October 28, 1985

Docket No. 50-271

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

Dear Mr. Capstick:

The Commission has issued the enclosed Amendment No. 91 to Facility Operating License No. DPR-28 for the Vermont Yankee Nuclear Power Station. The amendment consists of changes to the Technical Specifications in response to your application dated January 15, 1985.

The amendment revises the Technical Specifications to provide an iodine spike limit for the reactor coolant concentration, and to limit the opening of two purge and vent valves (V16-19-7 and 7a) to 50 degrees while the reactor is operating.

A copy of the Safety Evaluation is also enclosed.

Sincerely,

Original signed by/

Vernon L. Rooney, Project Manager
Operating Reactors Branch #2
Division of Licensing

Enclosures:
1. Amendment No. 91 to
   License No. DPR-28
2. Safety Evaluation

cc w/enclosure:
See next page

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P PDR

Mr. R. W. Capstick
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Vermont Yankee Nuclear Power Station

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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. 91
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 15, 1985 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:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 91 , 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 the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Domenic B. Vassallo, Chief
Operating Reactors Branch #2
Division of Licensing

Attachment:
Changes to the Technical
Specifications

Date of Issuance: October 28, 1985

ATTACHMENT TO LICENSE AMENDMENT NO. 91

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 areas are indicated by marginal lines.

Pages

106

106a (added)

107

107a (added)

119

135

146

3.6 LIMITING CONDITIONS FOR OPERATION	4.6 SURVEILLANCE REQUIREMENTS

3.6 REACTOR COOLANT SYSTEM

4.6 REACTOR COOLANT SYSTEM

Specification:

A. Pressure and Temperature Limitations (cont.)

5. The reactor vessel irradiation surveillance specimens shall be removed and examined to determine changes in material properties in accordance with the following schedule:

CAPSULE	REMOVAL YEAR
1	10
2	30
3	Standby

The results shall be used to update Figures 3.6.2 and 3.6.3. The removal times shall be referenced to the refueling outage following the year specified, referenced to the date of commercial operation.

3.6 B. Coolant Chemistry

1. a. During reactor power operation, the radioiodine concentration in the reactor coolant shall not exceed 1.1 microcuries of I-131 dose equivalent per gram of water, except as allowed in Specification 3.6.B.1.b.

4.6 B. Coolant Chemistry

1. a. A sample of reactor coolant shall be taken at least every 36 hours and analyzed for radioactive iodines of I-131 through I-135 during power operation. In addition, when steam jet air ejector monitors indicate an increase in radioactive gaseous effluents of 25 percent or 5000 uCi/sec, whichever is greater,

3.6 LIMITING CONDITIONS FOR OPERATION

3.6 REACTOR COOLANT SYSTEM

B. Coolant Chemistry (cont'd)

b. The radioiodine concentration in the reactor coolant shall not exceed 1.1 microcuries of I-131 dose equivalent per gram of water, for greater than 24 consecutive hours.

c. The radioiodine concentration in the reactor coolant shall not exceed 4.0 microcuries of I-131 dose equivalent per gram of water.

4.6 SURVEILLANCE REQUIREMENTS

4.6 REACTOR COOLANT SYSTEM

B. Coolant Chemistry (cont'd)

1. a. during steady state reactor operation a reactor coolant sample shall be taken and analyzed for radioactive iodines.

b. An isotopic analysis of a reactor coolant sample shall be made at least once per month.

c. Whenever the radioiodine concentration of prior steady-state reactor operation is greater than 0.011 uCi/gm but less than 0.11 µCi/gm, a sample of reactor coolant shall be taken within 24 hours of the next reactor startup and analyzed for radioactive iodines of I-131 through I-135.

d. Whenever the radioiodine concentration of prior steady-state reactor operation is greater than 0.11 µCi/gm, a sample of reactor coolant shall be taken prior to the

3.6 LIMITING CONDITIONS FOR OPERATION

3.6 REACTOR COOLANT SYSTEM

B. Coolant Chemistry (cont'd)

2. The reactor coolant water shall not exceed the following limits with steaming rates less than 100,000 pounds per hour except as specified in Specification 3.6.B.3:

Conductivity	5umho/cm
Chloride ion	0.1 ppm

3. For reactor startups the maximum value for conductivity shall not exceed 10 umho/cm and the maximum value for chloride ion concentration shall not

