

**Vermont Yankee's Decommissioning
As An Example of
Nationwide Failures of Decommissioning Regulation**

Comments Submitted to the NRC

March 23, 2015

**Re: Entergy Nuclear Operations, Inc.,
Vermont Yankee Nuclear Power Station
Post-Shutdown Decommissioning Activities Report**

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Executive Summary:

Fairewinds concludes that weak NRC nuclear power plant decommissioning regulations have not created a solid financial and technical foundation to protect the public's health and welfare, but rather are a financial subsidy for the nuclear industry. We believe that the patchwork structure of NRC regulations creates a series of subsidies designed to minimize each energy corporation's cost to shut down nuclear power plants and marginalize decommissioning efforts for decades into the future, creating an intergenerational transfer of risk. Nuclear power corporations, including, but not limited to Vermont Yankee, are using available NRC legal precedents to distort the true cost of nuclear power and minimize the actual safety risks that exist in the decommissioning of each corporation's aging reactors.

The results of Fairewinds analysis are delineated in the sections below. This report is divided into two broad areas: financial issues and safety issues. The first area, Financial Issues, has significant national ramifications and is also inextricably intertwined with safety concerns relating specifically to the decommissioning of Vermont Yankee. Were it not for the financial incentives that the Nuclear Regulatory Commission has built into its regulations, nuclear plants would be promptly dismantled and Fairewinds' concerns regarding Vermont Yankee's ongoing safety issues with its carcass proposed to remain untended in Vermont for at least 60-years would no longer exist.

Fairewinds Energy Education received a grant from the Lintilhac Foundation to analyze Entergy's proposed plans for decommissioning the Vermont Yankee Nuclear Power Plant located in Vernon, Vermont. Fairewinds found it impossible to analyze Entergy's proposed decommissioning plans for Vermont Yankee without also concurrently analyzing the Rules and Regulations of the United States Nuclear Regulatory Commission (NRC).

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Part 1: Financial Issues:

The Federal Code of Regulations 10 CFR §50.75 is the foundation of the NRC’s regulations covering nuclear power plant decommissioning. There are eight critical financial issues associated with decommissioning nuclear power plants that stem from problems with the NRC’s legal interpretation of 10 CFR §50.75.

These issues are:

1. The Concept Of SAFSTOR
2. The Cost Formula For Decommissioning Estimates
3. Independent Spent Fuel Storage Installation Costs (ISFSI)
4. Spent Fuel Pool Storage
5. Growth Projections For The Decommissioning Fund
6. LLC Status – NRC And Entergy Statements
7. Sharing Of Excess Decommissioning Funds
8. Auditing The Expenditures From The Fund

1. The Concept Of SAFSTOR

The Code of Federal Regulations, 10 CFR §50.75 provides for three decommissioning options: rapid dismantlement, permanent entombment, and an intermediate concept called SAFSTOR. While permanent entombment has not yet been applied in the United States, and rapid dismantlement has been initiated occasionally, the new decommissioning option of choice for the nuclear industry has suddenly become SAFSTOR. Memorialized in 10 CFR §50.75, the SAFSTOR approach to decommissioning allows an energy corporation to wait 60 years before it must completely dismantle the mothballed nuclear plant. It is important to note that there is no basis in physics that led to this arbitrary conclusion that 60 years is an acceptable amount of time to wait to decommission a nuclear power plant. In reality, SAFSTOR is a financial mechanism designed to allow nuclear power plant owners to avoid paying for decommissioning costs as the plant operates, effectively creating an intergenerational transfer of risk and costs. Instead, SAFSTOR allows these corporations that may or may not even exist in 60 years to place inadequate funds in the volatile financial market in hopes that those funds will grow during the 60-year decommissioning hiatus to cover the astronomical costs of decommissioning. Reasons that the decommissioning costs have grown so astronomically are that inadequate funds were set aside initially, no effort has been made to ascertain current costs and make up differences, and most of these aged nuclear plants are leaking various radioactive isotopes that will necessitate even further costly cleanup.

The nuclear industry vehemently argues that SAFSTOR really is not a financial mechanism, and claims instead that it is a method by which to protect corporation personnel from exposure to increased doses of radiation by waiting 60 years to decommission the plant. While it is true radioactive material decays over time, the benefits of dose reduction are largely accrued during the first 10 years after a nuclear plant shut downs. Cobalt-60 is the primary isotope causing significant exposure to personnel during the first 10 years after shutdown. Since Cobalt-60 has a 5-year half-life, only 25% of Cobalt-60 remains after 10 years. Therefore, the benefit of waiting to

decommission for 10 years is that radiation exposure to workers from Cobalt-60 will be reduced by 75%, due to radioactive decay over that first decade. The latest claim made by the nuclear industry is that by waiting 60 years, the collective exposure to nuclear personnel should be minimized to slightly more than 300 Rem.

Truthfully, the actions of the nuclear industry while nuclear plants are operating belie industry claims regarding dose reduction to personnel. An illustrative example occurred in 2014 during a routine outage at the Entergy owned Palisades nuclear plant in Michigan. Entergy had shut down Palisades for routine maintenance and its regularly scheduled refueling outage. With long-standing and chronic aging management problems, Entergy finally decided to make a major repair while still maintaining an extraordinarily short refueling outage schedule. Entergy thus exposed 192 of its employees and independent contractors to very high levels of radiation in order to get the Palisades nuclear plant back into operation again as quickly as possible. The exposure to Entergy employees and contractors at the end of the three week long rushed outage was approximately 115 Person-rem.¹ However, once Palisades was again generating electricity, profits were also flowing to Entergy.

While the nuclear industry continues to claim that employee and contractor exposure should be minimized during decommissioning to a collective maximum of 300 Rem during or after 60-years of SAFSTOR, the same industry has no remorse regarding high levels of radiation exposure when returning a nuclear plant to the profitable status of generating electricity leads to a collective 115 Rem exposure in only three weeks.

It is apparent then the nuclear industry and the NRC have used the SAFSTOR option to create a double standard for dose reduction during decommissioning compared to operation.

By allowing underfunded escrow accounts during the lifetime of an operating nuclear

¹ Person-rem Physics measurement of radiation exposure radiation: Units for measuring ionizing radiation – For expressing the collective dose to a population, the person-Sv and person-rem are the units used. These units represent the product of the average dose per

power plant the NRC facilitates the reduction in nuclear production costs. By enabling the power companies to present perceived lower nuclear power costs actually creates a subsidy for the nuclear power industry and allows nuclear power to appear to be a more competitive method of generating electricity when compared against other electric generating alternatives.

At every step in the nuclear fuel chain, decommissioning costs have exceeded available funds. These extra hidden costs, like the production of mill tailings from the mining of uranium in Moab, Utah, and decommissioning of all nuclear facilities in the nuclear fuel chain are called externalities. The externalities of decommissioning, including the cleanup from leaking plants and their dismantlement, and the cost of mining, milling, and fuel fabrication decommissioning (after mining, milling, and fuel fabrication) are not factored into the price of nuclear power per kilowatt-hour when compared with other energy production like solar, wind, geothermal, wave, etc.

Recommendations:

- 1.1. Fairewinds believes that the Nuclear Regulatory Commission should remove the SAFSTOR 60-year option from 10 CFR §50.75. Although decommissioning and dismantlement may not be entirely feasible in a short amount of time at some rare locations, the economics show that allowing 60-years before decommissioning is merely a hidden nuclear power subsidy that has been memorialized into nuclear law in an effort to shift costs from the federal government's regulation of energy companies to the residents of the states in which the nuclear plants have been built.
- 1.2. Fairewinds believes that the methods used by the NRC to accrue decommissioning trust funds at all nuclear facilities, not just power reactors, needs to be completely revised to reflect the actual costs without allowing additional time for delayed cleanup. Present NRC methodology effectively creates a generational transfer of costs and risks.

2. The Cost Formula For Decommissioning Estimates

The formula the NRC has invented for nuclear decommissioning cost analysis is ordained in 10 CFR §50.75. Unfortunately for the communities surrounding the shutdown plants, the formula is simplistic and has no foundation in construction industry costs and environmental remediation. Instead, the archaic formula relies upon the age of each nuclear plant, the power level at which the nuclear plant was operated, and whether it is a boiling water reactor (BWR) or pressurized water reactor (PWR). Most disturbingly the so-called formula is not site specific, does not consider radiological leaks or other environmental or radiological damage to the specific site environment, the cost of massive site remediation, or the topographical and geological challenges in existence at each site. Furthermore, the decommissioning formula created by and applied by the NRC has never correctly estimated the true cost to decommission any nuclear power plant in the United States.

Finally the NRC formula provides no useful information for policy leaders at state and federal levels. Knowing how much money is currently in a site's decommissioning fund and then arbitrarily comparing that fund balance against the formula presented in 10 CFR §50.75 makes it impossible for any governing or regulating body to make an informed decision about when or how it may be possible to decommission any US nuclear power plant.

The experience with the decommissioning cost analysis by Entergy of Vermont Yankee in Vermont and the lack of fiscal oversight by the NRC of the Vermont Yankee decommissioning trust fund have proven that there is no transparent process in which the public is informed and able to participate.

“On his first day in Office, President Obama signed the *Memorandum on Transparency and Open Government*, ushering in a new era of open and accountable government meant to bridge the gap between the American people and their government:

- The Administration is **reducing the influence of special interests** with ethics rules that prevent lobbyists from coming to work in government or sitting on its advisory boards. ...
- **...The Administration is empowering the public – through greater openness and new technologies – to influence the decisions that**

affect their lives.”² [Emphasis Added]

The NRC claims that it subscribes to President Obama’s signed *Memorandum on Transparency and Open Government*,³ so stating:

“The NRC Approach to Open Government: As an independent regulatory agency that prides itself on openness, the U.S. Nuclear Regulatory Commission (NRC) is pleased to take an active role in President Barack Obama’s *Open Government Initiative*, with its focus on open, accountable, and accessible government. The NRC has a long history of, and commitment to, transparency, participation, and collaboration in our regulatory activities.”

