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10 CFR 72.30

BVY 22-005

February 24, 2022

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: ISFSI Decommissioning Funding Plan
Vermont Yankee Nuclear Power Station
Docket Nos. 50-271 and 72-59
License No. DPR-28

REFERENCE: Letter, USNRC to Entergy Nuclear Operations, Inc., "Order Approving Transfer of the License for the Vermont Yankee Nuclear Power Station and Conforming License Amendment (EPID# L-2017-LLM-0002)," dated October 11, 2018 (ML18242A638)

Dear Sir or Madam:

The NRC Final Rule on Decommissioning Planning was published in 76 FR 35512 on June 17, 2011 with an effective date of December 17, 2012. The final rule includes a requirement (10 CFR 72.30) for each holder of a 10 CFR Part 72 License to submit, for NRC review and approval, a decommissioning funding plan for purposes of decommissioning the licensee's Independent Spent Fuel Storage Installation (ISFSI), and to resubmit those plans with adjustments as necessary to account for changes in costs and the extent of contamination.

NorthStar Vermont Yankee is hereby submitting the required Funding Plan. The attached demonstrates that the surpluses in the 10 CFR 50.75 Decommissioning Trust Fund exceed the estimated costs of ISFSI decommissioning. The Trust Fund balances account for the 10 CFR Part 50 license expiration dates and the ISFSI decommissioning cost estimate (DCE) assume all of the ISFSI license termination costs are incurred in the year in which spent fuel has been fully removed from the ISFSI. The values are reported in 2021 dollars.

This letter constitutes a certification that financial assurance is provided to cover the estimated cost of ISFSI decommissioning.

This letter contains no new regulatory commitments.

Should you have any questions concerning this letter or require additional information, please contact me at 212.951.3660.

Best Regards,
NorthStar Vermont Yankee, LLC

By: _____
Scott E. State, P.E.
Chief Nuclear Officer

SES/tbs

Attachment: 10 CFR 72.30 ISFSI Decommissioning Funding Plan

cc: Director, Office of Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Mr. David C. Lew
Regional Administrator, Region 1
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Commissioner
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Attachment

Vermont Yankee Nuclear Power Station

10 CFR 72.30 ISFSI Decommissioning Funding Plan
(10 pages total including this cover sheet)

10 CFR 72.30 ISFSI Decommissioning Funding Plan
Vermont Yankee Nuclear Power Station
ISFSI Docket 72-059

1. Background and Introduction

The Nuclear Regulatory Commission (NRC) issued its final rule on Decommissioning Planning on June 17, 2011[1], with the rule becoming effective on December 17, 2012. Subpart 72.30, "Financial assurance and recordkeeping for decommissioning," requires that each holder of, or applicant for, a license under this part must submit for NRC review and approval a decommissioning funding plan that contains information on how reasonable assurance will be provided that funds will be available to decommission the Independent Spent Fuel Storage Installation (ISFSI).

The rule also requires resubmittal of the decommissioning funding plan at intervals not to exceed 3 years, with adjustments as necessary to account for changes in costs and the extent of contamination. This document updates the funding plan previously submitted by Entergy Nuclear Operations, Inc. in December 2018[2].

In accordance with the rule, this letter provides a detailed cost estimate for decommissioning the ISFSI at the Vermont Yankee Nuclear Power Station (Vermont Yankee), in an amount reflecting:

1. The work performed by an independent contractor;
2. An adequate contingency factor; and
3. Release of the facility and dry storage systems for unrestricted use, as specified in 10 CFR Part 20.1402

This letter also provides:

1. Identification of and justification for using the key assumptions contained in the cost estimate;
2. A description of the method of assuring funds for decommissioning; and
3. The volume of onsite subsurface material containing residual radioactivity, if any, that will require remediation to meet the criteria for license termination.

2. Spent Fuel Management Strategy

Vermont Yankee permanently ceased reactor operations on December 29, 2014[3]. Approximately 3,880 spent fuel assemblies (3,879 assemblies and 1 fuel debris canister) were generated over the life of the plant. Because of the breach by the Department of Energy (DOE) of its contract to remove fuel from the site, an ISFSI had been constructed and fuel casks have been emplaced thereon to support plant operations. Based upon the current projection of the DOE's ability to remove spent fuel from the site, a second pad was

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1 U.S. Code of Federal Regulations, Title 10, Parts 20, 30, 40, 50, 70 and 72 "Decommissioning Planning," Nuclear Regulatory Commission, Federal Register Volume 76, Number 117 (p 35512 et seq.), June 17, 2011.

