

Docket No.: 50-271

December 30, 1987

Mr. R. W. Capstick  
Licensing Engineer  
Vermont Yankee Nuclear Power  
Corporation  
1671 Worcester Road  
Framingham, Massachusetts 01701

SUBJECT: ISSUANCE OF AMENDMENT NO. 102 TO FACILITY OPERATING LICENSE NO. DPR-28  
(TAC# 64523) VERMONT YANKEE NUCLEAR POWER STATION

Dear Mr. Capstick:

The Commission has issued the enclosed Amendment No. 102 to Facility Operating License No. DPR-28 for the Vermont Yankee Nuclear Power Station. This amendment consists of changes to the Technical Specifications in response to your application dated January 16, 1987.

This amendment changes the Technical Specification to clarify and enhance limiting conditions of operation and surveillance requirements for the standby liquid control system.

A copy of our Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's Bi-Weekly Federal Register Notice.

Sincerely,

15/

Vernon L. Rooney, Project Manager  
Project Directorate I-3  
Division of Reactor Projects I/II

Enclosures:

- 1. Amendment No. 102 to DPR-28
- 2. Safety Evaluation

cc w/enclosures:

See next page

\*See previous concurrence

OFC	: PDI-3	: PDI-3	: OGC*	: D: PDI-3	:	:
NAME	: VRooney:lm	: MRushbrook	:	: RWessman	:	:
DATE	: 12/26/87	: 12/16/87	: 12/ /87	: 12/29/87	:	:

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Docket No.: 50-271

Mr. R. W. Capstick  
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Vermont Yankee Nuclear Power  
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1671 Worcester Road  
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Sincerely,

Vernon L. Rooney, Project Manager  
Project Directorate I-3  
Division of Reactor Projects, I/II

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See next page

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

DEC 30 1987

Docket No.: 50-271

Mr. R. W. Capstick  
Licensing Engineer  
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Sincerely,

A handwritten signature in dark ink, appearing to read "V. Rooney", written over a horizontal line.

Vernon L. Rooney, Project Manager  
Project Directorate I-3  
Division of Reactor Projects I/II

Enclosures:

1. Amendment No. 102 to DPR-28
2. Safety Evaluation

cc w/enclosures:  
See next page

Mr. R. W. Capstick

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Mr. R. W. Capstick

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Mr. Glenn O. Bright  
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Washington, DC 20555

AMENDMENT NO. 102 TO FACILITY OPERATING LICENSE DPR-28 -  
VERMONT YANKEE NUCLEAR POWER STATION

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Docket No. 50-271 ←

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J. Partlow

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ACRS (10)

E. Butcher

Wanda Jones

OPA

LFMB

Tech. Review Branch - T. Collins



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

VERMONT YANKEE NUCLEAR POWER CORPORATION

DOCKET NO. 50-271

VERMONT YANKEE NUCLEAR POWER STATION

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 102  
License No. DPR-28

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Vermont Yankee Nuclear Power Corporation (the licensee) dated January 16, 1987, 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 2.C.(2) of Facility Operating License No. DPR-28 is hereby amended to read as follows:

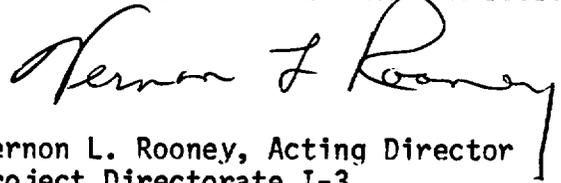
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(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 102, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective 30 days after the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Vernon L. Rooney, Acting Director  
Project Directorate I-3  
Division of Reactor Projects I/II

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: December 30, 1987

ATTACHMENT TO LICENSE AMENDMENT NO. 102

FACILITY OPERATING LICENSE NO. DPR-28

DOCKET NO. 50-271

Replace the following pages of the Appendix A Technical Specifications with the enclosed pages. The revised pages are identified by amendment number and contain vertical lines indicating the areas of change. The corresponding overleaf pages are provided to maintain document completeness.

<u>Remove Pages</u>	<u>Insert Pages</u>
79	79
--	79a*
80	80
83	83
84	84

\*Denotes new page

VYNPS

3.4 LIMITING CONDITIONS FOR OPERATION

4.4 SURVEILLANCE REQUIREMENTS

3.4 REACTOR STANDBY LIQUID CONTROL SYSTEM

Applicability

Applies to the operating status of the Reactor Standby Liquid Control System.

Objective

To assure the availability of an independent reactivity control mechanism.

Specification

A. Normal Operation

Except as specified in 3.4.B below, the Standby Liquid Control System shall be operable during periods when fuel is in the reactor unless:

1. The reactor is in cold shutdown  
  
and
2. Control rods are fully inserted and Specification 3.3.A is met.