4.6 SURVEILLANCE REQUIREMENTS

4.6 REACTOR COOLANT SYSTEM

B. Coolant Chemistry (cont'd)

1. (cont'd) d. next reactor startup and analyzed for radioactive iodines of I-131 through I-135, as well as within 24 hours following a reactor startup.

e. With the radioiodine concentration in the reactor coolant greater than 1.1 microcuries/gram dose equivalent I-131, a sample of reactor coolant shall be taken every 4 hours and analyzed for radioactive iodines of I-131 through I-135, until the specific activity of the reactor coolant is restored below 1.1 microcuries/gram dose equivalent I-131.

2. During startups and at steaming rates below 100,000 pounds per hour, a sample of reactor coolant shall be taken every four hours and analyzed for conductivity and chloride content.

3. a. With steaming rates greater than or equal to 100,000 pounds per hour, a reactor coolant sample shall be

3.6 LIMITING CONDITIONS FOR OPERATION

3.6 REACTOR COOLANT SYSTEM

B. Coolant Chemistry (cont'd)

3. (cont'd) exceed 0.1 ppm, in the reactor coolant water for the first 24 hours after placing the reactor in the power operating condition.

4. Except as specified in Specification 3.6.B.3 above, the reactor coolant water shall not exceed the following limits with steaming rates greater than or equal to 100,000 pounds per hours.

Conductivity	5 uhmo/cm
Chloride ion	0.5 ppm

5. If Specification 3.6.B. is not met, an orderly shutdown shall be intitiated and the reactor shall be in the cold shutdown condition within 24 hours.

4.6 SURVEILLANCE REQUIREMENTS

4.6 REACTOR COOLANT SYSTEM

B. Coolant Chemistry (cont'd)

3. (cont'd) a. taken at least every 96 hours and when the continuous conductivity monitors indicate abnormal conductivity (other than short-term spikes), and analyzed for conductivity and chloride ion content.

b. When the continuous conductivity monitor is inoperable, a reactor coolant sample shall be taken every four hours and analyzed for conductivity and chloride ion content.

3.6 & 4.6 (cont'd)

calculated on the basis of the radioiodine concentration limit of 1.1 uCi of I-131 dose equivalent per gram of water, atmospheric diffusion from an equivalent elevated release of 10 meters at the nearest site boundary (190 m) for a X/Q = 3.9 x 10^{-3} sec/m^3 (Pasquill D and 0.33 m/sec equivalent), and a steam line isolation valve closure time of five seconds with a steam/water mass release of 30,000 pounds.

The iodine spike limit of four (4) microcuries of I-131 dose equivalent per gram of water provides an iodine peak or spike limit for the reactor coolant concentration to assure that the radiological consequences of a postulate LOCA are within 10CFR Part 100 dose guidelines.

The reactor coolant sample will be used to assure that the limit of Specification 3.6.B.1 is not exceeded. The radioiodine concentration would not be expected to change rapidly during steady-state operation over a period of 96 hours. In addition, the trend of the radioactive gaseous effluents, which is continuously monitored, is a good indicator of the trend of the radioiodine concentration in the reactor coolant. When a significant increase in radioactive gaseous effluents is indicated, as specified, an additional reactor coolant sample shall be taken and analyzed for radioactive iodine.

Whenever an isotopic analysis is performed, a reasonable effort will be made to determine a significant percentage of those contributors representing the total radioactivity in the reactor coolant sample. Usually at least 80 percent of the total gamma radioactivity can be identified by the isotopic analysis.

It has been observed that radioiodine concentration can change rapidly in the reactor coolant during transient reactor operations, such as reactor shutdown, reactor power changes, and reactor startup if failed fuel is present. As specified, additional reactor coolant samples shall be taken and analyzed for reactor operations in which steady-state radioiodine concentrations in the reactor coolant indicate various levels of iodine releases from the fuel. Since the radioiodine concentration in the reactor coolant is not continuously measured, reactor coolant sampling would be ineffective as a means to rapidly detect gross fuel element failures. However, some capability to detect gross fuel element failures is inherent in the radiation monitors in the off-gas system on the main steam line.