And finally, the NRC confirms its commitment to public participation in its management processes that are of paramount interest to the public stakeholders, be it citizens or state and federal regulators in other state and federal agencies. Accordingly, the U.S. Nuclear Regulatory Commission (NRC) claims it “considers public involvement in, and information about, our activities to be a cornerstone of strong, fair regulation of the nuclear industry. We recognize the public’s interest in the proper regulation of nuclear activities and provide opportunities for citizens to be heard. For that reason, consistent with The NRC Approach to Open Government, the agency is committed to providing opportunities for the public to participate meaningfully in the NRC’s decision making process.”⁴

Participation allows members of the public to contribute ideas and expertise so that their government can make policies with the benefit of information that is widely dispersed in society. [Emphasis Added]

— Open Government Directive⁵

Ironically, all the formulas and methodology for decommissioning nuclear power plants predate this memorandum and have not been open to either discussion or stakeholder intervention at any site in NRC jurisdiction. Moreover, much of the data listed on the NRC website and in public pamphlets promoting NRC efforts were created anywhere from 4 to 10 and even 15 years prior to President Obama’s signed *Memorandum on*

² <https://www.whitehouse.gov/open/about>

³ <http://www.nrc.gov/public-involve/open.html>

⁴ <http://www.nrc.gov/public-involve/open/public-participation.html>

⁵ Ibid

Transparency and Open Government.

In order to provide a useful policymaking tool, it is time for the NRC to make financial decommissioning information open to federal and state regulators, citizens, environmental organizations and other stakeholders. It is long past time for the NRC to take the steps that an executive order by President Obama directed it to do back in 2009, and that the NRC claims on its website to have already done. It is time for other regulators (state and federal) and all stakeholders to call for the NRC to conduct an accurate cash flow analysis of the growth in the decommissioning trust fund of each plant and site as compared to the cash withdrawals from that fund as they are incurred. *With the advent of Excel spreadsheets, this is a routine request applied to businesses throughout the world; these are simple procedures that should be expected and required of all nuclear plant licensees and nuclear energy corporations.*

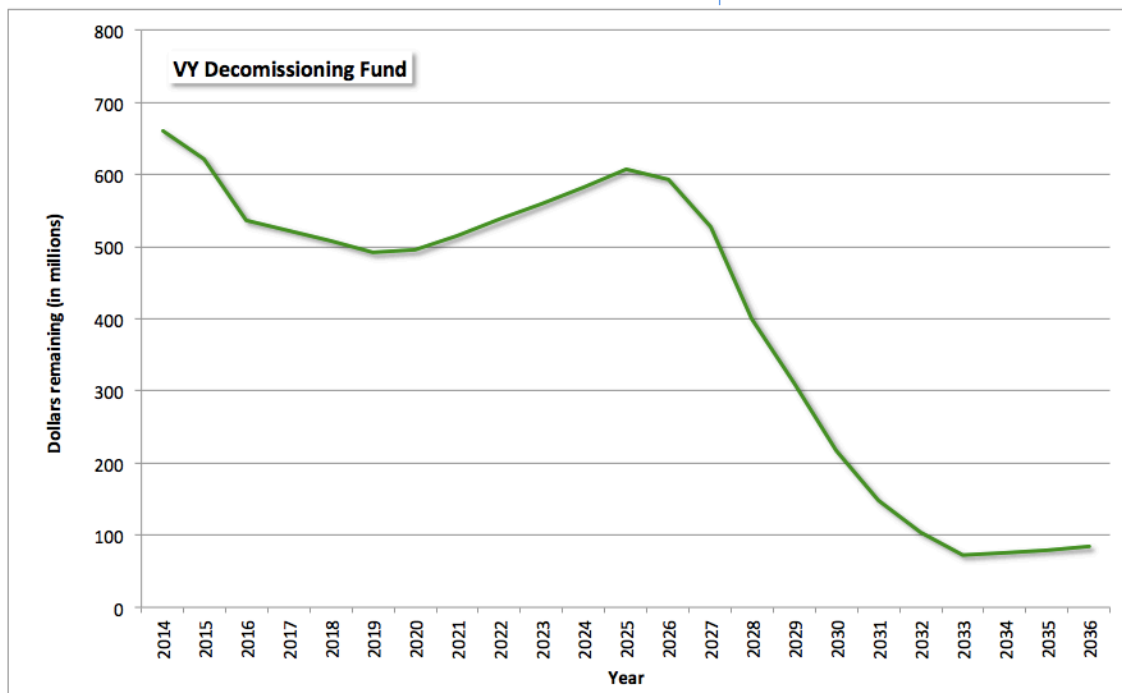
Fairewinds Associates has developed an Excel application spreadsheet to oversee the Vermont Yankee decommissioning fund and the decommissioning process. The methodology delineated in this spreadsheet enables the user to observe the rate of growth of the decommissioning trust fund to grow at a rate of interest that is determined by the user. The user(s) then apply the spreadsheet to calculate withdrawals from the decommissioning trust fund balance based upon decommissioning activity cost schedules that have been previously provided by the involved energy corporation; in this case that is the Entergy Corporation for its Vermont Yankee nuclear plant. New yearly balances are then created based upon growth of the fund and withdrawals from that fund.

Exhibit 1 to this report is a spreadsheet based upon a 5% rate of growth in the fund and a 3% rate of inflation for the costs associated with decommissioning. Being able to vary these two rates (interest and inflation) then allows policymakers and other stakeholders to make informed decisions about when decommissioning can commence.

The data in Exhibit 1 is based on information previously provided by Entergy. By conducting such a cash flow analysis, Fairewinds has determined that sufficient funds will be available for Entergy's actual decommissioning of its Vermont Yankee nuclear plant so that decommissioning work can begin in approximately 2026. Furthermore, the decommissioning should be completed approximately by 2032.

A graphical representation of the data provided in Exhibit 1 may be found below:

Cash Flow Analysis Vermont Yankee Decommissioning



Without this tool, policymakers must trust the nuclear energy corporation's unaudited estimation as to when the fund may have adequate cash with which to support commencement of a decommissioning project. An Excel spreadsheet process of this type promotes transparency in the decommissioning process for the stakeholders who will be most affected. Fairewinds and an independent consultant developed this basic spreadsheet in less than 10 person-days of design effort.⁶

⁶ Fairewinds will share its Excel spreadsheet online for policymakers in Vermont and other states to use. *However the cost data in the spreadsheet is site-specific and must be modified to reflect each nuclear reactor's actual costs and decommissioning fund balances in this comparative analysis.*

Therefore, local stakeholders and other state and federal regulators should insist that the NRC flex its regulatory muscle and meet the letter of transparency as provided and guaranteed in President Obama's signed [*Memorandum on Transparency and Open Government*](#), by instituting such spreadsheet regulations upon the nuclear industry and its energy corporations. Most likely, the nuclear energy companies will spend 100 times the cost of development of such a spreadsheet system to support decommissioning decisions nationwide in their initial legal challenges against such regulation. Rest assured that the development of such an open and transparent system meant to protect the public is not an undue burden on energy corporations who are NRC licensees.

Recommendation:

Fairewinds recommends that the Nuclear Regulatory Commission rewrite 10 CFR §50.75 to require a cash flow analysis at consecutive five-year intervals leading up to the ultimate decommissioning of the reactor. This cash flow analysis will provide policymakers with adequate information to determine when a nuclear plant will have the cash available to complete a decommissioning project.

3. Independent Spent Fuel Storage Installation Facility (ISFSI) Costs

Another disturbing problem in the decommissioning analyses at Vermont Yankee is that the calculations for the yearly decommissioning costs and ISFSI have been muddled and comingled in 10 CFR §50.75 and in the Vermont Yankee Post Shutdown Decommissioning Activities Report (PSDAR) and other planning documents. Nevertheless, Entergy has padded its cost estimates for Vermont Yankee with proposed expenditures that have no relationship to the decommissioning effort of the nuclear facility and site.

Specifically, Entergy is fully aware that it is illegal under NRC regulations to fund an Independent Spent Fuel Storage Installation (ISFSI) at Vermont Yankee using the decommissioning fund. As recently as February 9, 2015, Entergy acknowledged that it is not authorized to raid the decommissioning trust fund to supply cash to build an ISFSI as

it has proposed to do in the PSDAR.

In the letter T. Michael Twomey, Vice President, External Affairs wrote to Kyle H. Landis-Marinello, Vermont Assistant Attorney General and to Christopher Recchia, Commissioner Vermont Department of Public Service Entergy said,

ENVY acknowledges that current NRC regulations do not permit ENVY to use decommissioning funds for actual (i.e. non-planning) spent fuel management activities.⁷

Another example of this muddled relationship between actual and inappropriate cost shifting can be found in the 2012 Vermont Yankee decommissioning planning document entitled *Decommissioning Cost Analysis for the Vermont Yankee Nuclear Power Station*.⁸ A literal reading of this Entergy document led Vermont State policymakers to reach erroneous conclusions regarding the timing of Entergy's program for decommissioning Vermont Yankee. *Decommissioning Cost Analysis for the Vermont Yankee Nuclear Power Station* speculates that the costs associated with decommissioning Vermont Yankee are so excessive and exorbitant and that Entergy planned so poorly that it will take at least 60-years for the underfunded trust fund to finally accumulate adequate funds to address the excessive cost estimates of decommissioning the 40-year-old plant.

TLG Services is a wholly owned subsidiary of Entergy Corporation. Worse still is a series of erroneous financial premises that Entergy and its *for profit* decommissioning subsidiary TLG Services generate to reach its conclusions. These premises may be found hidden in the footnotes and small print of the document. Specifically, Footnote 3 on page viii states:

Projected expenditures for spent fuel management identified in the cost analyses do not consider the outcome of the litigation (including compensation for damages) with the DOE with regard to the delays incurred by Entergy VY in the timely removal of spent fuel from the site.

