

STATE OF VERMONT
PUBLIC SERVICE BOARD

Petition of Entergy Nuclear Vermont Yankee, LLC, and Entergy Nuclear Operations, Inc., for a Certificate of Public Good authorizing the construction of a second independent spent fuel storage installation storage pad and related improvements, including installation of a new diesel generator with an electrical rating of approximately 200 kW, at the Vermont Yankee Nuclear Power Station in the Town of Vernon, Vermont

December 23, 2015

Docket No. 8300

**PREFILED SURREBUTTAL TESTIMONY OF RAYMOND SHADIS
ON BEHALF OF NEW ENGLAND COALITION**

SUMMARY

Mr. Shadis responds to the rebuttal testimony of Entergy Vermont Yankee witnesses Michael Twomey and George Thomas.

With respect to the testimony of Michael Twomey regarding financial assurance for spent fuel handling, Mr. Shadis explains why expectations of drawing on the nuclear decommissioning trust ("NDT") are misplaced. He further explains that actual draw-downs likely to result in constraining the petitioners ability to fund mitigating measures for the project's negative impacts on site reuse, regional planning, local environment, and aesthetics.

With respect to the testimony of George Thomas, Mr. Shadis explains why Entergy's exploration of alternative siting and other mitigation of aesthetic impacts is inadequate and incomplete.

In response to the testimony of Mr. Twomey and Mr. Thomas, Mr. Shadis challenges both the accuracy and completeness of their projections. He further makes recommendations for the consideration of financing alternatives and additional aesthetic impact mitigating measures.

Respectfully Submitted,



Clay Turnbull
Pro Se Representative
New England Coalition

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Q-1. Please state your name, place of residence, and business address.

A-1. My Name is Raymond Shadis. I live in Edgecomb, Maine. My business address is 47 Shadis Road, Edgecomb, Maine 04556

Q-2. Please sum your education and experience.

A-2. My education and experience with respect to nuclear plant regulation, decommissioning, and spent fuel handling and storage issues was provided with my Rebuttal Testimony filed in this docket on August 19, 2015. In support of my comments herein regarding the aesthetic impacts of the proposed project, I would like to point out that I hold a Bachelor of Arts degree in fine art with a minor in psychology from Fairmont University. Upon earning that degree I participated in the National Teacher Examinations by Scholastic Testing Services and scored in the 99%tile overall and the 94%tile in Art Teaching and Theory. My psychology minor led to the award of a Graduate Fellowship (in Counseling) at West Virginia University. I have ten years of art

teaching experience in public and parochial schools in Texas, West Virginia, and Maine. As a professional artist, I have completed major sculptural commissions for more than a dozen churches in seven states.

Q 3. What is your present employment?

A 3. I am presently self-employed and since 2006 I have been serving as a technical consultant to New England Coalition. My services are similar to those I provided for the period 1997 through 2006 when I was employed by New England Coalition as staff technical advisor. My duties included tracking and reading nuclear power plant documents, regulatory issuances, and power industry journals. It was my responsibility to then make any new information accessible to the NEC Board of Trustees and to initiate an advocacy response to any safety, environmental, citizen rights, or regulatory issues that were identified.

The Vermont Public Service Board ("Board") has admitted my testimony on Vermont Yankee issues in Dockets 6545, 7195, 7440, 7600, 7801, and 8762.

Q 5. Did Entergy Nuclear Vermont Yankee ("ENVY") offer rebuttal to any portion of your August 19, 2015 prefiled written testimony?

A5. No. ENVY chose instead to file an Objection to my testimony on grounds of relevance and federal preemption and to forgo the opportunity to rebut. NEC replied to ENVY's Objection. A Board decision on the dispute remains pending.

Q 6. What is the purpose of your testimony in this instance?

A 6. My purpose is to respond to the rebuttal testimony of Entergy Vermont Yankee witnesses Michael Twomey and George Thomas and testify as to New England Coalition's positions regarding the subjects raised in their testimony.

With respect to the testimony of Michael Twomey regarding financial assurance for spent fuel handling I explain why expectations of drawing on the nuclear decommissioning trust ("NDT") are

misplaced. I further explain that actual draw-downs are likely to result in constraining the petitioners' ability or willingness to fund mitigating measures for the project's negative impacts on site reuse, regional planning, local environment, and aesthetics.

With respect to the testimony of George Thomas, I explain why Entergy's exploration of alternative siting and other mitigation of aesthetic impacts is inadequate and incomplete.

