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BVY 08-077

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

- References:
- (1) Letter, Entergy to USNRC, Report Pursuant to 10CFR50.54(bb), BVY 07-007, dated March 21, 2007
 - (2) Letter, USNRC to Entergy, Request for Additional Information to Support the Review of the Vermont Yankee Spent Fuel Management Plan Pursuant to 10CFR50.54(bb), NVY 08-030, dated March 12, 2008
 - (3) Letter, Entergy to USNRC, Response to Request for Additional Information, BVY 08-022, dated April 24, 2008
 - (4) Letter, USNRC to Entergy, Review of the Spent Fuel Management Plan, NVY 08-069, dated July 16, 2008

**Subject: Vermont Yankee Nuclear Power Station
License No. DPR-28 (Docket No. 50-271)
Revised Spent Fuel Management Plan Pursuant to 10CFR50.54(bb)**

Dear Sir or Madam,

In Reference (4), NRC staff completed a review of previous submittals (References 1 and 3) and determined that they could not provide preliminary approval of Entergy VY's spent fuel management program under 10CFR50.54(bb). NRC staff requested in Reference (4) that a revised spent fuel management plan be submitted for review.

Attachment 1 to this letter provides Entergy VY's response to the staff's request contained in Reference (4).

There are no new regulatory commitments being made in this submittal.

Should you have any questions concerning this submittal, please contact Mr. David J. Mannai at (802) 451-3304.

Sincerely,

Ted A. Sullivan
Site Vice President
Vermont Yankee Nuclear Power Station

Attachment 1 (8 pages)

A001
NRR

cc: Mr. Samuel J. Collins, Regional Administrator
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Docket No. 50-271
BVY 08-077

Attachment 1

Vermont Yankee Nuclear Power Station

Revised Spent Fuel Management Plan - 10CFR50.54(bb)

Vermont Yankee Nuclear Power Station
Program for Maintenance of Irradiated Fuel

Background and Introduction

This submittal is intended to respond to the Staff's request dated July 16, 2008 for a revised spent fuel management plan for Vermont Yankee Nuclear Power Station (Vermont Yankee) (ML081700564). Entergy Nuclear Vermont Yankee, LLC (Entergy VY or the Company) is seeking renewal of the operating license for Vermont Yankee, currently set to expire on March 21, 2012. However, pursuant to 10 CFR 50.54(bb), licensees of nuclear power plants that are within five years of the expiration of the reactor operating license shall submit written notification to the Nuclear Regulatory Commission for its review and preliminary approval of the program by which the licensee intends to manage and provide funding for the management of all irradiated fuel at the reactor following permanent cessation of operation of the reactor until title to the irradiated fuel and possession of the fuel is transferred to the U.S. Department of Energy (DOE) for ultimate disposal.

Entergy VY is submitting this plan to comply with the requirements of 10 CFR 50.54(bb). Entergy VY has not determined or committed to a specific decommissioning approach for Vermont Yankee at this time. However, it is Entergy VY's current plan for purposes of demonstrating the adequacy of funding to meet regulatory requirements to use the SAFSTOR decommissioning option based on the current license expiration date, employing a SAFSTOR period as permitted in 10 CFR §50.82(a)(3) such that decommissioning is completed within 60 years of permanent cessation of operations, coupled with a \$60 million cash contribution to the decommissioning trust in 2026. VY license renewal is likely to require a need to revise this preliminary plan.

Spent Fuel Management Strategy

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 removed from service ("oldest fuel first allocation"). The Company's current spent fuel management plan for the Vermont Yankee spent fuel is based upon (1) a 2017 start date for repository operations, consistent with the DOE's License Application Schedule for Yucca Mountain released in 2006, and (2) the DOE's expectations for spent fuel receipt as delineated in the "Acceptance Priority Ranking & Annual Capacity Report," DOE/RW-0567,

last updated in July 2004. Based on these assumptions, the Company projects that all fuel would be removed from the site as of 2042.^[1]

Interim storage of the spent fuel, until the DOE has completed the transfer, will be in the reactor building storage pool and/or at an Independent Spent Fuel Storage Installation (ISFSI) located on the Vermont Yankee site.

An ISFSI has been constructed within the protected area (PA) to support continued plant operations. Depending upon the shutdown date and DOE's performance, this facility may not have sufficient capacity to support decommissioning operations. For purposes of this plan, a second, supplemental ISFSI is assumed to be required to accommodate all the assemblies discharged over the operating period of the reactor. For financial planning purposes, the cost to construct this new facility is included within the decommissioning cost reported for the SAFSTOR scenario.