⁷ *Pre-Notice of Disbursement from Entergy Nuclear Vermont Yankee, Decommissioning Trust*, Entergy Letter of an Entergy letter to Vermont Assistant Attorney General Landis-Marinello and to DPS Commissioner Christopher Recchia, February 9, 2015Page 3, Footnote 11.

⁸ *Decommissioning Cost Analysis for the Vermont Yankee Nuclear Power Station* (E11-1643-001, Rev. 1) prepared by TLG Services, Inc., February 2012.

As such, this analysis takes no credit for collection of damages, even though utilities are now routinely being awarded such damages in the courts. Collection of spent fuel damages from the DOE is expected to provide the majority of funds needed for spent fuel management following shutdown.

Furthermore, according to paragraph 3.4.1 on pages 7&8 of Section 3:

An ISFSI has been constructed within the protected area (PA) to support continued plant operations. The ISFSI has a capacity of 36 dry storage modules. As such, under the current assumptions for DOE performance, a second ISFSI will be required to completely off-load the spent fuel pool at the cessation of plant operations.

Construction, operation and maintenance costs for the ISFSI are included within the estimates and address the costs for staffing the facility, as well as security, insurance, taxes and licensing fees. The estimates include the costs to purchase, load, and transfer the multipurpose spent fuel storage canisters (MPCs) from the pool to the DOE or to/from the ISFSI. Costs are also provided for the final disposition of the facilities once the transfer is complete.

The impact of these two Entergy and TLG assumptions on the overall cost of decommissioning the Vermont Yankee site is enormous. According to *Table 6.1* of Entergy's 2012 Report, *Summary of Decommissioning Cost Contributions*⁹, the cost to build the second ISFSI, and then load and transfer the spent fuel to the facility is 15 to 17% of the entire cash outlay required for decommissioning the Vermont Yankee site and exceeds \$150,000,000. More importantly, Entergy plans to withdraw those funds early in the decommissioning process thus draining the decommissioning fund, by reducing the interest that can be accrued for plant dismantlement. Finally, *Table C-1*¹⁰ entitled *Vermont Yankee Nuclear Power Station: Scenario 1, 2012 Shutdown, SAFSTOR Alternative*, shows that Entergy/TLG also plans to extract an additional major charge to the decommissioning fund of \$61,000,000 ostensibly to guard the spent fuel and monitor

⁹ *Summary of Decommissioning Cost Contributions, Table 6.1, DECOMMISSIONING COST ANALYSIS for the VERMONT YANKEE NUCLEAR POWER STATION* (Document E11-1643-001, Rev. 1) TLG Services, Inc., February 2012

¹⁰ *Table C-1 2a.4, Vermont Yankee Nuclear Power Station: Scenario 1, 2012 Shutdown, SAFSTOR Alternative, DECOMMISSIONING COST ANALYSIS for the VERMONT YANKEE NUCLEAR POWER STATION* (Document E11-1643-001, Rev. 1) TLG Services, Inc., February 2012

its radiation while it is stored on site.

While 10 CFR §50.75 does not adequately provide a means to determine the true cost of decommissioning, that regulation is quite clear that funding for the Independent Spent Fuel Storage Installation is simply not included in the regulation as promulgated.

Even the NRC has publicly stated that the Decommissioning Trust Fund shall not be used to fund an ISFSI. In a newspaper article entitled **VY spent fuel plan gets nod** (2/4/09: Brattleboro Reformer), NRC spokesman Neil Sheehan said,

The NRC rejected the request because trust fund money may only be used for decommissioning work unless the funds are in addition to decommissioning funds and if they have been earmarked for spent fuel management, said Neil Sheehan, spokesman for the NRC.

Furthermore in a private email from an attorney representing the Vermont Department of Public Service to Mr. Gundersen dated January 19, 2011, both the NRC and the State of Vermont acknowledge reactors should not be paying for an ISFSI from the decommissioning fund without seeking and receiving a waiver (emphasis added):

From: "Hofmann, Sarah" <Sarah.Hofmann@state.vt.us>
Subject: FW: questions to NRC
Date: January 19, 2011 11:39:29 AM EST
To: 'Arnie Gundersen' <sailchamplain@gmail.com>
Cc: "Miller, Elizabeth" <Elizabeth.Miller@state.vt.us>

Good morning Arnie. In response to your email this morning, I thought I would see what NRC could give us for info on this issue. I asked three questions of Doug Tift to ask of the decomm unit at NRC. Doug is our state liaison to NRC. I asked the questions and he answered in a phone call so I have typed his response below each question.

Could you pass on three questions for me to your decommissioning gurus:

(1) Are plants paying for an ISFSI upon decommissioning out of their decommissioning trust funds?

A. **They shouldn't be paying for an ISFSI from the decommissioning fund without getting an exemption.**

(2) If so, is it necessary to get an exemption from NRC?

A. **Yes, an exemption would be necessary**

(3) Have any plants gotten exemptions to use money out of their decommissioning trust funds for ISFSIs or any other spent fuel management purpose?

A. **Two plants asked for exemptions and then withdrew the requests. No other plant has requested an exemption.** They believe others will but no others to date other than the two.

Many thanks.

Sarah Hofmann
Director for Public Advocacy
Vermont Department of Public Service

Finally, it appears that the 2002 Memorandum of Understanding between the State of Vermont and Entergy requires the approval of the Public Service Board to remove decommissioning funds in order to build and maintain an ISFSI.

Finally, ENVY will seek Board approval for any disbursements from the decommissioning trust fund, unless the disbursements are used for decommissioning.¹¹

Entergy's own admissions, the legislative history of 10 CFR §50.75, as well as NRC, DPS, and PSB comments clearly indicate that the intent of the decommissioning trust fund is that it be used to decommission Vermont Yankee and not to be used to fund an ISFSI.

Recommendation:

Entergy has applied to the NRC for an exemption from 10 CFR §50.75 to fund its Independent Spent Fuel Storage Installation (ISFSI). Fairewinds recommends that the NRC reject such an exemption, as there is no basis in the statutory regulations of 10 CFR §50.75 for such funding to be extracted from a site's decommissioning fund. Furthermore, Fairewinds also recommends that the Vermont Department of Public Service file an appearance as an intervenor/stakeholder with the NRC specifically rejecting such an exemption waiver.

¹¹ *Docket 6545, 6/13/2002: Board Order, Page 35, refers to footnote 64. Exh. VY-42 @ Para. 7*

4. Spent Fuel Storage

Entergy is not the only nuclear licensee energy corporation seeking to fund its ISFSI by siphoning off monies from trust funds strictly created for the actual decommissioning and dismantlement of these plants. This new effort by energy corporations to raid established decommissioning trust funds to pay for ISFSIs appears to be the beginning of a nationwide trend by nuclear energy corporations. The Nuclear Regulatory Commission appears to be complicit in this process and is in fact providing a significant subsidy to the nuclear industry when it looks the other way by allowing public trust funds to be raided in violation of federal law.

By delaying the nuclear fuel transfer into interim independent spent fuel storage facilities using dry casks until a nuclear power plant is completely decommissioned, the nuclear energy corporate licensees are avoiding spending corporate profits for the secure spent fuel storage. This desire to not use their own corporate profits for fuel storage is the main reason that large amounts of spent nuclear fuel will remain in overloaded spent nuclear fuel pools when it would be much safer for the public as a whole if these used radioactive fuel rods were more safely stored in dry cask canisters rather in the much more vulnerable swimming pool style unprotected fuel pools.

Nuclear energy corporations have a real financial motivation to delay the transfer of spent nuclear fuel from their spent fuel pools into dry cask storage because they do not want to absorb those costs. If the energy corporations wait until the nuclear plant shuts down, the history of NRC actions shows that the corporations can fully expect the NRC will grant waivers and allow them to raid the individual trust funds of individual reactors. Then these corporations can force the federal government to pay all the cost of moving nuclear fuel to an *alleged interim* Independent Spent Fuel Storage Installation (ISFSI). Several nuclear energy corporations have already successfully achieved this action including in 2012, and now Vermont Yankee and others are lining up to do it again through routine breach of contract litigation against the Department of Energy.

Fairewinds is not alone in its observation that spent fuel storage is now being inappropriately subsidized by the NRC's application of its regulations through its decision to grant waivers to nuclear corporations. Former NRC Chair Allison Macfarlane and others have written extensively on the erroneous use of nuclear decommissioning trust funds to subsidize spent fuel storage. In an extensive treatise entitled *Reducing the Hazards from Stored Spent Power-Reactor Fuel in the United States*, Macfarlane and others state:

Because of the unavailability of off-site storage for spent power-reactor fuel, the NRC has allowed high-density storage of spent fuel in pools originally designed to hold much smaller inventories. As a result, virtually all U.S. spent-fuel pools have been re-racked to hold spent-fuel assemblies at densities that approach those in reactor cores. In order to prevent the spent fuel from going critical, the fuel assemblies are partitioned off from each other in metal boxes whose walls contain neutron-absorbing boron. It has been known for more than two decades that, in case of a loss of water in the pool, convective air cooling would be relatively ineffective in such a "dense-packed" pool. ...

Our central proposal is to move spent fuel into dry storage casks after it has cooled for 5 years ...