Materials in the primary system are primarily 304 stainless steel and Zircaloy. The reactor water chemistry limits are established to prevent damage to these materials. The limit placed on chloride concentration is to prevent stress corrosion cracking of the stainless steel.

TABLE 4.7.2.a

PRIMARY CONTAINMENT ISOLATION VALVES
VALVES SUBJECT TO TYPE C LEAKAGE TESTS

Isolation Group [1]	Valve Identification	Number of Power Operated Valves: Inboard	Number of Power Operated Valves: Outboard	Maximum Operating Time (sec)	Normal Position	Action on Initiating Signal
1	Main Steam Line Isolation (2-80A, D & 2-86A, D)	4	4	5(Note 2)	Open	GC
1	Main Steam Line Drain (2-74, 2-77)	1	2	35	Closed	SC
1	Recirculation Loop Sample Line (2-39, 2-40)	1	1	5	Closed	SC
2	RHR Discharge to Radwaste (10-57, 10-66)		2	25	Closed	SG
2	Drywell Floor Drain (20-82, 20-83)		2	20	Open	GC
2	Drywell Equipment Drain (20-94, 20-95)		2	20	Open	GC
3	Drywell Air Purge Inlet (16-19-9)		1	10	Closed	SC
3	Drywell Air Purge Inlet (16-19-8)		1	10	Open	GC
3	Drywell Purge & Vent Outlet (16-19-7A)		1	10	Closed*	SC
3	Drywell Purge & Vent Outlet Bypass (16-19-6A)		1	10	Closed	SC
3	Drywell & Suppression Chamber Main Exhaust (16-19-7)		1	10	Closed*	SC
3	Suppression Chamber Purge Supply (16-19-10)		1	10	Closed	SC
3	Suppression Chamber Purge & Vent Outlet (16-19-7B)		1	10	Closed	SC
3	Suppression Chamber Purge & Vent Outlet Bypass (16-19-6B)		1	10	Open	GC
3	Exhaust to Standby Gas Treatment System (16-19-6)		1	10	Open	GC
3	Containment Purge Supply (16-19-23)		1	10	Open	GC
3	Containment Purge Makeup (16-20-20, 16-20-22A, 16-20-22B)		3	NA	Closed	SC
5	Reactor Cleanup System (12-15, 12-18)	1	1	25	Open	GC
5	Reactor Cleanup System (12-68)		1	45	Open	GC
6	HPCI (23-15, 23-16)	1	1	55	Open	GC
6	RCIC (13-15, 13-16)	1	1	20	Open	GC
	Primary/Secondary Vacuum Relief (16-19-11A, 16-19-11B)		2	NA	Closed	SC
	Primary/Secondary Vacuum Relief (16-19-12A, 16-19-12B)		2	NA	Closed	Process
	Control Rod Hydraulic Return Check Valve (3-181)			NA	Open	Process
3	Containment Air Sampling (VG 23, VG 26, 109-76A&B)		4	5	Open	GC

* Valves 16-19-7 and 16-19-7A shall have stops installed to limit valve opening to 50° or less.

4.7.D. Primary Containment Isolation Valves

Those large pipes comprising a portion of the reactor coolant system whose failure could result in uncovering the reactor core are supplied with automatic isolation valves (except those lines needed for emergency core cooling system operation or containment cooling). The closure times specified herein are adequate to prevent loss of more cooling from the circumferential rupture of any of these lines outside the containment than from a steam line rupture. There, this isolation valve closure time is sufficient to prevent uncovering the core.

Purge and vent valve testing performed by Allis-Chalmers has demonstrated that all butterfly purge and vent valves installed at Vermont Yankee can close from full open conditions at design basis containment pressure. However, as an additional conservative measure, limit stops have been added to valves 16-19-7/7A, limiting the opening of these valves to 50° open while operating, as requested by NRC in their letter of May 22, 1984. (NVY 84-108)

In order to assure that the doses that may result from a steam line break do not exceed the 10CFR100 guidelines, it is necessary that no fuel rod perforation resulting from the accident occur prior to closure of the main steam line isolation valves. Analyses indicate the fuel rod cladding perforations would be avoided for the main steam valve closure times, including instrument delay, as long as 10.5 seconds. The test closure time limit of five seconds for these main steam isolation valves provides sufficient margin to assure that cladding perforations are avoided and 10CFR100 limits are not exceeded. Redundant valves in each line insure that isolation will be effected applying the single failure criteria.

