

April 26, 1999

Mr. Gregory A. Maret
Director of Operations
Vermont Yankee Nuclear Power Corporation
185 Old Ferry Road
Brattleboro, VT 05301

SUBJECT: VERMONT YANKEE NUCLEAR POWER STATION - ISSUANCE OF
AMENDMENT RE: EMERGENCY CORE COOLING SYSTEM ACTUATION
INSTRUMENTATION (TAC NO. MA4010)

Dear Mr. Maret:

The Commission has issued the enclosed Amendment No. 170 to Facility Operating License No. DPR-28, for the Vermont Yankee Nuclear Power Station in response to your application dated November 2, 1998. The amendment changes the Technical Specifications to more clearly describe the emergency core cooling system actuation instrumentation for the low pressure coolant injection and core spray systems.

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

Sincerely,

ORIGINAL SIGNED BY:

Richard P. Croteau, 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.170 to License No. DPR-28
2. Safety Evaluation

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

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A copy of the related Safety Evaluation is enclosed. 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. Croteau", written over a horizontal line.

Richard P. Croteau, Project Manager, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-271

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Vermont Yankee Nuclear Power Station

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

VERMONT YANKEE NUCLEAR POWER CORPORATION

DOCKET NO. 50-271

VERMONT YANKEE NUCLEAR POWER STATION

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 170
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 November 2, 1998, 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.

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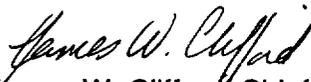
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 3.B of Facility Operating License No. DPR-28 is hereby amended to read as follows:

(B) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No.170 , 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 is to be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION



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: April 26, 1999

ATTACHMENT TO LICENSE AMENDMENT NO. 170

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. These revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

<u>Remove</u>	<u>Insert</u>
38	38
39	39
79	79

VYNPS

TABLE 3.2.1

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

Core Spray - A & B (Note 1)			
<u>Minimum Number of Operable Instrument Channels per Trip System</u>	<u>Trip Function</u>	<u>Trip Level Setting</u>	<u>Required Action When Minimum Conditions For Operation Are Not Satisfied</u>
2	High Drywell Pressure (PT-10-101(A-D) (M))	≤ 2.5 psig	Note 2
2	Low-Low Reactor Vessel Water Level (LT-2-3-72(A-D) (M))	> 82.5 " above top of enriched fuel	Note 2
1	Low Reactor Pressure (PT-2-3-56C/D(M))	$300 \leq P \leq 350$ psig	Note 2
2	Low Reactor Pressure (PT-2-3-56A/B(M) & PT-2-3-52C/D(M))	$300 \leq P \leq 350$ psig	Note 2
1	Pump Start Time Delay (14A-K16A & B)	$8 \leq t \leq 10$ seconds	Note 2
2	Pump (P-46-1A/B) Discharge Pressure (PS-14-44(A-D))	≥ 100 psig	Note 5
1	Auxiliary Power Monitor (LNPX C/D)	--	Note 5
1	Pump Bus Power Monitor (27/3A/B, 27/4A/B)	--	Note 5
1	Trip System Logic	--	Note 5

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TABLE 3.2.1
(Cont'd)EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

<u>Low Pressure Coolant Injection System A & B (Note 1)</u>			
<u>Minimum Number of Operable Instrument Channels per Trip System</u>	<u>Trip Function</u>	<u>Trip Level Setting</u>	<u>Required Action When Minimum Conditions For Operation Are Not Satisfied</u>
1	Low Reactor Pressure (PT-2-3-56C/D(M))	$300 \leq p \leq 350$ psig	Note 2
2	High Drywell Pressure (PT-10-101(A-D) (M))	≤ 2.5 psig	Note 2
2	Low-Low Reactor Vessel Water Level (LT-2-3-72(A-D) (S1))	> 82.5 " above top of enriched fuel	Note 2
1	Reactor Vessel Shroud Level (LT-2-3-73A/B(M))	$\geq 2/3$ core height	Note 5
1	Time Delay (10A-K72A & B)	≤ 60 seconds	Note 5
1	Pump Start Time Delay (10A-K50A & B)	$3 \leq t \leq 5$ seconds	Note 5
1	Low Reactor Pressure (PS-2-128A & B)	$100 \leq p \leq 150$ psig	Note 2
2 per pump	RHR Pump A-D Discharge Pressure (PS-10-105(A-H))	≥ 100 psig	Note 5
2	High Drywell Pressure (PT-10-101(A-D) (S1))	≤ 2.5 psig	Note 2

