

# **Resiliency Action Plan for the Town of Vernon in Preparation for the Eventual Closure of the Vermont Yankee Nuclear Power Station**

**Prepared by the  
Windham Regional Commission**



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**For the  
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## **Introduction**

In December, 2010, the Town of Vernon applied for a Municipal Planning Grant through the Vermont Agency of Commerce and Community Development, “to expand the Vernon Town Plan, an update of which is already underway, to include a significant component regarding post-closure planning related to the eventual closure of the Vermont Yankee Nuclear Power Station.” While the urgency of this proposal was prompted by the possibility that the plant might close in March, 2012 as a result of the expiration of its authority to operate from the State of Vermont, the purpose was driven by the recognition of the fact that the town’s largest employer and tax generator will, at some point, close. Whether that closure occurs in a matter of months, years, or decades, the town recognized the need to understand the range of possible impacts of the closure, how impacts might be mitigated, and what the land use implications of the eventual closure might be.

The Windham Regional Commission (WRC) was retained by the Town of Vernon to conduct this planning effort as directed by the Vernon Planning Commission. The WRC has participated extensively in the Public Service Board dockets related to Vermont Yankee, and has maintained a neutral position as to whether or not the plant should or should not continue to operate. The WRC adopted this position in order to facilitate discussion among all sides about the plant, and to share information from those dockets with the public. Information gathered over time about the potential impacts of the eventual closure of the plant informs this report. While the WRC has adopted specific positions related to the eventual decommissioning of the plant, and the storage of spent fuel on the site, those positions are not presented or advocated for here. The goal is to provide the Town of Vernon with objective information about the eventual closure of the plant such that it can make its own informed decisions.

The Town of Vernon should be commended for taking on this challenging task. For a community to recognize that its economic and fiscal foundation will one day change dramatically takes emotional and political courage. To plan ahead for that day so the impacts can be anticipated and mitigated to the greatest extent possible takes real strength. The goal here is to give the Town of Vernon information with which it can plan ahead for resiliency in the face of economic change.

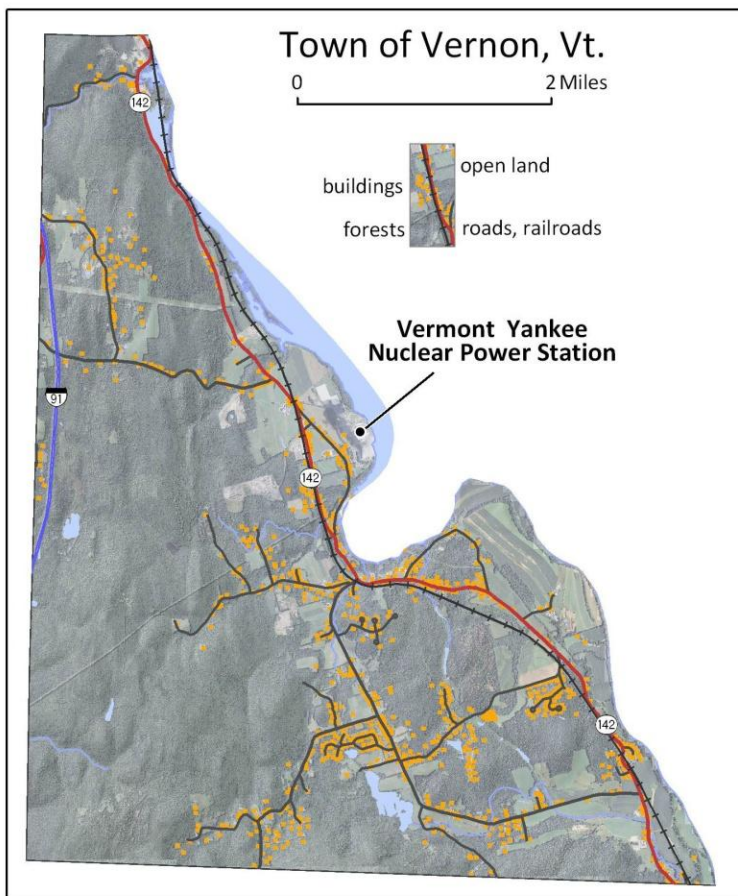
Special thanks are in order to the Vernon Planning Commission for their engagement in the development of this plan. Thanks also to Bernard Buteau, State Liaison Engineer with Entergy Nuclear Vermont Yankee, for providing information about the plant’s operations in Vernon, and for arranging a tour of the plant for the Commission, in his capacity as liaison between the Commission and the plant owner. Last but not least, thank you to the Department of

Economic, Housing and Community Development for providing a municipal planning grant in support this effort.

### **Structure of This Report**

This report first presents the current interrelationship between the Entergy Vermont Yankee Nuclear Power Station and the Town of Vernon. It then provides a general overview of the three possible decommissioning scenarios related to the closure of nuclear power stations because each decommissioning process has its own implications for the abruptness of the impacts that will be felt by the town. It next provides an overview of decommissioning precedents and what they mean for Vernon’s planning assumptions and actions, especially as related to the possible reuse of the site. The major findings are then summarized, followed by specific recommended action items to be pursued by the Town of Vernon.

### **Current Status: The Vermont Yankee Nuclear Power Station and the Town of Vernon**



The Vermont Yankee Nuclear Power Station occupies a site on the Connecticut River that is approximately 125 acres in size, and which is in immediate proximity to the civic center of the Town of Vernon. The town offices, library, and elementary school are located very near the entrance to the plant. This demonstrates the extent to which the town has historically embraced the plant.

In addition to the nuclear power station, a Vermont Electric Company (VELCO) substation and switchyard are located on the plant site, and the site is adjacent to the 32.4 megawatt Vernon hydroelectric dam owned by TransCanada. Other structures on

the site include the historic Governor Hunt House, the gate facility, a business office building, the reactor complex, dry cask spent fuel storage pad and containers, and cooling towers.

Vermont Yankee paid a total of \$1,147,399.96 in taxes to the Town of Vernon for the 2011-12 tax year,<sup>1</sup> which constitutes 48.5 % of the total town tax receipts \$2,364,334.22<sup>2</sup> for that year. The following table is a breakdown of taxes paid by Entergy property.