Nuclear power operators can be expected to balk at the extra cost of moving spent fuel out of pools to on-site dry storage. As a result of deregulation, many operators are no longer able to pass such costs through to customers without fear of being undersold by competing fossil-fueled power plants.¹²

Nuclear power reactor owners claim that their main concern about moving fuel from spent fuel pools is to avoid worker exposure. However as Fairewinds has delineated in Section 1 above, the nuclear industry gives workers unnecessary radiation exposure in large amounts in order to meet critical refueling efforts and repairs in the least amount of time. While it is true radioactive material does decay slightly over time, the risk of retaining spent fuel in pools remains real and significant, as proven in the tragedy at all

¹² *Reducing the Hazards from Stored Spent Power-Reactor Fuel in the United States*, Macfarlane, 2003, Robert Alvarez, Jan Beyea, Klaus Janberg, Jungmin Kang, Ed Lyman, Allison Macfarlane, Gordon Thompson, Frank N. von Hippel
http://www.princeton.edu/sgs/publications/articles/fvhippel_spentfuel/rAlvarez_reducing_hazards.pdf

four spent fuel pools at Fukushima Daiichi.

The actions of the nuclear industry while their plants are operating belie their claims regarding concerns of dose reduction to their personnel during the decommissioning. As discussed above, during the 2014 Palisades refueling outage, 192 Entergy employees received 115 Rem of collective exposure in only three weeks. The total exposure during a 60-year long SAFSTOR decommissioning is expected to be a total of approximately 300 Rem. It is apparent then the nuclear industry and the NRC have a double standard applied to dose reduction.

The factual reason nuclear licensees prefer to store spent nuclear fuel in the spent fuel pool until decommissioning commences is that the deferral of moving fuel sooner allows them to avoid spending operating revenues for dry cask storage. Instead of prompt removal, those costs can be levied against the decommissioning trust fund. If those costs were incurred when a nuclear reactor was operating, the balance sheets of the nuclear corporations would be adversely affected. Granting waivers to allow nuclear energy corporations to raid their decommissioning trust funds once a nuclear reactor shuts down, is a subsidy to each nuclear reactor amounting to hundreds of millions of dollars.

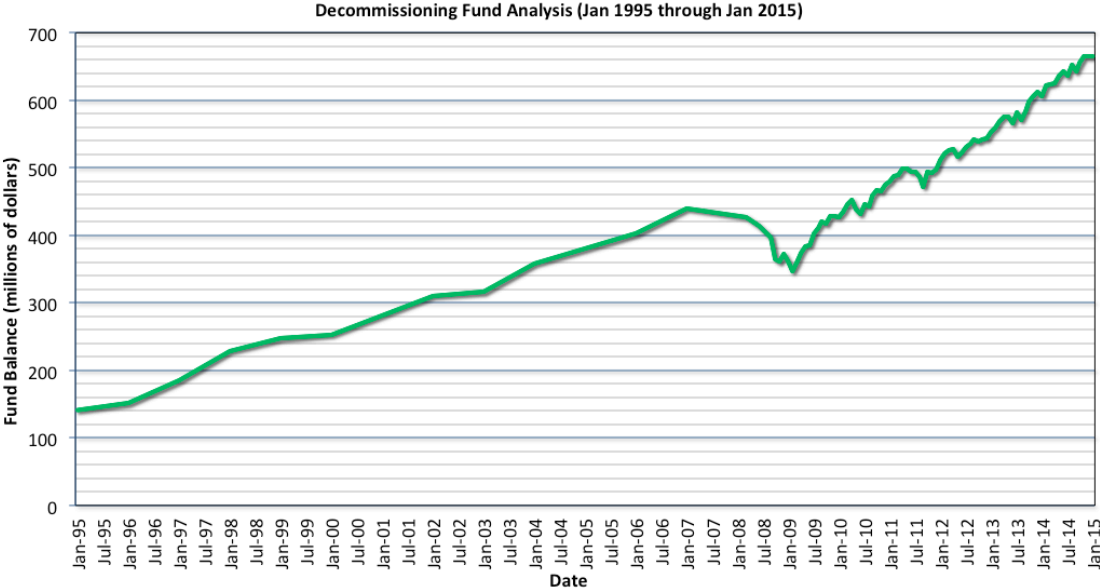
Recommendation:

The use of waivers by the nuclear industry to build and maintain their ISFSIs is incompatible with the regulations of the Nuclear Regulatory Commission. The NRC should not issue waivers for ISFSI construction and maintenance.

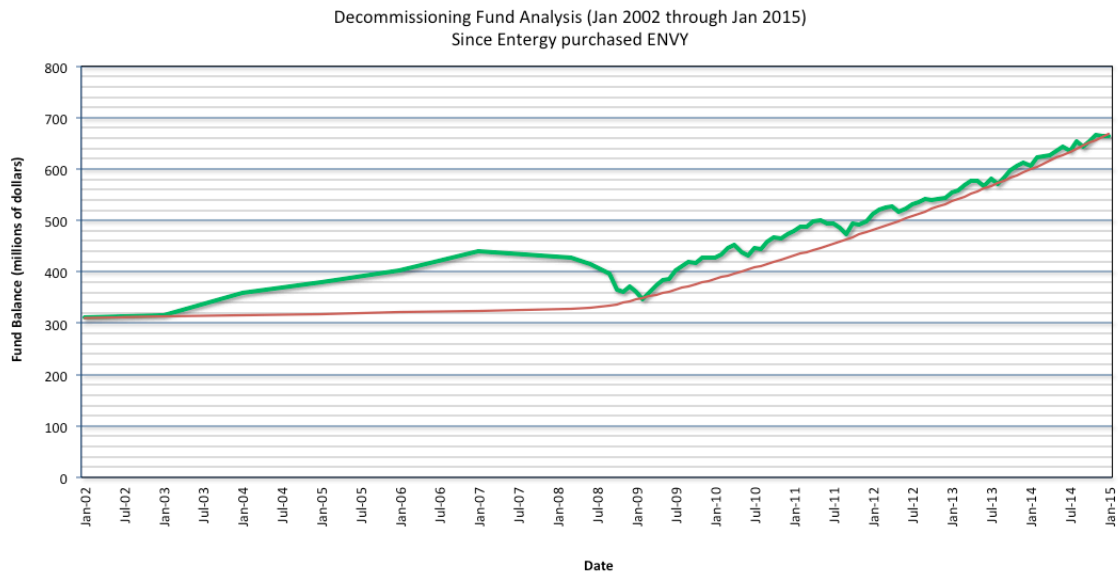
5. Growth Projections For The Decommissioning Fund

Based on data provided by the Vermont Department of Public Service, Fairewinds has analyzed the growth in the Vermont Yankee (VY) decommissioning trust fund from 1995 until 2015. Fairewinds analyzed this 20-year period because this is the only publicly available data regarding the VY Decommissioning Fund. During the timespan from 1995 until 2002, the trust fund was regulated by the Vermont utilities that originally built the nuclear plant. In 2002 when the Entergy Corporation of Louisiana purchased VY, control

of the VY decommissioning fund was transferred to Entergy, where it currently remains. From 1995 until 2002, the fund grew significantly for two reasons: first the money was invested, but it also had additional financial growth because Vermont ratepayers contributed approximately \$10 million to the fund each year. The rate of growth during this initial seven-year period was approximately 6.5% per year, excluding additional ratepayer contributions.



After Entergy took control of the fund in 2002 no further contributions were made to the fund, and growth of the fund was due solely to stock market growth during the remaining 13-year time period. The compound rate of growth during the last 13 years was approximately 5.8%



The Nuclear Regulatory Commission allows its nuclear energy corporations to estimate that conservatively invested decommissioning funds will grow at approximately 5% per year. During the 20-year period analyzed by Fairewinds, growth of the Vermont Yankee decommissioning fund was slightly higher than the 5% per year that the NRC estimates all funds will grow. However, 10 CFR §50.75 allows for a fund growth estimate of 5% per year that seems to provide a reasonably conservative approximation of the fund growth over extended periods.

Recommendation:

10 CFR §50.75 specifies a 5% fund growth. Based on the data reviewed by Fairewinds, the 5% growth rate is reasonably conservative for the 20 years of data for Vermont Yankee. Given the fluctuations in the stock market, it should not be raised.

6. LLC Status – NRC And Entergy Statements

Recent statements to the press and at public meetings and legislative hearings in Vermont show that the NRC and Entergy have a significant difference of opinion regarding the legal interpretation of nuclear power plant decommissioning regulations and Entergy's responsibilities as the owner of Vermont Yankee.

“We would not let Entergy walk away,” said Bruce Watson, chief of the NRC’s reactor decommissioning office in Washington, D.C. on February 22, 2015, according to *Times Argus* reporter Susan Smallheer.¹³

In an article written almost three weeks earlier, Smallheer also quotes two NRC officials, Bruce Watson and Marc Ferdas, who “said Entergy Nuclear is responsible financially for the plant’s decommissioning under the terms of its federal license to operate Vermont Yankee. But they didn’t give specifics on how a company would be held liable 60 years in the future if there were additional costs.”¹⁴

“ “Ultimately, it is a parent guarantee and legal responsibility,” Watson told Nancy Braus of Putney” according to a January 30, 2015, article by Smallheer.

He [Watson] said he guessed Entergy will ultimately have to contribute to the decommissioning fund, which currently amounts to about half of the \$1.24 billion needed.”

“They are legally responsible for the safety of the plant,” he emphasized.¹⁵

However, statements by Entergy during the same time period appear to be in stark opposition to the NRC’s position regarding the decommissioning responsibilities of Entergy and other energy corporations. Entergy does not believe it has any responsibilities after the 60-year SAFSTOR period is over according to Dave Gram of the Associated Press, who quoted Entergy Vice President Mike Twomey during a legislative committee hearing on February 12, 2015.

An Entergy Corp. official said Wednesday the company is offering no guarantees it will pay to decommission its retired Vermont Yankee nuclear power plant if the job’s still not done by the end of a 60-year period.

Entergy Vice President Michael Twomey told members of two Vermont legislative committees that if decommissioning isn’t done by the end of the

¹³ *Lack of Details in Cleanup Plan Draws Fire, Times Argus*, February 22, 2015

¹⁴ *NRC Deflects Queries on Yankee Costs, Times Argus*, February 6, 2015

¹⁵ *NRC Reassures Residents on Yankee Cleanup, Times Argus*, January 30, 2015

period, known in the nuclear industry as “SAFSTOR,” he expects there would be litigation, with the state and Entergy taking different positions.

