July 19, 1976

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Docket No. 50-271

Yankee Atomic Electric Company
ATTN: Mr. Robert H. Groce
Licensing Engineer
20 Turnpike Road
Westboro, Massachusetts 01581

Gentlemen:

The Commission has issued the enclosed Amendment No. 24 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 29, 1976.

This amendment requires operability and surveillance of shock suppressors (snubbers) required to protect the primary coolant system and all other safety related systems and components. We have made certain changes in the Technical Specifications you proposed and have discussed these changes with your staff.

Copies of the Safety Evaluation and the Federal Register Notice are also enclosed.

Sincerely,

Original Signed by

Robert W. Reid, Chief
Operating Reactors Branch No. 4
Division of Operating Reactors

Enclosures:
1. Amendment No. 24
2. Safety Evaluation
3. Federal Register Notice

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Form AEC-318 (Rev. 9-53) AECM 0240

cc: w/enclosure
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Hill and Dale Farm
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Mr. Raymond H. Puffer
Chairman
Board of Selectman
Vernon, Vermont 05354

cc w/enclosures and copy of
VY's filing dtd. 1/29/76

Mr. Martin K. Miller, Chairman
State of Vermont
Public Service Board
120 State Street
Montpelier, Vermont 05602

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. 24
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 29, 1976, 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;

   E. After weighing the environmental aspects involved, 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 a change to the Technical Specifications as indicated in the attachment to this license amendment.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Robert W. Reid, Chief
Operating Reactors Branch No. 4
Division of Operating Reactors

Attachment:
Changes to the
Technical Specifications

Date of Issuance: July 19, 1976

ATTACHMENT TO LICENSE AMENDMENT NO. 24

FACILITY OPERATING LICENSE NO. DPR-28

DOCKET NO. 50-271

Revise the Appendix A Technical Specifications as follows:

Remove Pages	Insert Pages
---	110a & 110b
---	116a - 116c
125	125 & 125a

3.6 LIMITING CONDITIONS FOR OPERATION

I. Shock Suppressors (Snubbers)

1. During all modes of operation except Cold Shutdown and Refuel, all safety-related snubbers listed in Table 4.6.2 shall be operable except as noted in 3.6.I.2 through 3.6.I.4 below.

2. From and after the time that a snubber is determined to be inoperable, continued reactor operation is permissible only during the succeeding 72 hours unless the snubber is sooner made operable or replaced.

3. If the requirements of 3.6.I.1 and 3.6.I.2 cannot be met, an orderly shutdown shall be initiated and the reactor shall be in a cold shutdown condition within 36 hours.

4. If a snubber is determined to be inoperable while the reactor is in the shutdown or refuel mode, the snubber shall be made operable or replaced prior to reactor startup.

5. Snubbers may be added to safety related systems without prior License Amendment to Table 4.6.2 provided that a revision to Table 4.6.2 is included with the next License Amendment request.

4.6 SURVEILLANCE REQUIREMENTS

I. Shock Suppressors (Snubbers)

The following surveillance requirements apply to all hydraulic snubbers listed in Table 4.6.2.

1. All hydraulic snubbers whose seal material has been demonstrated by operating experience, lab testing or analysis to be compatible with the operating environment shall be visually inspected. This inspection shall include, but not necessarily be limited to, inspection of the hydraulic fluid reservoir, fluid connections, and linkage connections to the piping and anchor to verify snubber operability in accordance with the following schedule:

Number of Snubbers Found Inoperable During Inspection or During Inspection Interval	Next Required Inspection Interval
0	18 months ± 25%
1	12 months ± 25%
2	6 months ± 25%
3, 4	124 days ± 25%
5, 6, 7	62 days ± 25%
≥8	31 days ± 25%

The required inspection interval shall not be lengthened more than one step at a time.

Snubbers may be categorized in two groups, "accessible" or "inaccessible" based on their accessibility for inspection during reactor operation. These two groups may be inspected independently according to the above schedule.