<b>Property Identification</b>	<b>Taxable Valuations</b>	<b>Tax Payment to Vernon For 2011-12 Tax Year</b>
394 Governor Hunt Road	Assessed Value \$170,800 Grand List \$1,708 Homestead \$170,800 Total Acreage 1	Municipal \$604.12 Education \$1,576.14  Total Tax: \$2,180.26
374 Governor Hunt Road	Assessed Value \$60,500 Grand List \$605 Total Acreage 1	   Total Tax: 772.28
298 Governor Hunt Road	Assessed Value \$192,000 Grand List \$1,920 Homestead \$192,000 Total Acreage .63	Municipal \$679.10 Education \$1,771.78  Total Tax: \$2,450.88
304 Governor Hunt Road	Assessed Value \$62,400 Grand List \$624 Total Acreage .50	   Total Tax: \$796.54
Land, Plant, Misc Buildings Governor Hunt Road	Assessed Value \$300,000,000 <sup>3</sup> Grand List \$3,000,000 Exemptions \$300,000,000 Total Acreage 144.79	   Total Tax: \$1,141,200.00
		<b>Total: \$1,147,399.96</b>

The VELCO switchyard located within the Vermont Yankee site is assessed by the Town of Vernon at \$256,000, and the Vernon substation is assessed at \$918,000, with total taxes paid to Vernon by VELCO for the 2011-12 tax year being \$1,174,682.52.<sup>4</sup> In a telephone conversation with VELCO, it was explained that the eventual closure of Vermont Yankee should not alter the need for the substation and switchyard, and therefore they should continue operation.<sup>5</sup> The following information was reported for this project to the WRC by Entergy Vermont Yankee on June 12, 2012.<sup>6</sup> As of that date, the total number of people employed by Vermont Yankee

<sup>1</sup> From Vernon 2011 As Billed Grand List Tax Book Report provided via email by Sally Brassor, Vernon Town Treasurer, on May 1, 2012.

<sup>2</sup> Total and percentage provided via email by Sally Brassor, Vernon Town Treasurer, on May 7, 2012.

<sup>3</sup> In June, 2012 Vernon town officials extended a tax assessment agreement with Entergy VY, keeping the power station's valuation at \$300 million for another year. *Brattleboro Reformer* "VY Taxes: Vernon Extends Agreement with Nuclear Plant," June 6, 2012.

<sup>4</sup> Total confirmed via email by Sally Brassor, Vernon Town Treasurer, on May 7, 2012. A spokesperson for VELCO explained in May, 2012 that the company was challenging the valuation of their facilities by the Town.

<sup>5</sup> Shana Duval, VELCO Public Affairs

<sup>6</sup> Via email dated June 12, 2012 from Bernard Buteau, State Liaison Engineer with Entergy Nuclear Vermont Yankee, LLC. Mr. Buteau served as the liaison between the WRC and the Vernon Planning Commission and Vermont Yankee for this

was 624. The total number of employees residing in Vernon was 84. The number of spouses of employees residing in Vernon was reported as 61, and the number of children was reported as 129. These numbers together (employees and their spouses and children residing in Vernon) represent approximately 12.4 percent of the total population of the town.<sup>7</sup> The number of contracted employees residing in Vernon is assumed by Vermont Yankee to be small. The 2011 distribution of employees by state was reported as 239 in Vermont, 191 in New Hampshire, and 164 in Massachusetts.

Total payroll for all staff employees was reported in June, 2012 by Entergy Vermont Yankee as being approximately \$66 million. The total wages and wage range of those employed by the plant that live in Vernon was unavailable. Wages paid by Vermont Yankee are relatively high for the Windham Region, with the 2006 average wage for Vermont Yankee employees being \$103,777.<sup>8</sup> The payroll for contracted staff during 2006, a non-outage year, totaled \$16,120,183.<sup>9</sup> While the total number of persons employed by Vermont Yankee is not high relative to the town's total population (approximately 3.8 percent), or as a percentage of adults aged 18 to 64 (approximately 6.6 percent) based on 2010 Vermont State Data Center population data, it is possible that their total household earnings are relatively high.<sup>10</sup>

Spending on charities and charitable functions by Vermont Yankee is considerable. In its June 2012 report to the WRC, Entergy Vermont Yankee reported that it spent \$300,000 to \$400,000 annually across approximately 100 organizations. A breakdown of charitable expenditures specifically in Vernon was not available. It is known that a number of Vermont Yankee employees participate as volunteers in a variety of capacities within the town, including service as volunteer firefighters and coaches. Information about direct spending by Vermont Yankee on public services in Vernon was not available, but it was reported that funding has been provided to assist the fire and police departments.

Vermont Yankee is a major presence in the private and public economies of the town, as well as a major physical presence within the town's civic center. It is also a major presence in the town's civic life and its identity. The future of the plant is a principal topic of conversation both within the town and beyond. While certainly not the sole contributor to the identity of the town within its municipal boundaries, the town's role as the host community to the nuclear power station is how the town is best known beyond its boundaries. There are very strong physical, economic, political, social, and emotional ties between the plant and its host community. As planning for its eventual closure goes forward, it will be important to look

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project. He also scheduled and led a tour of the Vermont Yankee plant for the Vernon Planning Commission on April 17, 2012.

<sup>7</sup> Vernon's 2010 total population was estimated as 2,206.

<sup>8</sup> WRC Follow-up Questions, January 28, 2008.

<sup>9</sup> Ibid.

<sup>10</sup> Vernon's 2010 population age 18-64 was estimated as 1,287

beyond the numbers to appreciate the full range of impacts that closure will have on the town and its residents. The plant may employ a relatively small percentage of the town's total population, but those employees have families in the community, and those families are part of the civic and social fabric of the Town of Vernon. The tax contributions of the plant to the town budget have supported a level of public service that will no doubt change when the plant is closed. The same can be said of the philanthropic contributions by the plant and its employees to non-profit services in the town.

### **Decommissioning Described**

How Vermont Yankee is ultimately decommissioned once the plant closes will directly influence the nature of the impacts experienced by Vernon. This section examines what decommissioning means, and what the different decommissioning scenarios allowed by the U.S. Nuclear Regulatory Commission imply for Vernon. Of particular importance is not if change will come to the town when the plant closes, but how fast that change will happen and how much time the town will have to adapt to and absorb that change. Changes in revenue paid to the town and related support for town services is one of the more obvious and quantifiable changes the town will face. Financial support for local charities and activities is another. That jobs will be lost when the plant closes is a given. How fast those jobs are lost, and the extent to which employees and their families that are Vernon residents will choose to move to find new employment, will be a major factor in the town's resilience.

