Institute for Nuclear Host Communities

An Affiliate of the AEHS Foundation

Pilgrim Station Phase II: Community Guidebook for Closure Response

Prepared for the Town of Plymouth and
Old Colony Regional Planning Commission by the Institute for Nuclear Host Communities

October 22, 2016

FINAL REPORT

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Glossary of Terms

This section identifies many terms, abbreviations, and acronyms commonly found in the regulatory, industry, and planning documents addressing nuclear plant operations and closure. It is organized by category, and then alphabetically within each category.

Organizations

DOE U.S. Department of Energy: federal agency tasked by Congress with permanent storage of spent nuclear fuel (see **NWPA**).

EPA U.S. Environmental Protection Agency: federal agency tasked by Congress with creating and enforcing regulations to protect human health and the environment, except where pre-empted by other federal agencies (see **EPA MOU**).

FEMA Federal Emergency Management Agency: federal agency overseeing local and state nuclear incident plans (see **EPZ**).

NEI Nuclear Energy Institute: nuclear industry lobbying group, representing industry interests to the NRC and Congress.

NDCAP Nuclear Decommissioning Citizens Advisory Panel: 19-member group formed by Vermont Legislature in 2014 to address decommissioning and site restoration issues at the Vermont Yankee site (see **VY MOU**).

NRC U.S. Nuclear Regulatory Commission: federal agency tasked with oversight and management of civilian uses of nuclear reactors, materials, and waste.

Legislation

CERCLA Comprehensive Environmental Response, Compensation, and Liability Act: law passed in 1980 authorizing EPA to identify and compel responsible parties to clean up sites contaminated with hazardous substances, or to undertake the process on its own. Authorizes states to create their own versions of the law for local use. Does not apply to sites contaminated with non-hazardous waste (see **RCRA**), and EPA defers to NRC decision-making regarding the decommissioning of nuclear sites (see **EPA MOU**).

NPDES National Pollutant Discharge Elimination System: permit program introduced by the Clean Water Act of 1972. Regulates the discharge of pollutants to surface waters from point sources, such as industrial facilities. Although managed by the EPA, states with sufficiently strong programs are

authorized to perform all permitting, administrative, and enforcement acts on behalf of the federal government.

NWPA National Waste Policy Act: law passed in 1982 to establish a comprehensive national program for the safe, permanent disposal of highly radioactive wastes. Directed the DOE to site, construct, operate, and eventually decommission a repository for spent nuclear fuel and high-level radioactive waste. Directed the EPA to set public health and safety standards for the release of materials from the repository. Directed the NRC to provide regulations for repository construction, operation, and closure. Required generators of spent fuel and wastes to pay for disposal costs, and required utilities to fund the program through a fee on nuclear-generated energy.

RCRA Resource Conservation and Recovery Act: law passed in 1976 governing the disposal of solid and hazardous waste. Relevant programs address Hazardous Waste (RCRA Subtitle C); Non-Hazardous Solid Waste (RCRA Subtitle D); and Underground Storage Tanks (RCRA Subtitle I). EPA oversight is transferred to states with programs meeting or exceeding federal regulatory minimums.

TSCA Toxic Substances Control Act: law passed in 1976 directing the EPA to protect public and environmental health. Specifically targeted the production, importation, use, remediation, and disposal of PCBs (see **PCB**), it has been expanded to issues related to asbestos, lead paint, radon, and other substances. States can preempt TSCA with more restrictive programs.

WARN Worker Adjustment and Retraining Notification Act: law passed in 1988 requiring employers to provide employees with 60 days of advance notice before mass layoffs or plant closings. Applies to most employers with 100 or more employees, and will apply to Pilgrim Station.

Regulations and Agreements

CFR Code of Federal Regulations: publication containing the permanent rules and regulations of federal agencies in the United States. Parts 0 - 199 of Section 10 pertains to the NRC.

GEIS Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities (NUREG-0586): publication of the NRC, last updated in 2002, that establishes the general range of impacts of nuclear decommissioning on a number of issues, including socioeconomics. Categorizes the local socioeconomic impacts of nuclear power plant

decommissioning as "small." Acknowledges that nuclear power plant closures likely have local socioeconomic impacts, but views them as a separate issue.

MARSSIM Multi-Agency Radiation Survey and Site Investigation Manual (NUREG-1575): a 1997 guidance document produced by the NRC, DOE, EPA, and Department of Defense to provide contractors and regulators with a single manual for ensuring that radioactive contaminants have been cleaned up to levels acceptable to all agencies.

EPA MOU EPA Memorandum of Understanding: agreement by and between the Environmental Protection Agency and the Nuclear Regulatory Commission regarding jurisdictional and procedural issues related to the presence of contaminants regulated by the EPA on sites regulated by the NRC.

VY MOU Vermont Yankee Memorandum of Understanding: agreement by and between Entergy Nuclear Vermont Yankee and a number of Vermont state agencies regarding the cessation of legal actions between the parties, securing the state's approval for Vermont Yankee to operate on its extended 20-year license, and stipulating the amount and timing of payments by Entergy to Vermont to offset economic and energy impacts of Vermont Yankee's shutdown.

Decommissioning Methods

DECON A method of decommissioning in which plant components with radioactive contamination are removed from a site and disposed of at an appropriate low-level waste disposal facility, or decontaminated on-site. Often takes 5-10 years.

ENTOMB A method of decommissioning in which plant components with radioactive contamination are encased in concrete or a similar material, until the radioactivity levels decay to acceptable levels. Not practical for large commercial reactors.

SAFSTOR A method of decommissioning in which an entire plant facility is left intact and maintained for subsequent decontamination in future years. Allows for natural decay of radiation, accrual of decommissioning funds, and development of new technologies. May result in a decommissioning process of up to 60 years.

Decommissioning Documents

HSA Historical Site Assessment: a process of documenting historic radioactive materials spills or leaks to determine their environmental impacts. Process is defined by the **MARSSIM** manual, and often includes testing for non-radiological hazardous waste, as well.

LTP License Termination Plan: a document submitted for NRC approval during the decommissioning process, at least two years before the expected license termination date. Includes a site characterization; description of remaining work; plans for site remediation; detailed plans for final radiation survey; updated estimate of remaining decommissioning costs; and any new or significant environmental changes. NRC holds one public meeting near the facility to discuss the LTP.

PSDAR Post Shutdown Decommissioning Activities Report: a document submitted to the NRC by the plant, before or within two years of permanent reactor shutdown. Includes a description and schedule for the planned decommissioning activities; an estimate of the expected costs; and sufficient evidence to demonstrate that the environmental impacts associated with the decommissioning activities are within established guidelines of an environmental impacts statement. Major decommissioning operations can begin 90 days after NRC receives PSDAR. NRC does not approve of or certify the contents of the PSDAR. NRC holds one public meeting near the facility to discuss the PSDAR.

Additional Terminology

ALARA As Low as Reasonably Achievable: principle guiding plant owner programs for managing levels of radiation exposure in the workplace for plant personnel exposure.

D&D Decontamination and Decommissioning

DTF Decommissioning Trust Fund: see **NDT**.

EPZ Emergency Planning Zone: 10-mile radius around nuclear power plants characterized by substantial radiological incident response programs. **FEMA** oversees state and local preparedness, and the NRC oversees preparedness at the plant.

ISFSI Independent Spent Fuel Storage Installation: a facility designed for the storage of spent nuclear fuel. Consists of “dry casks,” in which spent fuel rods are placed in a steel vessel, bolted or welded shut, and filled with inert

gas. The vessel is then encased in additional steel or concrete to form a standalone cask. Plant operators are required to build, operate, and maintain ISFSIs until a permanent geologic repository or alternative solution is identified by DOE.

NDT Nuclear Decommissioning Trust: a fund required of every nuclear power plant to meet the costs of reactor decommissioning. Funds are collected from consumers through a fee, and are not the property of the plant owner. Where plants have more than one reactor, there is a separate NDT for each reactor. Where a shutdown is planned, major reactor decommissioning activity may not begin until NDT funds are adequate to cover all expenses. Pilgrim's fund of nearly $900 million is above the NRC requirement, but short of the recent cost estimates of over $1 billion for Vermont Yankee and Zion.

Radioactive Contaminants

GTCC Greater Than Class C Waste: the most hazardous of the four classes of low-level radioactive waste. Although it is not spent fuel, it is sufficiently radioactive to require ISFSI storage until permanent geologic repository is determined.

HLRW High-Level Radioactive Waste: highly radioactive materials, such as spent fuel discharged from a nuclear reactor. Stored on site in a spent fuel pool for at least one year before being transferred to ISFSI storage until permanent geological repository is determined.

LLRW Low-Level Radioactive Waste: any item with an elevated level of radioactivity resulting from day-to-day operations at a power plant. Along with GTCC, there are three other categories. Class A and Class B wastes pose no hazards to individuals exposed after 100 years, and Class C wastes pose no hazards to individuals exposed after 500 years.

Non-radioactive Contaminants

PCB Polychlorinated Biphenyl Compounds: environmental contaminant and known carcinogen explicitly regulated by the **TSCA** of 1976, under the jurisdiction of the EPA. Widely used in industrial fluids, it was banned in 1979.

PCE Tetrachloroethylene: environmental contaminant and likely carcinogen. Commonly used in dry cleaning, degreasing, and found at many industrial sites. Subject to state oversight.

Introduction & Background

The Institute for Nuclear Host Communities

The Institute for Nuclear Host Communities (INHC) addresses a unique planning and community development problem: the local and regional socioeconomic impacts of nuclear power plant closure. Nuclear power plant closure presents challenges that go far beyond existing best practices for facility closures, and the INHC is the nation's only organization dedicated to resolving them. The mission of INHC is simple: to provide the communities that host nuclear power plants with the knowledge and tools they need to shape their post-nuclear futures. The INHC is an independent firm that does not advocate for or against nuclear power.

About Nuclear Plant Closure

Distributed across dozens of states, and often sited in rural or low-density areas, nuclear power plants become powerful, long-term economic forces in their host communities. The closure of a nuclear plant is therefore a significant socioeconomic event, but its effects are difficult to categorize and are often underestimated. In some ways, nuclear plant closures are similar to other major industrial facility closures, with much larger workforces than are found at other types of power plants. However, due to their technical complexity, engineering requirements, and substantial duration, nuclear closure and decommissioning activities more closely resemble military facility closures and brownfield redevelopment projects. Furthermore, there are distinct regulatory frameworks for environmental cleanup and decontamination pertaining to nuclear decommissioning, which is overseen by the Nuclear Regulatory Commission (NRC), and the management of spent nuclear fuel, which is the responsibility of the Department of Energy (DOE). At this time, however, there is no standalone program or policy to support the host community's socioeconomic needs through and beyond closure and decommissioning. Furthermore, host communities are not empowered to take a role in the safety and security issues related to site remediation, or the local storage of spent nuclear fuel.

It is important to note that all nuclear plants and host communities are unique. As a result, there is significant variation in plant characteristics, operational timelines, community relationships with plant operators, market conditions, and scenarios for closure and decommissioning. One of the most significant challenges with this work, therefore, is finding the applicable lessons learned from the limited number of closures that have taken place to date, even as we enter the most active period of nuclear plant closures in our nation's history.

The "Second Wave" of Nuclear Power Plant Closure

In 2013, nuclear power plants in Wisconsin, Florida, California, and Vermont announced plans to shut down. That year, UMass Amherst planning professor Dr. John Mullin, FAICP formed a research group, now known as the INHC, to assess the impacts of plant closure and the capacity of host communities to weather them. Since then, an increasing "wave" of closures that this group had forecast has indeed taken shape: in the past two years, five more closures have been announced. Several other plants are now being considered for early shutdowns, due to the low electricity rates resulting from low natural gas prices, a number of policy shifts toward renewable energy, the rising operational costs of aging plants, and other factors.

The INHC and Pilgrim Station

In 2014 the Town of Plymouth, Massachusetts and the Old Colony Planning Council (OCPC), the planning bodies for the area most impacted by the presence of the Pilgrim Station, engaged the UMass Amherst Center for Economic Development and the Institute for Nuclear Host Communities to intensify preparations for the closure of the nuclear power plant located in Plymouth. In the spring of 2015, the INHC issued its final report, the *Pilgrim Nuclear Power Station Study*.

The next section of this report touches on this detailed economic study, and then moves on to the results of the INHC's research, education, and responses to the rapidly changing conditions and opportunities on the ground since the announcement of Entergy's plans to shut down Pilgrim Station in 2019.

Phase I: Assessing Local Socioeconomic Impacts

The INHC has found that previous plant closures generally produced positive (compliant) environmental and safety outcomes, but unimpressive or negative socioeconomic outcomes. This finding is impacted by current state and federal regulatory practices which support community cleanup expectations, but not expectations for positive economic outcomes. Site reuse, economic development and job replacement are not addressed. Absent programs and/or funding further host community's ability to recover after a power plants closing. One of the only tools communities have is the lead-time provided by a predictable licensing-based process for these power plants.

Utilizing lead-time with timely, focused efforts can accomplish three overarching goals to improve outcomes at the community level:

- Anticipate and understand the socioeconomic changes affecting host communities when their nuclear power plant closes.
- Identify opportunities and strategies to act effectively.
- Develop capacity and resources to overcome socioeconomic losses.

To address the first goal, the Town of Plymouth and the OCPC commissioned Dr. Mullin and the INHC to conduct a study of the socioeconomic impacts of Pilgrim Station's operations and hypothetical closure. The *Pilgrim Nuclear Power Station Study* provided an overview of how plant activity changes during closures, and how that plays out across the region, affecting jobs, philanthropic activity, emergency management, and municipal budgets. The report's recommendations, supported by place-based economic, demographic, and market analyses, were tailored towards improving closure outcomes in Pilgrim Station's host community. At the time, there were no plans to close Pilgrim Station, and the report presumed that the plant would operate until 2032.

Predictions about the timing and nature of economic changes were created based on some important assumptions on recent closures and policy trends. This includes assuming Pilgrim will move to SAFSTOR and that Entergy will conduct closure and decommissioning activities at Pilgrim in a similar fashion to work at the Vermont Yankee Nuclear Power Plant. Figures 1 and 2 illustrate these processes.

Figure 1: Timeline for Vermont Yankee Closure Activities[1]

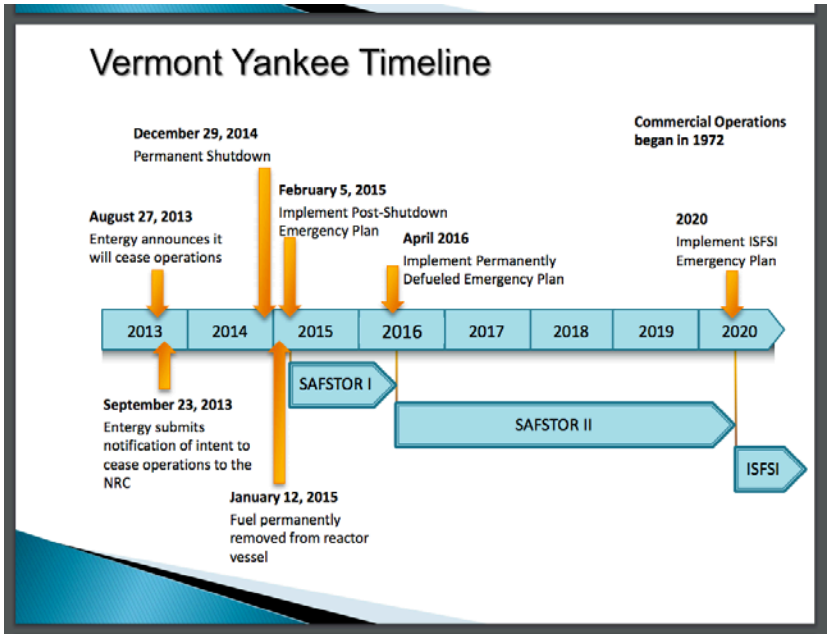
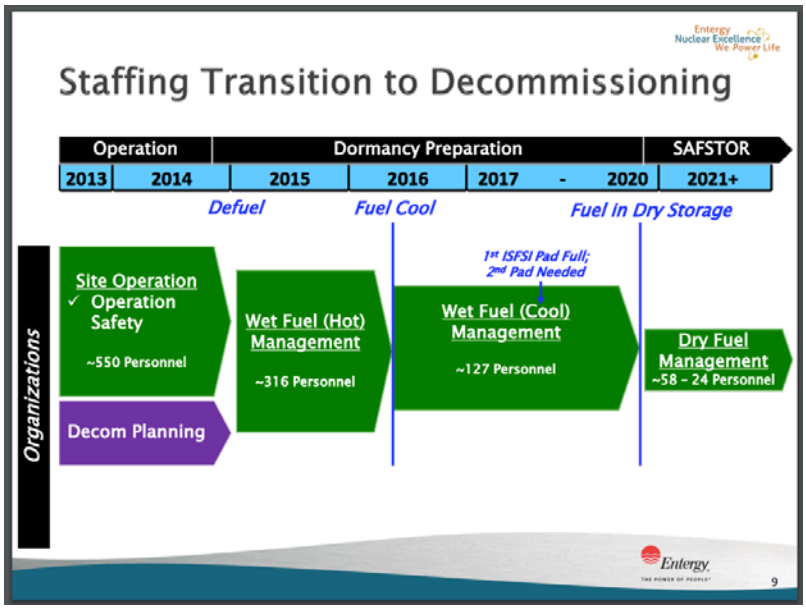


Figure 2: Timeline for Vermont Yankee Staff Reductions



Findings from the *Pilgrim Nuclear Power Station Study* published by the UMass Center for Economic Development, and authored by Dr. Mullin and Jonathan Cooper, were presented to the Plymouth Board of Selectmen on May

[1] http://publicservice.vermont.gov/sites/dps/files/Entergy%20Decommissioning%20Activities%20Presentation%20to%20NDCAP%20January%202016.pdf

19, 2015, and at the OCPC's 48th Annual Meeting on May 28, 2015. Regional press coverage ensured a broad public audience was made aware of the data. The study can be found on the websites of the Town of Plymouth, the INHC, and Pilgrim Station itself. A link to the study, available online through the Town of Plymouth web site, is included in the appendices below.

The report was immediately conveyed to the Governor's office, and since that time the Town has endeavored to ensure state legislators and agencies are aware of the report and its findings regarding the anticipated socioeconomic losses that Plymouth and the region will experience from closure. The majority of closure discussions and negotiations take place between the owner, state and federal officials. Opportunities to secure resources, or improve options, may arise during these discussions. It is therefore critical that the host community's needs be understood. Based on anecdotes from recent merchant plant closures, familiarity with economic data on host community losses was critical factor in securing economic assistance funds through the negotiated MOU between Entergy and Vermont.

The *Phase I: Pilgrim Nuclear Power Station Study* provided baseline economic research and a set of recommendations. In the fall of 2015, Town of Plymouth and the Old Colony Planning Commission followed up by engaging the INHC to continue with Phase II, enabling local and regional leaders, municipal and state officials, and volunteer committee members would continue to focus on socioeconomic impacts.

Sample of Jobs Reduction at Closing Nuclear Power Plants

Nuclear plants employee a large number of well-paid, mostly skilled workers who tend to make substantially more than area median wage. The staff reductions that come with closure are one of the primary changes host communities need to understand and respond to. These sample timelines from the Maine and Vermont Yankee plants illustrate.

