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March 28, 1983

Docket No. 50-271

Mr. J. B. Sinclair
Licensing Engineer
Vermont Yankee Nuclear Power
Corporation
1671 Worcester Road
Framing am, MA. 01701

Dear Mr. Sinclair:

The Commission has issued the enclosed Amendment No. 77 to Facility Operating License No. DPR-28 for Vermont Yankee Nuclear Power Station. This amendment consists of changes to the Technical Specifications in response to your application dated February 22, 1983.

These changes to the Technical Specifications modify the Limiting Conditions of Operation pertaining to the spiral unloading and reloading of the reactor core.

Copies of the Safety Evaluation and Notice of Issuance are enclosed.

Sincerely,

ORIGINAL SIGNED BY

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

Enclosures:
1. Amendment No. 77 to DPR-28
2. Safety Evaluation
3. Notice of Issuance

cc: w/enclosures
See next page

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F. R. NOTICE & AMENDMENT

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DATE	3/17/83	3/17/83	3/17/83	3/17/83	3/18/83		

NRC FORM 318 (10-80) NRCM 0240 OFFICIAL RECORD COPY USGPO: 1981—335-960

Mr. J. B. Sinclair

cc:

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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. 77
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 February 22, 1983 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. 77 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 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: March 28, 1983

ATTACHMENT TO LICENSE AMENDMENT NO. 77

FACILITY OPERATING LICENSE NO. DPR-28

DOCKET NO. 50-271

Revise the Technical Specifications by removing the following pages and inserting identically numbered pages.

183
185
185-a
185-b
186
186-a
187
187-a

3.12 LIMITING CONDITION FOR OPERATION	4.12 SURVEILLANCE REQUIREMENT
moved and one in an adjacent quadrant. For an SRM to be considered operable the following conditions shall be satisfied:	Thereafter, the SRMs shall be checked daily for response.
1. The SRM shall be inserted to the normal operating level. (Use of special movable, dunking type detectors during initial fuel loading and major core alternations in place of normal detector is permissible as long as the detectors is connected into the proper circuitry which contain the required rod blocks).	
2. The SRM shall have a minimum of 3 cps with all rods fully inserted in the core.	
3. Prior to spiral unloading, the SRMs shall be proven operable as stated in Sections 3.12.B.1 and 3.12.B.2 above, however, during spiral unloading the count rate may drop below 3 cps.	Prior to spiral unloading or reloading, the SRMs shall be functionally tested. Prior to spiral reloading, the SRMs shall be checked for neutron response.
4. Prior to spiral reloading, two diagonally adjacent fuel assemblies, which have previously accumulated exposure in the reactor, shall be loaded into their designated core positions next to each of the 4 SRMs to obtain the required 3 cps. Until these eight bundles have been loaded, the 3 cps requirement is not necessary.	
C. Fuel Storage Pool Water Level	C. Fuel Storage Pool Water Level
Whenever irradiated fuel is stored in the fuel storage pool the pool water level shall be maintained at a level of at least 36 feet.	Whenever irradiated fuel is stored in the fuel storage pool, the pool level shall be recorded daily.

3.12 LIMITING CONDITION FOR OPERATION	4.12 SURVEILLANCE REQUIREMENT
1. The reactor mode switch shall be locked in the "Refuel" position. The refueling interlock which prevents more than one control rod from being withdrawn may be bypassed on a withdrawn control rod after the fuel assemblies in the cell containing (controlled by) that control rod have been removed from the reactor core. All other refueling interlocks shall be operable.	1. This surveillance requirement is the same as that given in Specification 4.12.A.
2. SRMs shall be operable in the core quadrant where fuel or control rods are being moved, and in an adjacent quadrant. The requirements for an SRM to be considered operable are given in Specification 3.12.B.	2. This surveillance requirement is the same as that given in Specification 4.12.B
3. If the spiral unload/reload method of core alteration is to be used, the following conditions shall be met:	
a. Prior to spiral unload and reload, the SRMs shall be proven operable as stated in Specification 3.12.B1 and 3.12.B2. However, during spiral unloading, the count rate may drop below 3 cps.	
b. The core may be spirally reloaded to either the original configuration or a different configuration in the reverse sequence of that used to unload, with the exception that two (2) diagonally adjacent fuel assemblies, which have previously accumulated exposure in the reactor, shall be loaded into their designated core positions next to each of the four (4) SRMs to obtain the required 3 cps. Until these eight (8) bundles have been loaded, the 3 cps requirement is not necessary.	