While unemployment associated with the closure of the plant could be an issue, it is more likely that Vernon will be impacted by the departure of employees and their families that are residents of the town. Workers employed in the nuclear industry have unique skills and security clearances. As such, those workers who choose to seek employment elsewhere within the industry are likely to find it. Therefore, some of the most significant changes the Town will experience will be related to the departure of those workers that live in the town.<sup>11</sup> These departures will have impacts not only upon the social and civic structure of the town, but on the real estate market, home values, and grand list as well. This rate of departure will be determined in large part by the manner in which the plant is decommissioned.

Title 10 of the Code of Federal Regulations, Section 50.2 (10 CFR 50.2) defines decommissioning as the safe removal of a facility from service and reduction of residual radioactivity to a level that permits termination of the NRC license.<sup>12</sup> The act of decommissioning a nuclear power

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<sup>11</sup> See "The Closing of the Yankee Rowe Nuclear Power Plant" by Zenia Kotval and John Robert Mullin for an analysis of the impacts on the closure of Yankee Rowe (originally published in the *Journal of the American Planning Association*; Autumn 1997, Vol. 63 Issue 4. Available online at <http://scholarworks.umass.edu/>; use Yankee Rowe as the search term. Direct link is [http://works.bepress.com/cgi/viewcontent.cgi?article=1017&context=john\\_mullin](http://works.bepress.com/cgi/viewcontent.cgi?article=1017&context=john_mullin)). Links active as of 6/14/12.

<sup>12</sup> For detailed information from the NRC about the decommissioning process, visit <http://www.nrc.gov/about-nrc/regulatory/decommissioning/faq.html#1>. Link active as of 5/7/12.

plant involves the removal of the fuel that has been in the reactor vessel, dismantling all systems and components containing activation products (i.e., the reactor vessel), and cleaning or dismantling contaminated materials from the facility. All “activated materials” are removed from the site and shipped out to a waste processing, storage or disposal facility. Contaminated materials may be cleaned on site or may be removed and shipped to a processing, storage or disposal facility.

The NRC requires nuclear plants to decommission at the end of the licensing period, though a plant may close before the license expires. Once a plant operator makes the decision to permanently cease operations, it must notify the NRC within 30 days. When radioactive nuclear fuel is permanently removed from the reactor vessel, the owner must submit another written certification to the NRC, surrendering its authority to operate the reactor or load fuel into the reactor vessel. This eliminates the obligation to adhere to certain requirements needed only during reactor operation. There is no time limit specified before the fuel must be removed, or the corresponding certification received by the NRC.<sup>13</sup>

Within two years after submitting the certification of permanent closure, the licensee must submit a post-shutdown decommissioning activities report (PSDAR) to the NRC. This report provides a description of the planned decommissioning activities, along with a schedule for accomplishing them, and an estimate of the expected costs. The PSDAR must discuss the reasons for concluding that environmental impacts associated with the site-specific decommissioning activities have already been addressed in previous environmental analyses. Otherwise, the licensee must request a license amendment for approval of the activities and submit to the NRC a report on the additional impacts of decommissioning on the environment.

After receiving a PSDAR, the NRC publishes a notice of receipt in the *Federal Register*, makes the report available for public review and comment, and holds a public meeting in the vicinity of the plant to discuss the licensee’s intentions.

The NRC requires public involvement at specific points in this process. A public meeting is held in the vicinity of the facility after submittal of a post-shutdown decommissioning activities report (PSDAR) to the NRC. Another public meeting is held when NRC receives the license termination plan (LTP). An opportunity for a public hearing is provided prior to issuance of a license amendment approving the LTP or any other license amendment request. In addition, when NRC holds a meeting with the licensee, members of the public may observe the meeting (except when the discussion involves information that is proprietary, sensitive, safeguarded, or classified).

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<sup>13</sup> Absence of time limit noted in Frequently Asked Questions About Reactor Decommissioning <http://www.nrc.gov/about-nrc/regulatory/decommissioning/faq.html>

Licenses are allowed by the NRC and the regulations to choose their decommissioning strategy. There are three strategies: DECON, SAFSTOR and ENTOMB.<sup>14</sup>

- Under DECON, or immediate dismantlement, soon after the nuclear facility closes, equipment, structures, and portions of the facility containing radioactive contaminants are removed or decontaminated to a level that permits release of the property and termination of the NRC license.
- Under SAFSTOR, often considered "delayed DECON," a nuclear facility is maintained and monitored in a condition that allows for some of the radioactivity to decay; afterwards, it is dismantled. A plant could remain in SAFSTOR condition for up to 60 years, or possibly longer if approved by the NRC.<sup>15</sup>
- Under ENTOMB, radioactive contaminants are permanently encased on site in structurally sound material such as concrete and appropriately maintained and monitored until the radioactivity decays to a level permitting restricted release of the property. To date, no NRC-licensed facilities have requested this option.

The licensee may choose to adopt a combination of the first two strategies in which some portions of the facility are dismantled or decontaminated while other parts of the facility are left in SAFSTOR.

As DECON or SAFSTOR are the likely decommissioning strategies, the following discussion will focus on the implications of both.

### **Decommissioning Implications**

As was stated above, the NRC allows licensees to choose which decommissioning strategy or strategies they will pursue. It is possible that the Vermont Public Service Board could have some influence over the strategy chosen by the plant as part of its Certificate of Public Good process. However, given the current disagreement between Entergy Nuclear Vermont Yankee and the State of Vermont over state authority in the regulation of the facility, and related ongoing litigation in federal court, only the federal processes are discussed here. The absence of host community engagement requirements in the federal process is significant.

Very little input is afforded municipalities under the federal regulations that govern the decommissioning process. Beyond the aforementioned public hearings and public meetings associated with the PSDAR and LTP, the regulations do not in any way require plant owners to

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<sup>14</sup> For more information see <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/decommissioning.html>. Link active as of 5/7/12.

<sup>15</sup> Ibid. Decommissioning must be completed within 60 years of a plant's cessation of operations. Time beyond that is considered only when necessary to protect public health and safety in accordance with NRC regulations.



engage with the host municipality. That is left to the host community and plant owners to work out among themselves. This is important because the strategy that is ultimately chosen will influence the severity of the impacts confronted by Vernon when the decision is made to close Vermont Yankee. There are a number of reasons why the plant owner might choose one option over the other (DECON versus SAFSTOR). Among the issues most likely to drive the decision are decommissioning costs, and funds available for decommissioning.<sup>16</sup> The *New York Times* reported on March 12, 2012 that, “Entergy is at least \$90 million short of the projected \$560 million cost of dismantling Vermont Yankee.”

