

STATE OF VERMONT  
PUBLIC SERVICE BOARD

Petition of Entergy Nuclear Vermont Yankee, LLC, and )  
Entergy Nuclear Operations, Inc., for amendment of their )  
certificates of public good and approvals required )  
under 10 V.S.A. §§ 6501-6504 and 30 V.S.A. §§ 231(a), )  
248 & 254, for authority to continue after March 21, 2012, ) Docket No. \_\_\_\_\_  
operation of the Vermont Yankee Nuclear Power Station, )  
including the storage of spent-nuclear fuel )

SUMMARY OF PREFILED TESTIMONY OF BRUCE W. WIGGETT

Mr. Wiggett’s testimony addresses 30 V.S.A. §248 (b)(4)’s requirement that continued operation of the Vermont Yankee Nuclear Power Station (“VY Station”) result in an economic benefit to the state and its residents. In particular, Mr. Wiggett provides information regarding the value to Vermont of the revenue-sharing provision contained in Paragraph 4 of the March 3, 2002, Memorandum of Understanding entered between Entergy Nuclear Vermont Yankee, LLC, Entergy Nuclear Operations, Inc., the Vermont Department of Public Service and other parties in Vermont Public Service Board Docket No. 6545. Mr. Wiggett also describes other economic benefits that the VY Station currently provides to Vermont and discusses the likelihood of those benefits continuing if the Station is authorized to operate after 2012.

Mr. Wiggett sponsors the following exhibits:

- |                 |  |
|-----------------|--|
| Exhibit EN-BW-1 | Estimated Economic Value to Vermont of MOU Paragraph 4 with DPS Base Case  |
| Exhibit EN-BW-2 | Estimated Economic Value to Vermont of MOU Paragraph 4 with DPS Base Strike Price Adjusted for Lower NFMI Escalation |
| Exhibit EN-BW-3 | Estimated Economic Value to Vermont of MOU Paragraph 4 with DPS Base Plus 10%  |
| Exhibit EN-BW-4 | Estimated Economic Value to Vermont of MOU Paragraph 4 with DPS Base Minus 10%                                       |

Exhibit EN-BW-5

Estimated Economic Value to Vermont of MOU  
Paragraph 4 with DPS Base Adjusted for Busbar

Exhibit EN-BW-6

Estimated Economic Value to Vermont of MOU  
Paragraph 4 with DPS Base Adjusted for Unit &  
Busbar

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PREFILED TESTIMONY OF BRUCE W. WIGGETT

1 Q1. State your name.

2 A1. Bruce W. Wiggett.

3 Q2. What is your current position?

4 A2. I am an independent financial and economic consultant specializing in regulated  
5 utilities. In addition, I am an Adjunct Professor of Accounting at Plymouth State  
6 University, in Plymouth, New Hampshire.

7 Q3. Describe your educational background.

8 A3. I graduated from Plymouth State College of the University of New Hampshire in  
9 1974 with a Bachelor of Science Degree in Business Administration. In 1978, I  
10 received a Master of Business Administration Degree from Northeastern University.  
11 I have also attended various electric-utility, industry-sponsored seminars and  
12 workshops.

13 Q4. Outline your work experience.

14 A4. Upon graduating from college in 1974, I was employed by Public Service Company  
15 of New Hampshire, serving in various positions in the Accounting Division. In 1979,  
16 I was appointed Financial Accounting Supervisor, in 1980 Financing Accounting

1 Manager, in 1981 Assistant Comptroller and in 1988 Comptroller. In May 1990, I  
2 was elected to the additional positions of Treasurer and Secretary.

3  
4 In September 1991, I left Public Service Company of New Hampshire to join  
5 Vermont Yankee Nuclear Power Corporation (or “VYNPC”) as Vice President of  
6 Finance and Treasurer. I was promoted to the position of Senior Vice President of  
7 Finance and Administration and Treasurer in May, 2001. Upon the sale of the plant  
8 facilities to Entergy Nuclear Vermont Yankee, LLC (or “EVY”), on July 31, 2002, I  
9 was elected President and CEO of VYNPC. I resigned and retired from that position  
10 in October, 2004.

11 Q5. Have you previously testified before this Board?

12 A5. Yes, I have. I was VYNPC’s witness in Docket No. 6545, in which the Board  
13 approved the sale of the Vermont Yankee Nuclear Power Station (referenced in my  
14 testimony as “VY Station” or “Station”) to EVY. I was also the VYNPC witness in  
15 Docket No. 6300, involving the proposed sale of the VY Station to AmerGen Energy  
16 Company, LLC.