3.12 LIMITING CONDITION FOR OPERATION	4.12 SURVEILLANCE REQUIREMENT
c. Following insertion of the initial eight (8) bundles, the reactor will be spirally reloaded from the center cell outwards, until the core is fully loaded.	
c. At least 50% of the fuel assemblies to be reloaded into the core shall have previously accumulated a minimum exposure of 1000 Mwd/T.	
F. Fuel Movement	F. Fuel Movement
Fuel shall not be moved or handled in the reactor core for 24 hours following reactor shutdown to cold shutdown conditions.	Prior to any fuel handling or movement in the reactor core, the licensed operator shall verify that the reactor has been in the cold shutdown condition for a minimum of 24 hours.
G. Crane Operability	G. Crane Operability
1. The Reactor Building crane shall be operable when the crane is used for handling of a spent fuel cask.	1. a. Within one month prior to spent fuel cask handling operations, an inspection of crane cables, sheaves, hook, yoke, and cask lifting trunnions will be made. These inspections shall meet the requirements of ANSI Standard

3.12 LIMITING CONDITION FOR OPERATION	4.12 SURVEILLANCE REQUIREMENT
	B30.2, 1967. A crane rope shall be replaced if any of the replacement criteria given in ANSI B30.2.0-1967 are met.
	b. No-load mechanical and electrical tests will be conducted prior to lifting the empty cask from its transport vehicle to verify proper operation of crane controls, brakes and lifting speeds. A functional test of the crane brakes will be conducted each time an empty cask is lifted clear of its transport vehicle.
2. Crane Travel	2. Crane Travel
Spent fuel casks shall be prohibited from travel over irradiated fuel assemblies.	Crane travel limiting mechanical stops shall be installed on the crane trolley rails prior to cask handling operations to prohibit cask travel over irradiated fuel assemblies.
H. Spent Fuel Pool Water Temperature	H. Spent Fuel Pool Water Temperature
Whenever irradiated fuel is stored in the spent fuel pool, the pool water temperature shall be maintained below 150°F.	Whenever irradiated fuel is in the spent fuel pool, the pool water temperature shall be recorded daily. If the pool water temperature reaches 150°F, all refueling operations tending to raise the pool water temperature shall cease and measures taken immediately to reduce the pool water temperature below 150°F.

Bases:

3.12 & 4.12 REFUELING

A. During refueling operations, the reactivity potential of the core is being altered. It is necessary to require certain interlocks and restrict certain refueling procedures such that there is assurance that inadvertent critfcality does not occur.

To minimize the possibility of loading fuel into a cell containing no control rod, it is required that all control rods are fully inserted when fuel is being loaded into the reactor core. This requirement assures that during refueling the refueling interlocks, as designed, will prevent inadvertent criticality. The core reactivity limitation of Specification 3.2 limits the core alterations to assure that the resulting core loading can be controlled with the Reactivity Control System and interlocks at any time during shutdown or the following operating cycle.

The addition of large amounts of reactivity to the core is prevented by operating procedures, which are in turn backed up by refueling interlocks on rod withdrawal and movement of the refueling platform. When the mode switch is in the "Refuel" position, interlocks prevent the refueling platform from being moved over the core if a control rod is withdrawn and fuel is on a hoist.

Likewise, if the refueling platform is over the core with fuel on a hoist, control rod motion is blocked by the interlocks. With the mode switch in the refuel position, only one control rod can be withdrawn.