The Windham Regional Commission’s (WRC) research of other plant closures, and analysis of the information provided by Vermont Yankee through decommissioning cost analyses and Vermont Public Service Board dockets, indicates that prompt and complete decommissioning, or DECON immediately upon closure, could possibly support a more orderly transition and be less of a shock than SAFSTOR. This may seem counterintuitive – that the immediate dismantlement of the plant could cause less of a shock than shutting the facility down and leaving it intact for years or decades. The reason relates primarily to the rate at which jobs at the plant could be phased out.

The economic impact studies provided by Entergy suggest that DECON provides a stronger buffer against overall job loss than SAFSTOR. Under the DECON strategy, jobs would be retained for a period of several years as the plant is dismantled over an estimated period of 9 to 10 years.<sup>17</sup> Under the SAFSTOR strategy, the plant would cease operation and be maintained in a stable condition until dismantlement begins. As is noted above, actual dismantlement may not begin for years or decades after the plant ceases operations.

Based on the 2007 Vermont Yankee Decommissioning Cost Analysis, the WRC determined that through the roughly 10 year period of actual decommissioning, employment would average 355 Full Time Equivalents (FTE).<sup>18</sup> This number would likely include a large number of contracted

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<sup>16</sup> “As Reactors Age, the Money to Close Them Lags.” The New York Times. March 20, 2012. ([http://www.nytimes.com/2012/03/21/science/earth/as-nuclear-reactors-age-funds-to-close-them-lag.html?\\_r=1&pagewanted=print](http://www.nytimes.com/2012/03/21/science/earth/as-nuclear-reactors-age-funds-to-close-them-lag.html?_r=1&pagewanted=print)) Link active as of 6/14/12.

<sup>17</sup> Connecticut Yankee Decommissioning: Methods of Decommissioning (<http://www.connyankee.com/html/methods.html>). Link active as of 5/11/12.

<sup>18</sup> WRC sought projected employment changes from Entergy representatives beginning with our plant tour on October 31, 2007, and extending through a public meeting with Entergy representatives, including Entergy contracted economist Richard Heaps, on March 20, 2008. Neither Entergy representatives nor their contracted economist provided us with any projection of actual employment after station shutdown. We were instead referred to the Decommissioning Cost Analysis prepared by Entergy subsidiary TLG Services and provided by Entergy in docket 7440 as exhibit EN-TLG-2, which Mr. Heaps stated he had used for his economic projections. That document includes a projection of manhours needed at each stage of each of eight scenarios, and the Entergy representatives, including Mr. Heaps, stated that we could calculate employment from that data. The complete Decommissioning Cost Analysis (2007 decommissioning plan and budget) is available from the Public Service Board web site under Parties’ Filings as a 4.3 MB zip file of the testimony and exhibits of Entergy witness William Cloutier at: <http://psb.vermont.gov/docketsandprojects/electric/7440/prefiled#Direct>. The Decommissioning Cost Analysis is exhibit EN-TLG-2. It is also available as a 2.7 MB standalone document from the WRC web site at: <http://www.rpc.windham.vt.us/energy/petition/Cloutier-Ex2.pdf>. We do not profess to have expertise in developing economic models, however, in the absence of other sources, we reviewed the Decommissioning Cost Analysis and determined that

workers. This sustained demand for labor leads to our assumption that immediate decommissioning, or DECON, would represent a more orderly transition once the plant closes. By comparison, during the extended period of SAFSTOR, the WRC estimated that employment would average about 33 FTE's. In addition to the higher number of employees required under DECON, it has been explained to the WRC that the plant owner would likely retain workers who have been at the plant for many years because they have unique knowledge of the plant's systems and history.<sup>19</sup> Because plant dismantlement would be deferred for years or decades under the SAFSTOR strategy, current employees would not be available to provide this legacy knowledge. One of the considerations listed by Connecticut Yankee for choosing immediate dismantlement, or DECON, was, "the use of current plant employees who were trained and knowledgeable about the facility."<sup>20</sup>

The town would derive social, economic and fiscal benefits from the plant retaining employees that reside in Vernon for a longer period of time after the announced closure. First, an exodus of employees and their families occurring gradually over time would be less of a shock to the social fabric of the town (schools, youth activities, service organizations). If the selected decommissioning scenario is such that the plant would retain current employees to assist with decommissioning, those employees might be more inclined to stay in Vernon once their jobs at the plant have ended. A smoother transition might make it possible for them to better plan to remain in the town as retirees, seek other employment in the region (though they will likely be paid less than they were by the plant), or create their own businesses.<sup>21</sup>

Second, one of the greatest potential economic impacts in the town would be the effect of the closure on the real estate market as departing employees put their homes up for sale. A more gradual exodus would allow the real estate market to more gradually absorb houses available for sale. A surge in inventory, not only in Vernon but throughout the area, could depress prices.

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through the roughly 10 year period of actual decommissioning, employment would average 355 Full Time Equivalents (FTE). During the extended period of SAFSTOR employment would average about 33 FTE's. On April 16, 2008 we filed our derived data and analysis in Docket 7440 as part of exhibit WRC-TB-3 on pages 7-8, and asked Entergy to update or correct the record if we had misinterpreted the data. To date, Entergy has not provided any follow-up. That document (WRC-TB-3) offers our understanding of employment impacts, and why we believe the regional economy would be better served if the DECON option is used. WRC-TB-3 is available from the WRC web site at [http://www.rpc.windham.vt.us/energy/VY\\_WRC/Exhibit-WRC-TB-3.pdf](http://www.rpc.windham.vt.us/energy/VY_WRC/Exhibit-WRC-TB-3.pdf), or from the Department of Public Service at: <http://publicservice.vermont.gov/dockets/7440/Exhibit-WRC-TB-3.pdf>.

<sup>19</sup> Uldis Vanags, the nuclear engineer employed by the Vermont Department of Public Service, noted in his meeting with the WRC Energy Committee on March 24, 2008 that DECON is preferred because it would make use of workers who have been at the plant for many years and who have intimate knowledge of plant systems and history. "Closing and Decommissioning Nuclear Power Reactors: Another Look Following the Fukushima Accident" published by the United Nations Environment Programme makes a similar assertion (p. 39, [http://www.unep.org/yearbook/2012/pdfs/UYB\\_2012\\_CH\\_3.pdf](http://www.unep.org/yearbook/2012/pdfs/UYB_2012_CH_3.pdf)). Link active as of 6/11/12.

