

**THE TOWN OF DUXBURY NUCLEAR ADVISORY COMMITTEE  
TESTIMONY IN FAVOR OF H.3492 (2019)**

**H.3492 An Act relative to community radiological emergency response funds**

PETITION OF:

NAME:	DISTRICT/ADDRESS:
<i>Josh S. Cutler</i>	<i>6th Plymouth</i>
<i>Thomas J. Calter</i>	<i>12th Plymouth</i>
<i>James M. Cantwell</i>	<i>4th Plymouth</i>
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Section 5K of Chapter 111 of the General Laws as appearing in the 2012 Official Edition is hereby amended by adding the following paragraph:

The licensee of each existing and proposed nuclear power plant in the Commonwealth, shall fully fund offsite radiological emergency response expenses incurred by the Commonwealth or a municipality post closure until all the reactor's spent fuel is removed from the spent fuel pool and placed in dry casks. No monies from any Decommissioning Trust Fund shall be used to satisfy this obligation.

**TESTIMONY IN FAVOR**

There is widespread support for continuing financial support by the licensee for emergency planning post operations. For example:

- **The Commonwealth** also provides support for the need for emergency planning post operations, paid for by the licensee. This is explained in the pending Commonwealth's Motion to Intervene<sup>1</sup> in the License Transfer Application of Pilgrim Station from Entergy to Holtec Decommissioning International submitted by the Attorney General, February 20, 2019. The Motions' expert declaration by John Priest, director of MDPH's Radiological Division, explains that the Pilgrim Site Decommissioning Activities Report (PSDAR) submitted by the prospective owner of Pilgrim (Holtec Decommissioning International LLC) is deficient,

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<sup>1</sup> <https://www.nrc.gov/docs/ML1905/ML19051A114.pdf> NRC Electronic Library link

highlighting in effect the importance of this bill. It says that: “ The PSDAR does not adequately address preparedness in the event of a radiological emergency during decommissioning or the transfer of spent fuel to the spent fuel pool or from the spent fuel pool to dry casks or consider the cost of such an incident. An adequate radiological emergency preparedness plan would include specific protocols for both “small scale” host community events and “larger scale” state resource scenarios.” See Attachment A for text.

- **The Nuclear Decommissioning Citizens Advisory Panel (NDCAP)**, established by the Legislature. In its July 20, 2018, Annual Report to the Legislature (Safety and Security Working Group at 16), it said that: The panel recommends that the Decommissioning Regulations be amended to require the licensee to maintain the 10-mile Emergency planning Zone (EPZ) radius until all spent fuel has been transferred to dry casks. Moreover, after all spent fuel has been moved into dry casks, offsite emergency planning and funding support should continue, to a lesser degree, until the fuel leaves the site.” Also, licensee funding for emergency planning post shutdown is supported by the Town of Duxbury as evidenced by Duxbury’s Annual Town Meeting March 2019 unanimous vote that approved Article 38 that included the following: “Retain current offsite emergency planning, funded by licensee, until the spent fuel pool is emptied (3-5 years). Continue licensee-funded offsite emergency planning, on a reduced level, until fuel leaves the site.”
- **Town of Duxbury:** March 2019 Annual Town Meeting voted unanimously in support of Article 38 that said, in part, “Retain current offsite emergency planning, funded by licensee, until the spent fuel pool is emptied (3-5 years). Continue licensee-funded offsite emergency planning, on a reduced level, until fuel leaves the site.”
- **Public interest groups**, including for example: Clean Water Action, Toxics Action Center, Pilgrim Watch, Pilgrim Legislative Action Committee, Plymouth League of Women Voters, Greater Boston Physicians for Social Responsibility, Pilgrim Coalition.

### **THE COMMONWEALTH HAS AUTHORITY**

So long as a nuclear power plant is operating, and post-closure until all the reactor’s spent fuel has been removed from the spent fuel pool and placed in dry casks, the Commonwealth and its towns near Pilgrim necessarily will incur expenses if they are adequately to protect their citizens from the consequences of a spent fuel fire or other nuclear incident.