“There would probably be quite a bit of litigation about that,” Twomey told a joint hearing of the House and Senate Natural Resources committees. “We’d all have different points of view.”¹⁶

There is a disparity between the stand taken by energy corporation Entergy versus the statutory authority of the NRC regarding corporate responsibilities for complete decommissioning of their profit making nuclear power plants. The paradigm shift occurred in 2002 when the NRC allowed Entergy, an energy corporation not a utility, to buy Vermont Yankee as what the industry calls a stand-alone merchant plant.¹⁷ What was disturbing to utility customers and to many intervenors was the fact that Entergy created a Limited Liability Corporation (LLC) as the legal entity to purchase and operate the nuclear plant. Limited liability corporations like Vermont Yankee are specifically designed and created to limit the financial obligations (liability) of their parent corporation, which in this case is Entergy. Early in the 21st Century, former NRC commissioners and organizations such as Synapse Energy Economics in Cambridge, MA alerted regulators that allowing LLCs to own nuclear power plants was detrimental to the safety and the financial health of the nuclear power plant.

Entitled *FINANCIAL INSECURITY: The Increasing Use of Limited Liability Companies and Multi-Tiered Holding Companies to Own Nuclear Power Plants*, Synapse issued a scathing report in August 2002 alerting regulators to the very issues that are now facing Vermont in the proposed decommissioning and dismantlement of Entergy’s Vermont Yankee nuclear plant.

¹⁶ *Nuclear Plant Closing Costs Not Covered Past 60 years*, Associated Press, February 12, 2015

¹⁷ A merchant power plant is a non-utility generation plant that sells electricity on a wholesale basis to other companies, who then sell the power on a retail basis to individual residential, commercial, and industrial customers. Under deregulation of electricity generation, the developer of a merchant power plant is not guaranteed a return on its investment and must compete in a free economic market to sell the power it can produce. Both peaking facilities and base load facilities can operate as merchant power plants. http://northpacific.infinite-software.com/Glossary/merchant_power_plant.html

Regarding Entergy, Synapse said in:

Finding No. 11 – Taxpayers may be at risk if nuclear plant owning subsidiaries are unable to continue making safety-related or decommissioning expenditures or pay retrospective Price-Anderson Act premiums. In attempting to assure the Vermont Public Service Board that the former owners of the Vermont Yankee nuclear plant and their ratepayers are unlikely to be required to pay any shortfalls in decommissioning funds, Entergy has noted that the NRC has on several occasions said that the burden of paying any such shortfalls would fall on taxpayers:

NRC regulations do not specifically address the potential liability of other parties in the event that the licensed owner is unable to provide the funds required for decommissioning. In the past, the NRC indicated that any failure of the licensed owner to meet its decommissioning funding obligations would result in a burden on taxpayers - - presumably in the form of a publicly funded cleanup. See, e.g., SECY-94-280 (Nov. 18, 1984), at 4. ("Such action would either increase the potential risk to public health and safety of the decommissioning process or would shift the burden of decommissioning funding from ratepayers to taxpayers.") (emphasis added); 61 Fed. Reg. 15427, 15428 (Apr. 8, 1996)("The liability of the licensee to provide funding for decommissioning may adversely affect protection of the public health and safety. Also, a lack of decommissioning funds is a financial risk to taxpayers (i.e., if the licensee cannot pay for decommissioning, taxpayers would ultimately pay the bill. (emphasis added))."¹⁸

As if to add insult to injury, Entergy VP Twomey contacted the Associated Press after its report about the joint legislative meeting in an attempt to correct his previous statement.

According to AP,

Twomey said again, though, that he did not want Entergy committed to a promise that it would cover the cost if the project isn't done before the 2070s and funds are still short.

...He offered a hypothetical example: If during cleanup the site turned out to be more contaminated than believed when Entergy bought the plant in 2002, the company might seek to share the costs with the group of New

¹⁸ *FINANCIAL INSECURITY: The Increasing Use of Limited Liability Companies and Multi-Tiered Holding Companies to Own Nuclear Power Plants*, Synapse Energy Economics, Inc, August 7, 2002, Page 26

England utilities that owned it previously.¹⁹

Once again, Entergy makes it clear that it will not accept complete responsibility as the NRC Licensee that is ultimately responsible for site cleanup. In the 2002 MOU, Entergy bought Vermont Yankee from a group of utilities. Now in 2015, Mr. Twomey again suggests that Entergy will litigate against the previous owners in the event the LLC does not have enough funds to completely dismantle the reactor site.

While Vermont Yankee is one of five plants recently shut down and entering the early stages of decommissioning (Kewaunee, VY, San Onofre 2 & 3, and Crystal River 3), of these only Kewaunee and Vermont Yankee are so-called merchant plants owned by Limited Liability Corporations that are presently being decommissioned. There will be dozens more merchant nuclear plants needing to be decommissioned during the next several decades. As such, Vermont Yankee is *the test case* for the issue of who is responsible for the ultimate costs of decommissioning nuclear power plant: the corporation that owned it and made all the profit or the taxpayers of a region, many of whom never even used its electricity in the new less regulated market.

Recommendation:

Not only is it imperative that the NRC clarify its regulations concerning Limited Liability Corporations within the next year, so that Vermonters and others throughout the nation clearly know the reality of the financial situation, but also as the regulator, the NRC must clarify regulations regarding its previous position to allow LLC ownership of nuclear reactors.

7. Sharing of Excess Decommissioning Funds

More than a decade ago, the State of Vermont and Entergy completed delicate negotiations that included sharing any remaining decommissioning funds equally. This

¹⁹ *Vermont Yankee Official Expects Enough Money To Clean Site*, February 27, 2015, <http://www.washingtontimes.com/news/2015/feb/27/vermont-yankee-official-expects-enough-money-to-cl/>

agreement was memorialized in a formal 2002 Memorandum of Understanding that allowed Entergy to purchase Vermont Yankee and at the same time to accept \$310 million in decommissioning funds that were accrued through payments made by Vermont ratepayers.

It appears that now in 2015, Entergy no longer believes that the signed and binding MOU applies to them. In a February 2015 letter²⁰ to Vermont Assistant Attorney General Landis–Marinello and to DPS Commissioner Christopher Recchia, discussed earlier in this report, Entergy now claims that only the Federal Energy Regulatory Commission (FERC), which was created in 1977, has the legal authority to determine who any remaining decommissioning trusts funds may belong to, rather than the Memorandum of Understanding (MOU) signed into law with the State of Vermont in 2002. Even though FERC itself claims no jurisdiction over nuclear power plants²¹

Lastly, your letter also makes a number of statements regarding the Vermont ratepayers' interest in any remaining decommissioning trust funds.¹⁹ Your letter fails to recognize, however, that the trust funds were collected by Vermont Yankee Nuclear Power Corporation through wholesale power contracts "with each of its sponsoring utilities which obligate[d] such utilities to purchase the output and capacity of the Vermont Yankee plant and to pay therefor 100% of Vermont Yankee's costs, including decommissioning" and that "[t]hese contracts ... have been approved as rates by the FERC."²⁰ As such, FERC has authority to determine the disposition of any excess trust funds.²¹

ENVY is committed to completing the decommissioning of Vermont Yankee safely. We are equally committed to using and managing ENVY decommissioning trust funds responsibly, in accordance with the Trust Agreement and all applicable NRC requirements.

²⁰ *Pre-Notice of Disbursement from Entergy Nuclear Vermont Yankee Decommissioning Trust*, Entergy Letter of an Entergy letter to Vermont Assistant Attorney General Landis–Marinello and to DPS Commissioner Christopher Recchia, Page 4, footnote 11, February 9, 2015.

²¹ <http://www.ferc.gov/about/ferc-does.asp> – *What FERC Does Not Do*, Many areas outside of FERC's jurisdictional responsibility are dealt with by [State Public Utility Commissions](#)... Areas considered outside of FERC's responsibility include: ...Regulation of nuclear power plants by the [Nuclear Regulatory Commission](#)

Recommendation:

The State of Vermont must inform Entergy that the commitments made in the 2002 MOU are binding upon Entergy.

8. Auditing The Expenditures From The Fund

As a merchant plant purchased by a Limited Liability Corporation (LLC), and created as a new separate LLC, there appears to be very few constraints in place to review, control, and audit expenditures from the Vermont Yankee Decommissioning Trust Fund, of which half of any remaining funds belong to Vermonters. For any nuclear reactors that are owned by a or created as a public utility, there are strict oversight rules and financial controls in place that can be applied through public service commissions and boards to monitor decommissioning trust funds and the decommissioning process. However, it appears that while the NRC approved the LLC merchant plant concept, it seems to have developed no such financial oversight methodology.

Entergy is the sole owner of a decommissioning firm called TLG Services, which is a for-profit venture designed to capitalize on the decommissioning market. Entergy has chosen to have TLG Services create all of the decommissioning reports related to Vermont Yankee submitted to the date. If TLG Services manages the entire decommissioning of Vermont Yankee, it will be able to mark up the services of subcontractors while at the same time billing management fees for its efforts. Entergy claims it was not making a profit and so shut down Vermont Yankee, and now it appears well poised to make significant profits during the lengthy decommissioning process.

With a decommissioning firm as its wholly owned subsidiary, there is no incentive for Entergy to seek competitive bids for decommissioning Vermont Yankee or to protect the integrity of the decommissioning trust fund rather than to take a conservative approach and refund any remaining funds to the Vermonters who originally put millions upon millions of dollars into the decommissioning trust fund. As delineated previously, Entergy VP Michael Twomey has informed legislators that Entergy believes it has no responsibilities for the site past the 60-year SAFSTOR timespan, even if the

decommissioning and dismantlement are not completed or the unmonitored trust fund is found to be short of funds to complete the necessary cleanup.