2 Letter, Entergy Nuclear Operations, Inc. to USNRC, "ISFSI Decommissioning Funding Plans (10 CFR 72.30)," dated December 17, 2018 (Accession No. ML18351A478).

3 BVY 15-001, "Certifications of Permanent Cessation of Power Operations and Permanent Removal of Fuel from the Reactor Vessel," January 12, 2015 (Accession Number ML15013A426).

constructed to support decommissioning. The ISFSI is operated under a Part 50 General License (in accordance with 10 CFR 72, Subpart K[4]).

Because of the DOE's breach, the spent fuel is packaged in dry storage casks for interim storage at the ISFSI.

Completion of the ISFSI decommissioning process is dependent upon the DOE's ability to remove spent fuel from the site. DOE's repository program assumes that spent fuel allocations will be accepted for disposal from the nation's commercial nuclear plants, with limited exceptions, in the order (the "queue") in which it was discharged from the reactor. Vermont Yankee's current spent fuel management plan is based in general upon: 1) a 2025 start date for DOE initiating transfer of commercial spent fuel to a federal facility (not necessarily a final repository), and 2) expectations for spent fuel receipt by the DOE for the Vermont fuel. The DOE's generator allocation/receipt schedules are based upon the oldest fuel receiving the highest priority. Assuming a maximum rate of transfer of 3,000 metric tons of uranium/year[5], the spent fuel is projected to be fully removed from the Vermont Yankee site in 2052.

NorthStar Vermont Yankee believes that one or more monitored retrievable storage facilities could be put into place within a reasonable time. In January 2013, the DOE issued the "Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste," in response to the recommendations made by the Obama administration's Blue Ribbon Commission and as "a framework for moving toward a sustainable program to deploy an integrated system capable of transporting, storing, and disposing of used nuclear fuel..."[6]

The report stated that "[W]ith the appropriate authorizations from Congress, the Administration currently plans to implement a program over the next 10 years that: …[A]dvances toward the siting and licensing of a larger interim storage facility to be available by 2025 that will have sufficient capacity to provide flexibility in the waste management system and allows for acceptance of enough used nuclear fuel to reduce expected government liabilities."

The DOE has taken the position that under the Standard Contract, it does not have an obligation to accept canistered fuel from licensees. This position, coupled with the DOE's failure to perform, has increased the difficulty of estimating future requirements under 10 CFR 72.30. The estimates presented in this report are for budgeting purposes only, and do not represent any conclusion by the licensee about how the DOE will actually perform in the future. This report should not be taken as any indication that the licensee knows how the DOE will eventually fulfill its obligations, or has any specific expectation concerning that performance. If DOE's failure to perform results in specific additional costs beyond those reflected in this report, it is expected that the DOE will compensate the licensee for those costs.

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4 U.S. Code of Federal Regulations, Title 10, Part 72, Subpart K, "General License for Storage of Spent Fuel at Power Reactor Sites."

5 "Acceptance Priority Ranking & Annual Capacity Report," DOE/RW-0567, July 2004.

6 "Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste," U.S. DOE, January 11, 2013.

NorthStar Vermont Yankee's position is that the DOE has a contractual obligation to accept the spent fuel earlier than the projections set out above consistent with its contract commitments. No assumption made in this study should be interpreted to be inconsistent with this position.

3. ISFSI Description

The design and capacity of the Vermont Yankee ISFSI(s) is based upon the Holtec HI-STORM 100S dry cask storage system. The system consists of a multi-purpose canister, with a nominal capacity of 68 fuel assemblies, and a steel-lined concrete storage overpack.

The Vermont Yankee spent fuel management plan resulted in 58 spent fuel storage casks being placed on the storage pads at the site (including the casks generated during plant operations). There will also be one storage overpack used for the storage of Greater-than-Class-C (GTCC) waste placed on the storage pad.

Table 1 provides the significant quantities and physical dimensions used as the basis in developing the ISFSI decommissioning estimate.

4. Key Assumptions / Estimating Approach

The decommissioning estimate is based on the configuration of the ISFSI expected after all spent fuel and GTCC material has been removed from the site. The configuration of the ISFSI is based on the current spent fuel inventory at the site (3,880 assemblies) and the DOE's spent fuel acceptance assumptions, as previously described. For purposes of this analysis, the second pad was needed to accommodate all the casks used to store spent fuel at the site, including those casks placed on the initial ISFSI pad during plant operations. The second ISFSI pad is 93 feet by 106 feet and has a maximum capacity of 25 casks.