If Pilgrim did not exist and had not annually provided its owners with hundreds of millions of dollars in revenues, the Commonwealth and its towns would not incur these costs. This is a money bill. The Federal government does not preempt the Commonwealth from requiring Pilgrim to pay the costs for which it is responsible.

Contrary to what many apparently assume, the Atomic Energy Act (AEA) gives the NRC exclusive authority and responsibility with *only* in the “field of nuclear safety *regulation*” (*Pacific Gas & Elec. Co. v. State Energy Resources Conservation and Development Comm'n*, [461 U.S. 190](#), 216 (1983, italics added)), i.e., *only* with respect to the regulation of “the construction and operation of” a nuclear power plant. “The [NRC]...does not purport to exercise its authority based on economic considerations... Congress intended the States to continue to make these judgments” (*Pacific Gas & Electric*, 461 U.S. at 207-208); and a state or local law grounded in economic purposes “lies outside the occupied field of nuclear safety regulation.” (*Pacific Gas & Electric*, 461 U.S. at 216).

This bill is directed only to the Commonwealth’s right to enact a law – based solely on its own economic considerations – that would require Pilgrim to pay emergency planning costs for which Pilgrim is responsible. The bill has nothing to do with how Pilgrim or any other nuclear reactor is constructed or operated. Neither federal law nor the NRC says licensees are not responsible for offsite emergency planning - either while a reactor is operating or while it continues to store spent nuclear fuel in its spent fuel pool.

A basic legal principle, recently reaffirmed by, Judge (now Justice) Gorsuch in *Cook v. Rockwell International Corp.*, 790 F.3d 1088 (10<sup>th</sup> Cir. 2015), is that a court should presume that there is no preemption, and that a court has a duty to read a statute in a way that disfavor’s preemption, a duty that “is only ‘heightened’ where (as here) the area of law in question is one of traditional state regulation like public health and safety;” or, as in *Pacific Gas & Electric*, economics.

The Commonwealth’s right to enact this bill is also supported by another principle articulated by Justice Gorsuch in *Cook*. In striking a balance between promoting the nuclear energy industry and insuring relief to those who might be injured by it, Congress authorized the federal government alone to promulgate *before-the-fact nuclear safety* regulations, but it left with the states the authority to enact laws that protected their citizens from potential *after-the fact* consequences.

This bill has nothing to do with any NRC *before-the-fact nuclear safety* regulation. Rather, it seeks only to protect the Commonwealth and its citizens from the *after-the fact* economic consequences of a

potential “nuclear incident,” i.e., defined by the Atomic Energy Act as “any occurrence ... causing ... bodily injury, sickness, disease, or death or loss or damage to property ... arising out of or resulting from ... the radioactive material.” (42 U.S.C. §§ 2014(q); 2210(n)(2)). The Atomic Energy Act is clear that the right of a state to protect itself and its citizens against the consequences of a “nuclear incident” do not depend on “the law of the state in which the nuclear incident involved occurs” (42 U.S.C. §2014(hh)) and are not preempted.

If there should be a significant offsite radiological release, inadequate radiological emergency preparation and response planning would cause negative health outcomes and have negative economic impacts on individuals, families, and the Commonwealth.

In short, Massachusetts has the right to enact this bill. Nothing preempts the Commonwealth’s right to require Pilgrim to pay the off-site emergency planning costs; not only because Pilgrim is responsible for those costs, but also because requiring the licensee to pay for offsite radiological emergency response plans, training and equipment will allow the communities and state to provide radiological emergency plans, equipment, and training necessary to reduce the number of citizens with negative health impacts that translate into economic harms and costs to the communities and the Commonwealth.

## **RATIONALE**

The licensee of each existing and proposed nuclear power plant in the Commonwealth, shall fully fund offsite radiological emergency response expenses incurred by the Commonwealth or a municipality post closure until all the reactor's spent fuel is removed from the spent fuel pool and placed in dry casks.

### **Accident Risk Post Shutdown**

#### **A. Accident Risk & Potential Consequences Justify Need For Offsite Emergency Planning**

This bill is necessary because the federal government (Nuclear Regulatory Commission) has allowed exemptions when a licensee requested to stop responsibility for offsite emergency plans post closure. Pilgrim filed for exemption, January 2018. But contrary to the licensee’s rationale, there is credible risk of significant offsite radiological releases until the spent fuel is removed from the spent fuel pool and placed in safer dry cask storage; and there is risk of a fire onsite in contaminated buildings during the decommissioning process.