<sup>20</sup> Connecticut Yankee Decommissioning (<http://www.connyankee.com/html/decommissioning.html>). Link active as of 6/12/12.

<sup>21</sup> "The Closing of the Yankee Rowe Nuclear Power Plant: The Impact on a New England Community" October, 1997 ([http://works.bepress.com/cgi/viewcontent.cgi?article=1017&context=john\\_mullin](http://works.bepress.com/cgi/viewcontent.cgi?article=1017&context=john_mullin)) Link active as of 6/14/12.

Third, the closure of the plant will impact the town's fiscal robustness and services it is able to provide. A decline in taxes paid by the plant to the town is the most obvious impact, but the effect of the closure on the value of real property should not be overlooked, as there will be grand list impacts. This again will be affected by the rate of job loss. As noted above, a sharp loss of jobs would likely result in a sharp increase in the inventory of homes for sale, and the potential for a subsequent drop in appraised value. If, on the other hand, houses enter the market more gradually, the effects on home inventory, price and appraisal may not be as great.

Precisely how much the closed plant might be assessed in taxes is unclear and has been the subject of much speculation. WRC provided one scenario in which new construction associated with an additional spent fuel storage facility would be valued at about \$100 million and taxed at roughly 2 percent annually, yielding an annual tax of about \$2 million dollars and a potential tax through extended SAFSTOR of as much as \$100 million.<sup>22</sup> Conversely, the most recent Decommissioning Cost Analysis prepared for Entergy Nuclear Vermont Yankee in January, 2012 assumes that after shutdown, the plant property would be assessed as vacant land, and that they will be assessed gross property tax of between \$219,000 for 20 years, or \$533,000 for 70 years, depending upon the date of shut down, date of decommissioning, and date of final fuel pick-up.<sup>23</sup> This breaks down to an assumption of annual gross taxes in the range of \$7,614 to \$14,375 per year once the plant is closed.<sup>24</sup> This comparison is offered to demonstrate the range of assumptions about the eventual valuation of the closed plant and spent fuel storage facilities. Other municipalities have had to contend with the challenge of assessing the value of a closed plant and the spent fuel that will remain after decommissioning. A worthwhile summary of the experience of Wiscasset, Maine is "Nuclear Waste Disposal: A Taxing Real Estate Issue," which is available online through The Counselors of Real Estate.<sup>25</sup>

As was noted in the previous section, VELCO does not anticipate a change in need for the switchyard and substation located on the Vermont Yankee site once the plant closes. One should then logically assume that the valuation of the VELCO assets will not be influenced by the plant closure.

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<sup>22</sup> Docket 7440, WRC Reply Brief page 12 and testimony of Commissioner Thomas Buchanan at technical hearing, transcript, May 26, 2009 page 23.

<sup>23</sup> Final fuel pick-up relates to the eventual date when a permanent nuclear waste storage facility has been established in the United States.

<sup>24</sup> "Entergy VY currently pays taxes to the state based upon annual megawatts generated (generation tax). Under the current law, payments cease once the plant is permanently shutdown. Local property taxes are paid in accordance with a Tax Stabilization Agreement with the Town of Vernon. The agreement is only valid during the operating life of the plant. Once shutdown, local property taxes would most likely be assessed at the fair market value of the property under normal property tax rules. However, there are no specific provisions for determining the value of a shutdown unit (and significant remediation project), if any. Therefore, for purposes of this cost analysis, the decommissioning estimates include an allowance for post-operation tax payments with the assumption that the property would be assessed as vacant land." Section 3, pages 19 & 20. Decommissioning Cost Analysis for the Vermont Yankee Nuclear Power Station prepared for Entergy Nuclear Vermont Yankee prepared by TLG Services, Inc. Document E11-1643-001, Rev. 0.

<sup>25</sup> Nuclear Waste Disposal: A Taxing Real Estate Issue by Jack P. Friedman, Ph.D., CRE, & Barry A. Diskin, Ph.D., MAI ([http://www.cre.org/memberdata/pdfs/31\\_1\\_Nuclear.pdf](http://www.cre.org/memberdata/pdfs/31_1_Nuclear.pdf)) Link active as of 6/14/12.

A separate issue related to the eventual dismantlement of the plant is the demand for rental properties. When the dismantlement of the plant begins, the demand for rental properties could increase as contracted workers are brought in to do this specialized work for a period of 3 to 5 years. This would represent both an opportunity and a challenge for the town if sufficient demand for new apartments within Vernon is created. Those wanting to meet this demand may propose the construction of new apartments, or owners of single-family homes may find it advantageous to convert existing single-family homes into multi-family apartments. The town will want to decide what, if any, regulatory control it wants to have of housing development within the town.

### **Precedents: Look Beyond the Plant and Beyond the Site**

The Town of Vernon can learn much from the lessons of communities that have already experienced the decommissioning of a nuclear power station. Of particular note are the experiences of Wiscasset, Maine, home of Maine Yankee, Haddam Neck, Connecticut, home of Connecticut Yankee, and Rowe, Massachusetts, home of Yankee Rowe.

There is a temptation to look to the Vermont Yankee site for the solution to the challenges faced by the Town of Vernon when the plant closes. This is understandable. When discussing how a community can prepare for the eventual closure of a major employer and source of income, it's not uncommon for the initial response to center on ideas that will keep that employer in operation. The task before the Town of Vernon, however, is to plan how it can best prepare for the day when the owners of the plant, whether it is Entergy or another operator, decide the plant must permanently cease operations for whatever reason. This is a hard thing to think about, but it is an eventuality around which the town has chosen to plan so the impacts might be mitigated. Right now many in Vernon likely feel the town's fate is tied to that of the plant. The challenge, then, is to think about how to decouple the town's fate from that of the plant. What does the town want to be in the absence of an operating nuclear power station?

Another common response is to assume that the solution that will help mitigate the impacts of closure of a major employer and tax generator lies within the site of the business that is closing. This may be a logical approach when the business in question occupies a site and facility that is easily and quickly transferable and adaptable to another use. This is not the situation presented by the Vermont Yankee site.

As will be explained, at best Vernon should operate under the assumption that the Vermont Yankee site will not be available for industrial redevelopment for at least 10 years after the plant announces the permanent cessation of operations. It is frankly more likely that the site will not be available for redevelopment at all.

First, the minimum amount of time it will take the plant owners to develop a decommissioning plan and dismantle the station is 10 years or longer. Second, as long as spent fuel is stored on the site it is improbable that the land will be approved for redevelopment due to safety and security concerns.