Phase	Timeline	Staffing:	ME	VT
Closure announced	12-18 mo. ahead		675	625
Plant closure	<60 days to go		600	550
Post-operational	Years 1 and 2		315	315
Wet fuel cooling	Years 3-6		115	125
Dry cask storage	Year 6 onwards		20	25

Phase I Key Findings from Pilgrim Nuclear Power Station Study

$150,000,000 = Approximate Annual income + revenue provided by plant operation to the region

- Sustains approximately 600 jobs with high wages
- Workforce clustered near plant
- Positive and stabilizing effect on town and region with lower income totals and higher levels of seasonal jobs

$105,000,000 from plant employees and vendors creating "second wave" economic impacts

- Supporting an additional 600 jobs in the region
- Significant spending in non-nuclear industries
- High levels of home ownership and tax revenue

If plant operation produces…

- Approximately 1,200 jobs
- Approximately $14 million in municipal taxes
- Approximately $107 million in wages and benefits
- Approximately $148 million in non-payroll spending

Then plant closure means…

- Workforce losses beyond the power plant
- Reductions to municipal finances
- Household spending impacts in non-nuclear homes
- Revenue impacts in several industries in the economy

Plymouth is home to 190 employees

- Over 30 percent of Pilgrim's personnel live in Plymouth
- $17.8 million in wages earned by plant employees living in Plymouth
- $25 million in wages to the Old Colony Planning Commission region

Major Industries Supported

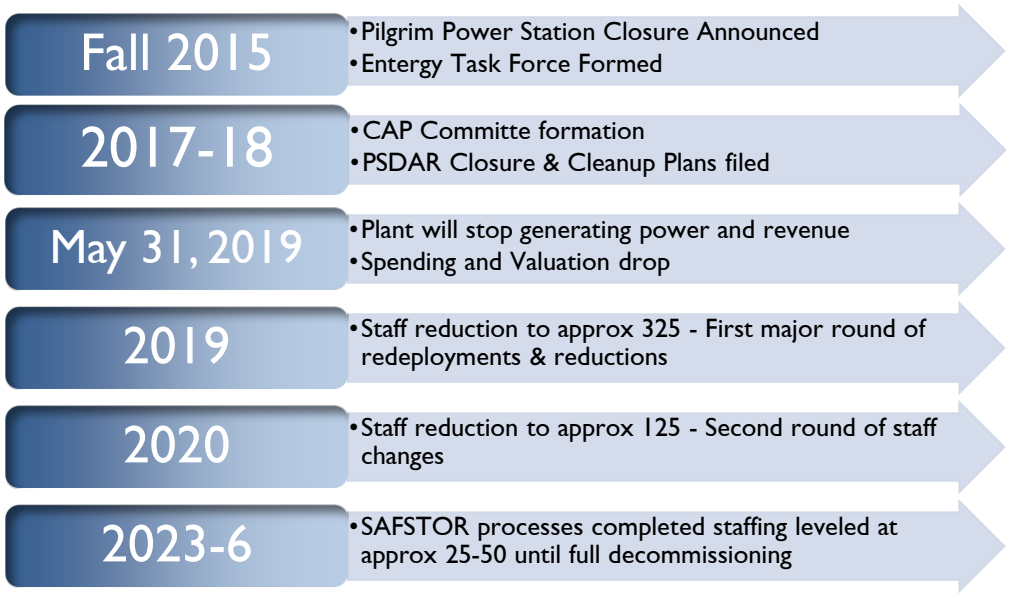
Plant Spending	Plant Workforce Spending
Technical Services	Health Care
Engineering/Consulting	Physicians/Hospitals
Manufacturing	Financial Services
Electronics/Equipment	Banks/Lenders
Specialty Construction	Real Estate
Utility Systems/Electric	Brokers/Developers
Industrial Equipment	Food Services
Machinery/Metals	Grocers/Restaurant
Support Services	
Landscaping/Security	

Phase II: Pilgrim Closure Preparation

Phase II, which was a continuation of the *Phase I: Pilgrim Nuclear Power Station Study* completed in Fall 2015, focuses on supporting local and regional leadership's proactive approach to the closure and decommissioning of Pilgrim Station. It establishes checklists for action items, based on the lead time between closure announcements and final shutdown; provides technical assistance to enhance closure communications between local, state and federal stakeholders; and addresses recommendations for community closure preparedness.

In late 2015, work activities were adapted to important new developments that included an announcement by Entergy that it intended to close Pilgrim Station well ahead of 2032, as early as 2017. While the recently-confirmed closure target of May 2019 is preferable to the more immediate scenario, it marks a substantial shift from the previous closure horizon of 2032 that the INHC, Plymouth and the OCPC had been working with. In terms of replacing taxes, spending, and jobs, this accelerated sunset will bring dramatic changes to Plymouth much earlier than previously thought, as Figure 3 shows. In light of this modified timeline, INHC created a two-part checklist to track the work that the Host Community has outlined.

Figure 3: Pilgrim Timeline - Closure to SAFSTOR Staffing and Spending Reductions



Closure Preparation Checklists

Planning for the socioeconomic changes incurred by nuclear plant closure is an emerging area of practice. Pilgrim Station's host community has been working with UMass and the INHC at the leading edge of knowledge on the extent and nature of impacts, policy implications and limitations, as well as long-term effects and opportunities to improve outcomes. Best practices are being developed in real time, based on lessons from past closures and related events like base closures and DOE legacy site management. The goal is to improve upon lackluster, default post-closure economic scenarios of past communities by overcoming a lack of knowledge by providing educational material, creating awareness and attention, developing resources, and forming partnerships and strategies.

Figure 4, the *Checklist for Nuclear Plant Closure Socioeconomic Preparedness: Long-Term Horizon*, tracks the host community's previously-completed efforts to build local, regional and state-level awareness of the dramatic economic and social changes plant closure. In the case of Pilgrim Station, the local action items were undertaken when the anticipated date of closure was 2032. This underscores the value of planning and preparation before closure announcements are expected.

Of course, other host communities may need to work with an abbreviated timeline, and socioeconomic losses may receive little attention or closure may be announced with little warning. The checklist in Figure 5 detailing actions from the announcement of closure onwards, focuses on this more condensed version. It identifies next steps to continue a proactive approach to the coming socioeconomic losses from the plant closure. Plymouth and OCPC are identifying new opportunities for state and federal support to mitigate the predicted impacts off site and on, including efforts to ensure that the large site the plant sits on can be productive, as well as environmentally clean, in the future.

Figure 4: Checklist for Nuclear Plant Closure Socioeconomic Preparedness: Long-Term Horizon

Anticipated Closure 10+ years Out		
Plant Phase	Actions to Prepare	Plymouth Action Items
Long-term operational: 20-year +/- closure horizon	• Pay attention to relicensing and factors affecting closure: energy markets & policy, age, politics • Pay attention to plant's economic and social role in community	✓ Policy active with state ✓ Engagement & expertise: town staff & Nuclear Matters Committee ✓ Efforts to launch national host community network
Medium-term operational: 10-year +/- closure horizon	• Secure detailed research and data on plant's socioeconomic impacts • Increase Public awareness • Build partnerships for effective local/regional approach	✓ Pilgrim economic study (UMass/INHC) ✓ Presentations & press on socioeconomic impacts ✓ Town of Plymouth & OCPC collaboration
Near-term operational: Less than 10 years out (based on license or other data)	• Decision-makers become 'experts' • Build awareness, attention and alliances with policymakers • Local/regional body organized	✓ INHC Phase II work ✓ Town staff, officials and economic leadership engaged ✓ Entergy Task Force (ETF) formed

Figure 5: Checklist for Nuclear Plant Closure Socioeconomic Preparedness: Near-Term Horizon

Anticipated Closure < 10 years Out		
Plant Phase	Actions to Prepare	Plymouth Action Items
Closure date announced: 3-year closure horizon	• Engage leadership in areas of socioeconomic impact • Multi-scale Policy engagement to build awareness of community impacts • Engage with Utility around closure impacts and needs • Network with Peers • Dedicate staff & resources to socioeconomic losses	✓ Entergy Task Force ✓ Policy active with federal delegations, state legislators, agencies & Governor's office ✓ Initiated contact with Entergy closure staff ✓ Pilgrim Host delegation at UMass Nuclear closure conference, visit to Vermont Yankee hosts.
Closure pending: 1-3 years out	• Identify short, mid, long term funding, strategies, projects • Clarify economic/ redevelopment lead org(s) • Build public awareness of impacts, enlist state support • Leverage national network to affect long term options – federal / national level • Pathway to site reuse	✓ State legislator action for $ ✓ PILOT negotiations with Entergy ✓ OCPC pursuing EDA funding options ✓ Engaging with Long Term policy issues (NRC & DOE) to improve site outcomes ✓ Phase 2 INHC & follow up
Active Closure Mode (PSDAR)	• Increased communication needs – web, public meetings, press • Pursue off site mitigation • Steps toward site reuse	N/A
Post-Closure: Phase I	• Leverage crisis for state & federal assistance– 1st layoffs, spending & tax reductions	N/A
Post-Closure: Phase II	• Second round of staff reductions brings renewed attention to closure and losses • Follow on strategies to sustain economic mitigation over time	N/A

Three Identified Preparations for Closure

The INHC's Phase II work consisted of three general activities. The first involved responding to time-sensitive factors with long-term implications; the shortened plant closure timeline and two important, unexpected federal level announcements regarding the NRC rulemaking on decommissioning and the DOE spent fuel siting.

We also turned attention towards the upcoming formation of a Citizens' Advisory Panel (CAP) for the Pilgrim closure and decommissioning. CAPs help ensure information flow and transparency, provide coordination and connections, and promote accountability throughout closure. Past CAPs in

other host communities have varied in composition, mandate, focus and duration.

Finally, the INHC worked to continue increasing local capacity - stakeholder expertise and new resources. These efforts focused on educational materials, relationships with relevant peers and experts, and research into specific topic areas based on precedent and current understanding.

Phase II: Pilgrim Host Community Closure Preparedness

Changing Conditions New Opportunities	Citizens Advisory Panels	Capacity Building - Phase I Follow up
Pilgrim Closure timeline Activity at Federal Level NRC Rulemaking on decommissioning DOE Spent Fuel process restarted	VY "NDCAP"– connect, observe, network, learn Best Practices for Pilgrim CAP – adaptations from precedent, partners, resources	Building knowledge and momentum, working with other host communities • Education • Relationships • Research

Changing Conditions & New Opportunities

In the fall of 2015 came the announcement of Pilgrim's intention to close by 2019, with the subsequent need to reframe closure planning as a near-term event. With a three-year planning horizon, rather than 17 years as previously anticipated, discussions about how to follow up on the economic study shifted gears to identify more quickly possible resources to plan and mitigate and opportunities for partnership or negotiations to improve socioeconomic outcomes. This includes "briefs" found in this guidebook relating to financial options, and relationship-building with economic development leaders in Vermont to get advice in charting an accelerated pathway to closure recovery.

Also in the fall of 2015, two unexpected announcements drove attention to federal level processes with long-term implications for the Pilgrim site. In late November, the NRC announced a period of public comment on potential changes to the regulations for plant decommissioning. This "rulemaking" opportunity required quick turnaround to review the proposed changes and consider their implications.

The Town of Plymouth, through its Entergy Task Force, seized this timely opportunity, helping to successfully gain an extension of the filing period to allow this and other host communities to provide thoughtful, detailed input.

The Plymouth Board of Selectmen approved and submitted a letter and comments, with INHC assistance (see appendix). While the NRC process will take years to unfold, NRC rulemaking touches directly upon profound constraints affecting the town, region and state's ability to influence site processes and disposition and to improve long-term outcomes.

Shortly thereafter the DOE, which is responsible for spent fuel at nuclear sites, announced an initiative to formulate a new framework to identify and approve storage sites for spent nuclear fuel. DOE public comment period for this "consent-based siting" approach began early December 2015. A return to the issue of spent fuel storage and transport, four years after the "Blue Ribbon Commission Report on America's Nuclear Future" represents an important opportunity to shape long-term outcomes. Spent fuel is one of the greatest challenges to repurposing the plant site, given a complete lack of options to remove the spent fuel stored in both wet pool and dry cask containers. The INHC submitted comments on "consent-based siting," in an effort to direct this opportunity towards a long-term resolution of the spent fuel issue for all host communities. The Plymouth Board of Selectmen approved and submitted a letter on behalf of the town.

Emerging Challenges and Opportunities in 2015-2016

Fall 2015 – Spring 2016: Closure horizon shifts from 2032 to 2019

Thanksgiving 2015: NRC announces "Rulemaking" on decommissioning

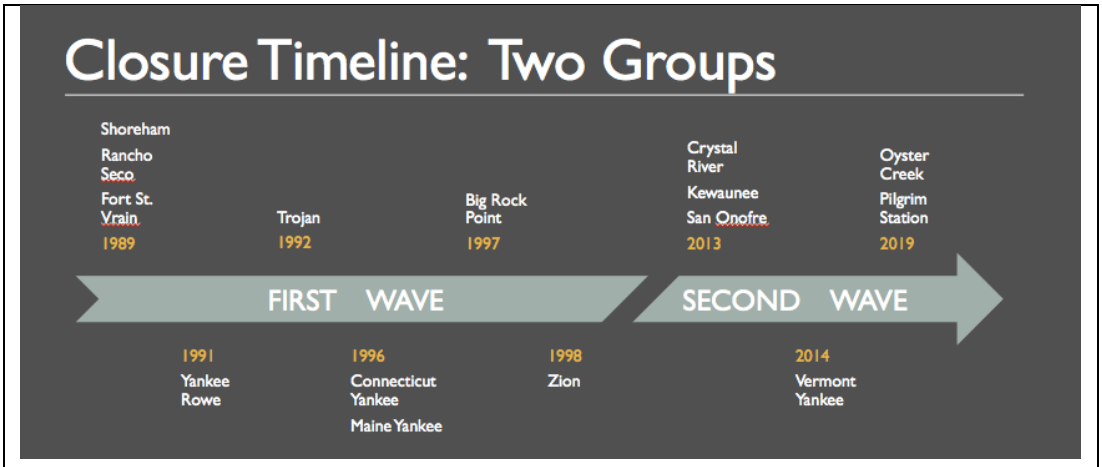
December 2015: DOE takes up consent-based siting of spent fuel

Spring 2016: Entergy forms Nuclear Decommissioning Organization (NDO) to oversee nuclear plant closures

Summer 2016: Uncertainty continues to roil nuclear industry, and four plants announce closures and a fifth is sold to remain open.

Pilgrim is a "merchant" power plant, owned by a private corporation rather than a public utility. This distinction affects suitability of past closures as precedents to understand what lies ahead for Plymouth, since most until recently involved public utilities. Recent merchant closures (Vermont Yankee and Kewaunee, WI) illustrate the importance of regulatory implications of this shift. For instance, as Figure 6 illustrates, there is a trend towards SAFSTOR, or deferred final decommissioning. On the other hand, when it comes to economic impacts corporate owners have been quick to understand the communities' desire to mitigate losses, in addition to expectations for safety and environmental outcomes. While assistance levels have varied in other closures, Pilgrim Entergy's agreement in principle at least, that excellent socioeconomic outcomes are a central goal.

Figure 1: Changing Ownership and Outcomes - Two Waves of Closures



First Wave: plants owned by public utilities	Second Wave: investor-owned "merchant" plants
DECON – Immediate & Total Cleanup aside from spent fuel which remained.	SAFSTOR – Dismantlement, Deferred deconstruction, spent fuel remains.

Entergy owns Pilgrim Station and Vermont Yankee, and just recently sold the James A. FitzPatrick Nuclear Power Plant, near Oswego, NY, to Exelon to avoid shutdown. Prior to the sale of FitzPatrick, Entergy "identified a need to staff an organization within Entergy Wholesale Commodities for the purpose of executing a multiple, sequential site decommissioning strategy... with a flexible staffing arrangement in mind to accommodate sequential facility shut downs, while maintaining focus on shut down units over time." Entergy therefore has formed a new Nuclear Decommissioning Organization (NDO), and included in its staff are Paul Paradis and Joe Lynch, longtime employees well acquainted with Vermont Yankee and Pilgrim Station, among others.

Engaging with the NRC and DOE to Improve Long-Term Options

The INHC engages in federal policy on behalf of host communities to identify and improve resources, control and ultimately socioeconomic outcomes.

Nuclear Regulatory Commission (NRC) In Fall 2015 new NRC rulemaking was announced. The INHC partnered with the National Association of Development Organizations (NADO), a Washington DC economic development policy and advocacy group with dozens of nuclear host communities in its nationwide membership. NADO hosted a webinar for host communities on NRC Rulemaking featuring Windham VT's Regional Planning Director and an INHC speaker. INHC invited all nuclear host communities and resulting activity helped secure an extension of the deadline for public comment, allowing more communities to weigh in.

Department of Energy (DOE) Pilgrim's spent fuel will remain for decades. Creating a national repository would have tremendous benefits for the Town of Plymouth. Host communities must build alliances to pressure the federal government to rectify the current situation. The current nuclear host communities never gave consent to be interim spent fuel repositories, and have no recourse despite the uniquely troublesome constraints spent fuel imposes on site redevelopment and conservation. In Fall 2015 the DOE restarted its "Consent Based Siting" initiative to find new hosts for spent fuel. The INHC has worked to influence the DOE conversation in order to benefit *existing* nuclear host communities. Spent fuel is a core issue, potentially the basis for a host community network through which Plymouth will form alliances to leverage for better resources and support. Appendix A is a letter to the DOE from the INHC. A similar letter was approved and sent by the Town of Plymouth Board of Selectmen. The INHC provided public comment at the DOE June 2016 Boston, MA event on Consent-Based Siting, on behalf of Plymouth.

Citizens' Advisory Panels

The Pilgrim CAP will become a primary point of contact between officials concerned with the plant closure. Because of this, its formation is important for Plymouth and OCPC to engage with. Present here are some recommendations, an overview of past CAPs, and general findings based on observing the Vermont Yankee Nuclear Decommissioning Citizens Advisory Panel (NDCAP) proceedings. This section raises questions and concerns that need to be addressed to ensure that Pilgrim's CAP works well for the host community. Chief among these is the likelihood that the CAP cannot provide sufficient leadership, attention or resources to advance Plymouth and OCPC's socioeconomic mitigation goals.

A Citizens Advisory Panel (CAP) is normally formed to create a connection between regulators, the plant, and communities affected by plant closure and decommissioning. The CAP is a point of engagement for the public and their representatives, providing information and education, transparency, and accountability. The mandate and function of these committees varies. Some involved in Yankee Rowe's CAP (one of the country's first closures) have described the group's work in terms of collaborative problem-solving. Vermont Yankee's NDCAP (Nuclear Decommissioning Citizens Advisory Panel) has extended that scope, producing several advisory opinions for the state legislature on issues like the spent fuel storage pads. However, issues important to the host community may receive little attention. For instance, regional socioeconomic impacts have failed to become part of the agenda in Vermont, and the position of the host community (Vernon, VT) on the issue of site reuse is not generally part of the discussion.

With closure set for 2019 there is no need to hastily adopt any one model or approach. What worked well in one instance may not serve Plymouth's best interests. In Vermont, the CAP was created by the state legislature. Therefore, state agencies are well represented on the panel. Although this supports coordination between agencies, the town of Vernon does not necessarily find the CAP supports the municipality's agenda. In Maine, the CAP was convened by the plant itself. Citizen, regulator and utility members alike have reported this group functioned well. They produced a report on lessons from the experience that became a model for public involvement. However, Maine Yankee's closure preceded the deregulation of the energy market in the northeast. Much of the collaborative attitude is related to the plant's status as a publicly-owned entity, beholden to ratepayers not shareholders.

In the case of Pilgrim, site reuse and redevelopment could be substantially assisted if a mandate for the CAP goes beyond issues of regulatory compliance on safety and environmental goals, embracing as well excellent socioeconomic outcomes for the host community, and enlisting state actors in working towards that end. Plymouth's Entergy Task Force (ETF) can develop and then propose a CAP, or elements of a CAP, with a structure and mandate that benefits Plymouth, based on the Massachusetts context. Such a structure would be aligned with the points of leverage based on the state's unique regulatory environment. For instance, ensuring high-level representatives of agencies with direct influence on the process. State-level authority and points of influence that affect socioeconomic outcomes are few and far between. This would represent a major change from past CAPs**.** Therefore, it is also important to assess honestly what the CAP can't or won't do and look elsewhere for leadership and resources as needed.

In the coming year, it will be important to clarify the leverage points, and build contacts within the related state offices to improve Plymouth's opportunities to direct that authority towards executing on local and regional goals. These include but may not be limited to:

- The Department of Public Health, which oversees cleanup where state law exceeds NRC standards. This determines how clean the site must be prior to release, and therefore the cost and duration of cleanup. This has obvious implications for site reuse and decommissioning planning.
- The Department of Public Utilities and Attorney General's Office. Their counterparts in VT monitor (and challenge) decommissioning trust fund spending. MA lacks a Certificate of Public Good challenge, which VT has used to influence closure, including negotiating for economic development funds.
- The Department of Environmental Protection. Similar to the DPH's radiological exposure role, but applied to non-radiological contamination. Vermont's Agency of Natural Resources, MassDEP's counterpart in that state, has asserted RCRA authority in cleanup monitoring and standards. It is not clear what the implications are for VT or MA to gain influence over closure processes, but it is vital that local and regional officials have clarity on the extent of MassDEP's jurisdiction.
- Legislators and the Governor's Office, and any officials likely to be involved in closure agreement negotiations, funding and CAP legislation.

Please refer to the Community Guidebook section below for an overview of the composition and mandates of citizen advisory panels. Specific action items for Plymouth are included in the final section of this document. Here are four general recommendations for the coming year:

Slow down. Use this lead-time to outline priorities and options rather than rushing to form a CAP based on previous closures. Early efforts sought to duplicate Vermont or Maine CAPs. But adaptation is needed to overcome problems including but not limited to: members who are not on the CAP by choice, poor representation of host municipality interests, and above all the CAP not including socioeconomic issues in its mandate.

Learn more from past closures, including problems and limitations of their CAPs. Figure out agencies with the most leverage (see previous section) and ensure representation matches authority and goals. Massachusetts does not have a Certificate of Public Good process, so DEP and DPH may at the forefront more than in Vermont where much of the CAP leadership comes out of the utilities department. Look beyond nuclear closures for best practices, particularly in terms of long-term site planning, reuse and redevelopment.

Prepare legislation for 2017 and align support, Entergy included. Economic development can be part of the CAP agenda, addressing socioeconomic, safety, and environmental impacts. It has not been in the past, and opposition should be anticipated. One advantage of even nominal success would be to keep some attention on Plymouth's needs in this area. Another would be to create a forum where conflicts between goals can be brought to light and addressed, such as a desire to grow the DTF and begin full cleanup quickly versus a desire to draw on these funds for near-term economic and planning needs.