B. The SRMs are provided to monitor the core during periods of station shutdown and to guide the operator during refueling operations and station startup. Requiring two operable SRMs in or adjacent to any core quadrant where fuel or control rods are being moved assures adequate monitoring of that quadrant during such alterations. The requirement of 3 counts per second provides assurance that neutron flux is being monitored. Under the special condition of complete spiral core unloading, it is expected that the count rate of the SRMs will drop below 3 cps before all the fuel is unloaded. Since there will be no reactivity additions, a lower number of counts will not present a hazard. When all of the fuel has been removed to the spent fuel storage pool, the SRMs will no longer be required. Requiring the SRMs to be operational prior to fuel removal assures that the SRMs are operable and can be relied on even when the count rate may go below 3 cps.

Prior to spiral reload, two diagonally adjacent fuel assemblies, which have previously accumulated exposure in the reactor, will be loaded into their designated core positions next to each of the 4 SRMs to obtain the required 3 cps. Exposed fuel continuously produces neutrons by spontaneous fission of certain plutonium isotopes, photo fission, and photo disintegration of deuterium in the moderator. This neutron production is normally great enough to meet the 3 cps minimum SRM requirement, thereby providing a means by which SRM response may be demonstrated before the spiral reload begins. During the spiral reload, the fuel will be loaded in the reverse sequence that it was unloaded with the exception of the initial eight (8) fuel assemblies which are loaded next to the SRMs to provide a means of SRM response.

3.12 & 4.12 (Continued)

C. To assure that there is adequate water to shield and cool the irradiated fuel assemblies stored in the pool, a minimum pool water level is established. This minimum water level of 36 feet is established because it would be a significant change from the normal level, well above a level to assure adequate cooling (just above active fuel).

3.12 & 4.12 (Continued)

D. During certain periods, it is desirable to perform maintenance on two control rods and/or control rod drives at the same time. This specification provides assurance that inadvertent criticality does not occur during such maintenance.

The maintenance is performed with the mode switch in the "Refuel" position to provide the refueling interlocks normally available during refueling operations as explained in Part A of these Bases. in order to withdraw a second control rod after withdrawal of the first rod, it is necessary to bypass the refueling interlock on the first control rod which prevents more than one control rod from being withdrawn at the same time. The requirement that an adequate shutdown margin be demonstrated with the control rods remaining in service ensures that inadvertent criticality cannot occur during this maintenance. The shutdown margin is verified by demonstrating that the core is shut down even if the strongest control rod remaining in service is fully withdrawn. Disarming the directional control valves does not inhibit control rod scram capability.

E. The intent of this specification is to permit the unloading of a significant portion of the reactor core for such purposes as inservice inspection requirements, examination of the core support plate, etc. This specification provides assurance that inadvertent criticality does not occur during such operation.

This operation is performed with the mode switch in the "Refuel" position to provide the refueling interlocks normally available during refueling as explained in the Bases for Specification 3.12.A. In order to withdraw more than one control rod, it is necessary to bypass the refueling interlock on each withdrawn control rod which prevents more than one control rod from being withdrawn at a time. The requirement that the fuel assemblies in the cell controlled by the control rod be removed from the reactor core before the interlock can be bypassed ensures that withdrawal of another control rod does not result in inadvertent criticality. each control rod essentially provides reactivity control for the fuel assemblies in the cell associated with that control rod. Thus, removal of an entire cell (fuel assemblies plus control rod) results in a lower reactivity potential of the core.

One method available for unloading or reloading the core is the spiral unload/reload. A spiral unloading pattern is one by which the fuel in the outermost cells (four fuel bundles surrounding a control rod) is removed first. Unloading continues by unloading the remaining outermost fuel by cell spiralling inward towards the center cell which is the last cell removed. Spiral reloading is reverse of unloading, with the exception that two (2) diagonally adjacent bundles, which have previously accumulated exposure in-core, are placed next to each of the 4 SRMs before the actual spiral reloading begins. The spiral reload then begins in the center cell and spirals outward until the core is fully loaded. Additionally, at least 50% of the fuel assemblies to be

3.12 & 4.12 (Continued)

reloaded into the core shall have previously accumulated a minimum exposure of 1000 Mwd/T to ensure the presence of a minimum neutron flux as described in Bases Section 3.12.B.