## **Design-Basis Events Post Closure That Could Result in An Offsite Radiological Release of a spent fuel pool fire from mechanical error, human error, or a terrorist event<sup>2</sup>.**

Offsite radiological release from spent fuel in the spent fuel pool or from a dry cask canister drop in the pool during spent fuel transfer are possible design-basis events, and such releases could exceed EPA limits requiring offsite emergency response.

**Spent Fuel Pool:** High-density, closed frame pools are vulnerable to a zirconium fire following water loss (either water loss just to the top of the assemblies in the pool or total drain-down) resulting from acts of malice, equipment malfunction, natural events, human error, cask drops during transfer.<sup>3</sup> It is incorrect to assume that nothing can go wrong. For example: Dresden 1 partially drained its spent fuel pool when a pipe burst and if not for a watchman observing water in the basement an accident with the potential of offsite radiological release exceeding the limits established by EPA. Lessons learned from Fukushima, and quickly forgotten and glossed over, advised Americans not to enter the 50-mile zone, in large measure due to fears of spent fuel pool release<sup>4</sup>.

**Transfer:** A canister drop in the pool or on the reactor floor could cause offsite releases exceeding EPA's limits. Each filled transfer cask while in the pool weighs 40 tons. A drop perhaps is a low probability event but with high consequences; and there have been near misses, even with so-called "failure proof cranes" that Pilgrim installed. For example, at Vermont Yankee, the brakes on the crane that lifts the loaded cask out of the spent fuel pool failed to work properly. The brakes didn't fail entirely but the cask dropped to an inch and a half above the floor. At Palisades in 2006, per a U.S. Nuclear Regulatory Commission (NRC) inspection report, a container weighing 110 tons, fully loaded with high-level radioactive waste, dangled for 55 hours from a stuck crane above the reactor's irradiated fuel storage pool. Plant personnel, lacking proper knowledge about the crane, and without permission from plant management, mishandled the crane's

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1. The Massachusetts Attorney General's Request for a Hearing and Petition for Leave to Intervene With respect to Entergy Nuclear Operations Inc.'s Application for Renewal of the Pilgrim Nuclear Power Plants Operating License and Petition for Backfit Order Requiring New Design features to Protect Against Spent Fuel Pool Accidents, Docket No. 50-293, May 26, 2006 includes a Report to The Massachusetts Attorney General On The Vulnerability of Pilgrim's Spent Fuel Pool- Risks and Risk-Reducing Options Associated with Pool Storage of Spent Nuclear Fuel at the Pilgrim and Vermont Yankee Nuclear Power Plants, Gordon Thompson, May 25, 2006.

2. References: Risks and Risk-Reducing Options Associated with Pool Storage of Spent Nuclear Fuel at the Pilgrim and Vermont Yankee Nuclear Power Plants-A report for the Massachusetts Attorney General, Dr. Gordon Thompson, May 25, 2006; Comments on the US Nuclear Regulatory Commission's Draft Consequence Study of a Beyond-Design Basis Earthquake Affecting the Spent Fuel Pool for a US Mark I Boiling Water Reactor, Dr. Gordon Thompson, August 1, 2013; Environmental Impacts of Storing Spent Nuclear Fuel and High-Level Waste from Commercial Nuclear Reactors: A Critique of NRC's Waste Confidence Decision and Environmental Impact Determination, Dr. Gordon Thompson, Feb 6, 2009. Documents available on NRC Electronic Library, ADAMS

<sup>4</sup> Fukushima the Story of a Nuclear Disaster, D. Lochbaum, E. Lyman, S. Stranahan, New Press, 2014, pgs., 80,87, 90,92-93,99,139-140.

emergency brake, increasing the risk of the heavy load crashing, out of control, back down into the pool. The falling container could have severely damaged the pool, draining the cooling water. A radioactive waste fire could have followed, resulting in tens of thousands of cancer deaths from radiation exposure to 500 miles downwind, per a separate NRC report.

