

March 30, 2001

Mr. Michael A. Balduzzi
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SUBJECT: VERMONT YANKEE NUCLEAR POWER STATION - ISSUANCE OF
AMENDMENT RE: LOW PRESSURE COOLANT INJECTION OPERABILITY
DURING HOT SHUTDOWN (TAC NO. MB0667)

Dear Mr. Balduzzi:

The Commission has issued the enclosed Amendment No. 199 to Facility Operating License DPR-28 for the Vermont Yankee Nuclear Power Station, in response to your application dated December 7, 2000.

The amendment revises Technical Specification 3.5.A.1 by adding a note regarding operability of the Low Pressure Coolant Injection system under certain restrictive conditions. The subject change would provide a clarification of system operability that would result in additional flexibility in operations during hot shutdown 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/

Robert M. Pulsifer, 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. 199 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 CORPORATION

DOCKET NO. 50-271

VERMONT YANKEE NUCLEAR POWER STATION

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 199
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 December 7, 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. 199, 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: March 30, 2001

ATTACHMENT TO LICENSE AMENDMENT NO. 199

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

99
110

Insert

99
110

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 199 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 December 7, 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 proposed amendment would revise TS 3.5.A.1 by adding a "Note" regarding operability of the Low Pressure Coolant Injection system (LPCI) under certain restrictive conditions. The subject change would provide a clarification of system operability that would result in additional flexibility in operations during hot shutdown conditions.

2.0 BACKGROUND

The approval of the license amendment request (LAR) will have two effects: (1) the licensee will have more flexibility in determining the OPERABILITY of the LPCI subsystem during certain plant activities; and (2) this change will allow the reactor to remain in a hot shutdown condition with both loops of Residual Heat Removal (RHR) system in shutdown cooling (SDC) during certain plant activities.

The LAR does not change in any way the design or function of any safety or non-safety-related systems/components previously reviewed by the NRC staff and found to be acceptable. The LAR asks that a generic position (that during hot shutdown OPERABILITY of LPCI does not require automatic initiation capability) be extended for VY. The proposed change adds a Note to TS 3.5.A.1, clarifying the alignment requirements for the LPCI subsystems.

2.1 Current TS 3.5.A.1 states:

Except as specified in Specifications 3.5.A.2 through 3.5.A.4 below and 3.5.H.3 and 3.5.H.4, both Core Spray and the LPCI Subsystems shall be operable whenever irradiated fuel is in the reactor vessel and prior to a reactor startup from the cold shutdown condition.

The proposed change would add an asterisk (*) after the word "operable" in the above sentence with a corresponding footnote which states:

*Note: During Hot Shutdown, LPCI subsystems may be considered OPERABLE during alignment and operation for decay heat removal with reactor vessel pressure less than the RHR shutdown cooling permissive pressure, if capable of being manually realigned and not otherwise inoperable.

In deciding the acceptability of this LAR, the staff used the following requirements, guidance, and information:

1. The definition of OPERABILITY in the VY TS;
2. The definition of Limiting Condition for Operation (LCO) in 10 CFR Part 50.36(c);
3. The description of the design basis function of the LPCI subsystem and shutdown cooling (SDC) as discussed in VY TS bases;
4. The description of the LPCI subsystem and SDC as provided in the LAR;
5. Precedent as contained in NUREG-1433, Revision 1, "Standard Technical Specifications, General Electric Plants, BWR/4" dated April 1995; and
6. Precedent as contained in recent Technical Specification conversions for Dresden Nuclear Power Station, Units 2 and 3, LaSalle County Station, Units 1 and 2, and Quad Cities Nuclear Power Station, Units 1 and 2.

The LAR also includes conforming changes to the TS Bases.

3.0 EVALUATION

The primary function of the RHR system is to provide core and containment cooling under normal and accident conditions. There are several operating modes of the RHR system. The two pertinent modes addressed in this safety evaluation are LPCI and SDC.

At VY each RHR loop consists of two pumps, one heat exchanger, and the piping and valves necessary to support the various modes of operation of the system. The LPCI mode of RHR is designed to automatically initiate on low-low reactor vessel water level or high drywell pressure (in accordance with TS Table 3.2.1 trip settings $\geq 82.5"$ above the top of the enriched fuel and ≤ 2.5 psig, respectively) to pump water into the reactor vessel to cool the core. The design basis accidents for which the LPCI mode is designed would begin at high reactor power and pressure, with significant reactor vessel inventory loss occurring before the vessel pressure would be low enough for the RHR pumps to inject water into the vessel.