17  
18 More recently, I testified on behalf of EVY and Entergy Nuclear Operations, Inc. (or  
19 “ENO”; I will refer to EVY and ENO together as “Entergy VY”) in Docket No. 7082,  
20 involving the company’s proposal to construct a dry-fuel-storage facility on the VY  
21 Station site in Vernon, Vermont.

22 Q6. What is the purpose of your testimony?

23 A6. My testimony examines the value of Paragraph 4 of the Memorandum of  
24 Understanding (or “MOU”) among Entergy VY, the Vermont Department of Public

1 Service (to which I will refer as the “DPS” or “Department”) and other parties, dated  
2 as of March 3, 2002, which provides for revenue sharing for a ten-year period in the  
3 event of a plant-life extension for 20 years beyond March, 2012. Based on certain  
4 assumptions regarding market prices and other factors to be considered in calculating  
5 the value of Paragraph 4, assumptions which I will discuss in detail later in my  
6 testimony, I estimate that the minimum value to Vermont utilities and their customers  
7 of their percentage share of the MOU’s revenue-sharing provision will be in the range  
8 of \$126,915,000 to \$381,122,000 over the ten-year period, for a present value today  
9 of \$80,369,000 to \$237,957,000.  
10

11 In addition, I discuss the current economic benefits that Entergy VY provides to  
12 Vermont, and I discuss the likelihood of those benefits continuing in the event the VY  
13 Station continues to operate after 2012. My testimony supports the economic-benefit  
14 criterion of Section 248(b)(4) as well as the related economic-benefit aspects of  
15 Section 254(b) of Title 30 of the Vermont Statutes Annotated.

16 Q7. Mr. Wiggett, please explain your analysis of the revenue-sharing provision of  
17 Paragraph 4 of the sale MOU.

18 A7. It is my understanding that Entergy VY or its marketing affiliate is negotiating a  
19 power-purchase agreement (or “PPA”) with electric-distribution companies in  
20 Vermont, but for purposes of my testimony I assume that no such agreement will be  
21 reached and hence I assign no value to purchases of VY Station output by Vermont.  
22 Under the terms of the MOU in effect following the sale of the VY Station to Entergy  
23 VY, however, upon an extension of the plant’s operating life VYNPC is entitled to

1 share the revenue for a ten-year period on any energy sold from the VY Station,  
2 receiving a 50% share of revenue received above a stated strike price.

3  
4 Two Vermont utilities, Central Vermont Public Service Corporation (or “CVPS”) and  
5 Green Mountain Power Corporation (or “GMP”), are VYNPC sponsors. The  
6 Vermont utilities’ sponsorship percentages were set out in agreements with VYNPC,  
7 the former owner of the VY Station, that have been in place in some form since the  
8 formation of VYNPC. The Vermont sponsors and their respective sponsorship  
9 percentages as I understand it are:

<u>Name of Sponsor</u>	<u>Sponsorship Percentage</u>
Central Vermont Public Service Corporation	35.0%
Green Mountain Power Corporation	20.0%

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18  
19 I do not know how VYNPC will ultimately allocate funds received as a result of the  
20 revenue-sharing provision of Paragraph 4; however, I expect that CVPS and GMP  
21 will receive no less than 55% of any funds received by VYNPC under Paragraph 4.

22 Q8. What if Entergy VY cannot reach an agreement with the Vermont utilities for the  
23 purchase of energy from the facility during the license-extension period?

24 A8. Where and to whom Entergy VY sells the energy is not a factor in the provisions of  
25 the MOU. If Entergy VY sells its energy in excess of the strike price, VYNPC will  
26 receive its share of the revenues under Paragraph 4, with CVPS and GMP receiving  
27 their allocation of VYNPC’s share.

1 Q9. Please explain your analysis of the MOU revenue-sharing provision.

2 A9. The MOU (Paragraph 4) provision states: “In the event that [Entergy VY] extends  
3 the operation of the VYNPS pursuant to extension of its NRC license, [Entergy VY]  
4 agrees to share with VYNPC fifty percent of the ‘Excess Revenue’ for ten years  
5 commencing on March 13, 2012.”<sup>1</sup> Under this provision, for a ten-year period  
6 commencing in March 2012, if Entergy VY’s average energy price during the fiscal  
7 year exceeds the predetermined “Strike Price” of \$61.00 per MWH (escalated per  
8 agreed guidelines), Entergy VY agrees to share the difference equally with VYNPC.  
9 Excess revenues for the Station are determined based on the Station’s price for  
10 energy, exclusive of other products that may be offered by Entergy VY. Based on  
11 current estimated future electricity prices, this provision will provide value to  
12 Vermont during this ten-year period if the VY Station is allowed to operate after  
13 March 21, 2012. Exhibit EN-BW-1 sets forth my analysis of the benefit that should  
14 be received by Vermont if the plant is allowed to extend its current operation.