### **Consequences of a Spent Fuel Pool Fire- Potentially Catastrophic Offsite Releases**

Even if the probability were low the consequences are so large that even a low probability accident becomes consequential and demands protective actions for the public. Per nuclear security experts at Princeton University, a major spent-fuel pool fire could contaminate as much as 38,610 square miles, an area greater than the Commonwealth, forcing the evacuation of millions<sup>5</sup> -- far higher than NRC's 2013 estimate of 6,693 square miles<sup>6</sup>. A 2006 study conducted for the Massachusetts attorney general estimated a spent-fuel pool fire at Pilgrim would result offsite in \$488 billion in damage, 24,000 cancers, and contaminate hundreds of square miles<sup>7</sup>.

### **Potential Ignition Time of a Fire would not allow Mitigative Actions**

NRC supports exempting licensees from offsite emergency planning by arguing that a minimum of 10 hours is the time previously used for approved exemptions. It falsely assumes that 10 hours allows for onsite mitigative actions to be taken by the licensee or actions taken by offsite authorities in accordance with all-hazards emergency management plans. What's wrong?

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<sup>5</sup> Richard Stone, "Spent fuel fire on U.S. soil could dwarf impact of Fukushima," *Science*, May 24, 2016. (available at: <http://www.sciencemag.org/news/2016/05/spent-fuel-fire-us-soil-could-dwarf-impact-fukushima>)

<sup>6</sup> Consequence Study of A Beyond Design-Basis Earthquake Affecting The Spent Fuel Pool For A U.S. Mark I Boiling Water Reactor (October 2013) at 232 (Table 62) and 162 (table 33), Adams Accession NO ML13256A342)

<sup>7</sup> The Massachusetts Attorney General's Request for a Hearing and Petition for Leave to Intervene With respect to Entergy Nuclear Operations Inc.'s Application for Renewal of the Pilgrim Nuclear Power Plants Operating License and Petition for Backfit Order Requiring New Design features to Protect Against Spent Fuel Pool Accidents, Docket No. 50-293, May 26, 2006 includes a Report to The Massachusetts Attorney General On The Potential Consequences Of A Spent Fuel Pool Fire At The Pilgrim Or Vermont Yankee Nuclear Plant, Jan Beyea, PhD., May 25, 2006 (NRC Electronic Hearing Docket, Pilgrim 50-293-LR, 2—6 pleadings, MAAGO 05/26 (ML061640065) & Beyea (ML061640329); GAO -12-797, Spent Nuclear Fuel: Accumulating Quantities at Commercial Reactors Present Storage and Other Challenges, <http://www.gao.gov/assets/600/593745.pdf>; Consequence Study Of A Beyond DesignBasis Earthquake Affecting The Spent Fuel Pool For A U.S. Mark I Boiling Water Reactor (October 2013) at 232

(Table 62) and 162 (table 33), Adams Accession NO ML13256A342); Richard Stone, "Spent fuel fire on U.S. soil could dwarf impact of Fukushima," *Science*, May 24, 2016. (available at: <http://www.sciencemag.org/news/2016/05/spent-fuel-fire-us-soil-could-dwarf-impact-fukushima>; National Academy of Sciences, "Lessons Learned from the Fukushima Nuclear Accident for Improving Safety and Security of U.S. Nuclear Plants: Phase 2," May 2016, Available at: <http://www.nap.edu/catalog/21874/lessons-learned-from-the-fukushima-nuclear-accident-for-improving-safety-and-security-of-us-nuclear-plants>)

First, it incorrectly assumes that a fire in the pool would be slow breaking. But over a broad range of water-loss scenarios, the temperature of the zirconium fuel cladding would rise to the point (approximately 1,000 degrees C) where a self-sustaining, exothermic reaction of zirconium with air or steam would begin. **Fuel discharged from the reactor for 1 month could ignite in less than 2 hours, and fuel discharged for 3 months could ignite in about 3 hours.** Once initiated, the fire would spread to adjacent fuel assemblies, and could ultimately involve all fuel in the pool. A large, atmospheric release of radioactive material would occur. A variety of factors impact ignition times such as: age of the fuel, the configuration of the fuel in the pool, etc.