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BASES: 3.2 (Cont'd)

The Degraded Grid Protective System has been installed to assure that safety-related electrical equipment will not be subjected to sustained degraded voltage. This system incorporates voltage relays on 4160 Volt Emergency Buses 3 and 4 which are set to actuate at the minimum voltage required to prevent damage of safety-related equipment.

If Degraded Grid conditions exist for 10 seconds, either relay will actuate an alarm to alert operators of this condition. Based upon an assessment of these conditions the operator may choose to manually disconnect the off-site power. In addition, if an ESF signal is initiated in conjunction with low voltage below the relay setpoint for 10 seconds, the off-site power will be automatically disconnected.

The Reactor Core Isolation Cooling (RCIC) System provides makeup water to the reactor vessel during shutdown and isolation to supplement or replace the normal makeup sources without the use of the Emergency Core Cooling Systems. The RCIC System is initiated automatically upon receipt of a reactor vessel low-low water level signal. Reactor vessel high water level signal results in shutdown of the RCIC System. However, the system will restart on a subsequent reactor vessel low-low water level signal. The RCIC System is normally lined up to take suction from the condensate storage tank. Suction will automatically switch over from the condensate storage tank to the suppression pool on low condensate storage tank level.

Upon receipt of a LOCA initiation signal, if normal AC power is available, all RHR pumps and both Core Spray pumps start simultaneously with no intentional time delay. If normal AC power is not available, RHR pumps A and D start immediately on restoration of power, RHR pumps B and C start within 3 to 5 seconds of restoration of power and both Core Spray pumps start within 8 to 10 seconds of restoration of power. The purpose of these time delays is to stagger the start of the RHR and Core Spray pumps on the associated Division 1 and Division 2 Buses, thus limiting the starting transients on the 4.16 kV emergency buses. The time delay functions are only necessary when power is being supplied from the standby power sources (EDGs). The time delays remain in the pump start logic at all times as the time delay relay contact is in parallel with the Auxiliary Power Monitor relay contact. Either contact closure will initiate pump start. Thus, the time delays do not affect low pressure ECCS pump operation with normal AC power available. With normal AC power not available, the pump start relays which would have started the B and C RHR pumps and both Core Spray pumps are blocked by the Auxiliary Power Monitor contacts and the pump start time delay relays become the controlling devices.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO.170 TO FACILITY OPERATING LICENSE NO. DPR-28

VERMONT YANKEE NUCLEAR POWER CORPORATION

VERMONT YANKEE NUCLEAR POWER STATION

DOCKET NO. 50-271

1.0 INTRODUCTION

The Vermont Yankee Nuclear Power Station is a boiling water reactor (BWR), model BWR-4, with a Mark I containment. By letter dated November 2, 1998, the Vermont Yankee Nuclear Power Corporation, the licensee for the Vermont Yankee Nuclear Power Station, submitted for Nuclear Regulatory Commission (NRC) staff review a proposed change to the Technical Specifications (TSs). The licensee proposed changes to the TSs to more clearly describe the emergency core cooling system (ECCS) actuation instrumentation for the core spray (CS) system and low pressure coolant injection (LPCI) system or residual heat removal (RHR) system. The proposed changes to TS Table 3.2.1 involve the time delay relays for LPCI and CS pumps. These time delays are used to ensure, by load sequencing, that the emergency diesel generators (EDGs) are not overloaded when required to power pumps following an ECCS actuation and ensure that the loss-of-coolant accident (LOCA) safety analysis assumptions are met by providing flow within the time frames assumed in the LOCA analysis.