Task out. Even if the CAP takes on socioeconomic concerns, it is unlikely to have the time or resources needed. Plymouth and OCPC's post-closure economic development efforts deserve more focus, leadership, and attention, and the involvement of fewer people not directly impacted. Big Rock Point Plant developed a second committee, one dedicated for land reuse. Please refer to the INHC Briefing on Site Outcomes.

Capacity Building: Phase I Follow-up

This Community Guidebook builds on core recommendations from Phase I, stressing the importance of ongoing capacity-building. Nuclear plant closures bring new and unique challenges for communities, from immediate job-losses to the decades ahead hosting spent fuel. The INHC emphasizes an approach that stresses three components: education, relationships and research, to build local expertise and help stakeholders productively focus on improving socioeconomic outcomes for the host community.

A key finding from research into past closures is that default processes involve little attention to, or relief from, economic losses at local and regional scale. Host communities struggle to articulate and execute a set of local goals once plant closure is announced, in part because technical aspects are overwhelming. Radiological safety occupies regulatory actors, dominates public meetings and imagination, and drives financial expenditure. Closure requires, therefore, additional effort around impacts and outcomes for the community, to discern what can be affected, and how. Plymouth and OCPC have applied steady effort, building local expertise with presentations and discussion at board and committee meetings. This work is described here in terms of three general Steps:

- Step 1: Education or knowledge-building within the inner core
- Step 2: Relationship-building and education in the community
- Step 3: Research and information-gathering

Education and Research are covered separately because they relate to two distinct challenges. Education addresses a need for baseline local expertise and widespread understanding to foster productive communication, decision-making, and transparency. Nuclear closures are impacted by the political divisiveness that has accompanied nuclear power in America since its beginnings. Host communities are wise to invest in confidence and competency to overcome divisive, even inflammatory elements.

Research is used to create information for educational processes. Much of the technical detail pertaining to closure and decommissioning will be presented in a way that is inappropriate for non-specialists, and that fails to address implications for the community. As closure proceeds, Pilgrim will have new needs geared towards specific issues or actions. Research will be needed to improve upon the default outcomes, build a knowledge base relevant to areas of influence that can and should be explored, whether these are off-site economic development opportunities or a pathway to site reuse.

Step 1: Educating the Inner Core

Objectives:

- Focus Attention
- Comprehension: Building a Common Baseline
- Prepare for Productive Public Engagement

The INHC recommends that Step 1 focus on educating the "inner core" of the community, such as local leadership, state representation, and municipal officials. Properly educating the inner core will create less interpretation on the topic and establish confident sources of information that can have productive discussion with other members of the community. During the course of Phase II, the INHC developed content directly targeting the Pilgrim Station host community, worked to connect Plymouth with the growing network of host communities, and worked with town officials to ensure that Plymouth's voice was included in the broader conversations taking place at the federal level. This includes:

- October 2015: AEHS Foundation conference, *Nuclear Decommissioning Plenary and Platform Sessions.*
- December 2015: National Association of Development Organizations *NRC Rulemaking Webinar.*
- June 2016: Department of Energy panel discussion, *Consent-Based Siting of Spent Nuclear Fuel.*
- November 2015, June 2016: presentations to the Entergy Task Force.
- Throughout: in-person and teleconference consultation with Plymouth economic development and planning staff.
- Throughout: policy brief development for the Community Guidebook.

This Community Guidebook provides a digest of core closure basics. Some of the content and attached briefs address specific questions from the stakeholder group, and in other places covers information the INHC anticipates will be needed as closure unfolds. In general, an attempt has been made to "translate" material for a general audience to a common knowledge baseline or working knowledge. Preparation and sustained attention, particularly with regard to policy at the state and federal level, will help the Task Force attract attention and create the leverage needed to improve upon default outcomes. As the closure arrives and more people become aware, concerned, and involved, a well-informed Task Force will be able to guide future processes involving a broader public.

In the months leading up to closure, the Town of Plymouth and OCPC can expect detailed reports from Entergy's Nuclear Decommissioning Organization to be made available online, and presented and explained in the CAP setting. This includes timelines, activities, staffing changes, license and NRC activity, fuel disposition, emergency planning and decommissioning trust fund expenditures. These forecasts have been accurate in the case of Vermont Yankee. (Examples of these status reports can be found on both the Vermont Department of Public Service web sites and Entergy's vydecommissioning.com.)

In Phase 1 we outlined some of the unique characteristics that make the host communities' experience of nuclear power plant closure unlike other economic transitions or layoff events. Plymouth is also unlike many nuclear host communities. This creates some unique challenges, but for the most part a set of circumstances and assets which can be deployed effectively to improve socioeconomic outcomes.

Unique Characteristics of Nuclear Plant Closures

- Location: plants sited out of the way; connected to transmission but not other infrastructure like roads or rail.
- Workforce: highly specialized workers likely relocate to other plants, but there are many retirements or "second acts" coming.
- Cleanup: many variables, timeline measured in decades, unfamiliar to most state regulators, some unique jurisdictional angles between EPA and NRC.
- Assistance: no direct allies, organizations or policy support.
- Spent Fuel: policy failure around storage, transport and removal.

The focus in Phase II has been mainly on the educational needs of officials and core stakeholders involved during the early months since closure was announced. Attention should turn towards a broader audience in the coming months. Meetings, materials and additional resources like a trusted web site will be needed to help new stakeholders coming into the process find the information they need. This Community Guidebook is one of those resources. As new people engage with closure processes there will be an ongoing need to provide basic information and facts. Facts on the ground will continue to shift as plant activity evolves, and as the regulatory framework for closure and decommissioning also continues to evolve based on litigation, as well as previously mentioned NRC and DOE activities.

Step 2: Relationship-building and education in the Community

Objectives:

- Accelerate Learning
- Establish Resources for Next Phases
- Increase Leverage and Advocacy
- Improve Outcomes

Throughout Phase II, the INHC has worked to connect Task Force members with people who possess direct experience and knowledge based on past nuclear power plant closures in the region. These individuals want to leverage their expertise, to help Plymouth and the OCPC improve their own outcomes. They are resources for the town and region now, and will continue to be helpful throughout closure and decommissioning because many would also like to see improvements on the national policy level. Likewise, Task Force members have made substantial efforts to build and activate policy relationships across levels, including visits to Washington, D. C. to meet with Congressional representatives; to attend NRC and EDA events; and to promote dialogue with legislators and officials at the state level. These relationships will become increasingly important, especially given the need to coordinate across multiple scales during complex closure activities.

- Networking with other hosts - UMass AEHS Conference Fall 2016
- Task Force delegation trip to Southern VT
- Individual resources – experts and experience
- Host community network – leveraging Plymouth Leadership
- Forging Connections with Entergy Personnel

On October 21, 2015, Plymouth and OCPC representatives attended a day-long nuclear closure program at UMass Amherst, organized by the INHC in conjunction with the non-profit AEHS Foundation. During a morning plenary session and afternoon platform presentations, Task Force representatives formed direct connections with officials and experts. Some of these relationships continue, including ongoing contact with the VY NDCAP Chair, Kate O'Connor, who has since visited Plymouth in person. As the situation and needs evolve, additional peer experts will be enlisted to provide insight.

Partial List of Resources and Contacts

- Kate O'Connor, Brattleboro Chamber Commerce Executive Director, NDCAP Chair*
- Chris Campany, Windham Regional Commission Executive Director* **
- Adam Grinold, Brattleboro Development Credit Corporation Executive Director
- R.T. Brown, Brattleboro Development Credit Corporation Project Manager
- David Howland, MassDEP, involved in Rowe and Wiscasset plant closures**
- Chris Recchia, Vermont Public Service Department Commissioner.
- Laura Sibilia, Vermont State Representative, BDCC Economic Development Director
- Jim Hamilton, spentfuel.org Director, DOE consultant**
- Pat Moulton, Vermont Agency of Commerce and Community Development Secretary*
- Mike Hebert, Vermont State Representative, Vernon resident
- Martin Langeveld, co-author of VY Economic Impact Study, Vernon resident*
- Trey Martin, Vermont Agency of Natural Resources Deputy Secretary* **
- Avram Frankel, Integral Environmental Consulting Principal**

*NDCAP Member **AEHS Speaker

Representatives from Plymouth and OCPC had an opportunity to attend a VY NDCAP committee meeting in early 2016. They met in person with key players including Commissioner Recchia of the Vermont Public Service Department and the team at Brattleboro Development Credit Corporation, which is leading regional economic recovery efforts. This was an occasion to foster early connections with Entergy's Joe Lynch. Mr. Lynch will be a key player in the decommissioning process at Pilgrim Station. His experience extends back decades to the Rowe decommissioning in a career that has included both public utility and merchant plant closures. Through the new Entergy Nuclear Decommissioning Organization (NDO), he will have responsibility at multiple plant sites in the northeast. Although there are limits to what a direct connection with Entergy personnel can produce in terms of solutions, the company and its decommissioning personnel will be a major source of information and some support for the foreseeable future.

To improve socioeconomic outcomes, nuclear host communities will need to act as a coalition and work at the federal level. Yet there is neither the money nor the mandate from federal levels to support these vital efforts. Plymouth has used every possible opportunity to stimulate connections and a foster a host community network, traveling throughout the northeast, inviting representatives in, and reaching out to others. With assistance from the INHC, Plymouth led the way on community engagement in two unexpected openings for local input in the federal process, via public comment periods for NRC rulemaking on decommissioning, and the DOE's consent-based siting initiative. Plymouth and the INHC are building a web of relationships that can

become a robust host community network with the political clout needed to seriously improve conditions for closure and for the post-closure era. Plymouth's willingness to provide leadership, and to identify or develop and implement best practices at every step, moves us closer to realizing that goal.

The INHC is cultivating a network of relationships for a time in the future when their specific skills, experience, or alliance can be of use. The Task Force is becoming part of a growing network of people affected by various aspects of closure and decommissioning: in 2016 alone, four more nuclear power plants announced plans to shut down in the coming years. While unfortunate for the affected communities in California, Nebraska, and Illinois, this will hopefully increase opportunities for connections among these host communities going forward. The INHC is actively working to create the next opportunity to bring together host communities to learn and expand their networks.

Step 3: Research and information-gathering

Objectives:

- Quality Public Processes and Education
- Prepare for Closure & Decommissioning Activities
- Trusted Information Sources for Key Stakeholders

By drawing on colleges, consultants and experts, the Task Force is already developing independent, reliable, and objective resources. The 2015 *Pilgrim Nuclear Power Station Study* is an example: Plymouth and Old Colony have in hand much more information about Pilgrim Station and its closure impacts than most host communities have when their plants shut down. With respect to CAP formation, in addition to recommendations made here, we recommend asking the state to engage process experts like the Consensus Building Institute, who provided organizational support to the VY NDCAP.

Preparations for site restoration and redevelopment may require independent expert research counsel, given the unique regulatory frameworks involved. One example, a relatively untested memorandum of understanding between federal environmental (EPA) and nuclear safety agencies (NRC), is explored below in a guidebook briefing. Expert legal and environmental planning research and advice may help Pilgrim proceed in a nearly unprecedented area of timely nuclear plant site redevelopment.

Research helps to build trust in the information available. Information will come from a range of sources: Entergy; federal and state regulators; environmental conservation and activist groups; and nuclear interest groups. A significant challenge is identifying what is missing, and what questions to ask to understand implications for Plymouth. In previous closure experiences, a lack of trust among organizations became a very real impediment to productive closure or decommissioning discussions. A great deal of public interest will be driven by risk perception around radiological safety, but may unfortunately leave important basics poorly understood by all but the central parties.

Again, exhaustive processes can still overlook local needs entirely. At VY substantial time was spent by NDCAP and state agencies attempts to build a second pad for spent fuel storage. Discussions were based partly on general opposition to onsite spent fuel storage, which the NRC requires Entergy to provide until a new DOE program materializes. Discussions also related to state and local preference for immediate dismantlement (DECON) instead of deferred dismantlement (SAFSTOR), even though that is not an issue the public has influence over. Furthermore, highly technical presentations have made it hard to clarify key facts, and downplayed agreement that moving spent fuel from wet pools to dry casks in a timely fashion is the best course of action. Delayed permits prevented workers from being able to do their jobs. Moreover, very little attention was paid throughout this time to the town's aspirations for timely redevelopment and reuse of the site. Vernon's efforts to bring a natural gas facility to the VY site, reusing the transmission infrastructure and shoring up their tax base, occurred almost entirely outside the official proceedings of the CAP.

Plymouth - Host Characteristics Framing Options and Outcomes

The Pilgrim Site: unlike most nuclear power plant sites due to its extensive acreage in an area with considerable market demand and available infrastructure. Originally intended to host multiple reactors, Pilgrim has 1,500 acres of "buffer" land mostly outside the plant's operational site. Zoned for residential and commercial use, it is also large enough to accommodate substantial conservation.

Site Revenue: a PILOT agreement directs revenue to the Town of Plymouth based on the plant's high valuation, revenue is relatively high compared to other plants. However, the town's strong economic base means the PILOT portion of total local revenue is well below towns like Haddam, Wiscasset and Vernon. Revenue will decline once operations cease. Precedents indicate some ability to negotiate timeframe. Site reuse will to take shape years after closure, leaving a gap in time between revenue drop-off and replacement.

Redevelopment Potential: Plymouth has seen steady growth in high quality real estate development for decades, including residential areas built adjacent to Pilgrim as recently as the 1990s. This demonstrates that the presence of a nuclear plant was not a deterrent to real estate activities. Plant closure reduces risk and industrial activity on the nuclear power plant site, therefore it is reasonable to assume land around the plant will continue to be in demand.

Off Site Development: Plymouth is larger and more economically robust than most host communities. Situated in the corridor between Boston and Cape Cod, at 103 square miles Pilgrim is its own region with a diverse tax base, developable land and infrastructure, and major tourism. Given the long timeframe and uncertainty about Entergy releasing its land, Plymouth must pursue more certain and near-term options to replace revenue losses.

Governance, Expertise and Leadership: the Town of Plymouth benefits from expert staff, modern facilities and departments, strong leadership and experienced legislative representation. With respect to municipal and regional capacity, these advantages will be critical for the town and region to act effectively to mitigate economic losses in ways smaller, more rural communities cannot.

Plant Ownership: as an investor-owned plant, not owned by a public utility, Vermont Yankee may provide the clearest precedents. Yankee Rowe, despite being in Massachusetts, was owned and decommissioned by a public utility.

Entergy: in early 2016, Entergy formed the Nuclear Decommissioning Organization. Pilgrim's decommissioning will be the second initiated under the NDO, managed in concert with VY.

Findings and Recommendations for 2016-2017

The Community Guidebook covers the research, assessment, and information-building taking place over the past two years. This final section looks forward, presenting findings and recommendations for Plymouth focused on actions for the coming year. Each item has action items for the immediate future, many with long-term ramifications for the host community. There are many additional processes around the Pilgrim closure that are not covered by these recommendations, which will create demands that must be factored into allocation of time and resources.

These findings are based on observations from past closures. Closure and decommissioning tends to be demanding, even overwhelming for local, regional, and state officials. Few are likely to handle multiple closings in their career, so it's often an unfamiliar topic. Deregulation continues to produce change and uncertainty, making precedents less useful than they might be. The NRC brings its own economic and environmental approaches that are unlike other federal agencies, such as the EPA, DOD, and DOE.

Above all, nuclear closure and decommissioning is, by definition and by necessity, designed around safety and environmental cleanup. More so than in the past, however, the conversation now incorporates concerns about rising cost estimates costs and the availability of the decommissioning trust funds to cover expenses. At no point in the process are the needs of host communities, or the socioeconomic impacts of plant closure, given full and fair consideration.

The INHC's socioeconomic impact study of Pilgrim Station measured the substantial shadow the plant's closure could cast over the Town of Plymouth and the Old Colony Region. Officials and staff have been turning the data into plans. This includes immediate, local needs to replace tax revenue and jobs, and engaging federal policy-makers in removing obstacles to the host community's economic recovery. With no means to act on this information built into closure and decommissioning, the onus is on Plymouth and OCPC to keep working: to use the information provided, the relationships built, the insights gained, and the leadership involved as levers to achieve the outcomes desired.

Recommendation #1: Shape a Citizen's Advisory Panel That Works for Plymouth

Finding: Previous CAP's have generally not included host community's socioeconomic impact mitigation in their mandate or work.

Goal: to ensure a CAP that represents the Town of Plymouth's interests, including goals for mitigation of the socioeconomic losses.

Action Items:

- Work with Entergy's NDO and legislators to design and authorize a CAP with a membership and mandate capable of supporting actions that will mitigate socioeconomic losses from the Pilgrim closure specifically as they impact the host community.
- CAP must include members from state agencies with some authority over closure processes (DPH, DEP) who are consistently reminded by local and regional staff, officials and legislators of community economic impacts and lack of federal assistance.
- The CAP needs representatives from regional and state economic development agencies. VY's NDCAP includes the State Secretary of Commerce and Community Development, and the Executive Director of the regional planning commission.
- The CAP must include strong and consistent representation from the Town of Plymouth. The charter for VY's NDCAP reserved only one seat out of 19 for its host community, Vernon. Wiscasset and Rowe seem to have found greater community satisfaction with their CAPs than Vernon has with its.
- Absent any strong precedent for CAPs that substantially advance the socioeconomic needs of the host community, it is important that Plymouth plan alternative support structures. This may simply be an evolution of the Entergy Task Force, or an additional official CAP, which may provide advantages in terms of interfacing with Entergy, state and federal regulators.

Recommendation #2: Sustain Information Building and Educational Outreach to Foster Economic Recovery

Finding: Past closures have produced weak socioeconomic outcomes, in part due to lack of information and widespread understanding about closure losses and mitigation needs.

Goal: Build support within the community and with key outside supporters by continuing and increasing communications about the plant closure losses as they impact Plymouth and the region.

Action Items:

- Use the Phase I report and the Community Guidebook of Phase II as resources for existing and new stakeholders.
- Host a day-long conference on economic losses to raise awareness, build partnerships and allies, and focus on improving outcomes.
- Keep "translating" and disseminating information to the public, legislators, regulators and others through public meetings, the town web site, and press outlets.
- Create a one-stop web site: a trusted source on closure activities as they impact the Host Community, which is maintained through the removal of spent fuel. Sites hosted by Entergy, NRC, and state agencies will provide good resources for content, but won't reflect local concerns in the same way that a host community presence will.
- Allocate economic development resources to fund long term:
    - Web: staff and technical support for site content management.
    - Communications: balanced, consistent overall messaging on closure and related activities.
    - Contact: a dedicated point of contact between Plymouth and outside parties, including state and federal agencies, to ensure town is fully informed at all times.
    - Coordination: ongoing facilitation of all local efforts, to ensure consistency and accountability among all parties.

Recommendation #3: Sustain a Multi-Scale Approach to Achieving Desired Economic Outcomes

Finding: Plymouth will experience losses starting in 2019, earlier than anticipated, providing less time than expected to enact mitigation strategies around lost jobs, revenue and economic activity.

Goal: Pursue a three-part mitigation strategy for economic losses: near-term PILOT negotiations, mid-term revenue replacement through off-site economic development and long-term site reuse and redevelopment.

Action Items:

- Plymouth's intentions for the undeveloped Pilgrim land must be articulated and put before all who may be party to a negotiation or agreement in the coming year, including Entergy and state officials.
- PILOT negotiations may be undermined by legal challenges to Entergy's use of the DTF for taxes (once it stops generating power and revenue), requiring additional legal support to produce a fair, timely and predictable outcome.
- Continue conversations with Entergy to find out where they are willing to invest in the community to promote economic recovery.
- Create a day-long conference including leaders of firms affected by closure (hospitals, non-profits, suppliers), community leaders, legislators, Entergy, and state officials – awareness and strategies.
- Incorporate Pilgrim losses into the OCPC Comprehensive Economic Development Strategies update to the EDA to aid future applications.
- Use the Economic Study data to apply for EDA funding for studies or planning. Hazard County, KY received $80,000 from the POWER initiative to perform their first business inventory, to identify emerging opportunities and businesses that will be harmed by closure. The EDA can fund infrastructure investments to replace lost tax revenue off site, or planning and investment to redevelop the site itself.
- Identify how the upcoming Plymouth 400 celebrations can offset losses: replacing local spending, compensating for lost refueling hospitality, or helping to secure state investment to permanently boost local and state tourism revenues.
- Partner with unions, community colleges, related industries, and workforce investment boards to retrain and retain as much of the plant workforce as possible.
- Maintain a balanced and realistic approach. To date, Plymouth and OCPC have wisely avoided reliance on a single solution, as other hosts have done: trying to keep the plant open, attracting a new power utility to the site, or taxing the spent fuel.

Recommendation #4: Secure dedicated Capacity and Support for Recovery Needs

Finding: In the past key staff and officials responding to socioeconomic losses had other new responsibilities with regard to closure (e.g. emergency planning, permitting, cleanup), in addition to their usual roles and responsibilities. A lack of dedicated capacity undermines economic recovery.