While it is the Nuclear Regulatory Commission who approved the LLC concept, the NRC has historically limited its oversight to radiological issues and has not yet stepped in to monitor or audit these new LLC decommissioning trust funds. Such NRC limitations and lack of oversight allow Entergy unfettered access to VY's decommissioning trust fund as well as unmonitored and unaudited excess spending to occur at Vermont Yankee, that might actually derail radiological cleanup and environmental mitigation of the spreading radioactive Strontium-90 leak.

Without the ability to audit the expenditures that are occurring and being withdrawn from the decommissioning trust fund, neither the State of Vermont nor the Nuclear Regulatory Commission have any financial oversight relating to a trust fund that may easily exceed \$1 billion that will desperately be needed to clean up and mitigate the environmental damage created by radioactive isotopes so near to the Connecticut River and precious aquifers.

Vermonters are stakeholders in the decommissioning process. The MOU requires that if any excess funds are available after decommissioning is complete, one half of those funds should be returned to ratepayers in the State of Vermont. It is therefore appropriate that the Vermont DPS develop an audit function for Vermont Yankee's expenditures.

Recommendation:

Both the State of Vermont and the Nuclear Regulatory Commission need to formalize an audit function of Entergy's expenditures and withdrawals from the fund. Entergy has promised transparency during a decommissioning process and there can be no greater need for transparency than to assure the funds are properly spent. Vermont's State Auditor should be appointed to monitor competitive bidding of the work associated with the decommissioning of Vermont Yankee.

Part 2: Safety Issues:

Real safety issues are a significant concern to the families and children living near, as well as downwind and downstream of, the Vermont Yankee nuclear power plant.

Spokespersons for the Nuclear Regulatory Commission have said that it does not *approve* decommissioning documents like Vermont Yankee’s Post-Shutdown Decommissioning Activities Report (PSDAR), but rather the NRC will *simply accept* the document from Entergy.²²

Disturbingly, Entergy’s PSDAR is only a minimal attempt at meeting NRC regulations using the wording of a standard form, often referred to as boilerplate, that lacks both the technical and schedule specifics. As such, this PSDAR is a completely useless tool for any review of implementation regarding the actual decommissioning of Vermont Yankee or the use of the VY Trust Fund for that purpose.

NRC acceptance of the PSDAR without technical review and without scheduling and financial details means that once again, the NRC is refusing to meet its statutory responsibility to protect public health and safety as the people’s advocate. The NRC has an obligation to the State of Vermont, its people, and the nearby residents of Massachusetts and New Hampshire to assure that Vermont Yankee is promptly and safely decommissioned without unwarranted radiological contamination of the environment and extended cleanup and mitigation costs passed on to Vermont taxpayers and adjoining Connecticut River cities and towns.

Recommendation:

The Nuclear Regulatory Commission should demand more technical and financial specificity from Entergy before the PSDAR is *approved* or *merely accepted* – that is if the NRC refuses to “accept” responsibility for “approval” of the PSDAR.

Moreover, it is the responsibility of the NRC to give the PSDAR a rigorous technical and financial review rather than simply and complacently *accepting an*

²²*The NRC Reactor Decommissioning Process – Post Shutdown Decommissioning Activities Report (PSDAR) License Termination Plan (LTP) Nuclear Decommissioning, Citizens Advisory Panel for Vermont Yankee January 28, 2015, Slide 20.*

unanalyzed document. It should not be the responsibility of either the State of Vermont or Fairewinds to provide more adequate detail about how the decommissioning of Vermont Yankee will be completed. While Entergy promised a transparent process, that transparency is sadly lacking and requires technical and financial specifics throughout the entire PSDAR.

Finally Four Glaring Site Specific Issues Have Been Identified By Fairewinds.

1st) Emergency Planning

The four ongoing disasters at Fukushima Daiichi have clearly shown the vulnerability of nuclear power plants that have spent nuclear fuel stored in these overcrowded and unprotected spent fuel pools. All four spent fuel pools at Fukushima Daiichi lost cooling and boiled, and one fuel pool almost boiled completely dry. The seriousness of the tragedy can be seen in the evacuation order made by the Nuclear Regulatory Commission to Americans living within 50 miles of Fukushima Daiichi's spent fuel pools.

In stark comparison, we now look at the Vermont Yankee spent fuel pool that contains much more highly radioactive waste than was held in any of the fuel pools at Fukushima Daiichi. The fact that the unprotected pool at Vermont Yankee contains more Cesium-137 than would be contained in 700 nuclear warheads if exploded is shocking. Despite this ongoing risk, Entergy is seeking NRC approval to dismantle its emergency plan and to reduce inspection requirements on the ventilation system near the spent fuel pool.

Based on the ongoing disaster at Fukushima Daiichi, Entergy appears to be applying unrealistically low projected radioactive release numbers in order to attempt to prove to the Nuclear Regulatory Commission, Vermont regulators, and people living near the plant in three states that its emergency plan can be reduced and ventilation requirements can be minimized. The compromised fuel pools at Fukushima Daiichi were not the first fuel pools to leak and face catastrophe, there was a significant leak and near disaster on January 25, 1994 at Dresden Unit 1 in Illinois. While sitting in the minimally examined SAFSTOR the pipes froze at Dresden Unit 1 and began to drain the water out of the spent fuel pool. Almost 60,000 gallons of water leaked into the basement of Dresden Unit 1

before a watchman discovered the massive water leak. Had the water continued to leak for just one more day, the entire Dresden site, with three nuclear power plants would have had to be evacuated due to gamma rays emanating from the unshielded spent fuel.

Based on the massive fuel pool leak at Dresden Unit 1 and the ongoing disaster at Fukushima Daiichi Units 1, 2, 3, and 4, it is clear to Fairewinds that emergency plans must be maintained until all of the fuel has been removed from the spent fuel pool and placed into dry cask storage. SAFSTOR was not created with physics in mind or with adequate review. As such the emergency plan must be maintained until all the fuel has been placed securely and without incident into dry cask storage.

According to Susan Smallheer of the *Times Argus*:

[Commissioner] Recchia said the emergency planning zone didn't have to continue exactly as it did while the nuclear reactor was operating. ... But he said Entergy wants to shrink the zone by too much, to include just the plant's grounds.

Recchia and William Irwin, radiological health chief for the Department of Health, said they objected to the “on-off switch” that Entergy was adopting toward emergency planning for the communities surrounding the plant.²³ [Emphasis Added]

While Fairewinds has many issues with the numerical data provided by Entergy in order to make its radiation release calculations add up to their desired conclusion, there is a significantly more serious flaw in Entergy's decision to limit its responsibility for emergency planning. If one accepts at face value that Entergy can definitively prove that *no radiation could ever be released beyond the site boundary*, then it would also be logical to request that Entergy renounce its Price-Anderson Act nuclear liability insurance, since there is no possibility of any radiation induced releases that might harm people living and working in the vicinity of Vermont Yankee. Entergy and indeed the entire nuclear power investment community shields themselves from liability by retaining

²³ *Entergy Avoids Questions On Emergency Planning*, Susan Smallheer, *Times Argus*, February 28, 2015.
<http://tablet.olivesoftware.com/olive/Tablet/BarreTimesArgus/SharedArticle.aspx?href=BTA%2F2015%2F02%2F28&id=Ar00906>

the publicly funded Price-Anderson insurance, while at the same time minimizing its corporate costs by eliminating the emergency planning safety net for this region of Vermont, not to mention neighboring Massachusetts and New Hampshire.

Part of Entergy's request for relief from its Emergency Planning responsibility appears to emanate from its analysis that if there were a radiation release from the spent fuel pool, the radiation would not blow off site, but would willingly remain confined to the "Owner Controlled Area" immediately adjacent to the now shutdown plant.

Recommendation:

To protect all nearby residents and visitors, the NRC should continue to require operation of the complete emergency plan and its facilities, and also order the ongoing operation of the important spent fuel ventilation system, until such time as all of the spent fuel has been successfully removed from the pool and placed into dry casks, and the casks have been placed on the pad constructed by Entergy.

2nd) Removal Of The Fuel In Vermont Yankee's Spent Fuel Pool

Moving spent nuclear fuel and placing it into heavy canisters is a high-risk operation. In 2008, Vermont Yankee personnel already had one mishap while removing spent nuclear fuel from the spent fuel pool. The brakes failed on the enormous crane used to lift the 100 ton spent fuel canister causing the fully loaded fuel canister to wobble uncontrollably. Luckily, nothing crashed and broke and no radiation was released, however, this mishap shows just how complicated and risky it is to move fully loaded canisters of spent fuel.

The Vernon elementary school is less than 4500 feet from where this dangerous nuclear fuel will be moved, and moving spent nuclear fuel at Vermont Yankee has been shown to be a risky venture with a chance for mishap. The consequences of such an accident would be huge no matter when it is undertaken, so it makes absolutely no sense to move spent nuclear fuel while young children are attending the adjacent Vernon elementary school.

Recommendation:

The NRC should limit the removal of any spent nuclear fuel at Vermont Yankee to the specific times that children are not attending the Vernon elementary school. There is ample time during summer vacation to complete the task of removing the fuel without risking the health and safety of the children at this school.

3rd) Strontium Contamination On-Site

In its 2010 supplemental report, the Vermont Yankee Public Oversight Panel appointed by the Vermont Legislature determined that inadequate maintenance practices at Entergy caused a leak in the Advanced Off-Gas System.²⁴ The Panel advised the State Legislature that the leak was caused by Entergy, noting:

Limited resource allocation for non-safety systems might, therefore, be systemic within Entergy.

The issue of inadequate application of resources takes on heightened importance given Entergy's status as an aging plant. Over the remainder of Entergy's operating life, the possibility of shutdown within a few years can never be ruled out and will become a near certainty at some point.