A third constraint is the fact that the property is privately held. The decision as to how the plant will decommission, and how the site might be redeveloped, lies largely in the hands of the plant owner. The town might have a role in permit review when and if a redevelopment proposal is submitted, but it will otherwise have little input unless it develops a relationship with the plant that gives it a seat at the decision-making table.

**Time.** While the actual dismantlement of a plant may take 3 to 5 years or longer, there are actions the licensee must take prior to dismantlement.<sup>26</sup> This includes the development of the post-shutdown decommissioning activities report (PSDAR), or decommissioning plan, for submission to the NRC within 2 years of the date of the permanent cessation of operations. The PSDAR development and approval process, coupled with the actual dismantlement time, makes 10 years a very optimistic estimate as to how soon the site may be returned to a state that it could be redeveloped. This 10 year horizon is offered to provide perspective; the site will not be available for redevelopment for several years after the plant closure has been announced. The most acute impacts of the plant closure will be felt during this time. And as was noted previously, NRC regulations actually allow licensees to complete decommissioning within 60 years after the permanent cessation of operations, and possibly longer if necessary to protect human health.<sup>27</sup> This means that for the town's planning purposes it should assume structures will remain on the site, or be in a state of disassembly, for a period of 10 to 60 years, or more.

**Spent Fuel and Redevelopment.** There are very few examples of commercial redevelopment of decommissioned nuclear power station sites. The exceptions are cases where a nuclear facility has been converted to a natural gas power generating plant, as is the case with the Fort St. Vrain, Colorado reactor site and the Pathfinder, South Dakota reactor site. In both cases

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<sup>26</sup> NUREG-1628 Staff Responses to Frequently Asked Questions Concerning Decommissioning of Nuclear Power Reactors, U.S. Nuclear Regulatory Commission, June, 2000. (<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1628/sr1628.pdf>) Link active as of 6/12/12.

<sup>27</sup> Ibid.

natural gas was local and abundant and the conversion of some parts of plant infrastructure made economic sense. A fundamental factor that limits the redevelopment potential of decommissioned sites is the storage of spent reactor fuel on the site, and the related safety and security issues. Unless a permanent storage solution is adopted and executed by the federal government resulting in the permanent removal of spent fuel from the sites, this will remain a barrier.



**Maine Yankee Independent Spent Fuel Storage Installation (ISFSI)**

<http://www.mainevankee.com/images/upload/1-5-06isfsi1.jpg>

grade, with the notable exception of the independent spent fuel storage installation (ISFSI) where the spent fuel resides in dry casks. The general accessibility of the site, and the presence of the ISFSI, led to the decision that the entire 145 acres should be fenced and patrolled. The result is that the former site cannot be redeveloped at this time, though land owned by Maine Yankee around the site is proposed for industrial redevelopment. As is noted in a brochure prepared by Maine Yankee:

“As long as the spent nuclear fuel is stored at the Bailey Point ISFSI, this valuable piece of property is unavailable for productive reuse. Among other attributes Bailey Point has a rail line to the site, a barge slip with deep water access, a 345 and 115 Kv switchyard, transmission lines, and municipal water and sewer. Maine Yankee’s sister plants, Connecticut Yankee and Yankee Rowe in MA are

The inability of the federal government to develop a permanent off-site storage solution for spent fuel from nuclear power stations means that spent fuel must remain at the plant site in either dry casks or in spent fuel pools. This has major implications for site reuse. The 145 acre site of Maine Yankee in Wiscasset, Maine has been returned to “greenfield” status, meaning that all structures have been removed to three feet below

also fully decommissioned with their own ISFSIs, similar dry cask storage systems, and similar transportation and delayed opportunity issues.”<sup>28</sup>

Dry cask storage allows spent fuel that has already been cooled in the spent fuel pool for at least one year to be surrounded by inert gas inside a container called a cask. The casks are typically steel cylinders that are either welded or bolted closed. The steel cylinder provides a leak-tight containment of the spent fuel. Each cylinder is surrounded by additional steel, concrete, or other material to provide radiation shielding to workers and members of the public. Some of the cask designs can be used for both storage and transportation.<sup>29</sup>

An independent spent fuel storage installation, or ISFSI, is a facility that is designed and constructed for the interim storage of spent nuclear fuel. These facilities are licensed separately from a nuclear power plant and are considered independent even though they may be located on the site of another NRC-licensed facility.<sup>30</sup>

In a conversation with an NRC official who has been involved with multiple decommissioning processes, it was explained that it was unlikely that the Vermont Yankee site would be available for redevelopment after decommissioning because of the continued presence of the ISFSI on the site.<sup>31</sup> Unless there is a policy change or other development that results in the removal of all spent fuel from the site, it would seem that the eventual decommissioning will result in the same site conditions in Vernon that exist in Wiscasset, Rowe, and Haddam Neck.

**Structures.** If the spent fuel concerns are resolved, another constraint to redevelopment could be the remains of structures below the surface of the site. The most recent Decommissioning Cost Analysis prepared for Entergy Vermont Yankee assumes that site structures will be removed to a nominal depth of three feet below local grade wherever possible.<sup>32</sup> Some developers may have an aversion to the existence of any structural remains within the site, while in other cases the presence of the subsurface structures will make excavation and construction difficult.

**Site Ownership.** Site ownership is another issue that should be taken into consideration. The Vermont Yankee plant and site are owned by a private for-profit corporation, not a public utility, making it a “merchant plant.” It is the plant owners – not a public entity – who under

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<sup>28</sup> Maine Yankee: A Brief History of Operation, Decommissioning, and the Interim Storage of Spent Nuclear Fuel (<http://www.maineyankee.com/public/MaineYankee.pdf>) Link active as of 6/12/12.

<sup>29</sup> Dry Cask Storage (<http://www.nrc.gov/waste/spent-fuel-storage/dry-cask-storage.html>) Link active as of 6/12/12.

<sup>30</sup> Spent Fuel Storage in Pools & Dry Casks Key Points & Questions & Answers (<http://www.nrc.gov/waste/spent-fuel-storage/faqs.html#16>). Link active as of 6/12/12.

<sup>31</sup> Phone conversation with Ronald Bellamy, Chief Reactor Projects Branch #5, NRC Region 1 on June 12, 2012.

<sup>32</sup> Decommissioning Cost Analysis for the Vermont Yankee Nuclear Power Station prepared for Entergy Nuclear Vermont Yankee prepared by TLG Services, Inc. January, 2012 Document E11-1643-001, Rev. 0. Page xviii of xix.