The dry storage vendor, Holtec International, does not expect the overpacks to have any interior or exterior radioactive surface contamination. Any neutron activation of the steel and concrete is expected to be extremely small[7]. The decommissioning estimate is based on the conservative assumption that some of the concrete overpacks will contain low levels of neutron-induced residual radioactivity that would necessitate remediation at the time of decommissioning. As an allowance, 6 of the 58 overpacks are assumed to be affected, i.e., contain residual radioactivity. The allowance quantity is based upon the number of casks required for the final core off-load (i.e., 368 offloaded assemblies, 68 assemblies per cask) which results in 6 overpacks.

The dry storage vendor, Holtec International, does not expect any residual contamination to be left on the concrete ISFSI pads[8]. It would be expected that this assumption would be confirmed as a result of good radiological practice of surveying potentially impacted areas after each spent fuel transfer campaign. It is assumed for this analysis that the ISFSI pads will not be contaminated. As such, only verification surveys are included for the pads in the

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7 HI-STORM FSAR, Holtec International, Report HI-2002444, Rev. 14.

8 Ibid. page 2-206.

decommissioning estimate. An allowance is also included for surveying any transfer equipment.

The estimate is limited to costs necessary to support termination of the NRC license and meet the §20.1402 criteria for unrestricted use.

The decommissioning cost study[9] developed for Vermont Yankee and filed with the NRC as part of the license transfer from Entergy to Northstar, included the potential cost for the remediation of radiologically contaminated soil on site, which includes the ISFSI. This study was based upon a review of the site's radiological records and associated affected areas. However, during the construction of the existing ISFSI, the soil excavated was replaced with engineered fill. This material is not expected to become contaminated from the operation of the ISFSI. The second pad is located adjacent to the first.

For purposes of the funding plan, ISFSI decommissioning is considered an independent project. Consistent with the estimate included with the Post Shutdown Decommissioning Activities Report[10], in order to provide a more efficient decommissioning effort, NorthStar VY has initiated a series of Firm Fixed Price and Fixed Unit Price subcontracts to minimize the overall cost and schedule risk of the project.

The effects, if any, since the last submittal of the ISFSI decommissioning funding plan of the following events listed in 10 CFR 72.30(c)(1)-(4) have been specifically considered in the decommissioning cost estimate:

(1) Spills of radioactive material producing additional residual radioactivity in onsite subsurface material: There have been no spills at the ISFSI.

(2) Facility modifications: There have been no facility modifications of note since the previous update that affect the decommissioning cost estimate.

(3) Changes in authorized possession limits: There are no changes in authorized possession limits that affect the decommissioning cost estimate.

(4) Actual remediation costs that exceed the previous cost estimate: No actual remediation costs have been incurred, so no actual remediation costs exceed the previous cost estimate.

5. Cost Considerations

The estimated cost to decommission the ISFSI pads and release the facility and dry storage systems for unrestricted use is provided in Table 2. The cost includes an initial planning phase. During this phase the empty overpacks, ISFSI pads, and surrounding environs are characterized and the activity specifications and work procedures for the decontamination (overpack disposition) developed.

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9 Letter, NorthStar to USNRC, "Notification of Revised Post-Shutdown Decommissioning Activities Report (Revised PSDAR)," Section 4.0, "Estimate of Expected Decommissioning and Spent Fuel Management Costs" dated April 6, 2017 (Accession Number ML17096A394).

10 Ibid.

The next phase includes the cost for craft labor to demolish the activated overpacks, packaging in certified waste containers, transportation to the Andrews, TX site, disposal, as well as the costs for the supporting equipment, materials and supplies. The final phase includes the cost for the license termination survey, verification survey, and the associated equipment and laboratory support.

The estimate also contains costs for the NRC (and NRC contractor), site security (industrial), and other site operating costs.

For estimating purposes it is conservatively assumed that all expenditures will be incurred in the year 2052, the year following all spent fuel removal.

6. Financial Assurance

ISFSI operations at Vermont Yankee are in response to the DOE's failure to remove spent nuclear fuel from the site in a timely manner. The costs for management of the spent fuel are costs for which the DOE is responsible according to a judgment entered against the DOE under federal law and the Standard Contract[11]. It is therefore expected that, once the ISFSI is no longer needed, the cost to decommission the ISFSI would be a DOE-reimbursable expense. Until such time that the costs can be recovered from the DOE, NorthStar will rely upon the money available in its decommissioning trust fund to terminate the ISFSI license and release the facility and dry storage systems for unrestricted use.