15 Q10. Please explain Exhibit EN-BW-1.

16 A10. While there are many alternatives to use for estimating the cost of energy purchased  
17 on the market, I have used a forecast recommended by the Department of Public  
18 Service. This current recommendation was set forth in a letter dated November 11,  
19 2007, from Mr. Riley Allen, Director for Regulated Planning, to Mrs. Susan Hudson,  
20 Clerk of the Vermont Public Service Board, in which the Department recommended  
21 that the Board adopt the values attached to the letter for use by the Energy Efficiency  
22 Utility. It is important to note that the values provided by the Department are in

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<sup>1</sup> Paragraph 4 uses March 13, 2012, as the expected date of relicensing; however, this may be an error as it is my understanding that the actual date for relicensing is March 21, 2012.

1 “current dollars,” and for my analysis I wanted them to appear in “nominal dollars.”  
2 To accomplish this I inflated the current dollar amounts for the ten-year period at an  
3 inflation rate of 2.5%. I then used those values for the years of my analysis as the  
4 comparison to the stated strike price set forth in Paragraph 4 of the MOU. The DPS-  
5 recommended values are given by peak and off-peak and by summer and winter  
6 values. Using that data, I then applied a weighted-average methodology to arrive at  
7 an annual, estimated value of the energy.

8  
9 The estimated Station output for the period was developed based on an 87.86%  
10 capacity factor during an outage year and a 98% capacity factor in a non-outage year.  
11 These estimates of the VY Station’s capacity are based on the last ten-year average of  
12 VY Station output (7 outage years, and 3 non-outage years), except that the 98%,  
13 capacity-factor assumption that I use for non-outage years is slightly more  
14 conservative than the VY Station’s actual, non-outage-year, capacity-factor average  
15 of 100%.

16  
17 The strike price in Paragraph 4 of the MOU is stated to be \$61.00 per MWH in 2012  
18 and escalated based on specific “Escalation Factors”: the Employment Cost Index,  
19 the Gross Domestic Product Implicit Price Deflator and the Nuclear Fuel Market  
20 Index. To estimate the weighted average of those values for the period from 2012 to  
21 2022 would be quite speculative at this point. In an attempt to reflect all of the  
22 formula values, I looked at the respective historic values for those components for the  
23 ten-year period ended in 2007. The net effect of that calculation is a combined  
24 escalation factor of 4.10%. Using this escalation factor for the strike price and

1 comparing the strike price to the estimated future cost of Vermont energy produced a  
2 sharing for VYNPC under the terms of Paragraph 4 of \$461,852,000 over the ten-year  
3 period. Using a discount rate of 5% (as does Richard Heaps in the economic-impact  
4 estimates in his prefiled testimony in this Docket), the estimated benefit would equal  
5 \$289,288,000 in 2008 dollars. I have chosen to use a discount rate of 5% for  
6 illustrative purposes and to be consistent with Mr. Heaps' testimony; however, I  
7 recognize that other discount rates may be more appropriate in discounting future  
8 value-sharing revenues, depending on the application. As set forth in Exhibit EN-  
9 BW-1, under their sponsorship arrangement with VYNPC CVPS and GMP would  
10 receive at least 55% of this sharing for the benefit of Vermont ratepayers, or  
11 \$254,018,000 (\$159,163,000 net-present value in 2008 dollars).

12  
13 My estimate of the Nuclear Fuel Market Index (or "NFMI") component of the  
14 Paragraph 4-escalation factors was based on historical information from the ten-year  
15 period 1998 to 2008, in which certain of the components of the NFMI experienced  
16 unprecedented volatility. In particular, I understand that the average uranium index  
17 price increased six-fold in the early-2000s due to unusual market events but that it has  
18 leveled off more recently. To provide a sensitivity-case analysis to these unusual  
19 market conditions, I also ran an analysis of the Paragraph 4 escalation factors using a  
20 calculation of the NFMI based on the ten-year period from 1988 to 1998. Using this  
21 earlier (more stable) market period, I calculated a combined escalation factor of  
22 2.83% (vs. 4.10%). In Exhibit EN-BW-2, using this escalation factor for the strike  
23 price and comparing the strike price to the estimated future cost of Vermont energy  
24 recommended by the DPS produced a sharing of at least \$315,050,000 over the ten-

1 year period (assuming 55% of VYNPC's share goes to CVPS and GMP), which  
2 results in an estimated, net-present-value benefit of \$193,860,000 for Vermont.