The RHR SDC function, on the other hand, is designed to be manually initiated to remove decay heat from the reactor core after the reactor is already in a shutdown condition. The RHR system cannot be placed in the SDC mode until the reactor has been cooled down and depressurized below a pressure permissive. The RHR shutdown cooling permissive pressure (p) is set in accordance with TS Table 3.2.1 (i.e., $100 \leq p \leq 150$ psig) to protect RHR suction piping from over-pressurization. Therefore, when the RHR system is in the SDC mode of operation, reactor system pressure and core decay heat levels are significantly lower than the values assumed in the design of the LPCI system.

With the RHR system aligned to SDC, the system is not capable of automatically realigning to the LPCI mode if called upon. In the SDC mode, the torus suction valve for that loop will be shut and operator action will be required to open the valve to allow operation of the loop in the LPCI mode.

Although no specific analysis of LPCI initiation while in SDC mode has been performed, the allowance provided by the note being added to TS 3.5.A.1 is acceptable because: (1) a valid LPCI demand is highly unlikely while in SDC; (2) the energy requiring dissipation in Hot Shutdown, below 150 psig, is considerably less than that at 100% power with normal operating temperature and pressure, thus allowing time for manual action; and (3) re-establishing LPCI for operation only entails the repositioning of valves and resetting of pumps (if tripped). Further, because of the low probability of an event requiring ECCS initiation during shutdown cooling, the staff considers it appropriate to have the subsystems aligned for decay heat removal.

SDC evolutions are performed when reactor water level is well above elevations at which SDC would isolate or LPCI initiation signal would occur. A low reactor water level isolation signal while in SDC may indicate a Reactor Pressure Vessel (RPV) draindown problem. Because SDC could be the cause of the reduction in reactor water level, automatic vessel isolation is the first and most appropriate conservative action. The equipment interlocks that provide vessel isolation are designed to prevent draindown when in SDC.

The RHR SDC mode cannot be initiated until reactor pressure has been reduced to clear the shutdown cooling permissive interlock (i.e., $100 \leq p \leq 150$ psig). Typically, the reactor pressure is maintained less than 100 psig prior to initiating SDC to prevent an inadvertent isolation. Furthermore, in this condition, stresses in reactor coolant piping are much lower than during normal operating conditions, making the probability of a postulated double-ended guillotine pipe break remote (i.e., the LOCA scenario).

The current TS and the interpretation of LPCI OPERABILITY requires that the plant enter the LCO (i.e. declare LPCI inoperable) while the RHR is in the SDC mode in Hot Shutdown. This practice with its associated completion time to restore LPCI does not allow for extended SDC operation for plant maintenance activities that can only be performed during SDC operation such as noble metal chemical addition (NMCA). Entering an LCO should not be necessary for normal activities using systems as designed. At relatively low pressures and temperatures with the reactor shutdown (control rods inserted), operator manual action to realign two valves and, perhaps, restart a pump are adequate to meet the LPCI function.

At this reduced pressure the core spray system which is a backup for LPCI would normally be available for injecting adequate coolant to recover water level in the reactor pressure vessel if required and containment spray and suppression pool cooling modes of RHR operation would still be available. If necessary the realignment from the SDC operation into the LPCI mode of operation could easily and promptly be performed at the control room panel for RHR.

Unlike standard technical specifications (STS), the current VY TS 3.5 does not contain an explicit provision allowing LPCI subsystems to be considered operable when entering SDC during Hot Shutdown conditions. Many other BWRs now have this explicit provision specified in the TSs. Prior to STS, it was the practice of some BWRs to not enter a Limiting Condition for Operation (LCO) action when initiating SDC since this is a normal operating evolution. With the advent of STS, the need to enter the LCO was made explicit, but later mitigated by NRC through changes to the TSs.

This change does not affect the operability of other safety systems, such as core spray, from being able to meet their intended safety functions. With the reactor in Hot Shutdown, at relatively low pressure and temperature, control rods inserted, it is reasonable to assume that the remaining complement of low pressure ECCS subsystems would provide the required cooling, thereby allowing operation of RHR in the SDC mode. Even without full automatic LPCI injection capability, under the defined conditions, manual actions can easily and promptly be taken to realign LPCI, if necessary.

This proposed change is consistent with "Standard Technical Specifications General Electric Plants, BWR/4," dated April 7, 1995. STS Surveillance Requirement (SR) 3.5.2.1 contains a note that is very similar to the note proposed for VY TS 3.5.A.1. Since the note is used to determine system operability, the staff considers that the subject note is better incorporated into an LCO than an SR.

The NRC finds that the proposed changes will allow safe operation with these modifications to the LPCI subsystem TS LCO. The NRC staff, therefore, concludes that the proposed TS changes are acceptable.

We have also reviewed the applicable changes to the Bases for agreement with the reasoning in support of the TSs and have no objection to these 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 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 (66 FR 7686). 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.

5.0 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: Jack Foster

Date: March 30, 2001