3.6 LIMITING CONDITIONS FOR OPERATION

4.6 SURVEILLANCE REQUIREMENTS

2. All hydraulic snubbers whose seal materials are other than ethylene propylene or other material that has been demonstrated to be compatible with the operating environment shall be visually inspected for operability every 31 days.

3. The initial inspection shall be performed within 6 months from the date of issuance of these specifications. For the purpose of entering the schedule in Specification 4.6.I.1, it shall be assumed that the facility had been on a 6 month inspection interval.

4. Once each refueling cycle, a representative sample of approximately 10% of the snubbers shall be functionally tested for operability including verification of proper piston movement, lock up and bleed. For each unit and subsequent unit found inoperable, an additional 10% shall be so tested until no more failures are found or all units have been tested. Snubbers of rated capacity greater than 50,000 lbs need not be functionally tested.

Table 4.6.2

SAFETY RELATED SHOCK SUPPRESSORS (SNUBBERS)

Snubber Number	Location	Approximate Elevation	Snubber in High Radiation Area During Shutdown*	Snubbers Especially Difficult to Remove	Snubbers Inaccessible During Normal Operation	Snubbers Accessible During Normal Operation
HPCI-H102A	HPCI Steam Supply	238		X		X
HPCI-H102B	HPCI Steam Supply	238		X		X
HPCI-H103A	HPCI Steam Supply	238		X		X
HPCI-H103B	HPCI Steam Supply	238		X		X
MS-3	Main Steam Line "A"	270			X	
MS-6	Main Steam Line "A"	268			X	
MS-15	Main Steam Line "B"	268			X	
MS-24	Main Steam Line "C"	268			X	
MS-32	Main Steam Line "D"	270			X	
MS-35	Main Steam Line "D"	268			X	
MS-H126	Main Steam Line "A"	262			X	
MS-H127	Main Steam Line "B"	262			X	
MS-H128	Main Steam Line "C"	262			X	
MS-H129	Main Steam Line "D"	262			X	
FW-3	Feedwater Line "A"	270			X	
FW-15	Feedwater Line "B"	270			X	

Table 4.6.2

SAFETY RELATED SHOCK SUPPRESSORS (SNUBBERS)

Snubber Number	Location	Approximate Elevation	Snubber in High Radiation Area During Shutdown*	Snubbers Especially Difficult to Remove	Snubbers Inaccessible During Normal Operation	Snubbers Accessible During Normal Operation
RHR-3	RHR 46A Valve	268	X	X	X	
RHR-4	RHR 46A Valve	268	X	X	X	
RHR-H183	RHR Line "13A"	220				X
RHR-H185	RHR Line "13A"	220				X
RHR-H188	RHR Pump "D"	220				X
RHR-H193	"RHR To Torus" Line	258				X
RHR-H197A	RHR Pump "C"	220				X
RHR-H197B	RHR Pump "C"	220				X
SLC-H48	SLC Injection Line	268	X		X	
RR-2	Recirc Pump "A" Suction	266	X		X	
RR-3	Recirc Pump "A" Suction	247		X	X	
RR-13	Recirc Pump "A"	247		X	X	
RR-14	Recirc Pump "A"	247		X	X	
RR-19	Recirc Pump "A" Motor	255		X	X	
RR-20	Recirc Pump "A" Motor	255		X	X	
RR-21	Recirc Pump "A" Motor	255		X	X	
RR-24	Recirc Pump "A" Motor	247		X	X	

Amendment No. 24

Table 4.5.2

SAFETY RELATED SHOCK SUPPRESSORS (SNUBBERS)