If the events of the last few years are any guide, Entergy has a tendency to focus expenditure on safety systems and systems of obvious reliability importance while withholding resources from systems that it deems of secondary reliability importance.

Beginning in approximately 2007, leaks in portions of the off-gas system begin to permeate the soil at the Vermont Yankee site. Then in 2010, monitoring wells identified the presence of tritium in the subsurface water on the VY site. However, since the leak began in the off-gas system, it was clear to many engineers and employees that other isotopes including Cesium-137 (Cs-137) and Strontium-90 (Sr-90) would also be present. In fact, Entergy did detect Sr-90 and Cs-137 adjacent to and under the foundation of the

²⁴ *Supplemental Report of the Public Oversight Panel Regarding the Comprehensive Reliability Assessment of the Vermont Yankee Nuclear Power Plant*, July 20, 2010, page 10
<http://www.leg.state.vt.us/jfo/envy/POP%20VY%20Supplemental%20Report%2007-2010.pdf>

AOG (advanced off gas) building.

Now eight years after the leak actually began and five years after the leak was originally discovered, Sr-90 has migrated and has been detected in a monitoring well. As Fairewinds discussed when the leak was first discovered, Strontium-90 moves more slowly in groundwater than tritium and thus migrates more slowly to other locations. The belated discovery of Sr-90 in VY's monitoring wells should not be a surprise to anyone familiar with radiological migration on nuclear sites. We believe that this shows ongoing contamination of the VY site by other radionuclides most likely released from the AOG building.

Strontium-90 leaked into the groundwater at the Connecticut Yankee nuclear plant in Haddam, Connecticut thereby increasing decommissioning costs by hundreds of millions of dollars. Connecticut Yankee was totally unaware of the Strontium leak until decommissioning and dismantlement was well underway. Unlike Connecticut Yankee, Vermont Yankee has known for five years that Sr-90 was in the soil underneath the plant. The movement of Sr-90 at the VY site was also confirmed before the actual decommissioning process was even begun.

Given that contamination by Strontium-90 has the potential to migrate to the Connecticut River and to the nearby aquifer and will increase the cost of the decommissioning by hundreds of millions of dollars, it is prudent to remove the source of the Sr-90 now while there is still time to prevent additional site contamination and migration of this lethal isotope. Strontium-90 is called a bone-seeker because it mimics calcium and when ingested in food and/or water, the body cannot differentiate it from calcium so it is absorbed into bones as if it were calcium. Early removal of the source of Sr-90 at VY is essential to lower the overall costs and efforts of the long-term cleanup of the site and of decommissioning VY.

Recommendation:

The Nuclear Regulatory Commission and the State of Vermont should jointly

require that the AOG building and surrounding soil be completely removed as soon as possible in order to protect the site water table, aquifer, soil, and Connecticut River and to mitigate the spread of Sr-90 and any other migrating highly radioactive isotopes. Such action would minimize the radiological risk to the general public in three states and also lower the overall cost of decommissioning VY.

4th) Site Release Criteria

In supervising the decommissioning of previous nuclear power, fabrication, and waste sites, the overarching criteria applied by the NRC to consider former nuclear sites clean and prepared for public access (“released for unrestricted reuse”) was the removal and measurement of material to any items built to a depth of 3-feet. Unfortunately, recent discoveries of Sr-90 below the 3-foot depth indicate that the NRC may allow significant contamination to remain on site because its minimal criteria would be satisfied. This is unacceptable to Vermont’s fragile and vulnerable environment where flooding is a constant concern and could cause significant migration of any radioactive isotopes remaining onsite.

Recommendation:

Presently, the Nuclear Regulatory Commission allows radiation to remain on a dismantled nuclear site by releasing the site for public use if radiation above a certain concentration in soil and groundwater is not found to a depth of three feet. However it is known that the strontium contamination of Vermont Yankee has already permeated to a depth more than 3-feet below grade. The NRC must revise its site release criteria to include all radiation, not just that which happens to be above that arbitrary 3-foot regulatory cut off.

Conclusion:

In conclusion, Fairewinds determined that weak Nuclear Regulatory Commission enforcement of nuclear power plant decommissioning regulations do not protect public health and welfare as the Code of Federal Regulations has mandated the NRC to do, but rather such lax enforcement creates a huge unaccounted financial subsidy for the nuclear power industry not to mention the increase in radiological risk to present and future generations. Moreover, we believe that the patchwork structure of NRC regulations creates a series of subsidies designed to minimize each energy corporation's cost to shut down any nuclear power plant and marginalizes decommissioning efforts for decades into the future, creating an intergenerational transfer of costs and risk. Finally, nuclear energy corporations, including, but not limited to Vermont Yankee, are ignoring externalities and using all available NRC legal precedents to distort the true cost of nuclear power that exist in the decommissioning of each corporation's aging reactors, and thereby minimize or totally discount, the real safety risks facing all of us for generations to come.

Exhibit List:

Exhibit 1 – VYRapidDecommissioningExhibit1

Exhibit 2 – *Pre-Notice of Disbursement from Entergy Nuclear Vermont Yankee Decommissioning Trust*, Entergy Letter of an Entergy letter to Vermont Assistant Attorney General Landis–Marinello and to DPS Commissioner Christopher Recchia, February 9, 2015

VY Decommissioning Fund

Thousands of 2011 dollars

Scenario 1, 2012 Shutdown, SAFSTOR, p.61

Fuel Offsite 2045

		5.0		3.0		
	Year	Start of year fund balance	2012 SD Entergy Costs 2012 \$	2015 SD Inflated Costs	End of year fund balance	
1	2012		65,407			
2	2013		104,154			
3	2014	660,000	34,692		660,000	660.000
4	2015	693,000	34,692	71,294	621,706	621.706
5	2016	652,792	34,787	116,652	536,139	536.139
6	2017	562,946	16,733	39,896	523,050	523.050
7	2018	549,203	3,332	40,937	508,266	508.266
8	2019	533,680	3,332	42,092	491,587	491.587
9	2020	516,167	3,332	20,749	495,418	495.418
10	2021	520,189	3,332	4,232	515,957	515.957
11	2022	541,755	3,332	4,332	537,423	537.423
12	2023	564,294	31,238	4,432	559,863	559.863
13	2024	587,856	66,444	4,532	583,325	583.325
14	2025	612,491	103,880	4,631	607,859	607.859
15	2026	638,252	71,672	44,358	593,894	593.894
16	2027	623,589	71,048	96,344	527,245	527.245
17	2028	553,607	51,357	153,742	399,865	399.865
18	2029	419,858	32,021	108,225	311,634	311.634
19	2030	327,215	22,668	109,414	217,801	217.801
20	2031	228,691		80,630	148,061	148.061
21	2032	155,464		51,234	104,230	104.230
22	2033	109,442		36,949	72,493	72.493
23	2034	76,118		0	76,118	76.118
24	2035	79,924		0	79,924	79.924
25	2036	83,920		0	83,920	83.920
26	2037	88,116		0	88,116	88.116
27	2038	92,522		0	92,522	92.522



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T. Michael Twomey
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February 9, 2015

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SUBJECT: Pre-Notice of Disbursement from Entergy Nuclear Vermont Yankee
Decommissioning Trust

Dear Mr. Landis-Marinello and Commissioner Recchia:

This letter responds to your January 26, 2015 letter to the Director of the Office of Nuclear Reactor Regulation ("NRR") of the U.S. Nuclear Regulatory Commission ("NRC")¹ regarding the December 30, 2014 Pre-Notice of Disbursement from Decommissioning Trust submitted to the NRC by Entergy Nuclear Vermont Yankee, LLC ("ENVY") and the Bank of New York Mellon ("Trustee").² Although your letter was addressed to the NRC and not to ENVY, we do feel compelled to respond to a number of incorrect assumptions and assertions in your letter.

1. The Disbursement Notice and Actual Disbursement Complied With All Applicable Requirements

At the outset, we want to make clear that both the disbursement notice and the actual disbursement from the ENVY decommissioning trust fund complied with all applicable NRC requirements, Vermont Yankee Nuclear Power Station ("Vermont Yankee") Renewed Facility Operating License conditions, and ENVY Master Decommissioning Trust Agreement ("Trust Agreement")³ provisions.

¹ Letter from K. Landis-Marinello and C. Recchia, State of Vermont, to W. Dean, NRC, "Docket 50-271; Entergy's Pre-Notice of Disbursement from Decommissioning Trust" (Jan. 26, 2015) ("State Letter").

² Letter from C. Wamser, ENVY, and D. Ryan, Bank of New York Mellon, to W. Dean, NRC, "Pre-Notice of Disbursement from Decommissioning Trust" (Dec. 30, 2014).

³ Entergy Nuclear Vermont Yankee, LLC Master Decommissioning Trust Agreement for Vermont Yankee Nuclear Power Station (July 31, 2002).

As an initial matter, the December 30 disbursement notice meets all applicable regulatory requirements and is consistent in form and content with similar pre-disbursement notices that other decommissioning sites have submitted to the NRC. Pursuant to Section 4.05 of the Trust Agreement, no payments from the trust (other than for ordinary administrative expenses) may be made until the Trustee has first given the NRC 30 days' prior written notice of payment. The Trustee is also prohibited from making any disbursements from the fund if the NRR Director notifies the Trustee in writing of his or her objection to payment. ENVY and the Trustee submitted a notice of disbursement for up to \$18 million in decommissioning planning costs on December 30, 2014. In accordance with Section 4.05 of the Trust Agreement, the Trustee made no payments to ENVY during the 30-day period following the submittal of the disbursement notice. That 30-day period ended on January 29, 2015, and neither ENVY nor the Trustee received any notice of objection from the NRR Director.