Using the decommissioning trust fund is reasonable based on the following:

- The decommissioning trust fund is for radiological decommissioning costs and spent fuel management costs[12]. The ISFSI decommissioning is a radiological cost. To the extent that the trust fund balance exceeds costs required for Part 50 radiological decommissioning and spent fuel management, these funds would be available to address costs incurred, including ISFSI decommissioning costs.
- The projected amount necessary for decommissioning Vermont Yankee is $348.316 million, including spent fuel management costs, based upon the March 2021 10 CFR 50.75(f) filing for Vermont Yankee[13].
- The current decommissioning trust fund balance was $388.025 million (as of December 31, 2020), which is in excess of the projected costs as shown in Table 3[14]. Based on the remaining decommissioning trust fund balance in Table 3 below, projected fund earnings (assuming an annual 2% growth rate), and expected expenditures, the trust fund is expected to have an excess of $68.544 million over the estimated license

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11 Vermont Yankee Nuclear Power Corporation and Entergy Nuclear Vermont Yankee, LLC v. United States, Court of Federal Claims, Nos. 02-898C and 03-2663C (2006).

12 Entergy Nuclear Operations, Inc. obtained an exemption that allows the use of Vermont Yankee trust funds for spent fuel management activities. See NRC Approval of Exemption Request for Spent Fuel Management, 80 Fed. Reg. 35992 (June 23, 2015).

13 Letter, NorthStar Vermont Yankee to USNRC, "Status of Decommissioning and Spent Fuel Management Fund for Year Ending 2020," March 29, 2021, (Accession Number ML21106A269).

14 Ibid. Attachment 3, Table 3.

termination and spent fuel management costs.

- This surplus is more than sufficient to complete the decommissioning of the ISFSI (estimated cost provided in Table 2).

This certifies that, based on the trust fund balance and costs as shown as of the dates reflected in this report, financial assurance has been provided in the amount of the cost estimate for decommissioning of the ISFSI.

Table 1
Significant Quantities and Physical Dimensions

ISFSI Pad

Item	Length (ft)	Width (ft)	Residual Radioactivity
ISFSI Pad (1)	132	106	No
ISFSI Pad (2)	93	106	No

ISFSI Storage Overpack

Item	Value	Notes
Overall Height (inches)	218	Dimensions are nominal
Outside Diameter (inches)	132.0	Dimensions are nominal
Inside Diameter (inches)	73.5	Dimensions are nominal
Quantity (total)	59	58 spent fuel + 1 GTCC
Quantity (with residual radioactivity)	6	Equivalent to the number of overpacks used to store last complete core offload
Low-Level Radioactive Waste (total packaged volume)	17,232	Cubic Feet
Low-Level Radioactive Waste (packaged density)	94	Average weight density

Other Potentially Impacted Items

Item	Value	Notes
Number of Overpacks used for GTCC storage	1	No residual radioactivity

Table 2
NorthStar Vermont Yankee - ISFSI Decommissioning Costs and Waste Volumes

	Costs (*thousands of 2021 dollars*)						Waste Volume	Person-Hours	
	Removal	**Packaging**	**Transport**	**Disposal**	**Other**	**Total**	**Class A (Cubic feet)**	**Craft**	**Oversight and Contractor**
Decommissioning									
Planning (characterization, specs & procedures)	-	-	-	-	$175	$175	-	-	1,325
Decontamination/Demolition (activated cask disposition)	$285	$126	$866	$1,274	$26	$2,577	17,792	2,878	
License Termination (radiological surveys)	-	-	-	-	$702	$702	-	4,557	-
Subtotal	**$285**	**$126**	**$866**	**$1,274**	**$903**	**$3,454**	**17,792**	**7,435**	**1,325**
Supporting Costs									
Contracted Services	-	-	-	-	$239	$239	-	-	1,806
NRC/State Fees	-	-	-	-	$126	$126	-	-	-
Insurance	-	-	-	-	$119	$119	-	-	-
All Labor - Loaded	-	-	-	-	$770	$770	-	-	5,833
Materials & Supplies	-	-	-	-	$25	$25	-	-	-
Misc./Personal Expenses	-	-	-	-	$22	$22	-	-	-
Property and other Taxes	-	-	-	-	$184	$184	-	-	-
Utilities	-	-	-	-	$24	$24	-	-	-
ISFSI Fuel Management & Operations	-	-	-	-	$116	$116	-	-	881
Subtotal	**$0**	**$0**	**$0**	**$0**	**$1,625**	**$1,625**	**-**	**-**	**8,520**
GRAND TOTAL	**$285**	**$125**	**$866**	**$1,274**	**$2,528**	**$5,079**			