In response to the testimony of Mr. Twomey and Mr. Thomas, I challenge both the accuracy and completeness of their projections. I further make recommendations for the consideration of financing alternatives and additional aesthetic impact mitigating measures

Q 7. At A-4 in his rebuttal testimony ENVY witness, Michael Twomey states

Entergy VY intends to pay for spent fuel management costs in two ways. First, costs for the construction of the second Independent Spent Fuel Storage Installation ("ISFSI") pad, procurement of dry storage systems and transfer of the fuel from the spent fuel pool to the ISFSI will be funded by two revolving credit facilities totaling approximately \$145 million. Entergy VY plans to repay borrowings on these credit facilities with funds recovered from the U.S. Department of Energy ("DOE") for breach of its contract to remove spent nuclear fuel from the VY Station. Second, Entergy VY plans to fund operational spent fuel management activities from the nuclear decommissioning trust ("NDT"). The Nuclear Regulatory Commission ("NRC") on June 23, 2015 issued an exemption from its regulations, authorizing the use of VY NDT funds for operational spent fuel management activities.

What, in your opinion is wrong with that?

A 7. Taking Mr. Twomey's points *seriatim*, there is nothing wrong with ENVY borrowing money (\$145 million) to complete the Independent Spent Fuel Storage Installation ("ISFSI"), but anticipated "recovery" of funds from DOE strikes me as poor choice of collateral. It is not clear from Mr. Twomey's testimony whether or not a second lawsuit will be required in order to recover funds. Either way, DOE has proven to be far from reliable in honoring its commitments regarding nuclear waste handling and lawsuits *per se* are not certain in their outcome. If they were we wouldn't need courts and trials. Suing the federal government may be

a reasonable backup option but is hardly qualifies as a prudent and conservative business plan. Alternatively, the NDT appears to be much more certain of increasing value as collateral. To be clear, I mean "borrow against" and not "borrow from" the NDT, which should be allowed to grow unaffected by non-decommissioning draw-downs.

While NEC strongly objects to any drawdown of the NDT for any purpose other than decommissioning, using the NDT as collateral would leave the balance and growth potential untouched. In fact, NEC believes that Entergy, the parent company should fund both fuel management and decommissioning now with certain recovery for the lender from the NDT when it matures.

NEC reasons that Vermont and its citizens are expected to believe in and rely on the secure growth and eventual payoff of the NDT, why not Entergy?

Secondly, says Mr. Twomey, "Entergy VY plans to fund operational spent fuel management activities from the nuclear decommissioning trust ("NDT")."

There are, I believe, two things very wrong with this statement: there appears to be no funding assurance plan in place to cope with the possibility that spent fuel management may be required beyond decommissioning and beyond the expenditure of any surplus in the trust.

And further, if ENVY insists on paying for non-decommissioning post-operational expenditures out of the NDT there appears to be a risk that fund growth will be offset completely with no backup plan on the table. We have no assurance that financial straits brought on by a depleted NDT will not impede ENVY's mitigation of the ISFSI's potential negative impacts on site reuse, regional planning, local environment, and aesthetics.

Q 8. Please elaborate on your concern with Mr. Twomey's statement that "Entergy VY plans to fund operational spent fuel management activities from the nuclear decommissioning trust ("NDT")."

A 8. I do not share witness Twomey's apparent subscription to very recent DOE projections that spent fuel will begin to be loaded onto transport and removed from the Entergy Nuclear Vermont Yankee site beginning just ten years away in 2026 with the last fuel to leave the site in 2052, on the eve of demolition and decontamination, as it were. To paraphrase what I stated earlier, I believe that, responsibly, it must be considered that fuel may not be removed from the Entergy Nuclear Vermont Yankee site before the NRC-mandated terminus of decommissioning and site release, prior to 2072. In fact the NRC has been required by the federal courts to assure safety of on-site storage even if final waste fuel disposal is never achieved. NRC has offered that the soundness of dry storage systems (canisters and over-pack casks) could be reviewed on a 100 year basis and fuel switched to new on-site containers if necessary. The court action is recorded in *New York v. NRC*, 681 F.3d 471, 473, 481-82 (D.C. Cir. 2012) and NRC's action is recorded in Final Rule, Continued Storage of Spent Nuclear Fuel, 79 Fed. Reg. 56,238 (Sept. 19, 2014) (Continued Storage Rule); NUREG-21 57, Vols. 1 & 2, *Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel* (Sept. 2014) (ADAMS accession nos. ML14196A105 and ML14196A107) (Continued Storage GEIS) 2014.

. Several other federal agencies and national laboratories have in various studies and reports raised the specter of 500 year on-site storage. Citations to those studies and reports are contained in my prefiled testimony of August 19, 2015.

As evidenced in Mr. Twomey's letter defending use of the NDT to fund spent fuel costs, Mr. Twomey did not apparently have faith as recently as February 9, 2015 that the fuel would be removed until decades after the terminus of decommissioning.