NRC regulations will choose how the plant is to be decommissioned, and it is the plant owners who will determine how the site will be used if it is available for redevelopment (within the context of municipal and state land use permitting processes).

This is important because the absence of public ownership or control of the plant and site means that public input into both the decommissioning planning process, and future redevelopment process, could be limited to the public hearing requirements of both. Put another way, public involvement in the eventual decommissioning process could very well be limited to the two to four public hearings that will be held by the NRC when the PSDAR has been submitted for review.<sup>33</sup> If redevelopment is someday possible, public input could be limited to whatever hearings are required by the town (if any) and state permit review requirements (presumably Act 250 or Section 248, depending on the type of project). This means that if the Town of Vernon would like to have more input into the eventual decommissioning and possible redevelopment processes than the minimum required by law, it will be left to the Town to reach out to the owners of Vermont Yankee to establish relationships and processes that allow for an exchange of information. There is no public authority or legal or regulatory requirement that can compel Vermont Yankee to include Vernon in its decision-making beyond basic public participation processes required by law.

**Using the Town Planning Process.** Vernon's future without an operating nuclear plant lies within the larger town and its residents, not the Vermont Yankee site. The town has already embarked upon an update of its town plan. This is the document that lays out how the town got to where it is today, its vision for the future, and the goals, objectives, and policies that will help it achieve that vision. While it is not possible to know precisely what the impacts of the closure of the plant will be, the findings here lay out the nature of those impacts. The town plan process is an ideal means through which the community can have the conversation about what the future of the town and its residents should be whether Vermont Yankee is operating or not. From there the town can discuss the concrete steps that are necessary to create that future. The plan should not ignore the plant, but it should look to a future when the revenue stream generated by Vermont Yankee is no longer available. The vision defined by the town plan will inform how much of that revenue stream will have to be maintained and how. Hopefully discussion about the town's future will not be driven by how the current revenue stream can be maintained. The town's vision of its future should drive the revenue question, not the other way around. Where does the town see itself in the future, and what are the revenue requirements to support that future?

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<sup>33</sup> The likely number of hearings suggested in a phone conversation with Ronald Bellamy, Chief Reactor Projects Branch #5, NRC Region 1 on June 12, 2012.



## **Major Findings**

The following is a summary of the major findings of this analysis, and an overview of the impacts the Town of Vernon should anticipate when the Vermont Yankee nuclear power station permanently ceases operation.

1. The town revenue stream will be significantly impacted, though the acuteness of the impact will depend upon how the plant is valued, and what taxes are assessed, as it is decommissioned. The town has a history of retaining experts to negotiate valuation and assessment with the plant, and this capacity will need to be retained well beyond the announced closure of the plant.
2. The impacts on the town revenue stream could be mitigated somewhat by the fact that VELCO anticipates no change in the need for its substation and switchyard located within the Vermont Yankee site after the plant closes. One could reasonably assume that the closure of the plant will not affect the valuation of the VELCO assets.
3. The town should assume the site will not be available for redevelopment. Precedent indicates that spent fuel storage on the site of the dismantled plant will preclude redevelopment. There are also constraints related to what structures might remain a few feet below grade upon the completion of decommissioning. At a minimum, the town should assume that the site will not be available for redevelopment for a period of at least 10 years after the intent to cease operations is announced. It will take at least this long to develop, review and approve the decommissioning plan, and complete the dismantlement of the facility.
4. Vernon's future without an operating nuclear plant lies within the larger town and its residents, not the Vermont Yankee site, and it should plan accordingly. The town should capitalize upon its current town planning process to define what its future should be, and what it will take to make that future a reality. While the eventual loss of revenue from the plant will and should be part of the discussion, it is the town's future that should be the driver of the discussion. Revenue requirements should be driven by the needs necessitated by the town's vision for itself. Depending on what the vision and those needs are, revenue requirements may be more or less than what they are at present.
5. When a nuclear power station ceases operation, the tendency is for some of those employed by the plant to find employment elsewhere in the industry, while others will elect to stay in the community. While some unemployment may result from the plant closure, it

is the departure of employees and their families from the town that is of particular concern, and the rate at which these residents might leave. There is some thought that the decommissioning strategy chosen by the plant owners will influence the rate at which those presently employed by the plant will either lose their jobs or elect to leave. Under the immediate decommissioning scenario, or DECON, it is thought that those currently employed by the plant will be retained for a longer period to assist with the decommissioning planning and the oversight of the dismantlement. Conversely, there is thought that the delayed decommissioning scenario, or SAFSTOR, does not create the same incentive to retain employees. If these assumptions are true, DECON may result in less shock to the real estate market and grand list if fewer homes are put up for sale at the same time, and may result in less disruption to the social fabric of the town, as fewer employees and their families leave at one time. It is also possible that those who remain employed by the plant after closure may be more inclined to stay in the community.

6. There will be heavy dependency on contractors when the dismantlement of the plant begins, but Vernon has few businesses that can capitalize on the presence of these itinerant workers. Development of housing for these workers within Vernon may become an issue the town will need to address. The conversion of single-family residential homes to multi-family homes to provide housing represents both an opportunity and a challenge that the town may choose to regulate, as does the potential for the development of new multi-family housing units.
  
7. It is up to the town to establish a relationship and communications process with the owners of the plant to ensure the town's interests are known. There is no requirement in the regulations that govern decommissioning that compel the plant to engage the host community in discussions about the impacts of the closure or the mitigation thereof beyond the public meetings and hearings that will be held as part of the post-shutdown decommissioning activities report (PSDAR) review and approval process. The town and plant are strongly encouraged to emulate the community advisory panel (CAP) that was established as part of the Maine Yankee decommissioning process. The Maine Yankee CAP has produced an excellent publication titled "The Maine Yankee Decommissioning Advisory Panel: A Model for Public Participation in Nuclear Projects" that is available online,<sup>34</sup> and which has been provided to the Vernon Planning Commission. Another very useful publication, this one a study by John Mullin and Zenia Kotval about the experience of the decommissioning of Yankee Rowe, is instructional about the perils of not planning for the eventual closure of a nuclear power station, and the critical importance of municipal

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<sup>34</sup> <http://www.maineyankee.com/public/cap%20final.pdf> Link active as of 6/14/12.

engagement in the process.<sup>35</sup> This study is available online through UMass Amherst and has been provided to the Vernon Planning Commission.