Recommendation: Dedicate staff and funding to economic recovery. Even with more capacity than most host communities, increased demands on Plymouth and OCPC creates risk that economic goals will be subverted to time-sensitive closure activities.

Action Items:

- Define Pilgrim closure recovery work as a discrete and essential role, requiring dedicated staff and resources.
- Encode recovery priorities within organizational structures, with funding and a long-term commitment.

- Establish a lead on site reuse. Redevelopment may require more attention than other land use situations because of NRC procedures, untested due to lack of reuse precedent among merchant plants.
- Secure outside expertise on site reuse immediately if problems arise. This region has professionals experienced with complex military site redevelopment. Merchant plant site redevelopment is uncharted territory. Dedicated expertise may be needed to leverage the town's biggest asset.
- Move quickly to designate a single economic redevelopment point-person, to maximize working across scales and coordinating the efforts of different agencies; to help to apply for grants; and to provide public information.
- Whether it is a new or existing organization, consider establishing a long-term redevelopment entity.
- Stay policy active. Reach out to state officials (AG, Governor, DPU) who may be involved in closure negotiations to ensure Plymouth's concerns are understood and represented.
- Build a mitigation needs list: local elements at risk (use economic impact study); funding, land, or other resources sought; geographic allocation scheme; and mechanism to distribute funds.

Tools for Economic Recovery

Plymouth's toolkit includes major assets: over 1000 acres at the site, a tourism base and robust regional economy, a concentrated workforce and large regional utility sector. Additional resources will help leverage these and other assets:

The Economic Development Administration: (EDA) Economic Adjustment Assistance Program and Public Works and Infrastructure Grants

- **Pros** – OCPC has a CEDs and capacity to apply; EDA provided funds to help Vermont plan, build capacity and launch programming; EDA regional staff have been engaged with nuclear closure issues via VT for several years; can use for on site or off-site projects as long as connection between closure impacts and project outcomes is demonstrated.
- **Cons** – No pathway to POWER funds despite indications nuclear would join coal-communities targeted by this program; needs matching funds; cumbersome to administer.

MA Yearly Assessments: Legislation to assess Entergy at $25 million/year for the duration of the license.

- **Pros** – Correct scale of investment to mitigate PILOT, pursue site reuse and augment economic activity; Unlike grants, could be flexible to cover the range of needs from tax stabilization to special projects on and off site.
- **Cons** – May never happen; Not clear funds from Entergy won't come out of DTF; Gives Entergy excuse not to cooperate with host while it's being litigated; State allocated money to closure may not reach local community; May go to court.

Host Negotiates with Entergy: PILOT, land transfer, direct assistance.

- **Pros** – Simple. like Entergy Charitable Foundation $350k to NH, transfer of Governor Hunt House to Vernon.
- **Cons** – Too little and unreliable; money may come out of DTF depending upon litigation outcomes. DTF is not yet at level needed for full DECOM, so near term mitigation delays total cleanup by drawing down funds.

Vermont's WCEDP offers lessons, including the fact that no dollars have yet flowed into Vernon.

- Resist the "Default Settings:" that cleanup is the only goal, and that all negotiations are around how clean is clean, how long it takes, and how much it costs; that site reuse is the answer; or that outcomes should address state-level economic and energy supply goals. Plymouth will need to work constantly to put local goals on the agenda, identify and remove barriers, and secure resources.

Conclusion

The socioeconomic losses Pilgrim's closure will bring are already evident to the Town of Plymouth and Old Colony Planning Commission. However, impacts on host communities are not widely recognized, much less understood. Their severity and duration tend to be underestimated or ignored.

The Town of Plymouth is responding to urgent and immediate concerns like the potential loss of hundreds of residents starting in 2019. It faces situations with intergenerational consequences, like the presence of spent fuel. Striving to maintain that balance between near-term needs and long-term strategies is the crux of the challenge: balancing local comprehensive site and tax planning, regional economic mitigation and opportunities, and influencing the national policy frameworks that dictate local conditions. Closure and decommissioning processes are designed to produce a clean site. But the timeline for cleanup and release of the site will have profound economic effects on the community. These factors are determined by NRC rules, and the trust funds. The long-term goal is to improve policy and regulations to improve options for host communities.

The overarching challenge for the Pilgrim host community is to find balance between responsiveness, planning, and investing in long-term outcomes. The challenges are great, but Plymouth is uniquely positioned to succeed.

Unanswered Questions

- Where will money for economic actions come from, how much and for what?
- Will Entergy NDO represent a major change in practices from the Vermont Yankee closure?
- Does the recently announced sale of Entergy's Fitzpatrick plant in NY mean Pilgrim's closure date is still uncertain?
- Where will long term responsibility for mitigation sit, especially site reuse?

- Without nuclear included in POWER will Pilgrim, JAF struggle to secure EDA funding despite success in VT?
- Can consent-based siting by DOE bring attention, relief, to current hosts?
- Can Plymouth access some portion of the decommissioning trust funds allocated for planning (directly, through the state or Entergy)?
- Will the state or Entergy fund this work directly?
- How to fund sufficient staff to generate materials and maintain the site over several years, given the additional unfunded mandates that closure already imposes on the community?
- How to fund economic mitigation projects over the long term?
- Only 1-200 acres around plant are covered by site license. Are we certain the balance of the acreage can be released without 'restricted release'? (Activity involving site license must be initiated by licensee)
- Is Entergy willing to sell / convey the land? If not, why not?
- How can the state help Plymouth secure ownership & control for orderly and productive redevelopment in a timeframe suitable to replace losses?
- Who in state government embraces Plymouth's economic goals?
- Which state agencies involved in the CAP would help Plymouth and OCPC find support, resources or process control based on the specific regulatory frameworks affecting site cleanup?

Community Guidebook – Topic Briefings

The economic study, research and recommendations, and educational briefs are brought together in this Community Guidebook. While INHC focuses on socio-economic impacts, the Guidebook covers general closure topics for an important reason: In researching past closures and trying to understand why their socioeconomic outcomes were weak, we found the amount of technical information overwhelms local leadership. A lack of local and regional capacity that can meet closure in terms of the economic scale, and technical complexity, and long timeframes is an insidious factor that undermines host community outcomes. We believe helping overcome that disadvantage will support a commitment to create exceptional outcomes for Plymouth and the region.

This section brings together a series of briefs created to support local and regional efforts to increase expertise in all aspects of the closure event. These resources are part of an important pre-closure process whereby all officials and stakeholders are becoming conversant in the fundamentals of closure and decommissioning *as they relate to the community*.

Briefings included in the 2016 Phase II Report

- Closure and Decommissioning Timelines
- Pilgrim Station Decommissioning Cost Estimate
- Pilgrim Station Decommissioning Trust Fund
- Site Release Prior to Decommissioning
- Interaction between the NRC and the EPA
- Site Outcomes
- Citizens Advisory Panels
- External Funding

These materials have been prepared with a broad range of Pilgrim Stakeholders in mind, including todays leaders and tomorrow's citizens, future CAP members, legislators, and regulators, to promote a productive environment for deliberation and decision-making.

This is a first iteration of a resource every host community needs: A guidebook to nuclear plant closure written from the community perspective, taking into account your needs and objectives for near and long term success. The Institute for Nuclear Host Communities thanks the Pilgrim host community for their foresight and the opportunity to develop materials that will benefit this and other communities in the future.

Closure and Decommissioning Timelines

1. Key Points

- The NRC lets the plant owners select the decommissioning method: immediate dismantlement, (DECON) or deferred dismantlement (SAFSTOR).
- It is nearly certain Pilgrim Station will use the SAFSTOR approach.
- Temporary contractors carry out most decommissioning work, so staffing reduction patterns for existing plant employees is similar regardless of the method.
- Process begins to move very quickly, with limited opportunities for public engagement.

2. The Issues

The purpose of nuclear decommissioning is to return the site to a neutral radiological state, allowing for unrestricted future uses of the site. The NRC gives licensees a great deal of independence and flexibility in the decommissioning process, allowing them up to 60 years to complete the process. Public participation in the process is limited, NRC approval is not necessary for a number of activities, and the licensee is free to choose the method that best suits its needs. In Massachusetts, where the radiological cleanup standards of the state are stricter than the NRC's, a licensee is very unlikely to attempt an immediate cleanup. From the NRC's perspective, there are seven substantial milestones:

- After deciding to shut down, the licensee has 30 days to notify the NRC in writing.
- Once operations have ceased and the fuel has been removed from the reactor, the licensee must submit a written certification to the NRC.
- Within two years of the shutdown (or beforehand), the licensee must submit a Post-Shutdown Decommissioning Activities Report (PSDAR). The PSDAR describes the activities planned, a schedule for major milestones, a cost estimate, and appropriate environmental impacts considerations. NRC does not approve of the PSDAR. (The Vermont Yankee PSDAR was submitted to the NRC on December 19, 2014, ten days before the plant's closure on December 29.)
- After receiving the PSDAR, the NRC makes the document available for public review and holds a public meeting near the plant to discuss its contents.

- At least two years prior to completing decommissioning activities, the licensee must submit a License Termination Plan (LTP). NRC reviews and approves of the LTP or requests additional information. The LTP includes radiological data, remaining activities, site remediation plans, updated cost estimates, and a detailed plan for the final remediation survey.
- After receiving the LTP, the NRC makes the document available for public review and holds a public meeting near the plant to discuss its contents.
- Licensee submits Final Status Survey Report (FSSR). NRC performs confirmatory surveys to approve the FSSR. If approved, the decommissioning is complete and the license is terminated. ISFSIs are licensed separately from reactors, so a plant decommissioning can be completed without removing the ISFSI.

At the end of this process, currently estimated at 60 years, the site is available for reuse. However, the NRC allows for portions of a site to be reused prior to the completion of decommissioning, if certain conditions are met. Interest in this topic was first raised in the late 1990s, and resulted in NRC rulemaking to guide whether and how a portion of a site could be released for active use, either by the licensee or a third party.

Although decommissioning is overseen by the NRC, some questions have been raised about its programs for monitoring and remediating the non-radiological contaminants that are commonly found at any power plant or industrial site. The EPA ordinarily has jurisdiction over these contaminants, but it defers at NRC-licensed facilities. Since environmental and/or public health agencies in a number of states often administer and enforce federal regulations on behalf of the EPA, agency representatives are taking a close look at the NRC's non-radiological guidelines to ensure that they meet state and federal standards.

While the decommissioning method attracts the most attention due to the substantial time scale difference between DECON (5-10 years to complete) and SAFSTOR (up to 60 years), it should be noted that there are a number of similar outcomes: the same job losses, the same tax revenue depletion, and the same ISFSI next to the same vacant industrial site. In the case of DECON, a large temporary workforce of project managers, contractors, subcontractors, and laborers provides a bump in spending at hotels, motels, rentals, and restaurants and grocery stores shortly after the plant closes. This offsets some of the local loss of earned income due to staff reductions, but only to a fairly small extent and only for until the decommissioning is completed. A similar

bump occurs under the SAFSTOR approach, but not until after a dormant period of 40 to 50 years.

From a local perspective, the most substantial timeline issues pertain to plant staffing reductions, and changes to plant payments to host communities. Regardless of the decommissioning method chosen, Plymouth should expect the Pilgrim Station workforce of approximately 630 at the time of the recent closure announcement to drop by about half shortly after the plant shuts down; to fall to approximately 120 two years after closure, while the spent fuel cools in the pool; and decline to 25 or so six years after closure, which will hold steady as long as the ISFSI is on site.

To demonstrate that staffing reductions are similar for DECON and SAFSTOR, below are employment totals from the closures of Maine Yankee (DECON) and Vermont Yankee (SAFSTOR) are included.

Milestone/Phase	Timing	MY jobs	VY jobs
Closure announced	12-18 mos. Prior	675	625
Plant closure	(see **WARN Day**)	600	550
Post-operational	Years 1 and 2	315	315
Wet fuel cooling	Years 3-6	115	125
Dry cask storage	Year 6 onwards	20	25

WARN Day: under the federal Worker Adjustment and Retraining Notification Act (WARN), certain employers are required to provide affected employees with 60 days' notice in advance of plant closings and other mass layoffs. The act will be applicable to Pilgrim Station's employees. At Vermont Yankee, the reduction amounted to 165 jobs, approximately 30 percent of the remaining workforce (which had by then dropped to 554). The layoffs, which were directly related to the reduced workforce needs of a plant no longer generating electricity, were announced November 19 (about one month before the shutdown), and effective January 19, 2015. Plymouth can expect a similar drawdown within a month or so of the plant's closure.

In addition to the staffing changes, the post-operational phase will also affect the plant's contributions to municipal finances through property tax payments/PILOTs and emergency management payments as mandated by the existing EPZ (Emergency Planning Zone). Federal law requires nuclear plant operators to provide special emergency planning services and evacuation plans for residents within a ten-mile radius of the plant. Five towns are within Pilgrim Station's EPZ: Plymouth, Kingston, Duxbury, Carver, and Marshfield. These towns are also provided with annual payments from Entergy to offset the costs of their local emergency preparedness activities, as are three towns

outside the EPZ (Bridgewater, Taunton, and Braintree) that are included in the planning process. In 2014, Entergy paid a total of $1 million to these eight towns: $245,000 to Plymouth; $186,000 to Marshfield; $114,000 to Bridgewater; $100,000 to both Taunton and Braintree; and $85,000 apiece to Kingston, Carver, and Duxbury.

As part of the shutdown process, Entergy is likely to seek NRC approval to reduce the EPZ to the size of the plant itself, with the rationale that a permanently shut down reactor is incapable of producing the sort of emergency that the EPZ addresses. (In the case of Vermont Yankee, the NRC agreed with Entergy's position, greatly reducing its financial obligations to local emergency planning.) Entergy will enter into negotiations with Plymouth for a substantially reduced tax burden once the plant ceases operations, with the rationale that the plant is of little economic value, contains no immediately reusable infrastructure, and is characterized by elevated levels of radiological activity. The parties often come to an agreement eventually, but plant owners have shown a willingness to take host communities to court over assessment disputes, with some success.

Decommissioning plants have been also able to demonstrate to the NRC's satisfaction that a closed nuclear plant does not require the same level of emergency planning as an operational reactor. Some EPZ municipalities have agreed to a gradual drawdown of contributions from closed reactors, but the municipalities rarely negotiate directly with the plant owners. Instead, the relevant state emergency management and homeland security agencies, which are facing their own budget reductions with the loss of the EPZ, often represent the interests of the affected municipalities along with their own interests.

3. ETF Considerations and Next Steps

Site reuse: if this is a priority of the ETF, understanding the NRC rulemaking on the topic of partial site release could be helpful given the likelihood of SAFSTOR.

Decommissioning jurisdiction: if state environmental agencies are looking to establish standing regarding site cleanup, the ETF may wish to discuss the issue with representatives of those agencies and their MassDEP counterparts.

EPZ negotiations: since Plymouth receives the bulk of Entergy's municipal emergency management funding, the ETF may wish to review the outcomes for other host communities, and meet with MEMA officials to discuss the anticipated process and expected outcomes.

Workforce transitions: the ETF may wish to examine whether the Plymouth's industry mix could support a number of outgoing Pilgrim Station employees. Potential partners include labor unions representing plant employees, and Massachusetts Department of Career Services (DCS) Rapid Response Team, which provides career counseling and training services to employees receiving a WARN notices.

Pilgrim Station Decommissioning Cost Estimate

1. Key Points

- Decommissioning cost estimate is specific to Pilgrim Station.
- Projects closure in 2012, SAFSTOR until 2042, unrestricted use by 2050.
- Estimated cost: $914.4 million in 2007 dollars.

2. The Issues

Relevant statute: 10 CFR 50.75 (f)(3): Each power reactor licensee shall at or about 5 years prior to the projected end of operations submit a preliminary decommissioning cost estimate which includes an up-to-date assessment of the major factors that could affect the cost to decommission.

As a result of this statute, Entergy submitted a decommissioning cost estimate to the NRC in July of 2008, while the license renewal process was ongoing.[2] The analysis presumes a 2012 shutdown; SAFSTOR until 2042; active decommissioning until 2048; and site restoration until 2050. According to the cost estimate, the total cost (planning, decommissioning, spent fuel management, site restoration, etc.) was $914.4 million. Adjusted to 2015 dollars, the cost is $1.05 billion.

A key assumption in this and all other decommissioning cost estimates (including those for reactors that have been shut down, such as Vermont Yankee) is that they make the assumption that the Department of Energy will have removed all spent fuel from the site before site restoration is complete. The approach is in keeping with the established DOE program for how it will accept spent fuel, whenever that day comes. The DOE has an "oldest fuel first" policy in place, such that all fuel across the country that was exhausted in 1975 will be accepted before fuel that was exhausted in 1985.

In this instance, the estimate assumed that the DOE would begin accepting commercial spent fuel in 2017, and the first Pilgrim Station fuel in 2019. The fuel transfer process would then take place over the next 23 years. In fact, the active decommissioning period in the estimate would not begin until 2042, after all spent fuel had been removed. (Similarly, the estimate in VY's PSDAR assumes that the DOE will begin accepting spent fuel in 2025, and receive the last of VY's fuel in 2052.)

[2] Online at: http://pbadupws.nrc.gov/docs/ML0821/ML082170672.pdf.

While this may be a necessary step in the cost analysis, it is certainly not based in any realistic forecast of spent fuel storage in the United States. However, this has less to do with any operator sleight-of-hand and more to do with a policy failure. Congress passed the Nuclear Waste Policy Act (NWPA) in 1982, assigning the federal responsibility for long-term storage of spent nuclear fuel to the DOE. The NWPA directed the DOE to begin accepting spent fuel for storage by January 31, 1998. Although this plainly has not happened, and does not appear to be any closer to happening than it was on February 1, 1998, the assumption that it will happen one day is the only way to prevent the cost estimate from stretching onwards indefinitely. With ISFSI management at VY estimated to cost about $3.8 million per year (as per the cost estimate), the impasse on fuel storage can have clear consequences for the decommissioning trust fund.

3. ETF Considerations and Next Steps

Rulemaking comment: The ETF may wish to request that the NRC establish standards and necessary guidance for cost fund estimates that more accurately reflect the realities of the national impasse on spent fuel. Cost estimates that include unrealistic or arbitrary assumptions are likely to produce unrealistic or arbitrary estimates.

Nuclear Matters Committee guidance: input on the cost estimate from the NMC may help the ETF identify the most relevant factors in the analysis, and provide a level of “ground-truthing” through their years of experience.

Entergy dialogue: the ETF may wish to contact Entergy to explore the possibility of conducting an exploratory “status quo” estimate in which the spent fuel stalemate continues into the future.

Pilgrim Station Decommissioning Trust Fund

1. Key Points

- Fund is valued at approximately $870 million.
- Entergy may use up to three percent of fund for decommissioning planning.
- The NRC has granted requests at other facilities to use these funds for spent fuel storage. (Expenses related to spent fuel must then be recovered from the Department of Energy through the legal system.)

2. The Issues

Since the costs of decommissioning a nuclear power plant are so extensive, the NRC requires licensees to demonstrate financial assurance for the process. Operating reactors are required to report on the condition of the funds every two years, and annually once the reactor is within five years of shutdown until the reactor is decommissioned. For licensees such as Pilgrim Station, which are not able to recover expenditures through charges to ratepayers, the management of a trust fund is the most common way to grow the necessary funds. This is referred to as the nuclear decommissioning trust (NDT) or the decommissioning trust fund (DTF).

Licensees may access the NDT under three conditions: the withdrawal is for an expense for legitimate decommissioning activities; the withdrawal would not prevent the NDT from covering the costs to put the reactor into SAFSTOR should the need arise; the withdrawal would not affect the licensee's ability to provide additional funds needed for reactor decommissioning. Up to three percent of an NDT may be used for decommissioning planning prior to closure. Additionally, the NDT may be used to cover fund-related expenses, including taxes, administration, and legal costs. For all other expenditures, such as the management of spent fuel, the licensee is required to submit a notification to the NRC of an intent to withdraw funds, with 30-working days of notice. The NRC will notify the licensee if there is any objection to the intended expenditure. The NRC has accommodated most, if not all, of these filings over the years. Operators then sue the Department of Energy, which was supposed to have provided the public with a permanent repository for spent nuclear fuel many years ago, to recover the expenses related to spent fuel. However, questions remain as to the impact of this ad hoc process on the growth of the DTF while the court cases are proceeding (and the spent fuel costs are ongoing), and once the funds have been secured from the DOE.

According to the most recent reports filed with the NRC, Pilgrim Station's NTD was $896.4 million as of December 31, 2014.[3] This is well in excess of the NRC's Minimum Financial Assurance (MFA) calculation for the plant's decommissioning, which is $628.1 million. However, according to a Bill Mohl, president of Entergy Wholesale Commodities, the NDT balance was $870 million as of September 30, 2015. Whether this reflects changes in investment valuations, withdrawals for decommissioning planning expenses, withdrawals for spent fuel management expenditures approved by the NRC, or some combination of the three, is not immediately obvious.