Second, it incorrectly assumes that the area impacted could be evacuated within 10 hours without: offsite notification sirens, training of emergency personnel, exercises, or any of the other elements one believes that a potentially impacted area would need to be evacuated within 10 hours. Therefore, offsite plans must remain until the spent fuel pool is emptied.

### **Fire Onsite During the Decommissioning Process**

Throughout every stage of decommissioning, large quantities of radioactive material will exist within the remaining structures, systems, and components until they are decontaminated and dismantled. In the event of a fire, these materials may result in radioactive offsite contamination requiring emergency response. A fire also can result in contamination of, and radiation doses to, offsite first responders that for their safety requires monies available for emergency first responders' training and special equipment.

### **B. Who Properly Should Pay for Offsite Radiological Emergency Planning?**

Neither the Commonwealth nor the impacted towns can afford to pay, or should they pay. It is after all a risk brought on by one party - the licensee. It properly is Pilgrim's responsibility to foot the bill. MEMA's Nuclear Preparedness 2016 budget with costs assessed to licensees of operating reactors in the Commonwealth was \$482,901.<sup>8</sup> Towns in Pilgrim's emergency planning zone negotiate funding with Entergy. 2016 receipts ranged from \$85,000/yr. to \$295,000/yr. plus monies for training and equipment. Details in table below. If the towns do not continue to receive funds, training and

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<sup>8</sup> Massachusetts Emergency Management 2016 Nuclear Preparedness Budget \$482,910 (2015 spending \$ 447,176) costs assessed on operating reactor licensees in the Commonwealth  
[http://www.mass.gov/bb/h1/fy16h1/brec\\_16/act\\_16/h88000100.htm](http://www.mass.gov/bb/h1/fy16h1/brec_16/act_16/h88000100.htm)

equipment, they will be unable to provide the protection that their community needs, deserves and that they want to provide.

**Each community negotiates annually with Entergy. Marshfield initially signed a long-term contract that proved beneficial to that community in term of monies received each year-fixed % increase negotiated**

**ANNUAL ASSESSMENT FROM ENTERGY**

	<b>Carver</b>	<b>Duxbury</b>	<b>Kingston</b>	<b>Marshfield</b>	<b>Plymouth</b>
<b>2019</b>	?	\$85,000	?	?	?
<b>2018</b>	?	\$85,000	\$85,000	?	?
<b>2017</b>	\$100,000	\$85,000	\$85,000	?	?
<b>2016</b>	\$85,000	\$85,000	\$85,000	?	?
<b>2015</b>	\$85,000	\$85,000	\$85,000	\$298,880	?
<b>2014</b>	\$85,000	\$85,000	\$85,000	\$271,793	\$245,000
<b>2013</b>	\$85,000	\$85,000	\$85,000	\$246,243.98	\$245,000.00
<b>2012</b>	\$85,000	\$85,000	\$85,000	\$223,858.16	\$245,000.00
<b>2011</b>	\$100,000	\$100,000	\$100,000	\$203,507.42	\$235,000.00
<b>2010</b>	\$73,136	\$50,000	<b>\$69,000</b>	<b>\$185,006.75</b>	\$119,282.00
<b>2009</b>	\$71,796	\$66,500	\$69,000	\$169.112	\$111,320
<b>2008</b>	\$71,796	\$66,500	\$66,226	\$153,823	\$ 119,282
<b>2007</b>	\$70,796	\$66,500	\$66,226	\$139,923	\$111,442
<b>2006</b>	\$70,796	\$57,645	\$66,226	\$127,287	\$111,442.19
<b>2005</b>	\$70,796	\$57,645	\$66,226	\$120,093	\$111,442.19
<b>2004</b>	\$69,796	\$57,745	\$66,226	\$104,431	\$111,442.19
<b>2003</b>	\$73,224	\$57,645	\$66,226	\$94,937	\$111,442.19
<b>2002</b>	\$64,334	\$57,645	\$64,726	\$87,232	\$108,011.19
<b>2001</b>	\$62,134	\$57,645	\$62,929	\$79,386	\$105,091.31
<b>2000</b>	\$56,534	\$48,037	\$62,929	\$72,253	\$103,263.98