Snubber Number	Location	Approximate Elevation	Snubber in High Radiation Area During Shutdown *	Snubbers Especially Difficult to Remove	Snubbers Inaccessible During Normal Operation	Snubbers Accessible During Normal Operation
RR-34	Recirc Pump "A" Dis.	268		X	X	
RR-35	Recirc Pump "A" Dis.	268½		X	X	
RR-62	Recirc Pump "B" Dis.	268		X	X	
RR-63	Recirc Pump "B" Dis.	268		X	X	
RR-73	Recirc Pump "B" Bypass	247		X	X	
RR-76	Recirc Pump "B" Motor	255		X	X	
RR-77	Recirc Pump "B" Motor	255		X	X	
RR-78	Recirc Pump "B" Motor	255		X	X	
RR-80	Recirc Pump "B" Motor	247		X	X	
RR-81	Recirc Pump "B" Motor	247		X	X	
RR-82	Recirc Pump "B" Motor	247		X	X	
CS-H85	Core Spray Pump "B"	220				X
CS-H86A	Core Spray	245				X
CS-H86B	Core Spray	245				X
CU-1	CUW Suction Line	275			X	
CU-2	CUW Suction Line	275			X	
RR-12	Recirc Pump "A"	247		X	X	

* Modifications to this Table due to changes in high radiation areas should be submitted to the NRC as part of the next License Amendment.

3.6.I & 4.6.I SHOCK SUPPRESSORS (SNUBBERS)

Snubbers are designed to prevent unrestrained pipe motion under dynamic loads as might occur during an earthquake or severe transient, while allowing normal thermal motion during startup and shutdown. The consequence of an inoperable snubber is an increase in the probability of structural damage to piping as a result of a seismic or other event initiating dynamic loads. It is therefore required that all snubbers required to protect the primary coolant system or any other safety system or component be operable during reactor operation.

Because the snubber protection is required only during low probability events, a period of 72 hours is allowed for repairs or replacements. In case a shutdown is required, the allowance of 36 hours to reach a cold shutdown condition will permit an orderly shutdown consistent with standard operating procedures. Since plant startup should not commence with knowingly defective safety related equipment, Specification 3.6.I.4 prohibits startup with inoperable snubbers.

All safety related hydraulic snubbers are visually inspected for overall integrity and operability. The inspection will include verification of proper orientation, adequate hydraulic fluid level and proper attachment of snubber to piping and structures.

The inspection frequency is based upon maintaining a constant level of snubber protection. Thus the required inspection interval varies inversely with the observed snubber failures. The number of inoperable snubbers found during a required inspection determines the time interval for the next required inspection. Inspections performed before that interval has elapsed may be used as a new reference point to determine the next inspection. However, the results of such early inspections performed before the original required time interval has elapsed (nominal time less 25%) may not be used to lengthen the required inspection interval. Any inspection whose results require a shorter inspection interval will override the previous schedule.

Experience at operating facilities has shown that the required surveillance program should assure an acceptable level of snubber performance provided that the seal materials are compatible with the operating environment.

Snubbers containing seal material which has not been demonstrated by operating experience, lab tests or analysis to be compatible with the operating environment should be inspected more frequently (every month) until material compatibility is confirmed or an appropriate changeout is completed.

Examination of defective snubbers at reactor facilities and material tests performed at several laboratories (Reference 1) has shown that millable gum polyurethane deteriorates rapidly under the temperature and moisture conditions present in many snubber locations. Although molded polyurethane exhibits greater resistance to these conditions, it also may be unsuitable for application in the higher temperature environments. Data are not currently available to precisely define an upper temperature limit for the molded polyurethane. Lab tests and in-plant experience indicate that seal materials are available, primarily ethylene propylene compounds, which should give satisfactory performance under the most severe conditions expected in reactor installations.

3.6.I & 4.6.I SHOCK SUPPRESSORS (SNUBBERS)

To further increase the assurance of snubber reliability, functional tests should be performed once each refueling cycle. These tests will include stroking of the snubbers to verify proper piston movement, lock-up and bleed. Ten percent represents an adequate sample for such tests. Observed failures on these samples should require testing of additional units. Those snubbers designated in Table 4.6.2 as being in high radiation areas or especially difficult to remove need not be selected for functional tests provided operability was previously verified. Snubbers of rated capacity greater than 50,000 lb. are exempt from the functional testing requirements because of the impractability of testing such large units.