Table 3
Financial Assurance

Vermont Yankee Nuclear Power Station - PROMPT DECON Methodology									
Annual Cash Flow Analysis - Total License Termination, Spent Fuel Management (Thousands of 2021 Dollars) - See column definitions below									
	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9
Year	License Termination Cost	Spent Fuel Cost	Total Expenses	Beginning of Period Funded Balance	Withdrawals	Contributions DOE Recovery	Contributions NorthStar Escrow Deposits / Distributions	Annual Earnings on Fund	End-Of-Year Fund Balance
2021	$86,715	$4,241	$90,956	$388,025	$90,956	$0	$9,335	$5,941	$312,345
2022	$78,575	$4,241	$82,816	$312,345	$82,816	$0	$8,228	$4,591	$242,348
2023	$68,701	$4,241	$72,942	$242,348	$72,942	$10,000	$0	$3,588	$182,993
2024	$66,661	$4,241	$70,902	$182,993	$70,902	$21,205	$0	$2,666	$135,962
2025	$33,572	$4,241	$37,813	$135,962	$37,813	$4,241	$0	$2,048	$104,438
2026	$10,637	$4,241	$14,878	$104,438	$14,878	$4,241	$0	$1,876	$95,677
2027		$8,944	$8,944	$95,677	$8,944	$4,241	-$55,137	$1,819	$37,656
2028		$8,944	$8,944	$37,656	$8,944	$8,944	$0	$753	$38,409
2029		$8,944	$8,944	$38,409	$8,944	$8,944	$0	$768	$39,177
2030		$8,944	$8,944	$39,177	$8,944	$8,944	$0	$784	$39,961
2031		$8,944	$8,944	$39,961	$8,944	$8,944	$0	$799	$40,760
2032		$8,944	$8,944	$40,760	$8,944	$8,944	$0	$815	$41,575
2033		$8,944	$8,944	$41,575	$8,944	$8,944	$0	$832	$42,407
2034		$8,944	$8,944	$42,407	$8,944	$8,944	$0	$848	$43,255
2035		$8,944	$8,944	$43,255	$8,944	$8,944	$0	$865	$44,120
2036		$8,944	$8,944	$44,120	$8,944	$8,944	$0	$882	$45,003
2037		$8,944	$8,944	$45,003	$8,944	$8,944	$0	$900	$45,903
2038		$8,944	$8,944	$45,903	$8,944	$8,944	$0	$918	$46,821
2039		$8,944	$8,944	$46,821	$8,944	$8,944	$0	$936	$47,757
2040		$8,944	$8,944	$47,757	$8,944	$8,944	$0	$955	$48,712
2041		$8,944	$8,944	$48,712	$8,944	$8,944	$0	$974	$49,686
2042		$8,944	$8,944	$49,686	$8,944	$8,944	$0	$994	$50,680
2043		$8,944	$8,944	$50,680	$8,944	$8,944	$0	$1,014	$51,694
2044		$8,944	$8,944	$51,694	$8,944	$8,944	$0	$1,034	$52,728
2045		$8,944	$8,944	$52,728	$8,944	$8,944	$0	$1,055	$53,782
2046		$8,944	$8,944	$53,782	$8,944	$8,944	$0	$1,076	$54,858
2047		$8,944	$8,944	$54,858	$8,944	$8,944	$0	$1,097	$55,955
2048		$8,944	$8,944	$55,955	$8,944	$8,944	$0	$1,119	$57,074
2049		$8,944	$8,944	$57,074	$8,944	$8,944	$0	$1,141	$58,216
2050		$8,944	$8,944	$58,216	$8,944	$8,944	$0	$1,164	$59,380
2051		$8,944	$8,944	$59,380	$8,944	$8,944	$0	$1,188	$60,568
2052	$3,454	$8,944	$12,398	$60,568	$12,398	$8,944	$0	$1,142	$58,256
2053				$58,256	$0	$8,944	$0	$1,344	$68,544
TOTAL	**$348,316**	**$257,995**	**$606,311**	**$388,025**	**$606,311**	**$276,477**	**-$37,574**	**$47,927**	**$68,544**