8. The Town of Vernon and Vermont Yankee have a history of common advocacy around policy issues related to the plant. It is likely that the nature of this relationship will change when the decision to permanently cease operations is made because the interests of the town and the plant may diverge on key issues. For example, the decommissioning strategy that is in the best interest of the town may not be the approach that is desired by the plant owners. There may be disagreement about assessed value and taxes paid, or whether or not the plant should mitigate any abrupt revenue declines. Final site condition after dismantlement may be an issue, as might ongoing site maintenance or, conceivably, future site uses. The town will want to position itself to represent its own best interests. Having a CAP or similar relationship and communications structure in place prior to the announcement of the end of plant operations will help the town know where interests might diverge, and provide a forum through which differences might be negotiated.

### **Recommended Actions**

Vernon is commended for taking on the difficult topic of looking ahead to the day when Vermont Yankee announces it will permanently cease operations and how it might mitigate the impacts when that day becomes reality.

**Town Plan.** Use the town plan process as a means by which to engage the citizens of the town in a conversation about what they want the town to become and what needs to happen to make that vision a reality. The current draft represents a lot of work and deliberation by the Vernon Planning Commission and is an excellent jumping off point for this conversation. While the plan certainly shouldn't ignore the existence of the plant, it should decouple the town's future from that of the plant. The fate of the plant and the fate of the town are not the same.

**Capital Improvement Program.** A capital improvement program (CIP) is a non-regulatory tool the town can use to make decisions about where to locate, when to build, and how to pay for major capital investments such as new roads, parks, or public buildings. The capital improvement program links a municipality's long-term development plan with its annual budgeting process and can prevent budget and tax rate fluctuations by scheduling expensive capital projects over several years.<sup>36</sup> This CIP would build upon the vision, goals and objectives

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<sup>35</sup> "The Closing of the Yankee Rowe Nuclear Power Plant: The Impact on a New England Community" October, 1997 ([http://works.bepress.com/cgi/viewcontent.cgi?article=1017&context=john\\_mullin](http://works.bepress.com/cgi/viewcontent.cgi?article=1017&context=john_mullin)) Link active as of 6/14/12.

<sup>36</sup> Capital Improvement Program by the Vermont Land Use Education & Training Collaborative (<http://www.vpic.info/pubs/implementation/pdfs/4-CapitalImprovement.pdf>) Link active as of 6/12/12.

identified in the town plan, and would enable the town to work through what investments are sustainable in both the near and long-term.

**Property Tax Stability Plan.** The development of a plan that provides guidance as to how the town will respond to the loss of revenue from Vermont Yankee and what the likely outcome will be for those who pay property tax in the town would be beneficial to current property owners, prospective property purchasers, and town officials. This plan would best be informed and developed upon a foundation of both the Town Plan and the Capital Improvement Program, as both would inform long-term municipal investment needs, maintenance expectations, and related revenue demands. This plan should include an assessment of town services in a post-Vermont Yankee era to determine how demand for services will change, and what the town can realistically be expected to support. An informed projection of the likely impact of the plant closure on taxes would reduce uncertainty for everyone involved, and could mitigate some of the impact of the closure on the local real estate market. Potential buyers may stay away from home and other real estate purchases in the town if there is substantial uncertainty as to what the closure will mean for their taxes. This concern likely has present-day consequences. The town can do little to change the opinion of those who might be averse to purchasing property in a community where a nuclear plant, or site, exists, but it is within the town's power to develop a plan that establishes a basis for future municipal taxation. The greater concern may not be that taxes will increase. The greater concern may be uncertainty as to *how much* taxes will increase.

**Community Advisory Panel.** It is not too soon to establish a Community Advisory Panel (CAP) with the plant such as that established in Wiscasset, Haddam Neck, and other communities that are home to decommissioned plants. The purpose of the Maine Yankee (Wiscasset) CAP is:

“to enhance open communication, public involvement and education on Maine Yankee decommissioning issues. The CAP will serve as a formal channel of community involvement with Maine Yankee. The CAP will evaluate and comment upon data and other information provided by Maine Yankee and other reliable resources. The CAP will function as an advisory panel.”<sup>37</sup>

The more the town can engage the plant owners in discussions about what to expect when the plant eventually closes, the better. It is strongly advised that Vernon officials visit communities that have experienced decommissioning and meet with their respective CAPs. There is nothing in the regulatory process that requires the plant to engage the town or the general public in decommissioning discussions beyond the public meetings and hearings required by the NRC as

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<sup>37</sup> The Maine Yankee Decommissioning Advisory Panel: A Model for Public Participation in Nuclear Projects, p. 4 (<http://www.maineyankee.com/public/cap%20final.pdf>) The CAP charter can be found here: <http://www.maineyankee.com/public/capcharter05.pdf>. Links active as of 6/14/12.

part of the PSDAR and LTP review and approval process. The initiative to create a Vernon-Vermont Yankee CAP is up to the town.

The following is an excerpt from The Maine Yankee Decommissioning Advisory Panel report that summarizes how the Wiscasset CAP came to be:

In the wake of the shutdown decision, the company and the community shared a number of challenges. The community wrestled with the significant and immediate loss of its tax base, the concerns for the safe cleanup of the property, and the looming questions of the storage and ultimate disposition of the spent nuclear fuel that would remain on site. The company faced the challenges of an immediate dismantlement of the facility in a relatively new regulatory environment.

For the decommissioning of Maine Yankee to be successful, the company's ability to satisfy regulators had to be melded with public confidence in the decommissioning process. During the plant's final two years of operation, constant stakeholder attention had worked to erode that public confidence. Maine Yankee management decided that some vehicle for improving the company's dialogue with the local community was necessary, whether the plant shut down or continued to operate. When the plant closed, the Maine Yankee Community Advisory Panel on Decommissioning (CAP) was established to "enhance open communication, public involvement and education on Maine Yankee decommissioning issues".

Over the past seven years the community has witnessed the removal of components, the demolition of structures, rail shipments of waste and construction of a spent fuel storage facility. Through the CAP process, the community and the company together have wrestled with issues such as the final condition of the site, impacts of spent fuel storage after decommissioning, and loss of tax revenue.<sup>38</sup>

Maine Yankee felt compelled to form the Wiscasset CAP. The town should not assume the owner of Vermont Yankee will be similarly compelled. By learning from the experience of other municipalities Vernon can better position itself to make its interests known and attempt to negotiate its needed outcomes.

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<sup>38</sup> Ibid. p.1