4.4 REACTOR STANDBY LIQUID CONTROL SYSTEM

Applicability

Applies to the periodic testing requirements for the Reactor Standby Liquid Control System.

Objective

To verify the operability of the Standby Liquid Control System.

Specification

A. Normal Operation

At least monthly, the Standby Liquid Control System shall be verified operable by:

1. Operating each pump and recirculating demineralized water to the test tank. A minimum flow rate of 35 gpm at 1275 psig shall be verified for each pump.
2. Verifying the continuity of the explosive charges.

At least once during each operating cycle, the Standby Liquid Control System shall be verified operable by:

## VYNPS

### 3.4 LIMITING CONDITIONS FOR OPERATION

### 4.4 SURVEILLANCE REQUIREMENTS

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1. Testing that the setting of the pressure relief valves is between 1400 and 1490 psig.
2. Initiating one of the standby liquid control loops, excluding the primer chamber and inlet fitting, and verifying that a flow path from a pump to the reactor vessel is available by pumping demineralized water into the reactor vessel. Both loops shall be tested over the course of two operating cycles.
3. Testing the new trigger assemblies by installing one of the assemblies in the test block and firing it using the installed circuitry. Install the unfired assemblies, taken from the same batch as the fired one, into the explosion valves.
4. Recirculating the borated solution.

## 3.4 LIMITING CONDITIONS FOR OPERATION

B. Operation With Inoperable Components

From and after the date that a redundant component is made or found to be inoperable, reactor operation is permissible during the succeeding seven days unless such component is sooner made operable.

C. Liquid Poison Tank - Boron Concentration

At all times when the Standby Liquid Control System is required to be operable, the following conditions shall be met:

1. The net volume versus concentration of the sodium pentaborate solution in the standby liquid control tank shall meet the requirements of Figure 3.4.1.
2. The solution temperature, including that in the pump suction piping, shall be maintained above the curve shown in Figure 3.4.2.

D. If Specification 3.4.A or B is not met, an orderly shutdown shall be initiated and the reactor shall be in the cold shutdown condition within 24 hours.

E. If Specification 3.4.C is not met, action shall be immediately initiated to correct the deficiency. If at the end of 12 hours the system has not been restored to full operability, then a shutdown shall be initiated with the reactor in cold shutdown within 24 hours of initial discovery.

## 4.4 SURVEILLANCE REQUIREMENTS

B. Operation With Inoperable Components

When a component becomes inoperable, its redundant component shall be demonstrated to be operable immediately and daily thereafter.

C. Liquid Poison Tank - Boron Concentration

1. The solution volume in the tank and temperature in the tank and suction piping shall be checked at least daily.
2. Sodium pentaborate concentration shall be determined at least once a month and within 24 hours following the addition of water or boron, or if the solution temperature drops below the limits specified by Figure 3.4.2.

Bases:

### 3.4 & 4.4 REACTOR STANDBY LIQUID CONTROL SYSTEM

#### A. Normal Operation

The design objective of the Reactor Standby Liquid Control System is to provide the capability of bringing the reactor from full power to a cold, xenon-free shutdown assuming that none of the withdrawn control rods can be inserted. To meet this objective, the Liquid Control System is designed to inject a quantity of boron which produces a concentration of 800 ppm of boron in the reactor core in less than 138 minutes. An 800 ppm boron concentration in the reactor core is required to bring the reactor from full power to a 5%  $\Delta k$  subcritical condition. An additional margin (25% of boron) is added for possible imperfect mixing of the chemical solution in the reactor water. A minimum quantity of 3850 gallons of solution having a 10.1% sodium pentaborate concentration is required to meet this shutdown requirement.

The time requirement (138 minutes) for insertion of the boron solution was selected to override the rate of reactivity insertion due to cooldown of the reactor following the xenon poison peak. For a required minimum pumping rate of 35 gallons per minute, the maximum net storage volume of the boron solution is established as 4830 gallons.

Boron concentration, solution temperature, and volume are checked on a frequency to assure a high reliability of operation of the system should it ever be required. Experience with pump operability indicates that testing at monthly intervals is adequate to detect if failures have occurred. Flow, relief valve, circuitry, and trigger assembly testing at the prescribed intervals assures a high reliability of system operation capability. Recirculation of the borated solution is done during each operating cycle to ensure one suction line from the boron tank is clear.

#### B. Operation With Inoperable Components

Only one of the two standby liquid control pumping circuits is needed for proper operation of the system. If one pumping circuit is found to be inoperable, there is no immediate threat to shutdown capability, and reactor operation may continue while repairs are being made. Assurance that the remaining system will perform its intended function, and that the reliability of the system is good, is obtained by demonstrating operation of the pump in the operable circuit at least once daily.