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 1.010), 4.01 and 4.06 of the Trust Agreement. 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. [Emphasis Added] Letter, T. Michael Twomey to K. Landis-Marinello and C. Recchia February 9, 2015 Page 4 (Attached as NEC Exhibit RS 1)

Since my August testimony, it has been, widely reported in Vermont news media that DOE has begun a preliminary evaluation of Vermont and Massachusetts transportation infrastructure with an eye to rail and/or highway movement of nuclear fuel from the Energy Nuclear Vermont Yankee site. However, I share (at least partially) the somewhat jaundiced view of Nuclear Energy Institute Senior Director, Rod McCullum, as reported by the Vermont Digger:

Industry group: Government must move Vermont Yankee fuel

VERNON – Rod McCullum has what you might call conflicting feelings about storage of spent nuclear fuel at Vermont Yankee. "The fuel will be safe here," said McCullum, a senior director at the Nuclear Energy Institute. "The fuel shouldn't stay here." Asked what he thought about the current projection that all nuclear waste will be off the Vermont Yankee property by 2052, McCullum offered a qualified endorsement, "2052 is certainly doable," he said. "But the government has to move in some direction."...

Mike Faher, Vermont Digger, December 18, 2015

A "doable" schedule in the case of DOE waste projects has not proven to be the same as likely or even probable. Under the National Waste Policy Act of 1984, DOE offered contracts to nuclear plant operating companies with a performance deadline 1998; in 1998 DOE projected that it would open a national repository in 2005 and begin moving fuel in 2007. The latest iteration is less ambitious, the opening of the first of two interim storage sites able to host, as it

is envisioned, 500 of approximately 600 dry fuel storage casks now at shuttered plants. DOE plans projects opening the first site in 2021 and beginning to accept fuel in 2025 or 2026. However, the location of the first site has yet to be announced; possibly yet to be selected and secured. DOE claims that "several" communities have expressed interest in hosting an interim waste storage site but does not appear to allow time for potential procedural and legal opposition in its schedule. Among the tasks to be performed between notion and motion DOE lists:

- (1) Assemble management teams, identify shutdown site existing infrastructure, constraints, and transportation resource needs and develop interface procedures
- (2) Acquire Casks - Develop specifications, solicit bids, issue contracts, and initiate preparations, revisions to certificates of compliance as may be needed, procurement of AAR Standard S-2043 railcars, and procurement of off-site transportation services
- (3) – Conduct Preliminary Logistics Analysis and Planning- Determine fleet size, transport requirements, and modes of transport for shutdown site.
- (4) Coordinate with Stakeholders - Assess and select routes and modes of transport and support training of transportation emergency response personnel
- (5) Develop Campaign Plans - Develop plans, policies, and procedures for at-site operational interfaces and acceptance, support operations, and in-transit security operations.

In addition, the plan projects the following Operational Activities to Prepare, Accept, and Transport from a Shutdown Site.

- (6) Conduct Readiness -Assemble and train at-site operations interface team and shutdown site workers. Activities include readiness reviews, tabletop exercises and dry run operations
 - (7) Load for Off-site Transport-Load and prepare casks and place on transporters for off-site transportation.
 - (8) Accept for Off-site Transport - Accept loaded casks on transporters for off-site transportation.
 - (9) Transport - Ship shutdown site casks.
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Drawn from Table S-2. Activities to Prepare for and Remove Used Nuclear Fuel from Shutdown Sites - DOE Preliminary Evaluation of Removing Used Nuclear Fuel from Shutdown Sites - FCRD- NFST-2014-000091 Rev. 1 PNNL-22676 Rev. 4 *October 1, 2014 NEC EXHIBIT RS _2*

Although these tasks can to some degree run concurrently, DOE admits that some may require extended periods of time. At present, to best of my knowledge and upon diligent search of the literature, DOE has yet to select a design for a transport cask (s), fuel transfer equipment, and transport equipment. It has yet to acquire a NRC license for any fuel handling, transfer, or

transport equipment. As yet DOE has not applied for a NRC Interim Waste Facility license. It has yet to produce a complete list of required infrastructure (rail, highway, bridge, overpass) improvements to support (literally) fuel movement. To the practical observer this may appear "doable" within the seven to ten years DOE projects until the opening of the first interim waste storage site, but only with monumental, concerted "space program" quality effort. DOE has established no track record for this sort of effort.

Q 9. What approach then do you suggest be taken?