3 Q11. Did you consider other possible market prices of power in developing the potential  
4 savings associated with Paragraph 4 of the MOU?

5 A11. Yes. I did sensitivity analyses on the DPS-recommended forecast. I also considered  
6 two further scenarios that take into account VY Station-specific market factors, which  
7 I will discuss in greater detail later.

8  
9 For sensitivity purposes, I did an analysis that assumed a 10% increase in the future  
10 cost of energy and one that assumed a 10% decrease in the future cost of energy, both  
11 based on the DPS-recommended, future energy costs. These analyses are presented  
12 in Exhibit EN-BW-3 and Exhibit EN-BW-4 and show an estimated benefit for  
13 Vermont utilities of at least \$381,122,000 (in nominal dollars) and a net-present-value  
14 benefit of at least \$237,957,000 in 2008 dollars for the 10% increase in estimated  
15 energy cost and an estimated benefit of at least \$126,915,000 (in nominal dollars) and  
16 a net-present-value benefit of at least \$80,369,000 in 2008 dollars for a 10% decrease  
17 in the DPS-recommended, estimated energy cost. These are certainly significant  
18 potential savings from the revenue-sharing provision of Paragraph 4 of the MOU for  
19 the ten-year period.

20 Q12. You mentioned that you also considered scenarios that take into account VY Station-  
21 specific market factors. Please explain.

22 A12. Yes. My understanding is that the DPS-recommended forecast presents the Vermont  
23 load-zone price for energy and does not take into account the Vermont busbar-  
24 equivalent price relevant to the VY Station. Based on information obtained from

1 ISO-New England, it is my understanding that the busbar price for VY Station energy  
2 has ranged from 3.25% to 4.40% below the Vermont load-zone price since 2003. As  
3 a consequence, I ran an additional analysis incorporating a 3.79% discount on the  
4 DPS-recommended market curve to reflect the impact that busbar prices would have  
5 on market prices in the future. Exhibit EN-BW-5 contains my analysis, which shows  
6 that the Vermont utilities (again assuming a 55% allocation of VYNPC's share)  
7 would receive an estimated benefit of at least \$205,846,000 (\$129,300,000 net-  
8 present value in 2008 dollars) if busbar pricing is taken into account.

9  
10 In addition, I understand from Entergy that any long-term PPA for VY Station energy  
11 is likely to be a unit-contingent contract. It is my further understanding that the DPS-  
12 recommended market forecast assumes a firm price for energy and does not take into  
13 account any discount for the unit-contingent nature of the VY Station product. To  
14 reflect the reality of the unit-contingent nature of VY Station energy, I therefore ran a  
15 sixth analysis that assumes a 5% discount for VY Station energy sold on a unit-  
16 contingent basis. I also included the 3.79% busbar-price discount in this analysis to  
17 encompass both VY Station-specific market factors that should be considered in  
18 attempting to project future market prices for VY Station energy. Under this analysis,  
19 set forth in Exhibit EN-BW-6, I estimate a revenue-sharing benefit to Vermont  
20 utilities of at least \$142,295,000, for a net-present-value benefit of at least  
21 \$89,903,000.

1 Q13. Summarize your analysis with respect to the revenue-sharing provision of Paragraph  
 2 4 of the MOU.

3 A13. My analysis shows that the revenue-sharing provision of Paragraph 4 represents a real  
 4 benefit for Vermont ratepayers. The following table summarizes the six scenarios I  
 5 considered:  
 6

<b>Scenario</b>	<b>Minimum VT Utilities Portion 55% (\$MM)</b>	<b>Total VSA Amount (\$MM)</b>
High Scenario (DPS-Recommended Forecast +10% & 4.1% VSA Strike Escalation)	\$381.1	\$692.9
Mid Case Scenario (DPS-Recommended Forecast & 4.1% VSA Strike Escalation)	\$254.0	\$461.9
Low Scenario (DPS-Recommended Forecast -10% & 4.1% VSA Strike Escalation)	\$126.9	\$230.8
Low Strike Escalation Scenario (DPS-Recommended Forecast & 2.83% VSA Strike Escalation)	\$315.0	\$572.8
<b>Sensitivities on the Mid Case Scenario</b>		
Mid Case w/ Basis (DPS-Recommended Forecast w/ 3.79% Basis to VY Bus from VT Load Zone & 4.1% VSA Strike Escalation)	\$205.8	\$374.3
Mid Case w/ Basis & 5% UC Discount (DPS-Recommended Forecast w/ 3.79% Basis to VY Bus from VT Load Zone & 4.1% VSA Strike Escalation)	\$142.3	\$258.7

7  
 8 My analysis shows that the benefit is dependent on market prices, but one additional  
 9 point needs to be emphasized. With the revenue-sharing provision, Vermont  
 10 ratepayers will essentially have a built-in insurance policy or buffer against high  
 11 energy prices during the ten-year term of the provision.