2.0 EVALUATION

2.1 Proposed Change to TS Table 3.2.1 for Time Delay (10A-K51A&B)

The licensee proposed to change the Vermont Yankee, TS Table 3.2.1 by deleting trip function "time delay (10A-K51A&B)" and all other associated information for this function. The licensee stated that the start sequence for the RHR pumps in response to an accident signal depends upon the availability of power to the emergency buses. If normal power is available, all RHR pumps start immediately and directly from the accident signal. If normal power is not available, the four RHR pumps will automatically start in a predetermined sequence after the associated EDG has powered the associated emergency bus. Two pumps will start immediately and two pumps approximately 5 seconds later. The timed starting sequence is provided to prevent overloading of the EDGs. Additional equipment is similarly sequenced on the emergency buses to ensure that the EDGs are not overloaded.

The relays that were used in the original plant design to accomplish the predetermined loading sequence for all four RHR pumps used time delay contacts with an adjustable range of 0.2 to 180 seconds (minimum setting of 200 milliseconds). Because of an inherent drift, these relays were subsequently replaced with General Electric (GE) specified replacement relays

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(GE SIL 230 R1), which provided an adjustable range of 0.5 to 15 seconds (minimum setting of 500 milliseconds). The minimum 0.5-second start time was considered conservative (the time was enveloped by the assumptions of the safety analysis of record) even though the time exceeded the TS Table 3.2.1 specified value of 0 second for that start time delay function. These relays have since been replaced with "instantaneous" logic sequence relays and the time delay function is no longer applicable. The instantaneous logic sequence relay will function to initiate RHR Pump A/D start within 35 milliseconds of reenergization of the associated emergency bus. The installation of the "instantaneous" logic sequence relays is consistent with the intent of the 0-second time delay which existed in the plant TS.

The RHR pump A/D start time is within the assumptions of the LOCA safety analysis of record. In the most limiting LOCA failure, two LPCI pumps are initiated at 28.1 seconds after the start of the LOCA accident (see Table 6.5.3 of the FSAR). Therefore, the licensee did not take credit for the initiation of the first set of pumps (LPCI A & D) for the most limiting failure. The second set of pump's start time of 5 seconds is covered by the time delay relay (10A-K50A & B) given in the ECCS system actuation table. Therefore, the actuation of the second set of pumps is within the design basis accident analysis and the proposed change is acceptable.

The deletion of the 0-second time delay trip function is consistent with the methodology existing in the TS for "instantaneous" logic sequence relays. A separate trip function is not listed for instantaneous relays, and these relays are functionally tested once per operating cycle under the trip system logic trip function. The only change is that a calibration will not be required for an instantaneous logic sequence relay.

The staff finds that calibration of this instantaneous relay is not necessary and this change is an improvement over the previous 500-millisecond time delay. The proposed change is acceptable since EDG loading requirements and LOCA safety analysis assumptions will continue to be met with the proposed change.

2.2 Proposed Change to TS Table 3.2.1 for Time Delay (10A-K50A&B)

The licensee proposed changing the Vermont Yankee TS Table 3.2.1 by adding a lower limit to the "trip level setting" for trip function "time delay (10A-K50A&B)." The licensee proposed revision of the trip level setting from " ≤ 5 seconds" to " $3 \leq t \leq 5$ seconds." Without a lower limit, the trip level setting of ≤ 5 seconds could allow the time delay to be set too low. As a result, the second two RHR pumps could start before the first two pumps have fully started and before EDG voltage and frequency have recovered. Therefore, a lower limit of 3 seconds is being proposed for the trip level setting. This proposed trip level setting of $3 \leq t \leq 5$ seconds has been evaluated in accordance with the Vermont Yankee instrument setpoint and uncertainty program and validated through testing performed during integrated ECCS testing.

The licensee stated that the addition of 3-second lower limits to the second RHR pump start time delay (10A-K50A/B) trip level setting is a more restrictive change that ensures a minimum time lapse between the instantaneous start of the first RHR pump and the sequential start of the second RHR pump on the associated 4-kV emergency bus (powered by the EDG).

The proposed change ensures that the EDG has sufficient time to recover from the loading of the first RHR Pump set (A/D) before the loading of the second RHR Pump set (B/C). Surveillance testing during the integrated ECCS test demonstrates that the EDG output voltage

recovers to the rated voltage within 3 seconds following the start of each load group. The proposed minimum 3-second delay is bypassed when normal power is available.