In the scenario assumed for this plan, 3,719 assemblies are generated through the end of currently licensed operations in 2012. To maintain core off-load capability, ten casks are loaded during operations (680 assemblies) and placed on the PA ISFSI pad. A new, larger pad is constructed on the site (within the owner controlled area) to permit post-shutdown dry fuel storage. The ten casks are relocated to this new pad in early 2015. The assemblies stored in the reactor building's spent fuel storage pool at the time of shutdown (3,039 assemblies) are loaded into multi-purpose canisters (MPCs) and moved into storage casks on the new pad by late 2017. During the dormancy period, the MPCs are periodically off-loaded into a DOE transport cask such that all 55 canisters are removed from the site by the year 2042. A discussion of the site-specific considerations for the management of spent fuel at Vermont Yankee may be found in Section 3.4 of the referenced decommissioning analysis.

As indicated above, the present spent fuel management plan assumes a SAFSTOR period such that decommissioning is completed within 60 years of permanent plant shutdown. Starting in 2012, the plant is put into SAFSTOR, and spent fuel is moved to a new ISFSI. DOE begins spent fuel removal activities at the site in 2017, continuing to 2042. Between 2043 and 2067, the plant continues to remain in SAFSTOR. In 2067, dismantlement of the plant commences, and the decommissioning project is completed in 2072. Major scheduling milestones are identified in Table 1 below.

In the absence of identifiable DOE cask requirements, the design and capacity of the new ISFSI is based upon a commercial dry cask storage system. The MPC has a capacity of 68 fuel assemblies at a unit cost of approximately \$705,000. An additional cost of \$292,000 is allocated for the concrete storage overpack.

¹ In addition to the satisfactory resolution of current and pending legal challenges and the elimination or amendment of the administrative limit on the repository's total capacity. The Company's analysis assumes, for purposes only of this report, that the Company does not employ DOE spent fuel disposal contract allowances for up to 20% additional fuel designation for shipment to DOE each year.

An average cost of \$274,500 was estimated for the labor and equipment to load, seal and transfer each MPC from the storage pool to the ISFSI. A cost of \$76,000 was estimated for the final transfer of the MPC at the ISFSI into a DOE transport cask (50% of the cost incurred for transferring the spent fuel into a dry storage canister).

Operation of the spent fuel pool is discontinued in 2017 after the fuel has been transferred to dry storage. ISFSI operations continue throughout the dormancy period until such time that the DOE is able to complete the transfer of the Vermont Yankee fuel to a federal repository in 2042.

Dormancy activities while spent fuel is still on the site include operations and maintenance of the spent fuel pool until unloaded, procuring, loading and transferring MPCs, a 24-hour security force, preventive and corrective maintenance on security systems, area lighting, general building maintenance, heating and ventilation of buildings, routine radiological inspections of contaminated structures, maintenance of structural integrity, and a site environmental and radiation monitoring program.

After all fuel has been transferred to dry storage, dormancy activities include a 24-hour security force, preventive and corrective maintenance on security systems, area lighting, general building maintenance, heating and ventilation of buildings, routine radiological inspections of contaminated structures, maintenance of structural integrity, and a site environmental and radiation monitoring program.

Decommissioning

In 2067, decommissioning operations would commence. The ISFSI is scheduled to be decommissioned along with the nuclear plant facilities. It is assumed that once the MPCs containing the spent fuel assemblies have been removed, any required decontamination performed on the storage modules and the license for the facility terminated, the modules can be dismantled using conventional techniques for the demolition of reinforced concrete. The concrete storage pad can then be removed and the area regraded.

Financial Assurance

A site-specific estimate of the cost to decommission the Vermont Yankee nuclear unit has been prepared.^[2] The analysis evaluated eight possible decommissioning scenarios, reflecting differences in the decommissioning alternative or approach selected, the expected operating license, as well as when the DOE could be expected to complete the transfer of spent fuel from the site.

Entergy VY's spent fuel management plan herein is based on Scenario 5 as submitted in that decommissioning cost estimate (ML080430658). However, Scenario 5 has been altered for this

² "Decommissioning Cost Analysis for the Vermont Yankee Nuclear Power Station," Document No. E11-1559-002, Rev. 0, January 2007.

spent fuel management plan by extending the period of SAFSTOR such that decommissioning is completed in 2072, 60 years following permanent cessation of operations.