A similarly unclear question pertains to the fate of any remaining funds in the NDT after decommissioning is complete. In the most recent NRC meeting on the proposed rulemaking process, a representative if the NRC's financial assurance team answered a question from the public on the topic. According to the NRC, once the license has been terminated the contents of the fund are no longer subject to NRC oversight. What happens afterwards is outside the NRC's scope, and the agency is therefore unable to answer the question in any more detail.

3. ETF Considerations and Next Steps

NDT Remainders: Green Mountain Power and its subsidiary, the Vermont Yankee Nuclear Power Corporation, are scheduled to receive 55 percent of any leftover funds in the VY NDT. The ETF may wish to determine what entities, if any, are entitled to leftover funds from the Pilgrim Station NDT.

Vermont Yankee NDT negotiation: The ETF may benefit from a summary of State of Vermont's appeals to the NRC, the Atomic Safety Licensing Board, and the federal courts for NDT expenditure restrictions. In that instance, the total decommissioning cost estimate is $1.25 billion, nearly double the $650 million that was in the NDT at closure.

[3] Available at: https://adamswebsearch2.nrc.gov/webSearch2/view?AccessionNumber=ML15092A141

Site Release Prior to Decommissioning

1. Key Points

- Often coincides with completion of decommissioning.
- Partial site release prior to decommissioning is possible.
- Process must be initiated by licensee.

2. The Issues

When a site's residual radioactivity has been reduced to background levels, the NRC will release the site for unrestricted use. Most often, this coincides with the completion of decommissioning and the termination of the operating license, or at the very least the approval of the License Termination Plan (LTP) that is filed within two years of decommissioning completion. However, these are not the only circumstances under which a portion of a nuclear power plant's land holdings can be returned to active, unrestricted use.

In the late 1990s, a number of licensees expressed an interest in selling portions of their sites to third parties, and requested NRC guidance on the topic of partial site release prior to decommissioning. The NRC determined that the topic of partial site release was not adequately addressed in the Code of Federal Regulations (CFR). Through the rulemaking process, the NRC established 10 CFR 50.83: "release of part of a power reactor facility or site for unrestricted use[4]."

The NRC allows for this partial site release may be sought at any time. It requires that the licensee seeking the release perform a number of site surveys demonstrating that the portion under review is now and shall remain at an acceptable radiological threshold. Of special importance is that the NRC recognizes a difference between "impacted" and "non-impacted" portions of a site. Non-impacted areas are those with no reasonable potential for contamination, as evidenced by assessment documentation submitted by the licensee, and demonstrated to the NRC's satisfaction.

3. ETF Considerations and Next Steps

Prioritize areas of greatest interest: there are many hundreds of acres belonging to Entergy that could conceivably be categorized as "non-impacted" and therefore reasonable candidates for early release. For example, Entergy owns land adjacent to the 16 houses of Turnberry Drive, all but one of which

[4] Available at http://www.nrc.gov/reading-rm/doc-collections/cfr/part050/part050-0083.html.

were built between 1994 and 1999. The ETF should review these parcels and determine which, if any, it would be interested in seeking early site release for.

Discuss process with Entergy: if the ETF determines that any portion of Entergy land is of interest, it should consider reviewing the process in greater detail and approaching Entergy to explore possible outcomes, particularly with respect to any potential MOU or valuation of property following plant closure.

The NRC and the EPA

1. Key Points

- EPA mostly defers to NRC oversight at decommissioning power plants.
- NRC defers to EPA jurisdiction regarding hazardous waste through RCRA legislation.
- Most states (including Massachusetts) administer RCRA programs for the EPA.
- Concerns that SAFSTOR delays cleanup of hazardous waste hazardous waste cleanup programs from taking place in a timely fashion.

2. The Issues

The 2002 memorandum of understanding between the NRC and the EPA addresses the decommissioning and decontamination of NRC-licensed sites, including power plants[5]. At issue is the jurisdictional overlap presented by non-radiological contaminants at decommissioning sites. Such contaminants, such as PCBs, heavy metals, and volatile organic compounds (VOCs) are often found at industrial sites, and they are often detected by the site surveys that are a part of the nuclear decommissioning process.

Ordinarily, the EPA has jurisdiction over cleanup processes where such contaminants are found. Depending on the kind, amount, and location of the contaminants, the EPA would act in accordance with Congressional directives under the 1980 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); the 1976 Resource Conservation and Recovery Act (RCRA); and/or the 1974 Safe Drinking Water Act, which established Maximum Contaminant Levels (MCLs) for groundwater. Although the NRC is specifically tasked with overseeing the cleanup of nuclear sites, the EPA became involved as the first nuclear shutdown sites were undergoing decommissioning in the 1990s. By 1999, there was enough confusion that the House Committee on Appropriations required the two agencies to enter into an MOU to clarify the EPA's role at NRC-regulated sites.

The 2002 MOU establishes that the EPA defers to NRC decision making at sites undergoing nuclear decommissioning in most circumstances. With respect to CERCLA provisions, the NRC will seek out EPA guidance during the license termination process in four instances: if the NRC determines that there is radioactive groundwater contamination in excess of the EPA's established

[5] Available at http://www.nrc.gov/reading-rm/doc-collections/news/2002/mou2fin.pdf.

MCLs; if the NRC is considering a restricted release for a site; if the NRC is considering the use of alternate criteria for license termination; or if either the planned level or the actual level of residual radioactive soil contaminants is in excess of established concentration levels. With respect to RCRA provisions, however, the MOU makes clear that the cleanup of hazardous waste is within the EPA's jurisdiction. Since many states are authorized to implement the cleanup programs that meet RCRA standards for chemical contamination, the MOU directs the EPA to encourage those agencies to coordinate RCRA cleanups with the nuclear decommissioning process.

In both instances, the selection of a SAFSTOR decommissioning complicates matters. If the MOU's language about the "license termination process" is meant to refer to the licensee's filing of the License Termination Plan (LTP), the CERCLA-related provisions would not come into effect until approximately two years before the conclusion of decommissioning activities, when the LTP is sent to the NRC. Similarly, if the hazardous materials cleanup under RCRA must coincide with decommissioning, the work might not be undertaken for decades while the site is dormant. In Vermont, where the state's Agency of Natural Resources (ANR) has RCRA authority, the ANR has expressed concern that Entergy's decision to put Vermont Yankee into SAFSTOR will create the kind of public health risk RCRA is meant to prevent. In this instance, non-radiological contaminants would remain on a site adjacent to the Connecticut River for decades. The ANR has raised the issue with the NRC in the recent round of Rulemaking.

3. ETF Considerations and Next Steps

Contact MassDEP: the ETF should urge representatives from MassDEP (the Vermont ANR's equivalent) to contact ANR personnel regarding SAFSTOR's impacts on RCRA cleanup activities, and to update the ETF with anticipated regulatory positions.

Closures and Negotiations

1. Key Points

- Typically state-led, and based on relicensure.
- Relatively few examples.
- Local impact mitigation funding is calculated at random.

2. The Issues

The three examples discussed here demonstrate how widely negotiating outcomes vary for host communities faced with nuclear plant closure. In two of the cases, the license renewal process opened a negotiating window for state government. In the third, a county and town negotiated together, and the outcome isn't promising.

The first example is Oyster Creek, a nuclear plant on the New Jersey coast that is scheduled to shut down by 2019, ten years before the plant's license expires. The premature closure is the result of an agreement between the plant owners, Exelon, and New Jersey's Department of Environmental Protection (DEP). As the plant sought a twenty-year extension to the original operating license issued in 1969, the DEP determined that the agency could not sign off on the plant's continued operation without the construction of expensive cooling towers for water discharge. Acting on its authority to ensure compliance with state and federal environmental laws, the DEP considered withholding the necessary permits for the plant's operation. After extensive negotiations, the agency agreed to forgo the requirement for new cooling towers in exchange for the plant's early shutdown. The agreement, an Administrative Consent Order (ACO), also secured $1 million in financial contributions from Exelon for local environmental research and protection. The ACO did not address socioeconomic impacts in any way.

The second example is in Vermont, where the state's Public Service Department (PSD) and Agency of Natural Resources (ANR) negotiated a Memorandum of Understanding (MOU) with Entergy to ensure Vermont Yankee nuclear power plant's continued operation. In accordance with state law, Vermont Yankee needed to obtain a Certificate of Public Good from the state after receiving its license renewal from the NRC in 2012. By the time the certificate was issued in December 2013, Entergy had announced its intention to close the plant by the end of 2014. Under the terms of the MOU, the state agreed to issue the certificate to operate until the end of 2014 in exchange for financial contributions from Entergy totaling $40.2 million. Of that total, $25

million was set aside for site restoration after decommissioning; $10 million was marked for economic development in Windham County, where the plant is located; $5.2 million to support clean energy development, at least half of which was to take place in or for the benefit of Windham County; and with the remaining $5 million paid to the state. Although the Town of Vernon was not made a direct recipient of the money directed towards Windham County, this MOU is so far the most substantial attempt to secure funds to mitigate the socioeconomic impacts of a nuclear plant's closure.

On the other side of the dial is Kewaunee County and the Town of Carlton, Wisconsin, where the Kewaunee Power Station operated until 2013. The closure was unexpected, the state did not get involved, and the strategy was unwise. At the time of the shutdown, the plant was providing the town and the county with a total of approximately $1.1 million per year in taxes, and $120,000 for emergency management and fire protection. Initially, Dominion proposed a ten-year transition plan, starting in 2014. Under the plan, Dominion would maintain the pre-shutdown levels of tax revenues in Kewaunee County and the Town of Carlton for the first five years, and then begin a five-year phase out period in 2019. The governments supported the proposal at first, but Carlton officials eventually backed out of the plan. Where the three sides had originally agreed to a value of $10 million for the closed plant in 2014, Carlton placed an assessed value of $457 million on the plant for 2015. Since then, Dominion has taken the town to court, and the case is still ongoing. The county soon faced a $500,000 budget shortfall on $11 million of revenue, and the town raised mill rates to account for the loss of 70 percent of its budget. In July, a desperate appeal to the state legislature resulted in a new law to provide financial stability to the affected governments.

3. ETF Considerations and Next Steps

Identify potential negotiating partners: The ETF should consider reaching out to representatives from MassDEP, MEMA, and the departments of Revenue and Public Health, among others, to discuss closure impacts and departmental strategies.

Assessment valuation: The ETF should review the assessed values and litigation histories of other closed nuclear power plants, and evaluate risks and benefits.

Site Outcomes

1. Key Points

- There is very little activity at former nuclear power plant sites.
- Three factors drive the site outcomes: generally high standards and costs for cleanup; generally low location values; and the indefinite presence of spent fuel installations.
- Focus on site redevelopment/reuse and the factors listed above often prevents any discussion of the undeveloped buffer land around the site.
- Pilgrim Station's undeveloped land will attract an unusual amount of development interest.

2. The Issues

Nuclear decommissioning and site restoration are technically complex projects that require several years of high-intensity work and approximately one billion dollars to complete. The result, remarkably, is often a large, flat patch of nearly empty space, surrounded by hundreds of acres of undeveloped land. Even more remarkably, this entire project usually takes place in a rural hinterland, with the nearest house more than a mile away. The only clear indicator of a prior nuclear presence is the ISFSI pad, where large concrete casks hold the spent nuclear fuel as it releases heat into the air.

Between 1989 and 1998, the first wave of nuclear plant closure resulted in the shutdown of nine nuclear power plants. Eight of these have completed nuclear decommissioning and site restoration, and the ninth expects to complete the process by 2018. The table below summarizes a number of the relevant characteristics of these plants.

Plant	Year	Age	Ownership	Method	Site Reuse Outcome
Fort St. Vrain	1989	10	Public	Immediate	Gas plant (1996)
Rancho Seco	1989	14	Public	Deferred	Gas/solar plant, outdoor recreation (2006)
Shoreham	1989	3	Public	Immediate	Peak demand oil plant (2002)
Yankee Rowe	1991	30	Public	Immediate	None
Trojan	1992	16	Public	Immediate	Outdoor recreation
CT Yankee	1996	28	Public	Immediate	Failed gas plant (2002), land preservation
ME Yankee	1996	25	Public	Immediate	Failed gas plant (2007), outdoor recreation
Big Rock Point	1997	34	Public	Immediate	None
Zion	1998	25	Public	Deferred	Decommissioning now

The first issue from the chart above pertains to the early successes (on paper) of energy generation reuse. Every operating nuclear power plant is supported by valuable infrastructure: electrical transmission, transportation, waterways, pipelines, and other investments. To many observers, it seems natural that former nuclear power plants would be ideal sites for other sources of power generation, or any type of heavy industry. But Fort St. Vrain's switch to natural gas would have been much more challenging if the plant weren't atop the Denver-Julesburg Basin, one of the largest oil natural gas plays in the United States. Similarly, Rancho Seco sits atop the Sacramento Basin, and the nearby Rio Vista gas field is the state's largest. Even then, it was more than 15 years after the closure of the nuclear plant before the new gas plant came on line. Pilgrim Station, like the former Connecticut Yankee, Maine Yankee, and Vermont Yankee plants that have already shut down, is not as advantageously located as the plants in Colorado and California. It is therefore highly likely that any proposal for a natural gas plant would have the same unsuccessful outcome as the other New England site proposals.

The most common closure outcome is for the decommissioned site to remain "blank," with no activity except for the management of spent fuel installations, which requires a staff of about two dozen individuals, mostly security-related. Some portion of the land, distant from the ISFSI, may be converted to a public park or recreation area, or donated to a land trust for wildlife preservation if the habitat is of especially high quality.

The Pilgrim Station closure experience, however, may deviate substantially from the New England experience with respect to the buffer land surrounding

the plant. Previous closures in New England have taken place in relatively isolated locations with little inherent development value. While in the cases of Maine Yankee and Connecticut Yankee, some acres have been donated to wildlife preservations and land trusts, these plants were not located in growing towns near major cities. (Please see Appendix C of the Pilgrim Nuclear Power Station Study for more detailed information on these two closure experiences.) Some of the coastal sections of Pilgrim Station's nearly 1,700 acres may be of exceptional ecological value, and therefore likely to see limited development potential due to environmental regulations or local preservation interest. However, given the residential development on Turnberry Drive (adjacent to Entergy land) in the 1990s, it seems very likely that but the parcels along State Road are distant enough from the plant and the ISFSI to seem relatively attractive to developers.

3. ETF Considerations and Next Steps

The Task Force should bear in mind that plant ownership has an obligation to return the land to a neutral radiological state, and this involves the removal of substantial infrastructure that would otherwise be reusable. Focusing on a similar generation or other industrial use for the plant is unlikely to register as a priority for Entergy, and if there is substantial public interest in the reuse of the site, the Task Force may wish to work with Entergy to move the focus off "replacing" and on "rethinking."

The Task Force should take advantage of the exiting lead time prior to closure in order to explore a number of scenarios for closure outcomes. These scenarios would combine elements of permanently protected open space, real estate development, and "off-limits" decommissioning/ISFSI land. The purpose would be for the ETF to enter the final months of Pilgrim Station's operations with a set of preferred outcomes that would set the tone for the conversation, and provide other actors at regional and state levels with an understanding of local land use goals. Consulting with individuals involved with the decommissioning of Maine Yankee, Connecticut Yankee, and Yankee Rowe may help the Task Force understand the mechanics of donating former power plant buffer land, especially in light of state-mandated radiological cleanup standards that exceed federal thresholds.

Citizens Advisory Panels

1. Key Points

- Power plants often convene the community advisory panels, authoring the charter and either selecting the members or the groups represented.
- CAPs are often the only way for representatives of the relevant local and state entities to regularly meet with one another and the public.
- The nuclear decommissioning learning curve is steep, and most members of the public and of the CAP itself are not fully up to speed when the meetings begin.
- It is a resource and political drain to be angry at Entergy when vague NRC policy is the source of the conflict.

2. The Issues

When the decision to close a nuclear power plant is announced, community members are often surprised to learn that plant decommissioning is not a publicly-directed process. In fact, the Nuclear Regulatory Commission (NRC) currently requires only two public meetings during decommissioning: the first after the operator determines its plans for performing the decommissioning, and the second once the operator is close enough to the end of the process to map out final activities in greater detail.

For the community members and local officials with questions about the decommissioning process, and for the plant operators who would like the opportunity to address public concerns, the two-meeting minimum is insufficient. As a result, community advisory panels (CAPs) have been formed to provide stakeholders with a forum for input, information, and communication. This briefing provides an overview of these panels and their characteristics.

Since there is limited experience with nuclear decommissioning in general, there is fairly limited experience with decommissioning CAPs as well. The table below lists the handful of CAPs that have been formed since the first wave of plant closures began in 1989, along with some relevant characteristics.

Name	Size	Organizations	Local Reps	Regional Reps	Formed	Duration	Outcomes
Connecticut Yankee Community Decommissioning Activities Council	15	Conn Yankee; US House Rep's office; CT Division of EM/HS; League of Women Voters; Citizens Awareness Network	Village (Haddam Neck); Town (Haddam)	One appointee from each EPZ town; County Chamber of Commerce; Local Hospital	1997, by power plant	9 years, through decommissioning; became nine-member Fuel Storage Advisory Committee in 2007, which meets annually	No active use, some land preservation
Maine Yankee Community Advisory Panel	14	Maine Yankee; State Senator's office; Governor's office; Friends of the Coast	Town Planner (Wiscasset); Town resident.	One county resident. Seven EPZ residents: non-local; business owner; environmentalist; science teacher; professionals in emergency planning; radiological; marine resources.	1997, by power plant.	8 years, through decommissioning; became seven-member MYCAP on Spent Nuclear Fuel Storage & Removal in 2005, which meets annually	Some public access for hiking and hunting
Big Rock Point Citizen Advisory Board (CAB); Restoration Safety and Review Committee (RSRC)	CAB: 12-14; RSRC: 8.	Leaders of four-county area	County commissioner	Regional Chamber of Commerce	1995 (CAB); 1998 (RSRC), by plant	Through 2006 decommissioning	No active use
Yankee Rowe Community Advisory Board	16	Yankee Atomic; MassDEP; MEMA; Citizens Awareness Network	Town Selectperson.	Regional planning agencies; County Chamber of Commerce; one elected official from each non-local EPZ town (eight total)	1998, by plant (closed in 1992)	7 years, through decommissioning; transitioned to Spent Fuel Storage & Removal CAB in 2005, which meets annually	No active use

Zion Station Community Advisory Panel	12	ZionSolutions; IL House Rep;	Village: Fire & Police Chiefs, Trustee, resident; County: Board rep; Emergency Management director; School District business manager	WI Department of Human Services rep; radiological technician; regional resident	2012, by plant (closed in 1998)	Ongoing, meets quarterly	DECON
San Onofre Community Engagement Panel	18	American Nuclear Society; State Parks agency; Ocean Institute; Sierra Club	School district; labor union; County board of supervisors; county economic coalition; sheriff's office; coast office.	4-6 appointees from EPZ cities/counties; UC professors; Camp Pendleton (USMC)	2014, by power plant	Ongoing, meets quarterly with occasional extra meetings	DECON
Vermont Yankee Nuclear Decommissioning Citizens Advisory Panel	19	Vermont Yankee; Public Service Dep; Health Dep; Commerce Agency; Natural Res Agency; State Rep; State Senator	Host community rep; employee rep.	Regional planning commission; NH State Rep; MA State Rep;	2015, by state legislature	Ongoing, meets monthly	SAFSTOR

Generally, CAPs have more than a dozen members, representing the views of the plant, the host community, the EPZ communities/broader region, and the state. These frequently include select board members, emergency management personnel, public health officials, regional planning agencies, plant employees (workforce and executive), and chambers of commerce. As a result, CAPs bring the various decommissioning stakeholders together, often for the first time. While this can improve public understanding and ensure that issues are entered into the public record, the advisory nature of the CAPs means that the panels have no powers of their own.

Although the panel members sit around the same table, they do not share equivalent power or responsibility. Plant owners/operators make the decisions

about the decommissioning process under the auspices of the NRC, and inform the public and the rest of the CAP about these decisions. State agencies (public health, natural resources, and emergency management, for example) are primarily concerned with whatever elements are relevant to their jurisdictions, and discuss matters related to those issues. Local entities are often unsure of whether they have any role to play beyond participation. Interestingly, no panel has included a representative of the NRC, even though the entire decommissioning and site restoration process is governed by NRC regulations.

When the Vermont Legislature established the Nuclear Decommissioning Citizens' Advisory Panel (NDCAP) in 2014, it was the first time a CAP was created by state legislation. Until then, all CAPs had been convened by the plants themselves. With the exception of Zion Station, however, each of those plants had belonged to publicly-held utilities at the time of their closure. This distinction could have important consequences for future CAPs: panels are bound by the language in their charters, and it is interesting to note that while MYCAP explicitly includes "data and other information provided by Maine Yankee and other reliable sources" in its charter, the ZCAP charter of the privately-held Zion Station makes no such mention of external input. (Language from the MYCAP turns up, sometimes word-for-word, in the charters of subsequent CAPs, including Zion Station, San Onofre, and Vermont Yankee.)