Consequently, and as permitted by the Trust Agreement, on February 4, 2015, the Trustee disbursed \$12,143,197.21 from the ENVY qualified decommissioning trust fund account and \$32,915.54 from the non-qualified decommissioning trust fund account.⁴ This initial payment was for decommissioning planning costs ENVY incurred from the time of the plant shutdown announcement in August 2013 through December 2014. Of the approximately \$12 million incurred planning costs, \$282,300.27 were related to operational spent fuel management planning activities.⁵

2. NRC Regulations and the Trust Agreement Permit ENVY to Recover Spent Fuel Management Planning Costs

Contrary to your assertions that NRC regulations prohibit ENVY from using decommissioning trust funds for spent fuel management costs,⁶ NRC regulations and guidance permit ENVY to recover costs associated with planning costs for both license termination and spent fuel management activities. Under NRC regulations at 10 C.F.R. § 50.82(a)(8)(ii), licensees may use up to 3 percent of the generic decommissioning funding amount specified in Section 50.75 for "decommissioning planning." The NRC staff "recognizes that during planning for decommissioning, it is necessary to consider activities leading to license termination and *the storage of spent fuel*; therefore, the staff's interpretation of the appropriate use of these planning funds will permit planning for *all issues related to the decommissioning of the facility*."⁷ Accordingly, it is entirely appropriate and permissible for ENVY to recover spent fuel management planning costs from the trust fund.

⁴ With this \$32,915.54 withdrawal from the non-qualified account, ENVY has exhausted the funds in this account and is, therefore, closing the non-qualified sub-account.

⁵ In addition to the approximately \$280,000 in operational spent fuel management planning costs, ENVY has also incurred costs for dry storage planning activities. Although ENVY is permitted by NRC regulations and the Trust Agreement to recover these dry storage planning costs from the trust, and reserves all rights to do so, ENVY currently does not intend to seek reimbursement for such costs from the trust fund.

⁶ State Letter at 2.

⁷ NRC Regulatory Guide 1.184, Decommissioning of Nuclear Power Reactors, Rev. 1 at 6 (Oct. 2013) (emphasis added) ("Reg. Guide 1.184").

The Trust Agreement likewise permits ENVY to recover spent fuel management planning costs from the trust. Section 4.01 of the Trust Agreement states that “the Trustee shall make payments out of the Funds ... for purposes of paying costs, liabilities and expenses of Decommissioning.” “Decommissioning” is defined in Section 1.01(j) of the Trust Agreement to mean “the removal of the Station from service and disposal of its components in accordance with Applicable Law.” The Trust Agreement further defines the decommissioning process to include “pre-shutdown activities related to the removal and disposal of the Station, including ... planning ... and non-DOE spent fuel storage.”⁸ The Trust Agreement, therefore, expressly allows the Trustee to make payments to ENVY for incurred costs related to pre-shutdown spent fuel storage planning activities. Moreover, as noted above, the NRC staff interprets its own regulations (i.e., the “Applicable Law”) to allow licensees to recover spent fuel management planning costs from their decommissioning trust funds.⁹ Therefore, ENVY’s initial request to recover decommissioning planning costs, of which a very small portion is related to spent fuel management planning costs, is clearly permitted by the Trust Agreement’s plain language.

Although your letter raises a number of other issues that are not directly relevant to ENVY’s initial disbursement request, several of the statements made in your letter do warrant a response here.

3. The Trust Agreement Does Not Preclude the Use of Trust Funds for Spent Fuel Management Activities Before Radiological Decommissioning Activities Are Complete

We disagree with your assertion that the Trust Agreement requires the Trustee “to refrain from disbursing funds for anything other than radiological decontamination and decommissioning until those activities are complete.”¹⁰ To the contrary, the Trust Agreement authorizes disbursements for incurred spent fuel management costs before radiological decontamination is completed.¹¹ In particular, Section 4.01 of the Trust Agreement provides that, “[o]nce Decommissioning is completed, the Trustee shall also disburse amounts in the Funds in a manner designated in any Decommissioning Certificate for the purposes of paying costs, liabilities and expenses of Docket 6545 Decommissioning Activities, *Spent Fuel Costs* and *Site Restoration Costs (each to the extent not included in Decommissioning)*.”¹² By authorizing payment for spent fuel costs “to the extent not included in Decommissioning,” the Trust Agreement explicitly recognizes that spent fuel management costs will be paid from the trust during “Decommissioning,” as that term is defined in Section 1.01(j). Moreover, Section 4.06 of the Trust Agreement expressly confirms that disbursements are permitted under Section 4.01 for “Decommissioning costs *including costs* for decommissioning, *spent fuel storage* and site restoration.”¹³

⁸ Trust Agreement § 1.01(j).

⁹ See Reg. Guide 1.184 at 6.

¹⁰ State Letter at 4.

¹¹ ENVY acknowledges that current NRC regulations do not permit ENVY to use decommissioning trust funds for actual (i.e., non-planning) spent fuel management activities. As the State is aware, ENVY has requested an exemption from this restriction, which is pending before the NRC. See Letter from C. Wamser, Entergy, to NRC, “Request for Exemptions from 10 CFR 50.82(a)(8)(i)(A) and 10 CFR 50.75(h)(1)(iv)” (Jan. 6, 2015).

¹² Trust Agreement § 4.01 (emphasis added).

¹³ *Id.* § 4.06 (emphasis added).

These sections in the Trust Agreement, which specifically provide that "Decommissioning" costs include spent fuel costs, also refute the assertion in your letter that trust funds cannot be disbursed for spent fuel costs until radiological decommissioning has been completed. Although your letter cites to Exhibit D of the Trust Agreement as support for your assertion, that citation is misplaced.¹⁴ Exhibit D only defines the "Completion of Decommissioning" for purposes of termination of the Trust under Section 5.01. Exhibit D does not define "Decommissioning" or remove spent fuel costs from "Decommissioning," as that term is used in Sections 1.01(j), 4.01 and 4.06 of the Trust Agreement.¹⁵ Exhibit D states, "The Completion of Decommissioning is defined for purposes of this Exhibit D as plant dismantlement and decontamination to NRC standards plus the completion of additional activities agreed to or imposed in the course of Docket No. 6545 before the Vermont Public Service Commission or pursuant to any subsequent law or proceeding, but excluding spent fuel management and any site restoration."¹⁶ Exhibit D excludes spent fuel management from the "Completion of Decommissioning" because the distribution of any excess trust funds would otherwise be delayed until the U.S. Department of Energy ("DOE") had removed all the spent fuel from the site, which could be decades after ENVY completes the radiological decommissioning of the remainder of the site.

4. The Trust Agreement Does Not Preclude Reimbursement of Spent Fuel Management Costs that ENVY Will Seek to Recover from the Department of Energy

Your letter also posits that the trust fund "can only be used to cover expenses that the U.S. Department of Energy (DOE) does not have to pay," citing to the definition of "Decommissioning" and Exhibit D.¹⁷ Section 1.01(j) defines the decommissioning process to include "pre-shutdown activities related to ... non-DOE spent fuel storage."¹⁸ In this context of "pre-shutdown" (*i.e.*, operating) activities, "non-DOE spent fuel storage" clearly refers to on-site spent fuel storage as distinguished from the 1.0 mil per kWh of generation fee that all operating nuclear generating facilities, including the Vermont Yankee plant, paid to the Nuclear Waste Fund for spent fuel storage by DOE. The "non-DOE" reference in Section 1.01(j) thus does not conflict with, or in any way override, Section 4.01's authorization to disburse trust funds for spent fuel costs as a part of "Decommissioning." Exhibit D again only defines the "Completion of Decommissioning" and not the authority to disburse funds from the trust which is provided by Section 4.01. Exhibit D merely specifies *when* any excess trust funds shall be distributed and logically includes settlement or other resolution of Vermont Yankee's spent fuel cost claims against DOE as events triggering such distribution.

¹⁴ State Letter at 5.

¹⁵ See Trust Agreement, Exh. D.

¹⁶ *Id.*, Exh. D. at Exh. D-1 (emphasis in original). Exhibit D further provides that "Completion of Decommissioning shall be deemed to have occurred for purposes hereof notwithstanding that the Company [(ENVY)] may choose to re-use the Site, and portions of existing structures, systems and components, and that spent fuel is not removed from the Site."

¹⁷ State Letter at 5.

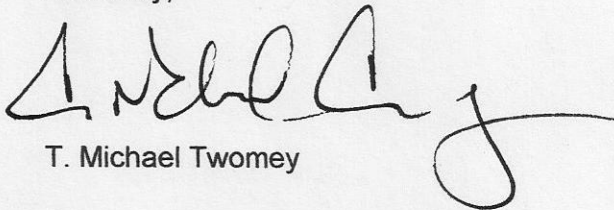
¹⁸ Trust Agreement § 1.01(j).

Lastly, your letter also makes a number of statements regarding the Vermont ratepayers' interest in any remaining decommissioning trust funds.¹⁹ Your letter fails to recognize, however, that the trust funds were collected by Vermont Yankee Nuclear Power Corporation through wholesale power contracts "with each of its sponsoring utilities which obligate[d] such utilities to purchase the output and capacity of the Vermont Yankee plant and to pay therefor 100% of Vermont Yankee's costs, including decommissioning" and that "[t]hese contracts ... have been approved as rates by the FERC."²⁰ As such, FERC has authority to determine the disposition of any excess trust funds.²¹

ENVY is committed to completing the decommissioning of Vermont Yankee safely. We are equally committed to using and managing ENVY decommissioning trust funds responsibly, in accordance with the Trust Agreement and all applicable NRC requirements.

Please contact me with any questions. With kind regards, I am

Sincerely,



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¹⁹ State Letter at 3-4.

²⁰ Vermont Yankee Nuclear Power Corporation Biennial Decommissioning Fund Status Report, submitted to the NRC March 28, 2001 (NRC Accession # ML 010930102) at 2.

²¹ See 18 C.F.R. § 35.32(a)(7).