



VERMONT YANKEE NUCLEAR POWER CORPORATION

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September 4, 1998
BVY 98-130

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

**Subject: Vermont Yankee Nuclear Power Station
License No. DPR-28 (Docket No. 50-271)
Technical Specification Proposed Change No. 207
Spent Fuel Pool Storage Capacity Expansion**

Pursuant to 10CFR50.90, Vermont Yankee Nuclear Power Corporation (VY) hereby proposes to amend its Facility Operating License, DPR-28, by incorporating the attached proposed changes into the Technical Specifications of Vermont Yankee Nuclear Power Station. This proposed change will increase the spent fuel storage capacity of the Vermont Yankee spent fuel pool from 2,870 to 3,355 fuel assemblies.

Vermont Yankee currently has full core discharge reserve storage capability through the Spring 2001, refueling outage. Since there are no immediate options for the shipment of spent fuel to a permanent repository as required by federal law, VY is requesting an expansion of spent fuel storage capacity in order to maintain full core reserve discharge capability beyond 2001. Section 5.5 of VY's Technical Specifications currently limits the number of spent fuel assemblies allowed to be stored in the spent fuel pool to 2,870 assemblies, accordingly, an amendment to increase this licensed storage capacity to 3,355 assemblies is requested.

Attachment 1 to this letter contains supporting information and the safety assessment of the proposed change. Attachment 2 contains the determination of no significant hazards consideration. Attachment 3 provides an environmental impact evaluation. Attachment 4 provides the mark-up version of the current Technical Specification page. Attachment 5 is the retyped Technical Specification page. Attachment 6 contains a Technical Report that provides descriptive information of the analytical effort and other considerations that have been pursued by Vermont Yankee Nuclear Power Corporation in support of the proposed change. It is noted that this report contains proprietary information and it is requested that this report be withheld from public disclosure per 10CFR2.790(a)(4). Attachment 6 also contains Holtec International's proprietary information affidavit for the proprietary information contained within the attachment. Attachment 7 provides the technical report in a non-proprietary format, and is provided for public disclosure.

VY has reviewed the proposed Technical Specification change in accordance with 10CFR50.92 and concludes that the proposed change does not involve a significant hazards consideration.

VY has also reviewed the proposed change against the criteria of 10CFR51.22 for environmental considerations and concludes that the proposed change will not increase the

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types and amounts of effluents that may be released offsite. Thus, VY believes that the proposed change is eligible for categorical exclusion from the requirements for an environmental impact statement in accordance with 10CFR51.22(c)(9).

The Plant Operations Review Committee and the Nuclear Safety Audit and Review Committee have reviewed the proposed Technical Specification change and concur with the above determinations. Pursuant to 10CFR50.91(b)(1), we have provided a copy of this proposed change and the associated no significant hazards consideration to the appropriate State of Vermont representative.

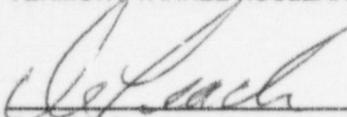
We request that the Staff issue the subject license amendment no later than February 2000, in order to insure implementation and installation prior to loss of full core reserve capability.

During the meeting held on June 23, 1998, between Staff and VY personnel, VY offered to conduct a technical presentation for members of the NRC review team. It was recommended that this presentation be scheduled after the Staff has conducted an initial review of the enclosed report. We will be pleased to schedule this presentation at the Staff's convenience.

If you have any questions on this transmittal, please contact Mr. Thomas B. Silko at (802) 258-4146.