In light of these issues, some questions about CAPs remain unresolved. First, what does it mean for a panel that by definition is meant to advise the plant on the decommissioning process to include plant representatives on the panel? Second, with no true powers, what can the CAP do to advance the needs and interests of a public that is as broadly defined as the panel's varied membership indicates, and how can it get past differences of opinion or interpretation between its members? Third, with so many questions surrounding decommissioning policy (pertaining to spent fuel storage, cleanup standards, non-radiological contaminants, and the use of the decommissioning trust fund, for instance), how can the CAP ensure that it is fostering accountability and transparency in the decommissioning process?

3. ETF Considerations and Next Steps

First, the Task Force should work to influence the mission and structure of the CAP. A focus on the site outcomes of interest at the local level, or the inclusion of a CAP committee dedicated to this topic, would keep attention where it best serves Plymouth. By nature, the CAP is likely to include representatives focused on a number of different issues, and addressing all of them at once is

likely to bog down the process in legal or technical issues of little long-term value to Plymouth.

Second, the ETF should advocate for the value of simplicity: CAPs should not become a public forum for textbook-length answers to highly technical questions. Instead, presenters and participants should be encouraged to provide information to enhance a layperson's understanding in a short period of time. Sustained local interest works in Plymouth's favor, and dwindling attendance through two hours of discussion about the conversion of "becquerels-per-liter to increased lifetime risk exposure" does not.

Third, the ETF should urge that the NRC be involved early on and as often as possible. Many of the sticking points in the CAP meetings to come will ultimately be traced back to questions about NRC policy. Panel members and the wider public are often frustrated with the conversational impasses in CAP meetings that boil down to interpretations of NRC regulations. Involving the NRC will help the public understand where the plant is coming from, and give all in attendance a better understanding of the issues that are in play and the issues that are not.

Appendices

INHC Draft of Plymouth Letter to DOE re: Consent-Based Siting

January XX, 2016

U.S. Department of Energy
Office of Nuclear Energy
Response to IPC
1000 Independence Ave SW
Washington, DC 20585

To Whom It May Concern:

As representatives of the Town of Plymouth, Massachusetts, a community that has hosted an operating commercial nuclear power plant since 1972, we are pleased to have this opportunity to provide the Department of Energy with feedback to the five questions posed in the Invitation for Public Comment (IPC) published in the Federal Register on December 23, 2015.

The Town of Plymouth fully supports the concept of a consent-based siting process to manage the transportation, storage, and disposal of commercial spent nuclear fuel and high level defense radioactive wastes. However, as our answers to the following questions demonstrate, it is our position that a truly consent-based process cannot ignore the realities and experiences of the several dozen communities across the country which, like Plymouth, are currently burdened with unwanted spent fuel storage facilities.

1. **How can the Department of Energy ensure that the process for selecting a site is fair?**

A truly fair process for an integrated waste management system must account for the status quo of nuclear waste storage in the United States by providing some relief or certainty to the communities across the country that have become de facto spent fuel repositories. The alternative, a process that only focuses on consent for the future of spent fuel storage, would reinforce the existing impression that the nation's nuclear policy has left these "pre-consent" communities by the wayside.

This is especially true in the case of nuclear power plant closure, which has become alarmingly frequent since 2013. Such instances leave a host community without the socioeconomic benefits of a major employer and taxpayer, while simultaneously burdening it with dry cask storage installations. While the DOE has a framework in place to compensate licensees and operators for the construction and maintenance of such ISFSI-only sites, the communities that host these sites are left out of the equation. Attempts to stabilize local revenues by levying a property tax on the spent fuel facility have proven unsuccessful, and have resulted in expensive legal proceedings between licensees and municipalities. The result is an open-ended, non-consensual liability that frustrates local socioeconomic growth and redevelopment.

2. **What models and experience should the Department of Energy use in designing the process?**

We believe that the DOE should build on the experiences of the Department of Defense's Base Realignment and Closure Commission (BRAC), which has a history of interagency cooperation relevant to the consent-based process at hand. The BRAC process not only

provides the necessary technical support services to affected communities through the department's Office of Economic Adjustment (OEA), it recognizes that actions causing community growth, whether short-term or long-term, also need to be adequately planned for. For the communities experiencing the removal of spent fuel, and the communities experiencing the development of the long-term repository, managing the changes will require sustained support from federal and state levels.

3. **Who should be involved in the process for selecting a site, and what is their role?**

The DOE should recognize communities with ISFSIs and other storage installations as existing interim sites. The DOE should consult with representatives of those communities to broker agreements on the continuation of spent fuel storage in a manner that conforms to local and state land use policy and legislation.

4. **What information and resources do you think would facilitate your participation?**

Engaging with organizations that serve the interests of communities affected by the presence of spent fuel would ensure sustained participation from many existing nuclear host communities. The National Association of Development Organizations (NADO), the National Association of Counties (NACo), and the International Economic Development Council (IEDC) serve the interests of many of these communities, and have established local, regional, state, and federal partnerships that serve local interests.

In terms of environmental outcomes, the Conservation Law Foundation has a long history of engagement with nuclear power plant closure, decommissioning, cleanup, and advocacy for strong outcomes at a community level. A number of other environmental and anti-nuclear groups have developed the expertise necessary to articulate a framework that would ensure positive environmental outcomes for communities.

Currently the conversation is hosted, facilitated and populated by industry-based groups like NEI or led by service-providers like the dry-cask contractors. These organizations are tremendously important resources in terms of technical detail, breadth and depth of knowledge of the energy sector and nuclear industry.

5. **What else should be considered?**

The DOE should consider revising its "oldest fuel first" policy for the acceptance of spent nuclear fuel to allow for the prioritization of fuel from commercial reactor sites that have been permanently shut down. This would enable communities that have lost the socioeconomic benefits of an operational reactor to more quickly return the entire site to unrestricted use, and remove a major redevelopment obstacle from the landscape.

Sincerely,
Etc.

INHC Draft of Plymouth Letter to NRC re: Rulemaking

January XX, 2016

Annette Vietti-Cook
Mail Stop O-16G4
Secretary U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

ATTN: Rulemakings and Adjudications Staff

The Town of Plymouth Massachusetts is submitting comments on the U.S. Nuclear Regulatory Commission's Advanced Notice of Proposed Rulemaking (Docket No. NRC-2015-0070). The Town would like to thank you for the opportunity to participate in the rule change process related to the decommissioning of nuclear power reactors. The Town of Plymouth has drafted a series of responses to the questions posed in the docket. With this letter, however, we will address three issues not addressed in the docket, which we feel will greatly enhance the usefulness of the rulemaking process.

First, the Town of Plymouth would like to express our satisfaction with the commission's decision to extend the comment period to March 18, 2016. We felt strongly that such an extension would provide the many stakeholders potentially affected by the rulemaking process with the necessary time to draft and submit comments.

Second, we request additional locations for rulemaking hearings. Given Plymouth's limited financial resources, fully participating in a rulemaking process centered on the NRC's headquarters has already proven challenging. We believe that a number of communities across the nation are in a similar position. We urge the NRC to hold additional rulemaking hearings in the host communities or, at the very least, in more accessible regional locations.

Finally, Plymouth requests that host communities be allowed to actively and substantively participate in the decommissioning process on a continual basis. The Nuclear Energy Institute serves as a unified industry voice and has formed a Decommissioning Task Force to advise the NRC. Plymouth strongly recommends that the NRC support a similar framework for host communities. We believe it is equally important that host communities be allowed to provide advice and guidance to the NRC on decommissioning issues and to provide local government insight to the NRC on economic, fiscal, employment, and environmental impacts, all of which are to be assessed by the NRC in its development of decommissioning Environmental Impact Statements.

The Town of Plymouth looks forward to working cooperatively with the NRC in the coming years as the decommissioning process for Entergy's Pilgrim Nuclear Power Station evolves.

Sincerely,
Etc.

V. Specific Considerations

The NRC is seeking stakeholders' input on the following specific areas related to power reactor decommissioning regulations. The NRC asks that commenters provide the bases for their comments (*i.e.*, the underlying rationale for the position stated in the comment) to enable the NRC to have a complete understanding of commenters' positions.

A. QUESTIONS RELATED TO EMERGENCY PREPAREDNESS REQUIREMENTS FOR DECOMMISSIONING POWER REACTOR LICENSEES

EP-1: The NRC has previously approved exemptions from the emergency planning regulations in § 50.47 and appendix E to 10 CFR part 50 at permanently shut down and defueled power reactor sites based on the determination that there are no possible design-basis events at a decommissioning licensee's facility that could result in an offsite radiological release exceeding the limits established by the EPA's early-phase protective action guidelines of 1 rem at the exclusion area boundary. In addition, the possibility of the spent fuel in the SFP reaching the point of a beyond-design-basis zirconium fire is highly unlikely based on an analysis of the amount of time before spent fuel could reach the zirconium ignition temperature during a SFP partial drain-down event, assuming a reasonably conservative adiabatic heat-up calculation. A minimum of 10 hours is the time that was used in previously approved exemptions, which allows for onsite mitigative actions to be taken by the licensee or actions to be taken by offsite authorities in accordance with the comprehensive emergency management plans (*i.e.*, all hazards plans). For licensees that have been granted exemptions, the EP regulations, as exempted, continue to require the licensees to, among other things, maintain an onsite emergency plan addressing the classification of an emergency, notification of emergencies to licensee personnel and offsite authorities, and coordination with designated offsite government officials following an event declaration so that, if needed, offsite authorities may implement protective actions using a comprehensive emergency management (all-hazard) approach to protect public health and safety. The EP exemptions relieve the licensee from the requirement to maintain formal offsite radiological emergency preparedness, including the 10-mile emergency planning zone.

a. What specific EP requirements in § 50.47 and appendix E to 10 CFR part 50 should be evaluated for modification, including any EP requirements not addressed in previously approved exemption requests for licensees with decommissioning reactors?

NO COMMENT

b. What existing NRC EP-related guidance and other documents should be revised to address implementation of changes to the EP requirements?

NO COMMENT

c. What new guidance would be necessary to support implementation of changes to the EP requirements?

NO COMMENT

EP-2: Rulemaking may involve a tiered approach for modifying EP requirements based on several factors, including, but not limited to, the source term after cessation of power operations, removal of fuel from the reactor vessel, elapsed time after permanent defueling, and type of long-term onsite fuel storage.

a. What tiers and associated EP requirements would be appropriate to consider for this approach?

NO COMMENT

b. What factors should be considered in establishing each tier?

NO COMMENT

c. What type of basis could be established to support each tier or factor?

NO COMMENT

d. Should the NRC consider an alternative to a tiered approach for modifying EP requirements? If so, provide a description of a proposed alternative.

NO COMMENT

EP-3: Several aspects of offsite EP, such as formal offsite radiological emergency plans, emergency planning zones, and alert and notification systems, may not be necessary at a decommissioning site when beyond-design-basis events—which could result in the need for offsite protective actions—are few in number and highly unlikely to occur.

a. Presently, licensees at decommissioning sites must maintain the following capabilities to initiate and implement emergency response actions: Classify and declare an emergency, assess releases of radioactive materials, notify licensee personnel and offsite authorities, take mitigative actions, and request offsite assistance if needed. What other aspects of onsite EP and response capabilities may be appropriate for licensees at decommissioning sites to maintain once the requirements to maintain formal offsite EP are discontinued?

Existing response actions should remain in place during decommissioning and until all spent fuel is removed from the site.

b. To what extent would it be appropriate for licensees at decommissioning sites to arrange for offsite assistance to supplement onsite response capabilities? For example, licensees at decommissioning sites would maintain agreements with offsite authorities for fire, medical, and law enforcement support.

Licensees at decommissioning sites should maintain agreements with offsite authorities for fire, medical, and law enforcement support, as well as local elected officials such as mayors and boards of selectmen.

c. What corresponding changes to § 50.54(s)(2)(ii) and 50.54(s)(3) (about U.S. Federal Emergency Management Agency (FEMA)-identified offsite EP deficiencies and FEMA offsite EP findings, respectively) may be appropriate when offsite radiological emergency plans would no longer be required?

Offsite response actions should remain in place during decommissioning and until all spent fuel is removed from the site.

EP-4: Under § 50.54(q), nuclear power reactor licensees are required to follow and maintain the effectiveness of emergency plans that meet the standards in § 50.47 and the requirements in appendix E to 10 CFR part 50. These licensees must submit to the NRC, for prior approval, changes that would reduce the effectiveness of their emergency plans.

a. Should § 50.54(q) be modified to recognize that nuclear power reactor licensees, once they certify under § 50.82, "Termination of License," to have permanently ceased operation and permanently removed fuel from the reactor vessel, would no longer be required to meet all standards in § 50.47 and all requirements in appendix E? If so, describe how.

Requirements should remain in place until all spent fuel is removed from the site.

b. Should nuclear power reactor licensees, once they certify under § 50.82 to have permanently ceased operation and permanently removed fuel from the reactor vessel, be allowed to make emergency plan changes based on § 50.59, "Changes, Tests, and Experiments," impacting EP related equipment directly associated with power operations? If so, describe how this might be addressed under § 50.54(q).

Requirements should remain in place until all spent fuel is removed from the site.

EP-5: Under § 50.54(t), nuclear power reactor licensees are required to review all EP program elements every 12 months. Some EP program elements may not apply to permanently shut down and defueled sites; for example, the adequacy of interfaces with State and local government officials when offsite radiological emergency plans may no longer be required.

Should § 50.54(t) be clarified to distinguish between EP program review requirements for operating versus permanently shut down and defueled sites? If so, describe how.

Requirements should remain in place until all spent fuel is removed from the site.

EP-6: The Emergency Response Data System (ERDS) transmits key operating plant data to the NRC during an emergency. Under § 50.72(a)(4), nuclear power reactor licensees are required to activate ERDS within 1 hour after declaring an emergency at an "Alert" or higher emergency classification level. Much of the plant data, and associated instrumentation for obtaining the data, would no longer be available or needed after a reactor is permanently shut down and defueled. Section VI.2 to appendix E of 10 CFR part 50 does not require a nuclear power facility that is shut down permanently or indefinitely to have ERDS.

At what point(s) in the decommissioning process should ERDS activation, ERDS equipment, and the instrumentation for obtaining ERDS data, no longer be necessary?

Requirements should remain in place until all spent fuel is removed from the site.

EP-7: Under § 50.72(a)(1)(i), nuclear power reactor licensees are required to make an immediate notification to the NRC for the declaration of any of the emergency classes

specified in the licensee's NRC-approved emergency plan. Notification of the lowest level of a declared emergency at a permanently shut down and defueled reactor facility may no longer need to be an immediate notification (*e.g.*, consider changing the immediate notification category for a Notification of Unusual Event emergency declaration to a 1-hour notification).

What changes to § 50.72(a)(1)(i) should be considered for decommissioning sites?

Notification Requirements should remain in place until all spent fuel is removed from the site.

EP-8: Under § 50.72(b)(3)(xiii), nuclear power reactor licensees are required to make an 8-hour report of any event that results in a major loss of emergency assessment capability, offsite response capability, or offsite communications capability (*e.g.*, significant portion of control room indication, emergency notification system, or offsite notification system). Certain parts of this section may not apply to a permanently shut down and defueled site (*e.g.*, a major loss of offsite response capability once offsite radiological emergency plans would no longer be required).

What changes to § 50.72(b)(3)(xiii) should be considered for decommissioning sites?

Reporting requirements should remain in place until all spent fuel is removed from the site.

B. QUESTIONS RELATED TO THE PHYSICAL SECURITY REQUIREMENTS FOR DECOMMISSIONING POWER REACTOR LICENSEES

Currently, the physical protection programs applied at decommissioning reactors are managed through security plan changes submitted to the NRC under the provisions of §§ 50.90 and 50.54(p) and exemptions submitted to the NRC for approval under § 73.5. All physical protection program requirements contained in the current § 73.55, appendix B to 10 CFR part 73, "General Criteria for Security Personnel," and appendix C to 10 CFR part 73, "Licensee Safeguards Contingency Plans," are applicable to operating reactors and decommissioning reactors unless otherwise modified. The questions on **physical security requirements (PSR)** have been listed in this document using the acronym "PSR" and sequential numbers.

PSR-1: Identify any specific security requirements in § 73.55 and appendices B and C to 10 CFR part 73 that should be considered for change to reflect differences between requirements for operating reactors and permanently shut down and defueled reactors.

No security requirements should be considered for change, and all security requirements should remain in place until all spent fuel is removed from the site.

PSR-2: The physical security requirements protecting the spent fuel stored in the SFP from the design basis threat (DBT) for radiological sabotage are contained in 10 CFR part 73 and would remain unchanged by this rulemaking. However:

a. Are there any suggested changes to the physical security requirements in 10 CFR part 73 or its appendices that would be generically applicable to a decommissioning power reactor while spent fuel is stored in the SFP (*e.g.*, are there circumstances where the

minimum number of armed responders could be reduced at a decommissioning facility)? If so, describe them.

Security requirements should remain in place until all spent fuel is removed from the site.

b. Which physical security requirements in 10 CFR part 73 should be generically applicable to spent fuel stored in a dry cask independent spent fuel storage installation?

Security requirements should remain in place until all spent fuel is removed from the site.

c. Should the DBT for radiological sabotage continue to apply to decommissioning reactors? If it should cease to apply in the decommissioning process, when should it end?

The DBT requirements for radiological sabotage should remain in place until all spent fuel is removed from the site.

PSR-3: Should the NRC develop and publish additional security-related regulatory guidance specific to decommissioning reactor physical protection requirements, or should the NRC revise current regulatory guidance documents? If so, describe them.

The same security requirements that exist for an operating plant should remain in place until all spent fuel is removed from the site.

PSR-4: What **clarifications** should the NRC make to target sets in § 73.55(f) that addresses permanently shut down and defueled reactors?

No comment

PSR-5: For a decommissioning power reactor, **are both the central alarm station and a secondary alarm station necessary**? If not, why not? If both alarm stations are considered necessary, could the secondary alarm station be located offsite?

No comment

PSR-6: Under § 73.54, power reactor licensees are required to protect digital computer and communication systems and networks. These requirements apply to licensees licensed to operate a nuclear power plant as of November 23, 2009, including those that have subsequently shut down and entered into decommissioning.

a. Section 73.54 clearly states that the requirements for protection of digital computer and communications systems and networks apply to power reactors licensed under 10 CFR part 50 that were licensed to operate as of November 23, 2009. However, § 73.54 does not explicitly mention the applicability of these requirements to power reactors that are no longer authorized to operate and are transitioning to decommissioning. Are any changes necessary to § 73.54 to explicitly state that decommissioning power reactors are within the scope of § 73.54? If so, describe them.

The language in the "preamble" to 10 CFR 73.54 should be modified to include licensees in a period of "continued effectiveness," as described in 10 CFR 50.51(b), including ISFSI-only sites. Furthermore, the same digital security requirements that exist for an operating plant should remain in place until all spent fuel is removed from the site.

b. Should there be reduced cyber security requirements in § 73.54 for decommissioning power reactors based on the reduced risk profile during decommissioning? If so, what would be the recommended changes?

The same cyber security requirements that exist for an operating plant should remain in place until all spent fuel is removed from the site, and there should be no reduction in cyber security requirements for decommissioning power reactors.

PSR-7: Under § 73.55(p)(1)(i) and (p)(1)(ii), power reactor licensees suspend security measures during certain emergency conditions or during severe weather under the condition that the suspension "must be approved as a minimum by a licensed senior operator." Literal interpretation of these regulations would require that only a licensed senior operator could suspend certain security measures at a decommissioning reactor facility. However, for permanently shut down and defueled reactors, licensed operators are no longer required, and licensees typically eliminate these positions shortly after shut down. Decommissioning licensees create a new certified fuel handler (CFH) position (consistent with the definition in § 50.2) as the senior non-licensed operator at the plant. These positions cannot be compared directly, so licensees typically are unable to demonstrate that the CFH position meets the "as a minimum" criteria in § 73.55(p). Because the regulation does not include a provision that authorizes a CFH to approve the suspension of security measures for permanently shut down and defueled reactors (similar to § 50.54(y) authorizing the CFH to approve departures from license conditions or technical specifications), licensees have requested exemptions from § 73.55(p)(1)(i) and (p)(1)(ii) to allow CFHs to have this authority.

Based on this discussion, are there any concerns about changing the regulations to include the CFH as having the authority to suspend certain security measures during certain emergency conditions or during severe weather for permanently shut down and defueled reactor facilities? If so, describe them.

No comment

PSR-8: Regulations in § 73.55(j)(4)(ii) require continuous communications capability between security alarm stations and the control room. The intent of § 73.55(j)(4)(ii) is to ensure that effective communication between the alarm stations and operations staff with shift command function responsibility is maintained at all times. The control room at an operating reactor contains the controls and instrumentation necessary to ensure safe operation of the reactor and reactor support systems during normal, off-normal, and accident conditions and, therefore, is the location of the shift command function. Following certification of permanent shut down and removal of the fuel from the reactor, operation of the reactor is no longer permitted. Although the control room at a permanently shut down and defueled reactor provides a central location from where the shift command function can be conveniently performed because of existing communication equipment, office computer equipment, and access to reference material, the control room does not need to be the location of the shift command function since shift command functions are not tied to this location for safety reasons, and modern communication systems permit continuous communication capability from anywhere on the site.

