

# CHRONOLOGY OF EVENTS<sup>1</sup>

## PILGRIM NUCLEAR POWER STATION

### PLYMOUTH, MA

#### 1960s

**1967:** In July 1967, the Town of Plymouth's Zoning Board of Appeals (ZBA) issues a **Special Permit** to Boston Edison for construction and operation of a nuclear plant, under the Town Zoning Bylaw. Plymouth is selected as the reactor site after a location closer to population centers near Boston was rejected. The ZBA issues the permit on finding that Pilgrim "will not be detrimental to the established or future character of the neighborhood and the town in view of the conditions and safeguards which will be imposed by the U.S. Atomic Energy Commission upon the operation of such nuclear-powered plant, and the comparative isolation of the site of the plant itself."<sup>2</sup> According to the Atomic Energy Commission's Provisional Construction Permit issued to Boston Edison, in 1965 the total residential and seasonal population within 1 mile of the site was 1,046; within 3 miles, 5,659; and within 10 miles, 44,629.

Original building plans for Pilgrim show storage of spent nuclear fuel (high-level radioactive waste) inside the reactor building, and discuss shipping waste offsite. U.S. Nuclear Regulatory Commission (NRC) records also indicate **spent nuclear fuel is intended to spend a relatively short time in the wet pool before being sent offsite to a reprocessing facility.**

**Construction** begins in 1967. The site is extensively altered by excavation and fill. Used construction equipment, including cranes, is buried on site.<sup>3</sup>

#### 1970s

**1970s:** Massachusetts seeks to require that Boston Edison install a "closed-cycle" cooling water system for the approximate 500 million gallons of water required to run Pilgrim daily. Boston Edison files a legal challenge to avoid the cost of a "closed-cycle" system, eventually prevailing. **Pilgrim is built with a "once-through" cooling water system.** It was well-known at the time that a once-through system causes destruction of marine life. The Sierra Club and other public interest groups oppose Pilgrim's construction and use of once-through cooling.

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<sup>1</sup> This chronology attempts to capture the major milestones related to Pilgrim Nuclear Power Station beginning with the Town of Plymouth's granting of a special permit to Boston Edison to construct a nuclear power facility.

<sup>2</sup> Plymouth Board of Appeals on the Zoning Bylaw: Notice of Special Permit August 22, 1967.

<sup>3</sup> Source available on request.

**1970s-1980s:** Pilgrim has **several spills and accidents** resulting in the release of radioactive materials into the environment. There are multiple radioactive resin spills into the building and through the storm drain into Cape Cod Bay.<sup>4</sup>

**1972:** The predecessor to the NRC, the Atomic Energy Commission, issues Boston Edison an **operating license. Pilgrim begins nuclear power production in July, 1972 using “once-through” cooling water system that impinges and entrains marine life and discharges thermal plume to Cape Cod Bay.** Federal Clean Water Act becomes law. Pilgrim begins **discharging radiological materials to the air and water during routine operations.**

**1973: “Large impingement event” occurs,** which is defined as those events involving greater than 20 fish per hour and an overall event total of 1,000 fish or more.<sup>5</sup> From August to September 1973, **1,600 clupeids are impinged** on Pilgrim’s intake screens.

In April 1973, a **large kill of Atlantic menhaden occurs** when a school enters Pilgrim’s discharge canal and thermal plume; approximately 90% of the fish exhibit signs of gas bubble disease. The resulting kill was estimated at 43,000 fish.

The only assessments of **Pilgrim’s impact on phytoplankton and zooplankton** were done from 1973 to 1975.<sup>6</sup>

**1974:** Boston Edison **installs an off gas treatment system,** a technology which attempts to reduce the radioactivity of gases that are removed from the radioactive steam that turns the turbine in the condenser.<sup>7</sup>

**1974-1975:** Boston Edison **proposes to add 2 additional nuclear reactors** to the Pilgrim site (Units 2 and 3). Proposal generates significant opposition.

**1974-1980: Opposition to Boston Edison’s plans to add two new reactors at Pilgrim (Units 2 and 3)** builds on a local and state-wide level, especially after the Three Mile Island nuclear accident in 1979. Following numerous legal appeals by Plymouth County Nuclear Information Committee and others, Boston Edison withdraws its proposals by 1980. Attorney Bill Abbott and others represents local residents seeking to block Units 2 and 3.

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<sup>4</sup> Boston Edison memo PNPS File No. TCH 82-73.

<sup>5</sup> Normandeau Associates. Apr. 2013. *Impingement of organisms on the intake screens at Pilgrim Nuclear Power Station, Jan. – Dec. 2012.* In: Entergy Nuclear – Pilgrim Station. 2013. Marine Ecology Studies Jan. 2012 – Dec. 2012, Report No. 81, Section 2.3.

<sup>6</sup> Toner R.C. *Zooplankton of western Cape Cod Bay*; Toner R.C. *Phytoplankton of western Cape Cod Bay.* Both in: *Observations on the ecology and biology of western Cape Cod Bay, Massachusetts.* 1984. Eds, Davis, J.D. and D. Merriman. Springer-Verlag.