(1) Report H. R. Erickson, Bergen Paterson to K. R. Goller, NRC, October 7, 1974
Subject: Hydraulic Shock Sway Arrestors

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 24 TO LICENSE NO. DPR-28

VERMONT YANKEE NUCLEAR POWER CORPORATION

VERMONT YANKEE NUCLEAR POWER STATION

DOCKET NO. 50-271

INTRODUCTION

During the summer of 1973 a significant number of shock suppressors (snubbers) were found to be inoperable at many reactor facilities. The failures were caused by degradation of seal materials and subsequent leakage of hydraulic fluid. A seal replacement program had been implemented which significantly reduced the incidence of snubber failure. However, failures continued to occur.

Our review of snubber experience at reactor facilities concluded that revised technical specifications requiring snubber operability and surveillance were needed. On July 11, 1975, (Amended December 18, 1975) we forwarded to Vermont Yankee Nuclear Power Corporation (VYNPC) model technical specifications and bases which would serve to provide additional assurance of satisfactory snubber performance and reliability for the Vermont Yankee Nuclear Power Station (VYNPS). By letter dated August 27, 1975, (Amended January 29, 1976) VYNPC proposed Technical Specifications for hydraulic snubbers at VYNPS. During our review of the proposed specifications, we found that certain modifications were necessary. These modifications were discussed with VYNPC and have been incorporated into the proposed Technical Specifications.

EVALUATION

Snubbers are designed to prevent unrestrained pipe motion under dynamic loads as might occur during an earthquake or severe transient while allowing normal thermal movement during startup and shutdown. The consequence of an inoperable snubber is an increase in the probability of structural damage to piping resulting from a seismic or other postulated event which initiates dynamic loads. It is, therefore, necessary that snubbers installed to protect safety system piping be operable during reactor operation and be inspected at appropriate intervals to assure their operability.

Examination of defective snubbers at reactor facilities has shown that the high incidence of failures observed in the summer of 1973 was caused by severe degradation of seal materials and subsequent leakage of the hydraulic fluid. The basic seal materials used in Bergen Paterson snubbers were two types of polyurethane; a millable gum polyester type containing plasticizers and an unadulterated molded type. Material tests performed at several laboratories (Reference 1) established that the millable gum polyurethane deteriorated rapidly under the temperature and moisture conditions present in many snubber locations. Although the molded polyurethane exhibited greater resistance to these conditions, it also may be unsuitable for application in the higher temperature environments. Data are not currently available to precisely define an upper temperature limit for the molded polyurethane. The investigation indicated that seal materials are available, primarily ethylene propylene compounds, which should give satisfactory performance under the most severe conditions expected in reactor installations.

An extensive seal replacement program has been carried out at many reactor facilities. Experience with ethylene propylene seals has been very good with no serious degradation reported thus far. Although the seal replacement program has significantly reduced the incidence of snubber failures, some failures continue to occur. These failures have generally been attributed to faulty snubber assembly and installation, loose fittings and connections and excessive pipe vibrations. The failures have been observed in both PWRs and BWRs and have not been limited to units manufactured by Bergen Paterson. Because of the continued incidence of snubber failures, we have concluded that snubber operability and surveillance requirements should be incorporated into the Technical Specifications. We have further concluded that these requirements should be applied to all safety related snubbers, regardless of manufacturer, in all light water cooled reactor failities.