The NRC is considering revising the requirements of § 73.55(j)(4)(ii) for a permanently shut down and defueled reactor. The revised requirements would be focused on maintaining a system of continuous communications between the shift manager/CFH and the security alarm stations (rather than the control room). Such a change would provide the facility's shift manager/CFH the flexibility to leave the control room without necessitating that other operational staff remain in the control room to receive communications from the security alarm stations. Personal communications systems would permit the shift manager/CFH to perform managerial and supervisory activities throughout the plant while maintaining the command function responsibility, regardless of the supervisor's location.

Based on the discussion above, are there any concerns related to changing the regulations in § 73.55(j)(4)(ii) to allow another communications system between the alarm stations and the shift manager/CFH in lieu of the control room at permanently shut down and defueled reactors? If so, describe them.

No comment

C. QUESTIONS RELATED TO FITNESS FOR DUTY (FFD) REQUIREMENTS FOR DECOMMISSIONING POWER REACTOR LICENSEES

The NRC's regulations at § 26.3 lists those licensees and other entities that are required to comply with designated subparts of 10 CFR part 26, “Fitness for Duty Programs.” Part 26 does not apply to power reactor licensees that have certified under § 50.82 to have permanently shut down and defueled. The questions on **fitness for duty (FFD)** have been listed in this document using the acronym “FFD” and sequential numbers.

FFD-1: Currently, holders of power reactor licenses issued under 10 CFR part 50 or 10 CFR part 52, “Licenses, Certifications, and Approvals for Nuclear Power Plants,” must comply with the physical protection requirements described in § 73.55 during decommissioning. Under § 73.55, each nuclear power reactor licensee shall maintain and implement its Commission-approved security plans as long as the licensee has a 10 CFR part 50 or 52 license. Furthermore, § 73.55(b)(9) requires the licensee to establish, maintain, and implement an insider mitigation program (IMP) that contains elements from various security programs, including the FFD program described in 10 CFR part 26. Each power reactor licensee has committed within its security plan to using NEI 03-12, “Security Plan Template,” revision 7, as the framework for developing its security plans to meet the requirements of § 73.55. NEI 03-12, which was endorsed by NRC Regulatory Guide (RG) 5.76, “Physical Protection Programs at Nuclear Power Reactors (Safeguards Information (SGI)),” letter dated November 10, 2011, states that the IMP is satisfied when the licensee “implements the elements of the IMP, utilizing the guidance provided in RG 5.77, `Insider Mitigation Program.' ” The NRC is in the process of revising RG 5.77 in order to clarify those FFD elements needed for the IMP.

a. Should the NRC pursue rulemaking to describe what provisions of 10 CFR part 26 apply to decommissioning reactor licensees or use another method of establishing clear, consistent and enforceable requirements? Describe other methods, as appropriate.

No comment

b. As an alternative to rulemaking, should the drug and alcohol testing for decommissioning reactors be described in RG 5.77, with appropriate reference to the

applicable requirements in 10 CFR part 26? This option would be contingent on an NEI commitment to revise NEI 03-12 to include the most recent revision to RG 5.77 (which would include the applicable drug and alcohol testing provisions) and an industry commitment to update their security plans with the revised NEI 03-12.

No comment

c. Describe what drug and alcohol testing requirements in 10 CFR part 26 are not necessary to fulfill the IMP requirements to assure trustworthiness and reliability.

No comment

d. Should another regulatory framework be used, such as a corporate drug testing program modelled on the U.S. Department of Health and Human Services' Mandatory Guidelines for Federal Workplace Drug Testing or the U.S. Department of Transportation's drug and alcohol testing provisions in 49 CFR part 40? If this option is proposed, describe how (i) the laboratory auditing, quality assurance, and reporting requirements would be met by the proposal; (ii) licensees would conduct alcohol testing; and (iii) the performance objectives of 10 CFR 26.23(a), (b), (c), and (d) would be met.

No comment

FFD-2: On March 31, 2008, the NRC published a final rule in the Federal Register (73 FR 16966) adding subpart I, "Managing Fatigue," to 10 CFR part 26. The addition of subpart I in the revised rule provides reasonable assurance that the effects of fatigue and degraded alertness on an individual's ability to safely and competently perform his or her duties are managed commensurate with maintaining public health and safety. The fatigue management provisions also reduce the potential for worker fatigue (*e.g.*, that associated with security officers, maintenance personnel, control room operators, emergency response personnel, etc.) to adversely affect the common defense and security. The 2008 rule established clear and enforceable requirements for operating nuclear power plant licensees and other entities for the management of worker fatigue. Power reactor licensees that had permanently shut down and defueled were not considered within the scope of that rulemaking effort. This is because the scope of activities at a facility undergoing decommissioning is much less likely to create a public health and safety concern due to the significantly reduced risk of a radiological event.

a. Should any of the fatigue management requirements of 10 CFR part 26, subpart I, apply to a permanently shut down and defueled reactor? If so, which ones?

All existing fatigue management requirements should remain in place during decommissioning and until all spent fuel is removed from the site.

b. Based on the lower risk of an offsite radiological release from a decommissioning reactor, compared to an operating reactor, should only specific classes of workers, as identified in § 26.4(a) through (c), be subject to fatigue management requirements (*e.g.*, security officers or certified fuel handlers)? Please provide what classes of workers should be subject to the requirements and a justification for their inclusion.

All existing fatigue management requirements should remain in place during decommissioning and until all spent fuel is removed from the site.

c. Should the fatigue management requirements of 10 CFR part 26, subpart I, continue to apply to the specific classes of workers identified in response to question b above, for a

specified period of time (*e.g.*,until a specified decay heat level is reached within the SFP, or until all fuel is in dry storage)? Please provide what period of time workers would be subject to the requirements and the justification for the timing.

All existing fatigue management requirements should remain in place during decommissioning and until all spent fuel is removed from the site.

d. Should an alternate approach to fatigue management be developed commensurate with the plant's lower risk profile? Please provide a discussion of the alternate approach and how the measures would adequately manage fatigue for workers.

All existing fatigue management requirements should remain in place during decommissioning and until all spent fuel is removed from the site.

D. QUESTIONS RELATED TO TRAINING REQUIREMENTS OF CERTIFIED FUEL HANDLERS FOR DECOMMISSIONING POWER REACTOR LICENSEES

Reactor operators are licensed under 10 CFR part 55 to manipulate the controls of operating power reactors. The regulations at § 55.4 define "controls" to mean, "when used with respect to a nuclear reactor . . . apparatus and mechanisms the manipulation of which directly affects the reactivity or power level of the reactor." "Controls" are not relevant at decommissioning reactors because the reactors are permanently shutdown and defueled and no longer authorized to load fuel into the reactor vessel. Consequently, without fuel in the reactor vessel, decommissioning reactors are in a configuration in which the reactivity or power level of the reactor is no longer meaningful and there are no conditions where the manipulation of apparatus or mechanisms can affect the reactivity or power level of the reactor. Therefore, licensed operators are not required at decommissioning reactors. The NRC regulations do not explicitly state the staffing alternative for licensed operators after a reactor has permanently shutdown and defueled under § 50.82(a)(1). When licensees permanently shut down their reactors, they must continue to meet minimum staffing requirements in technical specifications and regulatory required programs (*e.g.*, emergency response organizations, fire brigade, security, etc.). Given the reduced risk of a radiological incident once the certifications of permanent cessation of operation and permanent removal of fuel from the reactor vessel have been submitted, licensees typically transition their operating staff to a decommissioning organization. This transition includes replacing licensed operators with CFHs as the on-shift management representative responsible for supervising and directing the monitoring, storage, handling, and cooling of irradiated nuclear fuel in a manner consistent with ensuring the health and safety of the public. Regulations in § 50.2 define a CFH for a nuclear power reactor as a non-licensed operator who has qualified in accordance with a fuel handler training program approved by the Commission. The transition to the use of CFHs from licensed operators at decommissioning reactors occurs following the NRC's approval of a licensee's CFH training program and an amendment to the administrative and organization section of the licensee's defueled technical specifications.

However, the NRC regulations do not contain criteria for an acceptable CFH training program. Because of the reduced risks and relative simplicity of the systems needed for safe storage of the spent fuel, the Commission stated in the 1996 decommissioning final rule that "[t]he degree of regulatory oversight required for a nuclear power reactor during its decommissioning stage is considerably less than that required for the facility during its operating stage" (61 FR 39278). In the proposed rule, the Commission also provided

insights as to the responsibilities of the CFH position. Specifically, the CFHs are needed at decommissioning reactors to ensure that emergency action decisions necessary to protect the public health and safety are made by an individual who has both the requisite knowledge and plant experience (60 FR 37374, 37379).

CFH-1: Based on the NRC's experience with the review of the CFH training/retraining programs submitted by licensees that have recently permanently shutdown, the following questions are focused on areas that may need additional clarity. Specifically:

a. When should licensees that are planning to enter decommissioning submit requests for approval of CFH training/retraining programs?

No Comment

b. What training and qualifications should be required for operations staff at power reactors that decommission earlier than expected and that do not have an approved CFH training/retraining program?

No Comment

c. Should the NRC issue new requirements that prohibit licensees from surrendering operators' licenses before implementation of an approved CFH training/retraining program, or should other incentives or deterrents be considered? If so, what factors must be included?

No Comment

d. Should the contents of a CFH training/retraining program be standardized throughout the industry? If so, how should this be implemented?

No Comment

e. Should a process be implemented that requires decommissioning power reactor licensees to independently manage the specific content of their CFH training/retraining program based on the systems and processes actually used at each particular plant instead of standardization? If so, how should this work?

No Comment

f. Is there any existing or developing document or program (from the Institute of Nuclear Power Operations, NEI, NRC, or other related sources) that provides relevant guidance on the content and format of a CFH training/retraining program that could be made applicable to CFH training?

No Comment

g. Should the requirements for CFH training programs be incorporated into an overall decommissioning rule, or addressed using other regulatory vehicles such as associated NUREGs, regulatory guides, standard review plan chapters or sections, and inspection procedures?

No Comment

E. QUESTIONS RELATED TO THE CURRENT REGULATORY APPROACH FOR DECOMMISSIONING POWER REACTOR LICENSEES

In the SRM to SECY-15-0014, the Commission directed the staff to **determine the appropriateness of (1) maintaining the three existing options for**

decommissioning and the timeframes associated with those options, and (2) address the appropriate role of State and local governments and non-governmental stakeholders in the decommissioning process. Based on the Commission's direction, the NRC staff is seeking additional information on the need for any regulatory changes concerning the use of decommissioning options, the timeframe to complete decommissioning, and the role of external stakeholders in the decommissioning process. The questions on regulatory approach (REG) have been listed in this document using the acronym "REG" and sequential numbers.

REG-1: The NRC has evaluated the environmental impacts of three general methods for decommissioning power reactor facilities, DECON, SAFSTOR, or ENTOMB, as described in Section II.A, footnote 1 of this document. The choice of the decommissioning method is left entirely to the licensee, provided that the decommissioning method can be performed in accordance with NRC's regulations. The NRC would require the licensee to re-evaluate its decision on the method of the decommissioning process that it chose if it (1) could not be completed as described, (2) could not be completed within 60 years of the permanent cessation of plant operations, (3) included activities that would endanger the health and safety of the public by being outside of the NRC's health and safety regulations, or (4) would result in a significant impact to the environment. The licensee's choice is communicated to the NRC and the public in the PSDAR. To date, most utilities have used DECON or SAFSTOR to decommission reactors. Several sites have performed some incremental decontamination and dismantlement during the storage period of SAFSTOR, a combination of SAFSTOR and DECON as personnel, money, or other factors become available. No utilities have used the ENTOMB option for a commercial nuclear power reactor.

a. Should the current options for decommissioning—DECON, SAFSTOR, and ENTOMB—be explicitly addressed and defined in the regulations instead of solely in guidance documents, and how so?

The current options for decommissioning—DECON, SAFSTOR, and ENTOMB— should be explicitly addressed and defined in the regulations and the NRC should explicitly discuss the risks and benefits associated with each. The appropriate place for this is 10 CFR 50.2, the subpart for "Definitions."

b. Should other options for decommissioning be explored? If so, what other technical or programmatic options are reasonable and what type of supporting documents would be most effective for providing guidance on these new options or requirements?

Best practices for other forms of decommissioning should be presented and discussed. For example, the NRC should consider a new decommissioning option that enables non-radiological contamination and hazardous wastes to be cleaned up immediately after shutdown, while reactors utilizing SAFSTOR prepare for dormancy.

c. The NRC regulations state that decommissioning must be completed within 60 years of permanent cessation of operations. A duration of 60 years was chosen because it roughly corresponds to 10 half-lives for cobalt-60, one of the predominant isotopes remaining in the facility. By 60 years, the initial short-lived isotopes, including cobalt-60, will have decayed to background levels. In addition, the 60-year period appears to be reasonable from the standpoint of expecting institutional controls to be maintained. Completion of

decommissioning beyond 60 years will be approved by the NRC only when necessary to protect public health and safety. Should the requirements be changed so that the timeframe for decommissioning is something other than the current 60-year limit? Would this change be dependent on the method of decommissioning chosen, site specific characteristics, or some other combination of factors? If so, please describe.

A timeframe based on the decay of Cobalt-60 inadvertently places an unreasonable burden on host communities, and a more appropriate timeframe would be related directly to the technological and financial capacities of plant owners. Acknowledgement and discussion of new technologies should be reviewed before the 60-year limit is approved.

REG-2: In support of decommissioning planning for a permanently shut down and defueled power reactor, the licensee submits to the NRC a PSDAR that: (1) Informs the public of the licensee's planned decommissioning activities; (2) assists in the scheduling of NRC resources necessary for the appropriate oversight activities; (3) ensures that the licensee has considered the costs of the planned decommissioning activities and has funding for the decommissioning process; and (4) ensures that the environmental impacts of the planned decommissioning activities are bounded by those considered in existing environmental impact statements.

After receiving a PSDAR, the NRC publishes a notice of receipt, makes the PSDAR available for public review and comment, and holds a public meeting in the vicinity of the plant to discuss the licensee's plans and address the public's comments. Although the NRC will determine if the information is consistent with the regulations, NRC approval of the PSDAR is not required. However, should the NRC determine that the informational requirements of the regulations are not met in the PSDAR, the NRC will inform the licensee, in writing, of the deficiencies and require that they be addressed before the licensee initiates any major decommissioning activities. Any decommissioning activities that could preclude release of the site for possible unrestricted use, impact a reasonable assurance finding that adequate funds will be available for decommissioning, or potentially result in a significant environmental impact not previously reviewed, must receive prior NRC approval. Specifically, the licensee is required to submit a license amendment request for NRC review and approval, which provides an opportunity for public comment and/or a public hearing. Unless the NRC staff approves the license amendment request, the licensee is not to conduct the requested activity.

Consistent with Commission direction, the NRC staff is seeking comment on the appropriate role for the NRC in reviewing and approving the licensee's proposed decommissioning strategy and associated planning activities.

a. Is the content and level of detail currently required for the licensee's PSDAR, adequate? If not, what should be added or removed to enhance the document?

The PSDAR should also quantify socio-economic impacts pertaining to the shutdown of the plant if the reactor decommissioning would lead to the cessation of all power generation on site, and include a requirement that licensees compensate host communities for spent fuel storage. The fact that the DOE has been found financially liable to the licensees for spent fuel storage costs demonstrates that there is a value to spent fuel storage, and host communities could be compensated within that framework.

Furthermore, the decommissioning cost estimates included in the PSDAR should include a "status quo" scenario for the DOE's acceptance of spent fuel, to reflect the fact that the DOE has no temporary or permanent repository (some cost estimates now assume the removal of spent fuel from the site starting in 2020, which is overly optimistic).

b. Should the regulations be amended to require NRC review and approval of the PSDAR before allowing any "major decommissioning activity," as that term is defined in § 50.2, to commence? What value would this add to the decommissioning process?

Yes. Continued NRC oversight is crucial to the safety of host communities.

REG-3: The NRC's regulations currently offer the public opportunities to review and provide comments on the decommissioning process. Specifically, under the NRC's regulations in § 50.82, the NRC is required to publish a notice of the receipt of the licensee's PSDAR, make the PSDAR available for public comment, schedule separate meetings in the vicinity of the location of the licensed facility to discuss the PSDAR within 60 days of receipt, and publish a notice of the meetings in the Federal Register and another forum readily accessible to individuals in the vicinity of the site.

For many years, the NRC has strongly recommended that licensees involved in decommissioning activities form a community committee to obtain local citizen views and concerns regarding the decommissioning process and spent fuel storage issues. It has been the NRC's view that those licensees who actively engage the community maintain better relations with the local citizens. The NRC's guidance related to creating a site-specific community advisory board can be found in NUREG-1757, "Consolidated Decommissioning Guidance," Appendix M, "Overview of the Restricted Use and Alternate Criteria Provisions of 10 CFR part 20, subpart E," Section M.6 (ADAMS Accession No. ML063000243). Appendix M does not require licensees to create a community advisory board, but only provides recommendations for methods of soliciting public advice. Nonetheless, Section M.6 contains useful guidance and suggestions for effective public involvement in the decommissioning process that could be adopted by any licensee.

a. Should the current role of the States, members of the public, or other stakeholders in the decommissioning process be expanded or enhanced, and how so?

Appendix M should require licensees to create a community advisory board and solicit public advice. Host communities must be given a voice in the decommissioning process and in setting the requirements for the safety and security of spent fuels storage.

b. Should the current role of the States, members of the public, or other stakeholders in the decommissioning process for non-radiological areas be expanded or enhanced, and how so? Currently, for all non-radiological effluents created during the decommissioning process, licensees are required to comply with EPA or State regulations related to liquid effluent discharges to bodies of water.

In addition to complying with EPA or State regulations related to liquid effluent discharges to bodies of water, all pertinent local regulations should be included.

c. For most decommissioning sites, the State and local governments are involved in an advisory capacity, often as part of a Community Engagement Panel or other organization aimed at fostering communication and information exchange between the licensee and the public. Should the NRC's regulations mandate the formation of these advisory panels?

Community Engagement must be a requirement and should include all issues related to the environment, safety, spent fuel storage, host community compensation, and other socio-economic impacts to the host community. NRC regulations should ensure funding support from licensees and states for the Community Engagement Panels to meet necessary expenditures for staff time, space, facilitation or research needs, et cetera.

F. QUESTIONS RELATED TO THE APPLICATION OF BACKFITTING PROTECTION TO DECOMMISSIONING POWER REACTOR LICENSEES

In the SRM to SECY-98-253, "Applicability of Plant-Specific Backfit Requirements to Plants Undergoing Decommissioning," dated February 12, 1999 (ADAMS Accession No. ML12311A689), the Commission approved development of a Backfit Rule for plants undergoing decommissioning. The Commission directed the staff to continue to apply the then-current Backfit Rule to plants undergoing decommissioning until the final rule was issued. The Commission ordered the development of a rulemaking plan, which became SECY-00-0145. In SECY-00-0145, the staff proposed amendments to § 50.109 to clearly show that the Backfit Rule applies during decommissioning and to remove factors that are not applicable to nuclear power plants in decommissioning. As explained in section II.A of this document, that rulemaking never occurred, but the Commission, in SRM-SECY-14-0118, directed the staff to proceed with a rulemaking that addresses, among other things, the issues discussed in SECY-00-0145.

The questions on backfitting protection (BFP) have been listed in this document using the acronym "BFP" and sequential numbers.

BFP-1: The protections provided by the backfitting and issue finality provisions in 10 CFR parts 50 and 52, respectively, can apply to a holder of a nuclear power reactor license when the reactor is in decommissioning. Backfitting and issue finality during decommissioning can be divided into two areas:

a. When a licensee's licensing basis for operations continues to apply during decommissioning until: (1) The licensee changes the licensing basis, (2) the NRC's regulations set forth generic criteria delineating when changes can be made to the licensing basis, or (3) the NRC takes a facility-specific action that changes the licensee's licensing basis. Why would backfitting protection apply in this area?

No Comment

b. When a licensee engages in an activity during decommissioning for which no prior NRC approval was provided. The activity could be required by an NRC regulation or new NRC approval (through an order or licensing action). Why would backfitting protection apply in this area?

No Comment

BFP-2: Should the NRC propose amendments to § 50.109 consistent with the preliminary amendments proposed in SECY-00-0145 that would have created a two-

section Backfit Rule: one section that would apply to nuclear power plants undergoing decommissioning and the other section that would apply to operating reactors?

No Comment

G. QUESTIONS RELATED TO DECOMMISSIONING TRUST FUNDS

The questions on decommissioning trust fund (DTF) have been listed in this document using the acronym "DTF" and sequential numbers.