**SUPPLEMENTARY MONIES RECEIVED FROM ENTERGY**

	<b>Carver</b>	<b>Duxbury</b>	<b>Kingston</b>	<b>Marshfield</b>	<b>Plymouth</b>
<b>2013</b>		10 percent radio reimbursement and the cost of training		Consumable supplies 500.00 Communication equip 425.00	
<b>2012</b>		10 percent radio reimbursement and the cost of training		Consumable supplies 500.00 Communication equip 425.00	
<b>2011</b>		10 percent radio reimbursement and the cost of training		Consumable Supplies 500.00 Communication equip 425.00	



<b>2010</b>		10 percent radio reimbursement and the cost of training		Consumable Supplies 500.00 Communication equip 425.00	<b>\$119,000 (expected)</b>
<b>2009</b>	\$50,000	\$50,000	\$50,000	\$50,000	
<b>2008</b>				*\$18,000	
<b>2007</b>					\$7000

\*Marshfield has a new computer system as of 2008 and cannot access older data. The \$18,000 can't be totally attributed to Entergy, but was in the same Special Revenue Account as the major yearly grant from Entergy

**Last, the bill also requires that no monies from any Decommissioning Trust Fund (DTF) shall be used to satisfy this obligation.** The NRC restricts use of DTF to “reduction of residual radioactivity”- not offsite emergency planning expenses. However, licensees have asked NRC to provide an exemption to use the Decommissioning Trust Fund for other purposes. The Commonwealth and Pilgrim Watch both have filed Motions to Intervene and Requests for Hearing in Entergy’s and Holtec’s request to the NRC to transfer Pilgrim’s license from Entergy to Holtec Decommissioning International LLC. Holtec would decommission and take ownership of the DTF to decommission the site. Both Motions to Intervene clearly show that the DTF is insufficient to decommission Pilgrim. Therefore, we do not want the DTF to be used for alternative purposes and further deplete the fund and leave a bigger bill for taxpayers to pay to complete the decommissioning process.

### C. PRECEDENT

Entergy signed a contract in 2016, after Vermont Yankee had closed at the end of 2014, with the Vermont Division of Emergency Management and Homeland Security that agreed to give the state \$600,000 for Vermont Yankee emergency planning over the next two years. \$300,000 per fiscal year through 2018 with the understanding that the state and Entergy will negotiate in good faith for additional funding in later years. Entergy also signed a new emergency planning agreement with Massachusetts. Entergy will pay \$229,000 to the Massachusetts Emergency Management Agency over the next four years — an amount identical to a previous agreement with New Hampshire.

Entergy’s agreement resulted from Vermont’s new legislation that expanded the state’s so-called bill back authority over Entergy that directed several state offices-including Emergency Management and Homeland Security- to continue emergency activities and send Entergy the bill. The contract with Entergy negated the need for that<sup>9</sup>.

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<sup>9</sup> Entergy Signs Two-Year Deal to Pay for Emergency Planning, Mike Faher, Vermont Digger, August 10, 2016.