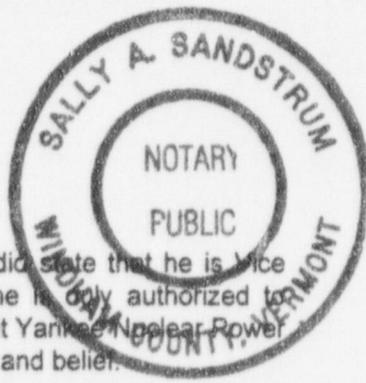
Sincerely,

VERMONT YANKEE NUCLEAR POWER CORPORATION

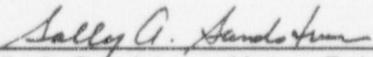


Don M. Leach
Vice President, Engineering

STATE OF VERMONT)
)ss
WINDHAM COUNTY)



Then personally appeared before me, Don M. Leach, who, being duly sworn, did state that he is Vice President, Engineering of Vermont Yankee Nuclear Power Corporation, that he is only authorized to execute and file the foregoing document in the name and on the behalf of Vermont Yankee Nuclear Power Corporation, and that the statements therein are true to the best of his knowledge and belief.



Sally A. Sandstrum, Notary Public
My Commission Expires February 10, 1999

Attachments

- cc: USNRC Region 1 Administrator
- USNRC Resident Inspector - VYNPS
- USNRC Project Manager - VYNPS
- Vermont Department of Public Service

Docket No. 50-271
BVY 98-130

Attachment 1

Vermont Yankee Nuclear Power Station

Proposed Technical Specification Change

Spent Fuel Pool Storage Capacity Expansion

Supporting Information and Safety Assessment of Proposed Change

September 1998

Vermont Yankee Nuclear Power Station
Proposed Technical Specification Change
Spent Fuel Pool Storage Capacity Expansion
Supporting Information and Safety Assessment of Proposed Change

INTRODUCTION

Vermont Yankee's (VY) spent fuel storage pool was originally designed and licensed on the basis that a fuel cycle would be in existence that would only require storage of spent fuel for a year or two prior to shipment to a reprocessing facility. Hence, the plant was originally configured with a total fuel pool storage capacity of 600 assemblies. The reactor core for VY contains 368 fuel assemblies with about 100 being replaced on an 18 month refueling schedule.

In September 1977, Amendment 37¹, increased the fuel storage capability from 600 assemblies to 2000 assemblies. This change permitted VY to operate and maintain full core reserve discharge capability until 1990. At the time that this license amendment was granted, it was fully anticipated that away-from-reactor storage would be available during the 1980's to complement reactor pool storage. Thus, VY anticipated shipping spent fuel off-site to maintain full core reserve discharge capability.

Due to delays in the development of a federal spent fuel repository, VY again submitted a proposed change to the Technical Specification for increased fuel storage. In July of 1991² VY received a license amendment allowing for the increase of its spent fuel storage pool capacity from 2,000 to 2,870 assemblies. Earlier, in May of 1988³, VY received a license amendment to install the high density free standing racks while maintaining the maximum Technical Specification storage capability at or below 2000 assemblies.

Vermont Yankee currently has full core discharge reserve storage capability through the Spring 2001, refueling outage. Since there are no immediate options for the shipment of spent fuel to a permanent repository, VY is requesting a further expansion of its spent fuel storage capacity in order to maintain full core reserve discharge capability beyond 2001. Section 5.5 of VY's Technical Specifications currently limits the number of spent fuel assemblies allowed to be stored in the spent fuel pool to 2,870 assemblies, accordingly, an amendment to increase this licensed storage capacity to 3,355 assemblies is requested.

ALTERNATIVES CONSIDERED

VY evaluated the available alternatives to augment its current storage capacity within the context of the Nuclear Waste Policy Act of 1982. Section 131 of this Act states, "the persons owning and operating civilian nuclear power reactors have the primary responsibility for providing interim storage of spent nuclear fuel from such reactors by maximizing, to the extent practical, the effective use of existing storage facilities at the site of each civilian nuclear power reactor, and by adding new on-site storage capacity in a timely manner where practical."

¹ Letter, USNRC to VYNPC, Amendment 37, dated September 15, 1977
² Letter, USNRC to VYNPC, Amendment 130, dated July 10, 1991
³ Letter, USNRC to VYNPC, Amendment 104, dated May 20, 1988

Further, Section 132 of this Act states, "The Secretary [USDOE], the Commission [USNRC] and other authorized Federal officials shall each take such actions as such official considers necessary to encourage and expedite the effective use of available storage and necessary additional storage, at the site of each civilian nuclear power reactor..."