DTF-1: The Commission's regulation at § 50.75 includes the reporting requirements for providing reasonable assurance that sufficient funds will be available for the decommissioning process. The regulation at § 50.82 contains, in part, requirements on the use of decommissioning funds. Every 2 years each operating power reactor licensee must report to the NRC the status of the licensee's decommissioning funding to provide assurance to the NRC that the licensee will have sufficient financial resources to accomplish radiological decommissioning. After decommissioning has begun, licensees must annually submit a financial assurance status report to the NRC.

The NRC's authority is limited to assuring that licensees adequately decommission their facilities with respect to cleanup and removal of radioactive material prior to license termination. Activities that go beyond the scope of decommissioning, as defined in § 50.2, such as waste generated during operations or demolition costs for greenfield restoration, are not appropriate costs for inclusion in the decommissioning cost estimate. The collection of funds for spent fuel management is addressed in § 50.54(bb) where it indicates that licensees need to have a plan, including financing, for spent fuel management.

The NRC has not precluded the commingling of the funds in a single trust fund account to address radiological decommissioning, spent fuel management, and site restoration, as long as the licensee is able to identify and account for these specific funds. In the 1996 decommissioning rule, the Commission indicated that the rule "does not prohibit licensees from having separate subaccounts for other activities in the decommissioning trust fund if minimum amounts specified in the rule are maintained for radiological decommissioning." Similarly, in the 2002 Decommissioning Trust Provisions Rule, the Commission stated that it "appreciates the benefits that some licensees may derive from their use of a single trust fund for all of their decommissioning costs, both radiological and not; but, as stated above, a licensee must be able to identify the individual amounts contained within its single trust. Therefore, where a licensee has not separately identified and accounted for expenses related to non-radiological decommissioning in its DTF, licensees are required to request exemptions from § 50.82(a)(8)(i)(A) and either § 50.75(h)(1)(iv) or § 50.75(h)(2), to gain access to monies in the decommissioning trust fund for purposes other than decommissioning (*e.g.*, spent fuel management). The NRC has approved exemptions from the requirements of §§ 50.82 and 50.75 allowing withdrawals to be made from decommissioning trust funds for spent fuel management in instances where the level of funding needed to complete decommissioning is not adversely affected. In each instance, the NRC found, pursuant to § 50.12, the exemptions were authorized by law, presented no undue risk to public health and safety, and were consistent with the common defense and security, and found that the application of the rules was unnecessary to achieve the underlying purpose of the rules.

In some cases, a licensee will not need an exemption. Those cases exist when a licensee can clearly show that (1) its decommissioning trust includes State-required funds and (2) the amount of radiological decommissioning funds in the trust exceeds the amount of money estimated to be needed for radiological decommissioning in the licensee's site specific decommissioning cost estimate (or if the licensee does not have a site specific decommissioning cost estimate yet, then the minimum amount necessary to provide financial assurance under § 50.75). If the licensee meets these criteria, then reasonable assurance of adequate radiological decommissioning funding still exists after removal of the State-required funds, and the licensee does not need an exemption to use those State-required funds.

The NRC issued Regulatory Issue Summary (RIS) 2001-07, Revision 1, "10 CFR 50.75 Reporting and Recordkeeping for Decommissioning Planning," on January 8, 2009 (ADAMS Accession No. ML083440158), to clarify the need for licensees to preserve the distinction in their decommissioning trust accounts between the radiological decommissioning fund balance and amounts accumulated for other purposes, such as paying for spent fuel management and site restoration, when using the trust for commingled funds. However, based on NRC experience with the power reactors that have recently and permanently shut down and entered into decommissioning, licensees continue to report funds they have accumulated to address spent fuel management and site restoration as part of the amount of funds reported for radiological decommissioning.

Should the regulations in §§ 50.75 and 50.82 be revised to clarify the collection, reporting, and accounting of commingled funds in the decommissioning trust fund, that is in excess of the amount required for radiological decommissioning and that has been designated for other purposes, in order to preclude the need to obtain exemptions for access to the excess monies?

The regulations should be revised to clarify the collection, reporting, and accounting of commingled funds in the decommissioning trust fund, that is in excess of the amount required for radiological decommissioning and should include the cost of spent fuel storage and removal.

DTF-2: The regulation at § 50.82(a)(8)(i)(A) states that decommissioning trust funds may only be used by licensees if their withdrawals "are for expenses for legitimate decommissioning activities consistent with the definition of decommissioning in § 50.2." In accordance with § 50.2, decommission means to remove a nuclear facility or site safely from service and reduce residual radioactivity to a level that permits: (1) Release of the property for unrestricted use and termination of the license; or (2) release of the property under restricted conditions and termination of the NRC license. Thus, "legitimate decommissioning activities" include only those activities whose expenses are related to removing a nuclear facility or site safely from service and reducing residual radioactivity to a level that permits license termination and release of the property for restricted or unrestricted use.

While the regulations are silent with regards to what specific expenses are related to legitimate decommissioning activities, the NRC's guidance documents identify some specific expenses that may or may not be paid from the decommissioning trust fund. For example, Regulatory Guide (RG) 1.184, Revision 1, "Decommissioning of Nuclear Power Reactors" (ADAMS Accession No. ML13144A840), states that the amount set aside for

radiological decommissioning as required by § 50.75 "should not be used for: (1) The maintenance and storage of spent fuel in the spent fuel pool, (2) the design, construction, or decommissioning of spent fuel dry storage facilities directly related to permanent disposal, (3) other activities not directly related to radiological decontamination or dismantlement of the facility or site." Similarly, other NRC guidance explain that the NRC's definition of decommissioning does not include other activities related to facility deactivation and site closure, including operation of the spent fuel storage pool, construction and/or operation of an ISFSI, demolition of decontaminated structures, and/or site restoration activities after residual radioactivity has been removed.

The NRC also has additional guidance that states that removing uncontaminated material, such as soil or a wall, to gain access to contamination to be removed would be a legitimate decommissioning cost. Finally, guidance also exists that provides examples of activities outside the scope of decommissioning including, "(1) the maintenance and storage of spent fuel, (2) the design and/or construction of a spent fuel dry storage facility, (3) activities that are not directly related to supporting long-term storage of the facility, or (4) any other activities not directly related to radiological decontamination of the site."

a. What changes should be considered for §§ 50.2 and 50.82(a)(8) to clarify what constitutes a legitimate decommissioning activity?

The guidance should codify the examples listed above, "(1) the maintenance and storage of spent fuel, (2) the design and/or construction of a spent fuel dry storage facility, (3) activities that are not directly related to supporting long-term storage of the facility, or (4) any other activities not directly related to radiological decontamination of the site." Workforce training and host community compensation should also be added to this list.

b. Regulations in § 50.82(8)(ii) states that 3 percent of the decommissioning funds may be used during the initial stages of decommissioning for decommissioning planning activities. What should be included or specifically excluded in the definition of "decommissioning planning activities?"

The definition of "decommissioning planning activities" should include the resolution of any and all negotiations between the licensee and local and state entities that pertain to decommissioning-induced changes to property valuation, tax revenues, emergency planning, workforce adjustments, regional economic impacts, and non-radiological site cleanup. "Decommissioning planning activities" should also include related planning work carried out by host communities, to fairly compensate officials involved in the process.

H. QUESTIONS RELATED TO OFFSITE LIABILITY PROTECTION INSURANCE REQUIREMENTS FOR DECOMMISSIONING POWER REACTOR LICENSEES

The questions on offsite liability protection insurance (LPI) have been listed in this document using the acronym "LPI" and sequential numbers.

LPI-1: The Price Anderson Act of 1957 (PAA) requires that nuclear power reactor licensees have insurance to compensate the public for damages arising from a nuclear incident, including such expenses as those for personal injury, property damage, or the

legal cost associated with lawsuits. Regulations in 10 CFR part 140, "Amounts of Financial Protection for Certain Reactors," set forth the amounts of insurance each power reactor licensee must have. Specifically, § 140.11(a)(4) requires a reactor licensee to maintain $375 million in offsite liability insurance coverage. In addition, the primary insurance is supplemented by a secondary insurance tier. In the event of an accident causing offsite damages in excess of $375 million, each licensee would be assessed a prorated share of the excess damages, up to $121.3 million per reactor, for a total of approximately $13 billion.

Regulations in § 140.11(a)(4) do not distinguish between a reactor that is authorized to operate and a reactor that has permanently shut down and defueled. Most of the accident scenarios postulated for operating power reactors involve failures or malfunctions of systems that could affect the fuel in the reactor core, which in the most severe postulated accidents, would involve the release of large quantities of fission products. With the permanent cessation of reactor operations and the permanent removal of the fuel from the reactor core, such reactor accidents are no longer possible with a decommissioning reactor.

The PAA requires licensees of facilities with a rated capacity of 100,000 electrical kilowatts or more to have the primary and secondary insurance coverage described above, which the NRC establishes in 10 CFR part 140. Typically, the NRC will issue a decommissioning licensee a license amendment to remove the rated capacity of the reactor from the license. This has the effect of removing the reactor licensee from the category of licensees that are required to maintain the primary and secondary insurance amounts under the PAA and 10 CFR part 140.

Most permanently shut down and defueled power reactor licensees have requested exemptions from § 140.11(a)(4) to reduce the required amount of primary offsite liability insurance coverage from $375 million to $100 million and to withdraw from the secondary insurance pool. As noted above, these licensees are no longer within the category of licensees that are legally required under the PAA to have these amounts of offsite liability insurance. The technical criteria for granting these exemptions are based on the determination that there are no possible design-basis events at a licensee's facility that could result in an offsite radiological release exceeding the limits established by the EPA's early-phase Protective Action Guidelines of 1 rem at the exclusion area boundary. In addition, the exemptions are predicated on the licensee demonstrating that the heat generated by the spent fuel in the SFP has decayed to the point where the possibility of a zirconium fire is highly unlikely. Specifically, if all coolant were drained from the SFP as the result of a highly unlikely beyond design-basis accident, the fuel assemblies would remain below a temperature of incipient cladding oxidation for zirconium based on air-cooling alone. For a postulated situation where the cooling configuration of a highly unlikely beyond design basis accident results in an unknown cooling configuration of the spent fuel, analysis should demonstrate that even with no cooling of any kind (conduction, convection, or radiative heat transfer), the spent fuel stored in the SFP would not reach the zirconium ignition temperature in fewer than 10 hours starting from the time at which the accident was initiated.

The NRC has considered 10 hours sufficient time to take mitigative actions to cool the spent fuel. Based on this discussion:

a. Should the NRC codify the current conservative exemption criteria (*i.e.*,10 hours to take mitigative actions) that have been used in granting decommissioning reactor licensees exemptions to § 140.11(a)(4)?

Ten hours should be codified as the maximum amount of time allowed.

b. As an alternative to codifying the current conservative exemption criteria (*i.e.*, 10 hours to take mitigative actions), should the NRC codify a requirement to allow decommissioning reactor licensees to generate site specific criteria (*i.e.*, time period to take mitigative actions) based upon a site specific analysis?

c. The use of $100 million for primary liability insurance level is based on Commission policy and precedent from the early 1990s. The amount established was a qualitative value to bound the claims from the Three Mile Island accident. Should this number be adjusted?

The number should not be changed.

d. What other factors should be considered in establishing an appropriate primary insurance liability level (based on the potential for damage claims) for a decommissioning plant once the risk of any kind of offsite radiological release is highly unlikely?

Consideration should be given to insuring the safe transport of spent fuel off site.

I. QUESTIONS RELATED TO ONSITE DAMAGE PROTECTION INSURANCE REQUIREMENTS FOR DECOMMISSIONING POWER REACTOR LICENSEES

The questions on onsite damage protection insurance (ODI) have been listed in this document using the acronym "ODI" and sequential numbers.

ODI-1: The requirements of § 50.54(w)(1) call for each power reactor licensee to have insurance to provide minimum coverage for each reactor site of $1.06 billion or whatever amount of insurance is generally available from private sources, whichever is less. The insurance would be used, in the event of an accident at the licensee's reactor, to provide financial resources to stabilize the reactor and decontaminate the reactor site, if needed.

The requirements in § 50.54(w)(1) do not distinguish between a reactor authorized to operate and a reactor that has permanently shut down and defueled. With the permanent cessation of reactor operations and the permanent removal of the fuel from the reactor core, operating reactor accidents are no longer possible. Therefore, the need for onsite insurance at a decommissioning reactor to stabilize accident conditions or decontaminate the site following an accident, should be significantly lower compared to the need for insurance at an operating reactor.

Based on NRC policy and precedent, permanently shut down and defueled reactor licensees have requested exemptions from § 50.54(w)(1). The exemption granted to a permanently shut down reactor licensee permits the licensee to reduce the required level of onsite property damage insurance from the amount established in § 50.54(w)(1) to $50 million. The NRC has previously determined that $50 million bounds the worst radioactive waste contamination event (caused by a liquid radioactive waste storage tank rupture) once the heat generated by the spent fuel in the SFP has decayed to the point where the possibility of a zirconium fire in any beyond design-basis accident is highly

unlikely, and in any case, there is sufficient time to take mitigative actions. The technical criteria used in assessing the possibility of a zirconium fire, as discussed in question LPI-1 above, is also used for exemptions from § 50.54(w)(1). Based on this discussion:

a. Should the NRC codify the current exemption criteria that have been used in granting decommissioning reactor licensees exemptions from § 50.54(w)(1)? If so, describe why.

The required level of onsite property damage insurance should not be reduce until all spent fuel is removed from the site.

b. The use of $50 million insurance level for bounding onsite radiological damages is based on a postulated liquid radioactive waste storage tank rupture using analyses from the early 1990s. Should this number be adjusted? If so, describe

The required level of onsite property damage insurance should not be reduce until all spent fuel is removed from the site.

c. Is the postulated rupture of a liquid radioactive waste storage tank an appropriate bounding postulated accident at a decommissioning reactor site once the possibility of a zirconium fire has been determined to be highly unlikely?

No Comment

J. GENERAL QUESTIONS RELATED TO DECOMMISSIONING POWER REACTOR REGULATIONS

The general (GEN) questions related to decommissioning power reactor regulations have been listed in this document using the acronym "GEN" and sequential numbers.

GEN-1: Section 50.51, "Continuation of License," states in paragraph (b)(1) that all permanently shut down and defueled reactor licensees shall continue to take actions to maintain the facility, and the storage and control and maintenance of spent fuel, in a safe condition beyond the license expiration date until the Commission notifies the licensee in writing that the license is terminated. The NRC has recently focused on the licensee's maintenance of long lived, passive structures and components at decommissioning reactors. The NRC expects that many long-lived, passive structures and components may generally not have performance and condition characteristics that can be readily monitored, or could be considered inherently reliable by licensees and do not need to be monitored under § 50.65(a)(1). There may be few, if any, actual maintenance activities (*e.g.*, inspection or condition monitoring) that a licensee conducts for such structures and components. Treatment of long-lived, passive structures and components under the maintenance rule is likely to involve minimal preventive maintenance or monitoring to maintain functionality of such structures and components in the original licensing period. The NRC is interested in the need to provide reasonable assurance that certain long-lived, passive structures and components (*e.g.*, neutron absorbing materials, SFP liner) are maintained and monitored during the decommissioning period while spent fuel is in the SFP.

Based on the discussion above, what regulatory changes should be considered that address the performance or condition of certain long-lived, passive structures and components needed to provide reasonable assurance that they will remain capable of fulfilling their intended functions during the decommissioning period?

The NRC should develop SAFSTOR-specific training programs for employees maintaining and monitoring long-lived passive structures and components. The NRC should also adopt regulations to clarify site management responsibilities in the event that a licensee goes out of business or no longer exists.

GEN-2: Section 50.54(m) of the NRC's regulations for operating reactors specifies the minimum licensed operator staffing levels (*e.g.,* minimum staffing per shift for licensed operators and senior operators) for power reactors authorized to operate. The regulations define the duties of licensed operators as either the manipulation of controls or supervising the manipulation of controls that directly affect the reactor reactivity or power level of the reactor. A decommissioning plant is clearly not operating and no manipulation of controls that affect reactor reactivity or power can occur at a permanently defueled reactor. Therefore, the requirements in § 50.54(m) concerning licensed operator staffing levels for operating reactors are not applicable to a decommissioning plant. For a decommissioning power reactor, the senior on-shift management representative is a certified fuel handler who, as stated in § 50.2, is a non-licensed operator that has qualified in accordance with a fuel handler training program approved by the Commission. However, there are no regulatory provisions similar to § 50.54(m) concerning operator staffing levels for a power reactor licensee once it has certified that it is permanently shut down and defueled under § 50.82(a)(1). Because the decommissioning regulations are silent regarding staffing levels, licensees have sought amendments in their defueled technical specifications to specify minimum non-licensed operator staffing. Based on precedent used at most previous permanently shut down reactors, and considering the demonstrated safety performance of reactor decommissioning sites over many years, the NRC has found that an operations staff crew complement consisting of one certified fuel handler and one non-certified operator is an acceptable minimum staffing level.

Considering the discussion above, should minimum operations shift staffing at a permanently shutdown and defueled reactor be codified by regulation?

Yes.

GEN-3: Related to the decommissioning plant operator staffing levels is the requirement for and the use of a control room during decommissioning. Section 50.54(m) specifies the control room staffing requirements for licensed operators at an operating reactor with a fueled reactor vessel. No such requirements exist for the location of operations staff at a permanently shutdown and defueled reactor. The control room at an operating reactor contains the controls and instrumentation necessary for complete supervision and response needed to ensure safe operation and shutdown of the reactor and support systems during normal, off-normal, and accident conditions and, therefore, is the location of the shift command function. Following permanent shutdown and removal of fuel from the reactor, operation of the reactor is no longer permitted and the control room no longer performs all of the functions that were required for an operating reactor. There are no longer any activities at a permanently shutdown and defueled reactor that require a quick decision and response by operations staff in the control room. For most decommissioning reactors, the NRC has approved license amendments to the technical specifications that require at least one non-licensed operator to remain in a control room. This technical specification change is primarily based on precedent. However, the NRC has noted in the license amendment safety evaluations that the primary functions of the control room at a

permanently shutdown reactor are monitoring, response, communications, and coordination. Specifically, the control room at a decommissioning reactor is where many plant systems and equipment parameters are monitored (for operating status and conditions, radiation levels, electrical anomalies, or fire alarms for example). Control room personnel assess plant conditions; evaluate the magnitude and potential consequences of abnormal conditions; determine preventative, mitigating and corrective actions; and perform notifications. The control room provides a central location from where the shift command function can be conveniently performed because of the availability of existing monitoring and assessment instrumentation, communication systems and equipment, office computer equipment, and ready access to reference material. The control room also provides a central location from which emergency response activities are coordinated. When activated, the emergency response organization reports to the control room.

During reactor decommissioning, the control room may be subject to extensive changes, which are evaluated by the licensee for safety implications under the § 50.59 process. There is precedent among some previous decommissioning reactor licensees to design and construct a decommissioning control room that is independent of the original operating control room. Most decommissioning reactors can probably demonstrate that the command, communications, and monitoring functions performed in the control room could be readily performed at an alternate onsite location, based on the site-specific needs of a licensee during its decommissioning process. Consequently, several decommissioning licensees have questioned the meaning of the control room as it relates to decommissioning nuclear power plants.

Based on the discussion above, what regulatory changes should be considered for a permanently shutdown and defueled reactor to prevent ambiguities concerning the meaning of the control room for decommissioning reactors and should minimum staffing levels be specified for the control room?

No Comment

GEN-4: Are there any other changes to 10 CFR Chapter I, "Nuclear Regulatory Commission," that could be clarified or amended to improve the efficiency and effectiveness of the reactor decommissioning process?

GEN-5: The NRC is attempting to gather information on the costs and benefits of the changes in the regulatory areas discussed in this document as early as possible in the rulemaking process. Given the topics discussed, please provide estimated costs and benefits of potential changes in these areas from either the perspective of a licensee or from the perspective of an external stakeholder.

a. From your perspective, which areas discussed are the most beneficial or detrimental?

b. From your perspective, assuming you believe changes are needed to the NRC's reactor decommissioning regulatory infrastructure, what are the factors that drive the need for changes in these regulatory areas? If at all possible, please provide specific examples (*e.g.*, expected savings, expectations for efficiency, anticipated effects on safety, etc.) about how these changes will affect you.

c. Are there areas that are of particular interest to you, and for what reason?

d. Please provide any suggested changes that would further enhance benefits or reduce risks that may not have been addressed in this ANPR.

Reactor decommissioning places host communities with single-reactor plants at an elevated risk of prolonged economic hardship. Therefore, the NRC should consider revising section 4.3.12 of the "Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities," which addressed socioeconomic impacts associated with reactor decommissioning and determined that such impacts were "neither detectable nor destabilizing." Furthermore, the NRC should consider revising its decommissioning cost estimates to more accurately reflect the decommissioning cost estimates filed in recent PSDARs.

Pilgrim Nuclear Power Station Study (Phase I)

Access through Town of Plymouth Web Site:

http://www.plymouth-ma.gov/sites/plymouthma/files/uploads/umassced_pilgrimstation.pdf