On the basis of its review, the staff finds that this change is acceptable since specification of a lower limit for this time delay ensures that the EDG will be not be overloaded by these pumps and the lower limit does not affect the LOCA safety analysis.

2.3 Proposed Change to TS Table 3.2.1 for Time Delay (14A-K16A&B)

The licensee proposed changing the Vermont Yankee TS Table 3.2.1 by adding a lower limit to the "trip level setting" for trip function "time delay (14A-K16A&B)." The licensee proposed revision of the trip level setting from " ≤ 10 seconds" to " $8 \leq t \leq 10$ seconds." Without a lower limit, the trip level setting of ≤ 10 seconds could allow the time delay to be set too low. As a result, the core spray pumps could start before the second set of RHR pumps have fully started and before EDG voltage and frequency have recovered. Therefore, a lower limit of 8 seconds is being proposed for the trip level setting. This proposed trip level setting of $8 \leq t \leq 10$ seconds has been evaluated in accordance with the Vermont Yankee instrument setpoint and uncertainty program and validated through testing performed during integrated ECCS testing.

The licensee stated that the addition of the 8-second lower limits to the core spray pump start time delay (14A-K16A/B) trip level setting is a more restrictive change which ensures a minimum time lapse between the B and C RHR pump start and the sequential start of the CS pump on the associated 4-kV emergency bus (powered by the EDG). Surveillance testing during the integrated ECCS test demonstrates that the EDG output voltage recovers to the rated voltage within 3 seconds following the start of each load group. The proposed minimum 8-second delay is bypassed when normal power is available.

On the basis of its review, the staff finds that this change is acceptable since specification of a the lower limit for this time delay ensures that the EDG will be not be overloaded by these pumps and the lower limit does not affect the LOCA safety analysis.

2.4 Proposed Change to TS 3.2 Bases

The licensee proposed modification of TS Bases 3.2 to include the following.

Upon receipt of a LOCA initiation signal, if normal ac power is available, all RHR pumps and both CS pumps start simultaneously with no intentional time delay. If normal ac power is not available, RHR Pumps A and D start immediately upon restoration of power, RHR Pumps B and C start within 3 to 5 seconds of restoration of power and both CS pumps start within 8 to 10 seconds of restoration of power. The purpose of these time delays is to stagger the start of the RHR and CS pumps on the associated Division 1 and Division 2 buses, thus limiting the starting transients on the 4.16-kV emergency buses. The time delay functions are only necessary when power is being supplied from the standby power sources (the EDGs). The time delays remain in the pump start logic at all times as the time delay relay contact is in parallel with the auxiliary power monitor relay contact. Either contact closure will initiate pump starts. Thus, the time delays do not affect low-pressure ECCS pump operation with normal ac power available. With normal ac power not available, the pump start relays that would have started the B and C RHR

pumps and both CS pumps are blocked by the auxiliary power monitor contacts and the pump start time delay relays become the controlling devices.

On the basis of its review, the staff finds that the licensee has revised the bases to adequately reflect the proposed changes to TS Table 3.2.1 previously discussed. The staff does not object to the proposed bases change.

2.5 Summary

In summary, the staff concludes that the proposed revisions to the TSs to: (1) eliminate the RHR Pump A and D time delay function (trip level setting - 0 second); (2) provide a lower limit of 3 seconds to the existing ≤ 5 second trip level setting for the RHR Pumps B and C start time delay function; (3) provide a lower limit of 8 seconds to the existing ≤ 10 second trip level setting for the CS pump start time delay function; and (4) modify the bases of TS Section 3.2 to include a discussion of the RHR Pumps A through D and CS Pumps A and B LOCA start sequences are acceptable since the changes ensure that EDG loading requirements and the LOCA safety analysis will continue to be met.

3.0 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.

4.0 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 surveillance requirements. 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 (64 FR 6714). 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 Contributors: Z. Abdullahi
A. Pal

Date: April 26, 1999

DATED: April 26, 1999

AMENDMENT NO. 170 TO FACILITY OPERATING LICENSE NO. DPR-28 VERMONT
YANKEE NUCLEAR POWER STATION

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