F. The intent of this specification is to assure that the reactor core has been in the cold shutdown condition for at least 24 hours following power operation and prior to fuel handling or movement. The safety analysis for the postulated refueling accident assumed that the reactor had been shut down for 24 hours for fission product decay prior to any fuel handling which could result in dropping of a fuel assembly.

G. The operability requirements of the reactor building crane ensures that the redundant features of the crane have been adequately inspected just prior to using it for handling of a spent fuel cask. The redundant hoist system ensures that a load will not be dropped for any postulated credible single component failures. Details of the design of the redundant features of the crane and specific testing requirements for the crane are delineated in the Vermont Yankee document entitled "Reactor Building Crane Modification" (December 1975).

H. The Spent Fuel Pool Cooling System is designed to maintain the pool water temperature below 125°F during normal refueling operations. If the reactor core is completely discharged, the temperature of the pool water may increase to greater than 125°F. The RHR System supplemental fuel pool cooling may be used under these conditions to maintain the pool water temperature less than 150°F.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 77 TO FACILITY OPERATING LICENSE NO. DPR-28

VERMONT YANKEE NUCLEAR POWER CORPORATION

VERMONT YANKEE NUCLEAR POWER STATION

DOCKET NO. 50-271

Introduction

By letter dated February 22, 1983 the Vermont Yankee Nuclear Power Corporation (the licensee) submitted proposed change No. 113 to the Technical Specifications for Vermont Yankee on spiral unloading and loading of the reactor core.

The changes in the Technical Specifications would delete the requirement to measure the shutdown margin prior to the start of unloading, delete the requirement to leave bundles next to each Source Range Monitor (SRM) during unloading and delete the requirement to reload the core only to the configuration which existed prior to unloading the core.

Evaluation

The proposed Technical Specifications would bring the Vermont Yankee spiral unloading and reloading requirements into line with those for other operating boiling water reactors (see, for example, Amendment 57 to the Duane Arnold license (DPR-49) contained in a letter from the NRC to Iowa Electric Light and Power Company dated February 25, 1980). Shutdown margin is required to be maintained for the fully loaded core and the core reactivity decreases with unloading. For this reason measurement of shutdown margin just prior to reload is not necessary. Likewise it is not necessary to leave fuel surrounding the SRM detectors that are uncovered during the unloading.

However, for the spiral reload it is required that two exposed assemblies be placed around each SRM as the first step in the procedure. This assures that operation of the detectors can be continuously confirmed in accordance with Technical Specification 3.13.B.4. This requirement, coupled with the requirement that at least 50 percent of the fuel to be loaded into the core have an exposure greater than 1000 Megawatt-days per ton, assures that the core may be safely reloaded in accordance with standard procedures. Both of the above requirements are in the proposed Technical Specifications.

Based on the discussion presented above, we conclude that proposed change No. 113 to the Vermont Yankee Technical Specification is acceptable.

Environmental Consideration

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 impact statement, or negative declaration and environmental impact 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 amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated, does not create the possibility of an accident of a type different from any evaluated previously, and does not involve a significant reduction in a margin of safety, the amendment does 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: March 28, 1983

Principal Contributor: W. Brooks

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NO. 50-271

VERMONT YANKEE NUCLEAR POWER CORPORATION

NOTICE OF ISSUANCE OF AMENDMENT TO FACILITY

OPERATING LICENSE

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment No.77 to Facility Operating License No. DPR-28, issued to Vermont Yankee Nuclear Power Corporation which revised Technical Specifications for operation of the Vermont Yankee Nuclear Power Station (the facility) located near Vernon, Vermont. The amendment is effective as of its date of issuance.

The amendment modifies the Technical Specifications pertaining to spiral unloading and reloading of the reactor core.

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) and environmental impact statement or negative declaration and 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 February 22, 1982 (2) Amendment No. 77 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 05301. 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 Licensing.

Dated at Bethesda, Maryland this 28th day of March, 1983.

FOR THE NUCLEAR REGULATORY COMMISSION

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