The following alternatives to increasing spent fuel storage capacity at VY were considered:

1. Shipment to another reactor site or away-from-reactor (AFR) storage facility;
2. Increasing on-site storage capacity.

The option of off-site shipment of fuel to another reactor site or an AFR storage facility was considered, but determined not to be feasible due to the unavailability of an off-site storage facility. Further, the provision of the Nuclear Waste Policy Act of 1982 which sets a target date of 1998 for operation of a waste repository precludes any consideration of shipping spent fuel off-site to a repository prior to optimizing on-site storage.

In consideration of the above, increasing on-site storage capacity by installation of additional freestanding racks with a similar design to the existing racks was concluded to be the most practical alternative for VY.

Therefore, in order to maintain full core reserve discharge capability until the federally mandated repository is available, VY chose to retain the existing storage racks and install new racks of similar design.

PROPOSED NEW RACK MODULES

The proposed racks are designated as follows:

Rack NE: Rack Northeast, a 12 x 14 array with a capability of 168 storage locations.

Rack SE: Rack Southeast, a 17 x 12 array (with two additional cells) with a capability of 206 storage locations, plus 8 dual purpose cells on one side of the rack. These dual purpose cells are intended for Control Rod Blade Storage and can be converted to spent fuel storage cells by the installation of a cruciform insert. Conversion of the dual purpose cells permits a maximum storage of 238 spent fuel assemblies in the rack southeast. The overall rack size is consistent with a 17 x 14 array.

Rack CA: Rack Cask Area, a 19 x 14 array with a capability of 266 storage locations. Rack CA will be available for installation after the Fall 2004 refueling outage if required to support full core discharge capability.

The total installed storage capacity of the nine existing racks installed in the VY Spent Fuel Pool is 2,683 storage locations. Installing the three new proposed racks of similar design will increase the total storage capability to 3,355 fuel assemblies.

Rack NE and Rack SE are scheduled for installation, contingent upon NRC approval, prior to the Spring, 2001 refueling outage and are scheduled for delivery in February, 2000. Rack CA is

not required to support full core discharge until the Spring, 2004 refueling outage. The proposed racks will provide sufficient capacity for VY to maintain full core reserve discharge capability through the Fall, 2008 refueling outage. Rack CA is not planned to be used for permanent storage as it would be installed in the cask area. Thus, it may be installed and used to support full core discharge capability through the Fall, 2008 refueling outage and would be removed after the outage to permit access to the cask area.

SAFETY ASSESSMENT

VY's spent fuel pool storage expansion method consists of installing up to three new racks, similar in design to the existing racks. The design provides for a subcritical multiplication factor (k_{eff}) which was analytically demonstrated to be less than the criticality criterion of 0.95 for both normal and abnormal storage conditions. Normal conditions exist when the fuel storage racks are located at the bottom of the pool covered with a normal depth of water for radiation shielding and with the maximum number of fuel assemblies in their design storage position. Abnormal conditions may result from external events (such as an earthquake) or failure of an engineered system (such as the accidental dropping of an assembly).

The proposed new storage racks are high density, freestanding racks with the same cell to cell pitch, the same neutron absorber material (boral), the same neutron absorption areal density and the same materials of construction as the existing racks. The new racks will maintain the currently licensed minimum clearance of two inches from adjacent racks and adjacent walls.

The proposed racks along with the existing racks were analyzed in a comprehensive whole pool multi-rack analysis to demonstrate that the clearances are adequate to prevent rack to rack and/or rack to wall impacts, and that loading conditions on the fuel pool structure are consistent with code allowables.

Calculated seismic loading stresses in a fully loaded rack will not exceed that of Standard Review Plan Section 3.8.4 which has been used as a guide. Each rack module is a free-standing module that satisfies the seismic design requirements without mechanical dependence on neighboring modules or fuel pool walls for support. The rack modules are classified as Seismic Category I equipment. Racks of similar design have been licensed for other nuclear facilities.