This plan assumes a 2% annual real rate of return as allowed in 10 CFR 50.75. Under this plan, Entergy VY will deposit \$60 million in the decommissioning trust in the year 2026.

The decommissioning trust fund balance for Vermont Yankee was reported at \$439.567 million as of December 31, 2007.

Table 2 below provides a schedule of estimated expenditures for the license termination and spent fuel management costs in 2007 dollars. The source for this information is the latest decommissioning estimate, escalated from 2006 dollars to 2007 dollars. Costs are included for the design and construction of the ISFSI, the relocation of the spent fuel from the pool to the ISFSI pad, and eventual transfer of the fuel to the DOE.

To demonstrate the adequacy of the existing funds to cover both license termination and spent fuel management, the fund balance going forward is escalated at 2% per year. In year 2026, Entergy VY deposits an additional \$60 million into the decommissioning fund. The results of this analysis demonstrate that the balance in the decommissioning trust is adequate to fund both the decommissioning and spent fuel management costs, with a surplus shown at the end of the decommissioning project.

NRC Approvals

This spent fuel management plan assumes withdrawals from the decommissioning trust for spent fuel management purposes. Entergy VY will make appropriate submittals for an exemption in accordance with 10 CFR §50.12 from the requirements of 10 CFR §50.82(a)(8)(i)(A) in order to use the decommissioning trust funds for spent fuel management expenses. Entergy VY will periodically revisit the amount of the cash contribution required to the decommissioning fund to ensure that spent fuel management withdrawals would not inhibit the ability of the licensee to complete radiological decommissioning, and will make further contributions if required for that purpose.

**Table 1
 Projected Schedule and Milestones**

Major Milestones and Fuel-Related Events	
Currently scheduled cessation of plant operations	March 2012
New ISFSI available	2015 (beginning of 1 st quarter)
Casks transferred from PA ISFSI to New ISFSI	2015 (by end of 1 st quarter)
First MPC transferred from pool to New ISFSI	2015 (3 rd quarter)
Last MPC transferred from pool to New ISFSI	2017 (3 rd quarter)
End of wet storage pool operations (66 months)	September 2017
DOE begins to receive commercial spent fuel	March 31, 2017
1 st Vermont Yankee fuel assembly removed from site	2018 (4 th quarter)
Last Vermont Yankee fuel assembly leaves site	December 2042
Decommissioning Operations Commence	2067
ISFSI decommissioned (concurrent with other site facilities)	2067 – 2072

Table 2
Vermont Yankee Nuclear Power Station
Decommissioning Funding Plan
Scenario 5: 2012 Shutdown, Extended SAFSTOR Alternative, 2017 DOE Start Date
 (thousands of 2007 dollars)

Basis Year	2007					
Fund Balance	\$439.567					
Annual Escalation	0.00%					
Annual Earnings	2.00%					
	A	B	C	D	E	F
Year	50.75 License Termination Cost (millions)	50.54(bb) Spent Fuel Management Cost (millions)	Total License Termination and Spent Fuel Management Cost (millions)	Total Cost Escalated at 0% (millions)	Contributions to Trust Fund (millions)	Decommissioning Trust Fund Escalated at 2% (minus expenses) (millions)
2007	-	-	-	-	-	439.567
2008	-	-	-	-	-	448.358
2009	-	-	-	-	-	457.326
2010	-	-	-	-	-	466.472
2011	-	-	-	-	-	475.801
2012	32.668	13.597	46.265	46.265		439.052
2013	37.246	27.864	65.110	65.110		382.724
2014	3.816	28.362	32.178	32.178		358.200
2015	3.816	28.362	32.178	32.178		333.186
2016	3.826	28.440	32.266	32.266		307.584
2017	3.815	20.377	24.192	24.192		289.543
2018	3.813	2.956	6.769	6.769		288.565
2019	3.813	2.569	6.382	6.382		287.955
2020	3.823	2.808	6.631	6.631		287.083
2021	3.813	2.879	6.692	6.692		286.132
2022	3.813	2.879	6.692	6.692		285.163
2023	3.813	2.801	6.614	6.614		284.252
2024	3.823	2.731	6.554	6.554		283.383
2025	3.813	2.724	6.537	6.537		282.514
2026	3.813	2.724	6.537	6.537	60.000	341.627
2027	3.813	2.724	6.537	6.537		341.923
2028	3.823	2.731	6.554	6.554		342.207
2029	3.813	2.647	6.460	6.460		342.591
2030	3.813	2.724	6.537	6.537		342.906
2031	3.813	2.724	6.537	6.537		343.227