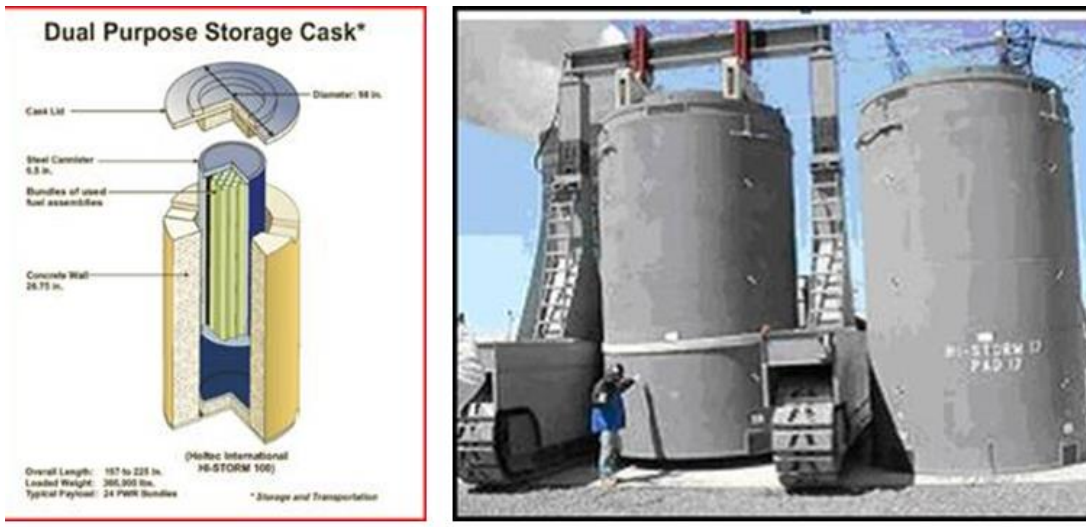
Massachusetts does not have a bill comparable to Vermont's "bill-back authority." This legislation fills a void, providing funding to better protect our citizens in the event of a credible accident requiring offsite emergency response post closure.

#### **D. Expanding Language in the bill -Dry Casks**

We respectfully request your consideration of expanding the bill to include funding, at a negotiated lower level, offsite radiological emergency response expenses incurred by the Commonwealth or a municipality post closure until all the reactor's spent fuel leaves the site.

### **Accident Risk & Potential Consequences Of Dry Cask Rupture, Justifies The Need Offsite Emergency Planning**

All of Pilgrim's spent fuel will be stored in 61 dry casks 2-3 years after ceasing operations.



The casks will be stored on a concrete pad, 300 feet from a public road-Rocky Hill Road

[HTTPS://VTDIGGER.ORG/2016/08/10/ENTERGY-SIGNS-TWO-YEAR-DEAL-TO-PAY-FOR-EMERGENCYPLANNING/](https://vtdigger.org/2016/08/10/entergy-signs-two-year-deal-to-pay-for-emergencyplanning/)



**Spent Fuel Dry Casks May Leak:** Although dry cask storage is far safer than pool storage, there are problems to consider. According to the Nuclear Regulatory Commission (NRC):

- The thin (0.5”) stainless steel canisters may crack within 30 years.
- No current technology exists to inspect, repair or replace cracked canisters.
- With limited monitoring, we will only know after the fact that a cask has leaked radiation.

**Casks are vulnerable to attack:** Pilgrim’s casks will be lined up vertically on a pad. Casks are vulnerable from an air or land-based attack with weapons readily available today.<sup>10</sup> Yet despite their vulnerability, the NRC commissioners voted to approve a staff proposal submitted on September 11, 2015<sup>11</sup> to postpone the schedule for developing new requirements for protecting spent fuel in dry cask storage from sabotage by five years. There are several good reasons to implement this rule sooner. The most important one is that the current rules do not provide adequate protection of dry casks from certain types of terrorist attack scenarios, as the NRC has acknowledged publicly. The pad’s new location is near a public road presenting a security threat from line-of-sight attack.

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<sup>10</sup> The Massachusetts Attorney General’s Request for a Hearing and Petition for Leave to Intervene With respect to Entergy Nuclear Operations Inc.’s Application for Renewal of the Pilgrim Nuclear Power Plants Operating License and Petition for Backfit Order Requiring New Design features to Protect Against Spent Fuel Pool Accidents, Docket No. 50-293, May 26, 2006 includes a Report to The Massachusetts Attorney General On The Vulnerability of Pilgrim’s Spent Fuel Pool- *Risks and Risk-Reducing Options Associated with Pool Storage of Spent Nuclear Fuel at the Pilgrim and Vermont Yankee Nuclear Power Plants*, Gordon Thompson, May 25, 2006; *Environmental Impacts of Storing Spent Nuclear Fuel and High-Level Waste from Commercial Nuclear Reactors: A Critique of NRC’s Waste Confidence Decision and Environmental Impact Determination*, Dr. Gordon Thompson, February 6, 2009, pgs., 29,