The capacity of the existing fuel pool structure is adequate for the loads imposed by the fully loaded racks. The design conditions described within Standard Review Plan Section 3.8.4 and ACI 349-80 were used as guidance in the calculation of fuel pool structural capacity.

The heat removal capability of the available spent fuel pool cooling systems has been evaluated in accordance with the guidance provided in SRP 9.1.3 and ASB 9-2. The decay heat load determined for the Fall, 2008 refueling outage is conservatively bounding and sufficient heat removal capability is available to maintain the pool at or below maximum design temperature. The heat removal capability of the seismic category 1 spent fuel pool cooling system utilized conservative values for heat exchanger fouling. Time to boil, bulk pool temperature and local maximum pool temperature used the Fall, 2008 refueling outage maximum decay heat.

Installation of the proposed racks in and of themselves has no impact on fuel handling accident or radiological shielding analyses. The materials used in the construction of the racks are

specified in accordance with the applicable ASME or equivalent ASTM specifications, and welds are specified in accordance with written procedures which meet the requirements of Section IX of the ASME code. Materials selected are corrosion-resistant.

The Reactor Building single failure proof 110 ton overhead crane will be used to install the new rack modules. The installation effort will be performed using procedures reviewed and approved prior to use by VY. Personnel performing the installation effort will be trained and qualified with cognizant VY staff providing project direction. The resultant rack configuration with Rack SE and Rack NE installed will not impact future cask handling activities. Since cask handling and installation of the new racks meets the applicable NUREG 0612 guidance, the proposed change does not increase the probability or consequences of an accident previously evaluated.

The Attachment 6, Technical Report provides a detailed discussion of the above analytical efforts and all other information concerning the proposed change.

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Attachment 2

Vermont Yankee Nuclear Power Station

Proposed Technical Specification Change

Spent Fuel Pool Storage Capacity Expansion

Determination of No Significant Hazards Consideration

September 1998

Vermont Yankee Nuclear Power Station
Proposed Technical Specification Change
Spent Fuel Pool Storage Capacity Expansion
Determination of No Significant Hazards Consideration

Pursuant to 10CFR50.92, Vermont Yankee Nuclear Power Corporation has reviewed the proposed change and concludes that the change does not involve a significant hazards consideration since the proposed change satisfies the criteria in 10CFR50.92(c).

1. The operation of Vermont Yankee Nuclear Power Station in accordance with the proposed amendment, will not involve a significant increase in the probability or consequences of an accident previously evaluated.

Vermont Yankee has determined that the proposed change to increase the spent fuel pool capacity does not involve a significant increase in the probability or consequences of an accident previously evaluated. The installation of new storage racks of similar design to the existing racks does not increase the probability or consequences of a fuel handling accident. Fuel handling equipment is not affected by the proposed amendment and the top of the new racks will be at the same elevation as the existing racks to prevent operator difficulties during fuel handling.

VY's proposed storage expansion method consists of installing up to three additional freestanding racks of a design similar to the existing proven design. Vermont Yankee has performed nuclear, thermal-hydraulic, mechanical, and structural analyses of normal and abnormal conditions which could create potential hazards. These include criticality considerations, seismic and mechanical loading, spent fuel pool cooling, and long-term corrosion and oxidation of fuel cladding.

Additionally, the neutron poison and rack structural materials were evaluated and shown to be compatible with the pool environment. The probability and occurrence of potential abnormal conditions and accident scenarios initiated either by external events (such as a seismic event) or by failure of an engineered system (such as dropping a fuel assembly) are not affected by the racks themselves; thus, the re-racking does not increase the probability of these conditions and accidents. Cask handling and installation of the new racks will meet the applicable NUREG 0612 guidance, therefore the proposed change does not increase the probability or consequences of an accident previously evaluated.

The radiological consequences of a fuel handling accident have been previously analyzed and remain unchanged by the proposed new rack installation. Radiological shielding analyses are unaffected by the proposed new rack installation. Installing additional racks on the east end of the spent fuel pool does not increase the consequences of a fuel handling accident.