The main steam line isolation valves are functionally tested on a more frequent interval to establish a high degree of reliability.

The containment is penetrated by a large number of small diameter instrument lines. A program for periodic testing and examination of the flow check valves in these lines is performed similar to that described in Amendment No. 23, Millstone Unit 1, Docket 50-245.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 91 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 15, 1985, Vermont Yankee Nuclear Power Corporation (the licensee/VYNPC) proposed a change to Sections 3.6, 4.6, and 4.7 of the Technical Specifications for the Vermont Yankee Nuclear Power Station. The proposed change would provide spike limit for the reactor coolant concentration of iodine and limit the opening of purge and vent valves V16-19-7 and V16-19-7a to no more than 50 degrees while the reactor is operating.

2.0 EVALUATION

2.1 Iodine Spike Limit

The evaluation of the radiological consequences of a LOCA while purging requires that an assessment be performed with "a pre-existing iodine spike." This "pre-existing iodine spike" is the maximum value during transient reactor operation (as well as steady state operation) permitted by the Technical Specifications. Exceeding this value would require plant shutdown. The licensee has proposed a Technical Specification limit on primary coolant dose equivalent iodine of 4 ci/gm. The licensee's analysis assumes a LOCA coincident with purging, a coolant concentration of dose equivalent iodine of 4 ci/gm, a decontamination factor of 2, primary coolant mass release of 2400 pounds of contaminated steam through an 18" purge valve assuming choked flow, and a ground level release with no filtration. The purge valve closure time is estimated at 10.5 seconds, and the release is assumed to be a rapid pressure surge that destroys piping downstream of the safety isolation valve. The staff did an independent dose analysis using the above assumptions with the exception of the decontamination factor (DF). The staff assumed a DF of 1 in its analysis of the purge contribution. The calculated purge dose contribution at the Exclusion Area Boundary (EAB) for the thyroid was calculated to be 9 rem and the Low Population Zone (LPZ) dose contribution for the thyroid was calculated to be 8 rem.

In the staff's Safety Evaluation Report (SER) dated June 1, 1971 accompanying the review of Vermont Yankee for an operating license, the EAB LOCA dose for the thyroid was calculated to be 148 rem, and the LPZ thyroid dose was calculated to be 113 rem. The addition of the purge doses to the SER LOCA doses result in the raising of the estimated EAB thyroid dose to 157 rem and the LPZ thyroid dose to 121 rem. The whole body doses for the purge contribution are negligible (less than 1) and would not result in a significant change in the previously calculated whole body doses reported in the operating license SER. Based on these estimated total EAB and LPZ doses, the staff concludes that the revised dose estimates are within the 10 CFR Part 100 dose guidelines, and are acceptable.

2.2 Purge and Vent Valve Opening

By letter dated May 22, 1984, the NRC staff concluded that the licensee had demonstrated the ability of the Vermont Yankee containment purge and vent valves to close against the buildup of containment pressure in the event of a DBA/LOCA. This conclusion was based on valves V16-19-7 and V16-19-7a being blocked at 50 degrees open, and the licensee was requested to propose Technical Specifications limiting the opening of these valves to 50 degrees. The licensee has added limit stops to valves V16-19-7 and V16-19-7a so that they are blocked at 50 degrees open. The licensee proposes to modify Table 4.7.2a of the Technical Specifications, listing primary containment isolation valves, to require that valves V16-19-7 and V16-19-7a remain blocked to limit opening to 50 degrees or less.

The licensee's proposed Technical Specification change of January 15, 1985 pertaining to purge and vent valve opening is fully responsive to the NRC staff's requests of May 22, 1984, and is acceptable.

3.0 SUMMARY

Based on the information provided by the licensee, we have concluded that the proposed changes to limit the spike reactor coolant iodine concentration and to limit the opening of valves V16-19-7 and V16-19-7a are acceptable.

4.0 ENVIRONMENTAL CONSIDERATIONS

This amendment involves changes in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes in surveillance requirements. 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 issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, this 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 this amendment.

5.0 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 Contributors: L. Bell, R. Wright, and V. Rooney

Dated: October 28, 1985