition with OPDRVs is comparable to the potential during refueling conditions with OPDRVs in progress. Therefore, for completeness, the applicability of TS 3.5.H.4 is being expanded to include ECCS requirements during a cold shutdown condition.

In addition, the licensee stated that the low pressure ECCS injection/spray subsystems provide a method of reflooding the reactor pressure vessel to maintain coolant inventory and provide heat removal capability. This specification ensures that this function is met with a single low pressure ECCS injection/spray subsystem, assuming a failure of one subsystem. If OPDRVs are in progress with irradiated fuel in the reactor vessel, operability of low pressure ECCS injection/spray subsystems is required to ensure capability to maintain adequate reactor vessel water level in the event of inadvertent reduction in reactor coolant inventory.

The staff finds the proposed change to specify low pressure ECCS requirements “when (1) irradiated fuel is in the reactor vessel; (2) the reactor is in either a cold shutdown or refueling condition; and (3) operations with a potential for draining the reactor vessel are in progress” is acceptable because core reflood capability may be needed in these conditions.

3.2.1 TS 3.5.H.4.a

Long term cooling analysis following a design basis LOCA demonstrates that only one low pressure ECCS injection/spray subsystem is required, post LOCA, to maintain adequate reactor vessel water level in the event of an inadvertent drain down. As stated in NUREG-1433, Vol. 1, Rev. 2, “Standard Technical Specifications General Electric Plants, BWR4,” the staff considers that it is reasonable, based on engineering judgement, that while in cold shutdown or refueling, one low pressure ECCS injection/spray system can maintain adequate reactor vessel water level. This ensures adequate coolant inventory and sufficient heat removal capability for the irradiated fuel in the core in case of an inadvertent drain down of the vessel water level. To provide redundancy, a minimum of two low pressure ECCS injection/spray subsystems are required in cold shutdown or refueling.

The licensee stated that the requirement for operable diesel generators is modified to provide greater flexibility during refueling operations. With the plant in a cold shutdown condition (i.e., < 212 °F), the risk potential is significantly reduced. This is reflected in the reduced ECCS operability requirements. VY has conservatively required operability of an emergency power supply under such conditions to protect against any unexpected loss of normal power. However, one operable diesel generator supplying backup power to one of the operable low pressure ECCS injection/spray subsystems is adequate protection in this regard. Even assuming a loss of offsite power, the operable diesel generator, powering an operable ECCS subsystem, will continue to provide adequate core reflood capability. The proposed revision to TS 3.5.H.4 will continue to satisfy the intended safety function with a loss of normal power since one ECCS pump powered by one diesel generator provides sufficient pumping capacity. The licensee also stated that requiring the availability of both diesel generators during cold shutdown or refueling conditions is overly conservative and beyond normal requirements to satisfy the basic safety objective.

The staff considers the proposed TS change to specify that two low pressure ECCS injection/spray subsystems and one diesel generator associated with one of the ECCS subsystems shall be operable (proposed TS 3.5.H.4.a), to be acceptable because one ECCS

subsystem is necessary to maintain adequate reactor vessel water level and specifying two ECCS subsystems provides redundancy.

3.2.2 TS 3.5.H.4.b

The licensee stated that the availability of at least 300,000 gallons of makeup water is required to assure core flooding capability. The staff considers the change regarding specification of a source of water in excess of 300,000 (proposed TS 3.5.H.4.b) gallons to be administrative since the current TS contains this requirement. This proposed change is acceptable because it does not change the requirements of the current TS.

3.2.3 TS 3.5.H.4.c

Proposed TS 3.5.H.4.c requires that with one required low pressure ECCS injection/spray subsystem inoperable, or the associated diesel generator inoperable, compliance must be restored to an operable status within 4 hours. In this condition the remaining operable subsystem can provide sufficient vessel flooding capability to recover from an inadvertent vessel drain down. The 4-hour completion time for restoring the inoperable subsystem is reasonable based on the low probability of a vessel draindown event during this time period and considering the availability of another subsystem to provide makeup.

The staff considers the proposed TS change acceptable because the remaining operable subsystem can provide sufficient vessel flooding capability and based on the low probability of a vessel draindown event during this time period.

3.2.4 TS 3.5.H.4.d

In accordance with proposed TS 3.5.H.4.d, with the inoperable subsystem not restored to operable status in the required completion time or if no low pressure ECCS injection/spray subsystems are operable, action must be immediately initiated to suspend OPDRVs to minimize the probability of a vessel drain down and the subsequent potential for fission product release. Actions must continue until OPDRVs are suspended. The staff considers proposed TS 3.5.H.4.d acceptable because current TSs do not require ECCS injection/spray subsystems with OPDRVs suspended and make-up water is not needed to keep the core covered with OPDRVs suspended.

3.2.5 TS 3.5.H.4 Conclusion

The staff finds the proposed changes to TS 3.5.H.4. acceptable because one ECCS subsystem is necessary and sufficient to maintain adequate reactor vessel water level and specifying two ECCS subsystems provides redundancy in this condition.

3.3 Bases Changes

The licensee also proposed corresponding changes to the TS Bases. The staff does not object to the proposed TS Bases changes.

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 comment.

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 (65 FR 62393). 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: R. Croteau

Date: November 17, 2000

Vermont Yankee Nuclear Power Station

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