1 Q14. Do you have additional information regarding the VY Station's economic benefit to  
2 the state of Vermont.

3 A14. Yes, I do. Currently, EVY and ENO employ about 454 employees in all aspects of  
4 VY Station operations (I understand that an additional 60 positions will be added  
5 within the next year or so), with total compensation of \$55,589,204 in 2007, as well  
6 as an additional 169 full-time contractors. In addition and as I have testified in the  
7 past with respect to the VY Station, station outages contribute a real, although  
8 relatively short-term boost to businesses in Windham County every 18 months.  
9 When an outage occurs, hundreds of contractors and workers come to and reside in  
10 the region for 20 to 45 days.

11  
12 Entergy VY also pays significant taxes in Vermont. The taxes paid by Entergy VY,  
13 both to the State and to the communities of Vernon and Brattleboro, include property,  
14 income, sales-and-use, and unemployment taxes and the Vermont Generation Tax,  
15 totaling in excess of \$8,000,000 per year.

16 Q15. These are current benefits that the VY Station furnishes to the state of Vermont. Is it  
17 reasonable for these benefits to continue if the VY Station continues to operate after  
18 2012?

19 A15. Most certainly it is. A substantial investment is required to operate a facility such as  
20 the VY Station, and it is not a business that can just "move on." As long as the VY  
21 Station operates, it will continue to generate significant expenditures within Vermont  
22 in general and southern Vermont in particular. While monies will be spent if the  
23 plant is required to shutdown, the amounts will be substantially less and will end

1 much sooner. Continued operation of the VY Station will allow the company to  
2 remain a significant contributor to the Vermont economy.

3 Q16. What will happen if the VY Station is required to shut down in 2012?

4 A16. If the Station is required to shut down in 2012, the direct benefits to the state of  
5 Vermont will be lost. If the plant shuts down in 2012 and the plant is placed into a  
6 SAFSTOR condition for a period of time, there will be expenditures in Vermont  
7 during that period but they will only average about \$11,000,000 annually over the 20-  
8 year period. As pointed out in Mr. Heaps' testimony in this proceeding, the differing  
9 economic impact between a continue-to-operate and shutdown scenario is very large.  
10 Mr. Heaps estimates that over the period from 2012 to 2050, Windham County  
11 employers will have a payroll that totals \$2.165 billion more and the employers in the  
12 remainder of Vermont \$343 million more if the plant is relicensed than if it is  
13 shutdown; during this same period, the State would receive a total of \$313 million  
14 more in tax revenues; and still over this same period, local communities would  
15 receive additional tax revenues of some \$92 million. In addition, Entergy VY makes  
16 annual charitable contributions of approximately \$370,000. This is certainly a  
17 significant impact to the economy of the state.

18 Q17. Please summarize your testimony.

19 A17. My analysis shows that the value of Paragraph 4 of the sale MOU to Vermont from  
20 2012 to 2022 ranges from at least \$126,915,000 to \$381,122,000 in nominal dollars  
21 (\$80,369,000 to \$237,957,000, net-present value in 2008 dollars) based on the DPS-  
22 recommended forecast as presented and adjusted to consider sensitivities and VY  
23 Station-specific market factors and depending on the ultimate allocation of VYNPC's  
24 share to the Vermont utilities. In addition, the revenue-sharing provision serves as a

1           buffer or insurance policy for Vermont consumers against high market prices during  
2           the ten-year period.

3  
4           Entergy VY and the VY Station are presently major economic contributors not only  
5           to the southern Vermont region but to the entire state of Vermont. If the VY Station  
6           continues to operate after 2012, these benefits are likely to continue to accrue. While  
7           it is a given that the VY Station will close at some point in the future, it should be  
8           recognized, as shown in the prefiled testimony of Mr. Heaps, that such a closure will  
9           have a significant, negative impact on Windham County and the state of Vermont.

10  
11           In summary, the extension of VY Station's operating license to March 21, 2032, will  
12           produce economic benefits to the southern Vermont region and the state of Vermont  
13           as a whole, thus promoting the general good of the state.

14    Q18.     Does that conclude your testimony?

15    A18.     Yes, it does.