The proposed Technical Specifications and Bases provide additional assurance of satisfactory snubber performance and reliability. The specifications require that snubbers be operable during reactor operation and prior to startup. Because snubber protection is required only during low probability events, a period of 72 hours is allowed for repair or replacement of defective units before the reactor must be shut down. The licensee will be expected to commence repair or replacement of a failed snubber expeditiously. However, the allowance of 72 hours is consistent with that provided for other safety-related equipment and provides for remedial action to be taken in accordance with 10 CFR 50.36(c)(2). Failure of a pipe, piping system or major component would not necessarily result from the failure of a single snubber to operate as designed, and even a snubber devoid of hydraulic fluid would provide support for the pipe or component and reduce pipe motion. The likelihood of a seismic event or other initiating event occurring during the time allowed for repair or replacement is very small. Considering the large size and difficult access of some snubber units, repair or replacement in a shorter time period is not practical. Therefore, the 72 hour period provides a reasonable and realistic period for remedial action to be taken.

(1) Report H. R. Erickson, Bergen Paterson to K. R. Goller, NRC October 7, 1974, Subject: Hydraulic Shock Sway Arrestors

An inspection program is specified to provide additional assurance that the snubbers remain operable. The inspection frequency is based upon maintaining a constant level of snubber protection. Thus the required inspection interval varies inversely with the observed snubber failures. The longest inspection interval allowed in the Technical Specifications after a record of no snubber failures has been established is nominally 18 months. Experience at operating facilities has shown that the required surveillance program should provide an acceptable level of snubber performance provided that the seal materials are compatible with the operating environment. Snubbers containing seal material which has not been demonstrated to be compatible with the operating environment are required to be inspected every 31 days until the compatibility is established or an appropriate seal change is completed.

To further increase the level of snubber reliability, the proposed Technical Specifications require functional tests once each refueling cycle. The tests will verify proper piston movement, lock up and bleed.

We have concluded that the proposed Technical Specifications, as modified, increase the probability of successful snubber performance, increase reactor safety and we therefore find them acceptable.

We have determined that the amendment does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and pursuant to 10 CFR §51.5(d)(4) that an environmental statement, negative declaration, or environmental appraisal need not be prepared in connection with the issuance of this amendment.

CONCLUSION

We have concluded, based on the considerations discussed above, that: (1) because the changes do not involve a significant increase in the probability or consequences of accidents previously considered and do not involve a significant decrease in a safety margin, the changes do not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) 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.

Dated: July 19, 1976

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NO. 50-271

VERMONT YANKEE NUCLEAR POWER CORPORATION

NOTICE OF ISSUANCE OF AMENDMENT TO FACILITY OPERATING LICENSE

Notice is hereby given that the U.S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 24 to Facility Operating License No. DPR-28 issued to Vermont Yankee Nuclear Power Corporation which revised Technical Specifications for operation of the Vermont Yankeee Nuclear Power Station located near Vernon, Vermont. The amendment is effective as of its date of issuance.

The amendment requires operability and surviellance of shock suppressors (snubbers) required to protect the primary coolant system and all other safety related systems and components.

The application for the amendment complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendment. Prior public notice of this amendment was not required since the amendment does not involve a significant hazards consideration.

The Commission has determined that the issuance of this amendment will not result in any significant environmental impact and that pursuant to 10 CFR §51.5(d)(4) an environmental statement, negative declaration or environmental impact appraisal need not be prepared in connection with issuance of this amendment.

For further details with respect to this action, see (1) the application for amendment dated January 29, 1976, (2) Amendment No. 24 to License No. DPR-28, and (3) the Commission's related Safety Evaluation. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, N.W., Washington, D. C. and at the Brooks Memorial Library, 224 Main Street, Brattleboro, Vermont.

A copy of items (2) and (3) may be obtained upon request addressed to the U.S. Nuclear Regulatory Commission, Washington, D. C. 20555, Attention: Director, Division of Operating Reactors.

Dated at Bethesda, Maryland, this 19th day of July 1976.

FOR THE NUCLEAR REGULATORY COMMISSION

Robert W. Reid, Chief
Operating Reactors Branch No. 4
Division of Operating Reactors