#### C. Liquid Poison Tank - Boron Concentration

The solution saturation temperature varies with the concentration of sodium pentaborate. The solution shall be kept at least 10°F above the saturation temperature to guard against boron precipitation. The 10°F margin is included in Figure 3.8.3 of the FSAR. Temperature and liquid level alarms for the system are annunciated in the Control Room.

VYNPS

3.4 & 4.4 REACTOR STANDBY LIQUID CONTROL SYSTEM

Pump operability is checked at a frequency to assure a high reliability of operation of the system should it ever be required.

Once the solution has been made up, boron concentration will not vary unless more boron or more water is added. Level indication and alarm indicate whether the solution volume has changed which might indicate a possible solution concentration change. Considering these factors, the test interval has been established.

Sodium pentaborate concentration is determined within 24 hours following the addition of water or boron, or if the solution temperature drops below specified limits. The 24-hour limit allows for 8 hours of mixing, subsequent testing, and notification of shift.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 102

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 January 16, 1987 from W.P. Murphy to H.R. Denton, Vermont Yankee Nuclear Power Corporation (the licensee) requested changes to the Technical Specifications for Vermont Yankee Nuclear Power Station (VYNPS). The changes are intended to clarify the existing specifications for the Standby Liquid Control System (SLCS) through a more explicit statement of flow, relief valve, circuitry, and trigger assembly operability test requirements.

2.0 EVALUATION

As a result of problems identified during the 1986 SLCS surveillance test, wherein both redundant components of the SLCS were inoperable in that their explosive squib valves would not actuate, if required, to provide a flow path from the Standby Liquid Control System storage tank to the reactor vessel; the licensee initiated several corrective actions, including a review of the Technical Specifications pertaining to specific requirements concerning testing/surveillance of the SLCS.

In a May 22, 1986 letter to the NRC Region I Administrator, the licensee described, as follows, corrective actions taken to enhance the reliability of the SLCS:

"When purchasing new charges, we will specifically request a copy of the corresponding drawing. This drawing will be compared against the copy on file at the plant. Specifically, the reviewer will look for any changes that may exist between the new drawings and the file drawings; accuracy; traceability to the purchase order; and traceability to the assemblies to be used. If this review is satisfactory, three (3) new assemblies, all manufactured from the same batch, will be removed from Stores after confirming they will not exceed their shelf life during the next cycle and tested for pin-to-pin continuity. At this point, in accordance with Vermont Yankee's surveillance procedure requirements,

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operability of SLC System is demonstrated, in part by demonstrating detonation of both installed trigger assemblies. Subsequently, one of the three new assemblies is installed in the firing circuit and test fired to demonstrate acceptability of the batch. The remaining two new assemblies are then installed in the SLC Squib valves to render the system operable for the next operating cycle."

In the May 22, 1986 letter, the licensee also committed to propose appropriate technical changes concerning the SLCS testing and surveillance requirements consistent with the above program.

The VY Technical Specification Limiting Condition for Operation (LCO) 3.4.A requires the SLCS to be operable whenever fuel is in the reactor and the reactor mode switch is not in the shutdown position. Technical Specification LCO 3.4.B permits operation to continue in the existing mode for seven days if a redundant component of the SLCS is inoperable. Unless Technical Specification LCOs 3.4.A or 3.4.B are met, the reactor shall be in the cold shutdown condition within 24 hours.

The proposed change reformats Sections 3.4.A, 4.4.A, 3.4.C, and 4.4.C to clarify SLC operability and surveillance requirements. Further, the Section 4.4. surveillance requirement is revised to specify flow, relief valve, circuitry, and trigger assembly operability functional test surveillance requirements. In addition to the above, the Section 3.4 and 4.4. Bases Section is revised to specify the SLC System operability functional testing requirements.

The staff has reviewed the Technical Specification changes proposed by the licensee. The changes do not involve any modification to the SLCS system performance requirements, design basis, or setpoints. The changes constitute an enhancement of the wording of the existing specifications, and a clarification as to which tests are specifically required to demonstrate SLCS operability.

The Technical Specification changes proposed by the licensee constitute an improvement to the wording of the existing specifications without any relaxation of current requirements. As a result, we have concluded that they are acceptable.

### 3.0 ENVIRONMENTAL CONSIDERATIONS

This amendment involves a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The 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 published a proposed finding that the amendment involves no significant hazards consideration and there has been no public comment on such finding. 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.

#### 4.0 CONCLUSION

We have 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, and (2) such activities will be conducted in compliance with the Commission's regulations, and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: T. Collins and V. Rooney

Dated: December 30, 1987