2. The operation of Vermont Yankee Nuclear Power Station in accordance with the proposed amendment, will not create the possibility of a new or different kind of accident from any accident previously evaluated.

VY has determined that the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated. VY has evaluated the

proposed additional racks in accordance with the NRC paper, "NRC Guidance on Spent Fuel Pool Modification Review and Acceptance of Spent Fuel Storage and Handling Applications (April 14, 1978 with revision January 18, 1979)," as well as appropriate NRC Regulatory Guides, appropriate NRC Standard Review Plan sections which were used for guidance and appropriate industry codes and standards.

In addition, VY has reviewed the NRC Safety Evaluation Report for the previous VY spent fuel rack replacement application and for other prior spent fuel pool rerackings. The proposed storage expansion method consists of installing up to three new racks of similar design to the existing racks with a previously approved and proven design. The credible accidents and consequences evaluated have been found to be conservatively bounded and no new categories or types of accidents have been identified.

3. The operation of Vermont Yankee Nuclear Power Station in accordance with the proposed amendment, will not involve a significant reduction in a margin of safety.

VY has determined that the proposed change does not involve a significant reduction in a margin of safety. The issue of "margin of safety" when applied to a reracking modification, includes the following considerations:

- a. Nuclear criticality considerations,
- b. Thermal-hydraulic considerations,
- c. Mechanical, material and structural considerations.

The margin of safety that has been established for nuclear criticality considerations is that the effective neutron multiplication factor (k_{eff}) in the spent fuel pool is to be less than or equal to 0.95, including all reasonable uncertainties and under all postulated conditions. The criticality analysis for the proposed modification which analyzed both the new and existing racks concluded that for all bounding normal and abnormal storage conditions, the subcritical multiplication factor (K_{eff}) was verified to be less than the criticality criterion of 0.95 at the 95/95 probability/confidence level under all postulated conditions. The proposed reracking does not involve a significant reduction in the margin of safety for nuclear criticality.

The margin of safety that has been established for the thermal-hydraulic considerations is that fuel pool cooling be capable of maintaining spent fuel pool water temperatures at or below the Technical Specification limit of 150°F with maximum postulated pool heat load. Analyses performed verify that the installed fuel pool cooling equipment can maintain spent fuel pool water temperature during the maximum decay heat load assuming full core discharge during the Fall, 2008 refueling outage.

The maximum heat load predicted for a full pool with the proposed additional racks, remains within the design capacity of existing equipment. It has also been demonstrated that if the Spent Fuel Pool Cooling System is lost for any reason, there is sufficient time and make-up capacity available to maintain pool water level. Thus, the proposed additional storage racks do not involve a significant reduction in any thermal-hydraulic margins of safety.

The racks are designed in accordance with applicable NRC Regulatory Guides, Standard Review Plans used as guidance, position papers and appropriate industry codes and standards, as well as to Seismic Category I requirements. All materials selected are corrosion-resistant. The materials utilized for the proposed new racks are compatible with the existing spent fuel racks, the spent fuel pool and the spent fuel assemblies. The conclusion of the analyses is that the margin of safety is not significantly reduced by the proposed reracking.

Summary No Significant Hazards Consideration

On the basis of the above, VY has determined that operation of the facility in accordance with the proposed change does not involve a significant hazards consideration as defined in 10CFR50.92(c), in that it: (1) does not involve a significant increase in the probability or consequences of an accident previously evaluated; (2) does not create the possibility of a new or different kind of accident from any accident previously evaluated; and (3) does not involve a significant reduction in a margin of safety.

Vermont Yankee has also reviewed the NRC examples of license amendments considered not likely to involve significant hazards considerations as provided in the final adoption of 10CFR50.92 published in the Federal Register, Volume 51, No. 44, dated March 6, 1986. Example (x) (page 7751 of FR) provides four criteria that, if satisfied by a reracking request, indicate that it is likely no significant hazards considerations are involved. These criteria with an explanation of how the VY proposed change complies with same are provided below.