<sup>[29]</sup> <http://allthingsnuclear.org/elyman/ominous-votes-by-the-nrc>

<sup>11</sup> <http://allthingsnuclear.org/elyman/ominous-votes-by-the-nrc>

Dr. Gordon Thompson also analyzed the impact of a shaped charge as one potential instrument of attack.<sup>12</sup> The analysis shows that the cylindrical wall of the canister is about 1/2 inch (1.3 cm) thick, and could be readily penetrated by available weapons. The spent fuel assemblies inside the canister are composed of long, narrow tubes made of zirconium alloy, inside which uranium oxide fuel pellets are stacked. The walls of the tubes (the fuel cladding) are about 0.023 inch (0.6 mm) thick. Zirconium is a flammable metal.

**Consequences of a Dry Cask Release:** Each cask contains ½ the Cesium-137 released at Chernobyl. Dr. Gordon Thompson observes that: Casks are not robust in terms of their ability to withstand penetration by weapons available to sub-national groups. A typical cask would contain 1.3 MCi of cesium-137, about half the total amount of cesium-137 released during the Chernobyl reactor accident of 1986. Most of the offsite radiation exposure from the Chernobyl accident was due to cesium-137. Thus, a fire inside an ISFSI module, as described in the preceding paragraph, could cause significant radiological harm.

Because the risk does not disappear once the fuel is in dry casks, we recommend that you consider adding to the bill's current language the following sentence, highlighted for your convenience.

The licensee of each existing and proposed nuclear power plant in the Commonwealth, shall fully fund offsite radiological emergency response expenses incurred by the Commonwealth or a municipality post closure until all the reactor's spent fuel is removed from the spent fuel pool and placed in dry casks; **then continue funding emergency planning on a reduced level until all fuel has left the site.** No monies from any Decommissioning Trust Fund shall be used to satisfy this obligation.

If you have any questions or wish additional materials, please contact us.

Respectfully submitted on behalf of The Town of Duxbury Nuclear Advisory Committee,

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<sup>12</sup> Gordon R. Thompson, *Environmental Impacts of Storing Spent Nuclear Fuel and High- Level Waste from Commercial Nuclear Reactors: A Critique of NRC's Waste Confidence Decision and Environmental Impact Determination* (Cambridge, Massachusetts: Institute for Resource and Security Studies, 6 February 2009). Tables also in Declaration of 1 August 2013 by Gordon R. Thompson: Comments on the US Nuclear Regulatory commission's Draft Consequence Study of a Beyond-Design-Basis Earthquake Affecting the Spent Fuel Pool for a US Mark I Boiling Water Reactor

## Attachment A

### **Commonwealth's Motion to Intervene<sup>13</sup> in the License Transfer Application of Pilgrim Station from Entergy to Holtec Decommissioning International submitted by the Attorney General, February 20, 2019. John Priest Declaration, excerpt. (Feb 20, 2019)**

#### **EMERGENCY PLANNING**

20. The PSDAR does not adequately address preparedness in the event of a radiological emergency during decommissioning or the transfer of spent fuel to the spent fuel pool or from the spent fuel pool to dry casks or consider the cost of such an incident. An adequate radiological emergency preparedness plan would include specific protocols for both "small scale" host community events and "larger scale" state resource scenarios.

21. Holtec does not adequately address their capabilities to monitor and respond to the following:

- (a) Leaks of large quantities of radioactive materials in solid or liquid form into the environment;
- (b) Deficiencies in the structures, systems, and components containing stored radioactive materials;
- (c) Response plan for emergent scenarios including combustible fires containing either low level radioactive contaminants or spent fuel, and hostile actions that destroy key structures that store radioactive materials;
- (d) Security measures surrounding the dry fuel pad, which should include substantial physical barriers, especially once it is relocated closer to a nearby road;
- (e) Details on remote and onsite radiation monitoring of the facility and spent fuel storage; or
- (f) Adequate routine physical inspection of dry casks and detailed contingency for damaged/degraded dry fuel storage containers.

22. All of these items represent discrete, foreseeable risks that Holtec did not provide sufficient detail that they have considered and accounted for in the PSDAR.

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<sup>13</sup> <https://www.nrc.gov/docs/ML1905/ML19051A114.pdf> NRC Electronic Library link