Table 2 (continued)
Vermont Yankee Nuclear Power Station
Decommissioning Funding Plan
Scenario 5: 2012 Shutdown, Extended SAFSTOR Alternative, 2017 DOE Start Date
 (thousands of 2007 dollars)

Basis Year	2007					
Fund Balance	\$439.567					
Annual Escalation	0.00%					
Annual Earnings	2.00%					
	A	B	C	D	E	F
Year	50.75 License Termination Cost (millions)	50.54(bb) Spent Fuel Management Cost (millions)	Total License Termination and Spent Fuel Management Cost (millions)	Total Cost Escalated at 0% (millions)	Contributions to Trust Fund (millions)	Decommissioning Trust Fund Escalated at 2% (minus expenses) (millions)
2032	3.823	2.576	6.399	6.399		343.693
2033	3.813	2.647	6.460	6.460		344.107
2034	3.813	2.647	6.460	6.460		344.529
2035	3.813	2.801	6.614	6.614		344.805
2036	3.823	2.654	6.477	6.477		345.225
2037	3.813	2.724	6.537	6.537		345.592
2038	3.813	2.724	6.537	6.537		345.967
2039	3.813	2.724	6.537	6.537		346.349
2040	3.823	2.731	6.554	6.554		346.722
2041	3.813	2.647	6.460	6.460		347.197
2042	3.859	3.063	6.922	6.922		347.219
2043	3.812	-	3.812	3.812		350.351
2044	3.812	-	3.812	3.812		353.546
2045	3.812	-	3.812	3.812		356.805
2046	3.812	-	3.812	3.812		360.129
2047	3.812	-	3.812	3.812		363.520
2048	3.812	-	3.812	3.812		366.978
2049	3.812	-	3.812	3.812		370.505
2050	3.812	-	3.812	3.812		374.104
2051	3.812	-	3.812	3.812		377.774
2052	3.812	-	3.812	3.812		381.517
2053	3.812	-	3.812	3.812		385.335
2054	3.812	-	3.812	3.812		389.230
2055	3.812	-	3.812	3.812		393.203
2056	3.812	-	3.812	3.812		397.255

Table 2 (continued)
Vermont Yankee Nuclear Power Station
Decommissioning Funding Plan
Scenario 5: 2012 Shutdown, Extended SAFSTOR Alternative, 2017 DOE Start Date
 (thousands of 2007 dollars)

Basis Year	2007					
Fund Balance	\$439.567					
Annual Escalation	0.00%					
Annual Earnings	2.00%					
	A	B	C	D	E	F
Year	50.75 License Termination Cost (millions)	50.54(bb) Spent Fuel Management Cost (millions)	Total License Termination and Spent Fuel Management Cost (millions)	Total Cost Escalated at 0% (millions)	Contributions to Trust Fund (millions)	Decommissioning Trust Fund Escalated at 2% (minus expenses) (millions)
2057	3.812	-	3.812	3.812		401.388
2058	3.812	-	3.812	3.812		405.604
2059	3.812	-	3.812	3.812		409.904
2060	3.812	-	3.812	3.812		414.290
2061	3.812	-	3.812	3.812		418.764
2062	3.812	-	3.812	3.812		423.327
2063	3.812	-	3.812	3.812		427.981
2064	3.812	-	3.812	3.812		432.729
2065	3.812	-	3.812	3.812		437.572
2066	3.812	-	3.812	3.812		442.511
2067	34.248	-	34.248	34.248		417.113
2068	106.707	-	106.707	106.707		318.749
2069	83.372	0.735	84.107	84.107		241.017
2070	60.237	0.994	61.231	61.231		184.606
2071	60.237	0.994	61.231	61.231		127.067
2072	39.211	0.750	39.961	39.961		89.647
	656.118	219.034	875.152	875.152	60.000	

Calculations:

Column C = A + B

Column D = (C)*(1+0%)^(current year - 2007) or for 0%, D = C

Column E = Contributions to trust fund

Column F = (Previous year's fund balance) * (1 + .02) - D (current year's decommissioning expenditures) + E (contributions)