Criterion (1):

The storage expansion method consists of either replacing existing racks with a design which allows closer spacing between stored spent fuel assemblies or placing additional racks of the original design on the pool floor if space permits.

Proposed Change:

The proposed change involves the installation of additional racks in available space on the east end of the spent fuel pool. The new rack modules are of a very similar design to the existing racks with the same cell to cell pitch, the same overall height and the same materials of construction including the neutron absorber material (Boral).

Criterion (2):

The storage expansion method does not involve rod consolidation or double tiering.

Proposed Change:

The new storage racks will sit on the spent fuel pool floor in the same manner as the existing racks. Pin consolidation is not being considered for either the existing rack storage cell locations or the new rack storage cell locations.

Criterion (3):

The K_{eff} of the pool is maintained less than or equal to 0.95.

Proposed Change:

The new and existing rack modules are provided with boral neutron absorption material to maintain K_{eff} at all times, at or below 0.95. Analysis of the new racks and existing racks has been performed assuming the highest anticipated enrichment through the end of plant life. Since VY is a BWR facility, the K_{eff} has been determined to be at or below 0.95 with no credit for soluble boron in the spent fuel pool water inventory.

Criterion (4):

No new technology or unproven technology is utilized in either the construction process or the analytical techniques necessary to justify the expansion.

Proposed Change:

The materials of construction, methods of fabrication and design of the proposed additional rack modules are consistent with numerous other rack installations throughout the industry including the existing racks installed in the VY spent fuel pool.

The supporting design analyses uses a methodology that is the same as that used on several recent reracking projects. Similarly, the computer codes used, whether they are commercial or proprietary, have been used on several recent reracking projects.

Conclusion:

Based upon the above, no new or unproven technology has been utilized in either the construction process or the analytical techniques necessary to justify the proposed spent fuel storage expansion.

Therefore, based on the above evaluation, VY has concluded that this change does not involve a significant hazards consideration.

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Attachment 3

Vermont Yankee Nuclear Power Station
Proposed Technical Specification Change
Spent Fuel Pool Storage Capacity Expansion
Environmental Impact Evaluation

September 1998

Vermont Yankee Nuclear Power Station
Proposed Technical Specification Change
Spent Fuel Pool Storage Capacity Expansion
Environmental Impact Evaluation

Vermont Yankee has evaluated the proposed change and determined that:

1. The change does not involve a significant hazards consideration as documented in Attachment 2.
2. The proposed change has no effect on effluents released offsite, since:
 - a. The consequences following a fuel handling accident or tornado missile event remain unchanged as installation of the racks will not change the currently licensed fuel design.
 - b. The proposed change involves installing additional racks in the spent fuel pool. Accordingly, there will be minimal radioactive waste generation as compared to a complete pool rerack project.
 - c. It is not anticipated that any significant activity will be released to receiving waters or to the atmosphere as a result of installation or use of the proposed new racks.

The proposed change does not involve a significant increase in individual or cumulative occupational radiation exposure. The occupational exposure limits are limited by 10CFR20 and controlled as low as reasonably achievable (ALARA) by plant procedures and practices. Increased storage capacity of the spent fuel pool is not expected to result in any significant increase in the radiation dose levels at the pool surface or other locations of accessibility.

Doses to workers will be constantly monitored during the pool preparation and subsequent installation phase. The use of dosimetry, in-pool radiation monitoring, as well as the presence of radiation protection staff, will provide a high degree of assurance that doses to workers will be minimized in accordance with ALARA principles.

The radiation protection staff will be an integral part of the spent fuel pool preparation and new rack installation, and will therefore be available to support emerging requirements. Reviews of the modifications performed to prepare the spent fuel pool for the new rack installation and the actual rack installation efforts will be formally reviewed as part of our ALARA process and documented as part of the project work scope.

Accordingly, the proposed change meets the eligibility criteria of categorical exclusion set forth in 10CFR51.22(c)(9). Therefore, pursuant to 10CFR51.22(b), VY believes an environmental impact statement of the proposed change is not required.