A 9. I suggest that the seriousness of the issues attendant to this project demand the most cautious, search, and conservative approach. Ironically ENVY has already started down that path by continuing to plan for fuel transfer to dry cask even though its claims absolute confidence that DOE is coming within a few years of the end of its \$145 million dollar transfer to dry cask campaign. As it happens the original agreements on spent fuel had DOE moving fuel in underwater (shielding) operations directly from the spent fuel pool to transport casks – hence the term spent fuel pool "cask lay-down" area. At Maine Yankee, we figured that the economic break-even between deploying dry cask systems and waiting for DOE to come and pluck the fuel directly from its spent fuel pool racks came at about ten years. If DOE were coming within ten years we reasoned, it did not pay to deploy casks at nominally \$1 million-a-piece. It seem that ENVY is certain, but not that certain. I suggest that Vermont prepare itself for the worst requiring only the smallest probability that DOE will once again fail to perform as promised. I am not suggesting that 'second-guessing DOE is appropriate, but rather something on the order of President Reagan's "trust..and verify." If ENVY insists on going forward based on its conviction that all fuel will be removed by 2052, then I suggest that the State of Vermont, through this Board, should incentivize ENVY to work with DOE to make fuel transfer happen

by requiring that ENVY produce a performance bond which would be forfeit if the fuel is not gone by 2052. The amount of the bond should be sufficient to cover fuel handling operations (including fuel removal) for whatever term the Board deems appropriate. I would suggest that the performance bond reflect the cost of establishing the ISFSI or \$145 million. The Board may note that the US District Court in *Maine Yankee Atomic Power Co v. Bonsey*, 107 F. Supp. 2d (D.Me.2000, said,

Kerr-McGee Chemical Corp. v. City of West Chicago, 914 F.2d at 827 ("The City does indeed have the power to say `no' to aspects of the project" that fail to comply with the City's regulations, "if they do not directly involve radiation hazards (including those `inextricably intermixed' with non-radiation hazards) and are not selected for scrutiny by the City merely to delay or frustrate the project as a whole."). (A normal and customary performance bond requirement, designed to ensure completion of site grading, landscaping, drainage, etc., would probably be permissible, for example.) [Emphasis added]

Q 10. What response do you have to the testimony of George Thomas?

Mr. Thomas testifies that an alternative ISFSI site along the northwest fence line was deemed not suitable because,

Locating an ISFSI on the available VY Station site land to the west of the Vernon Substation would create aesthetic problems due to the ISFSI's security lighting requirement and its close proximity to the residential property along Governor Hunt Road. Such proximity would also create problems complying with the radiation dose limits for members of the public, 10 C.F.R. 72.104, and (to the extent it is not preempted) the Vermont Department of Health's more stringent requirement in its Radiological Health Rule, Section 5-305(D)(1)(e).

George Thomas demonstrates why Entergy's exploration of alternative siting and other mitigation of aesthetic impacts is inadequate and incomplete. Security lighting is only one of the proposed ISFSI's adverse aesthetic impacts, the entire project is ominous and foreboding in aspect. It presents multiple industrial-looking cylindrical silos surrounded by a double wall of razor-wire topped chain-link fences and industrial security lighting with armed guards patrolling 24/7. Close observers also can see that the ISFSI is ringed with motion detectors. Thus while the average person may or may not have any idea of the stored contents, they know it is something pretty serious. One aspect of the silos is that they are tall (approximately 19 feet, looming over as it were the passer-by and easily

seen at a distance as a perceivably large object. The best solution to visual aesthetic impacts is to get the ISFSI out of site. The first ISFSI features an 18 foot high solid interstate highway style fence which blocks or obscures view from the river and the New Hampshire shore. Entergy is quick to say in any public forum that wall is there for aesthetic purposes.

NEC takes the position that Entergy has not adequately explored the feasibility and desirability of moving the ISFSI to an off-site, more private, and secure location, if one exists within the precincts of Vernon or surrounding towns. There is one example that readily presents itself; a disused gravel pit at the edge of Vernon founded I believe on granite bedrock, isolated and easily secured. Entergy should have and should now be ordered to credibly explore such an alternative site. This would spare the abutting neighbors along Governor Hunt Road and the local of Chamber of Commerce in their efforts to promote Vernon for business, investment, or residence.

A prime key to aesthetic relief for on-site storage is lowering the profile of the ISFSI. Entergy should be credibly evaluating actually lowering the ISFSI site through terra-forming, dropping the entire platform for the ISFSI and providing a kind of natural amphitheater or just providing the visible illusion of lowering the casks out-of-sight as much as possible by locating an earthen mound along the West fence-line, as high as practicable and where feasible. Mr. Thomas's cost concerns are easily swallowed in the \$ 145 million bet that Entergy is making on what may be an unnecessary and untimely dry cask campaign.

It should be noted that common soil is a very effective radiation attenuator and placing a substantial amount of soil as in an earthen berm or through an earthen depression would serve to substantially lower fence-line radiation dose. This effect was noted at Prairie Island NPP in a Report of the Goodhue County (Minnesota) Environmental Quality Board. Staff Report to EQB On The Siting Of A Dry Cask Storage Facility Staff Report to the Minnesota Environmental Quality Board On The Siting Of A Dry Cask Storage Facility In Goodhue County -1996

Does that complete your testimony?

A. Yes. That completes my testimony at this time. .