<sup>7</sup> Cargill E.B. *Survey of Documents Concerning the Operation of Pilgrim Nuclear Power Station* [Preliminary Draft]. <<http://www.pilgrimwatch.org/cargill.pdf>>

**1975:** Massachusetts Department of Environmental Protection (MassDEP) and U.S. Environmental Protection Agency (EPA) issue **water pollution permit** under state and federal laws to Boston Edison for Pilgrim’s discharge of heated water and other pollutants into Cape Cod Bay.<sup>8</sup> Use of once-through cooling water system continues unchanged; Pilgrim continues to discharge radiological waste to Cape Cod Bay.

On the issue of **spent fuel storage** (high level radioactive waste), legal notice in the U.S. Federal Register of September 16, 1975 says,

“[E]lectric utilities planning to construct and operate light water nuclear power reactors contemplated that the used or spent fuel discharged from the reactors would be chemically reprocessed.... It was contemplated by the nuclear industry that spent fuel would be discharged periodically from operating reactors, stored in onsite fuel storage pools for a period of time to permit decay of the radioactive materials contained within the fuel and to cool, and periodically shipped offsite for processing.

**1976:** Scientists concerned about the **impact of Pilgrim’s cooling water system on marine life in Cape Cod Bay** advocate for monitoring and oversight. Study of ichthyoplankton populations completed.

On August 5, 1976 a **“large impingement event”** occurs, and **1,900 alewife** (a species of protected river herring) are impinged on Pilgrim’s intake screens.

**1978:** On February 6, 1978 Pilgrim has an **emergency scram** when heavy snowfall caused by the Blizzard of 1978 causes electrical breakers in the 345 kilovolt switchyard to flashover and trip.<sup>9</sup>

Pilgrim has **another emergency scram on August 6, 1978:** the reactor automatically scrams from 100% power when **lightning strikes transmission lines causing a LOOP (loss of offsite power)**. The emergency diesel generators automatically started and connected to their electrical buses. The operators manually started the reactor core isolation cooling and high pressure coolant injection systems to maintain reactor water level. The operators opened a safety relief valve to control reactor pressure. Offsite power is restored about 30 minutes later.<sup>10</sup>

From November 23-28, 1978 another **“large impingement event”** occurs, and **10,200 Atlantic menhaden** are impinged on Pilgrim’s intake screens. Again from December 11-29, 1978 a “large impingement event” takes place, where **6,200 rainbow smelt** are killed on Pilgrim’s screens.

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<sup>8</sup> *Entergy v. MassDEP*, 459 Mass. 319 (2011), Decision by Mass. Supreme Judicial Court

<sup>9</sup> Attachment 3 to March 3, 2015 Letter to Governor Baker. Summary and Excerpts from: NRC Supplemental Inspection Report 05000293/2014008 and Assignment of Two Parallel White Performance Indicator Findings, 1/26/15. <<https://files.ctctcdn.com/3f5c2ed6201/d4fc04ec-bcef-481b-a9e8-9cfb8ef3aea1.pdf>>

<sup>10</sup> Exhibit 3 to Affidavit of William Maurer, submitted with Petitioners' Pre-Filed Testimony in Waterways Appeal, June 29, 2015 MassDEP's Office of Appeals and Dispute Resolution, Docket 2015-009. <<http://www.capecodbaywatch.org/wp-content/uploads/2015/09/Maurer-Exhibit-3.pdf>>

**1979:** In March 1979, there is a meltdown at **Three Mile Island** nuclear reactor in Pennsylvania.

In March and April 1979, a **“large impingement event”** occurs, where **1,100 Atlantic silversides** are impinged.

On July 27, 1979, Pilgrim has **another emergency scram**. The reactor automatically scrams when a lightning strike causes a LOOP.<sup>11</sup> About a month later, on August 28, 1979, Pilgrim has **another emergency scram**. Again, the reactor automatically scrams when a lightning strike causes a LOOP.<sup>12</sup>

## 1980s

**1981:** Over a 2-day period (September 23-24, 1981) **6,000 Atlantic silversides** are killed in a **“large impingement event.”**

**1982:** In January 1982, **NRC issues a \$550,000 penalty** to Boston Edison for mismanagement and mechanical failures at Pilgrim, one of the largest NRC fines in U.S. history.<sup>13</sup>

**U.S. Congress** passes the **National Waste Policy Act** in 1982, in an effort to deal with high level nuclear waste disposal (spent fuel). Pilgrim’s spent fuel remains stranded in the wet pool inside the reactor, and is never sent off site for reprocessing or disposal as planned in 1967 when Pilgrim was built. The law requires the U.S. Energy Department to identify and built two sites for long term deep geological storage of the nation’s nuclear waste.

In June 1982, a **radioactive material, Cesium-137 is released into the air** when Pilgrim’s filters burst.<sup>14</sup> Highly radioactive resin beads and particulate matter were found to have been accidentally injected into the ventilation system and outside the building. Material was discovered on roofs of several buildings and on grounds of the site. Pilgrim’s Environmental Radiation 1982 Report outlines test results for milk and vegetation samples from farms 0.7 to 12 miles away from Pilgrim. Due to contamination by radioactive materials, cows at the Plymouth County Farm on Obery Street in Plymouth are killed and buried on site.<sup>15</sup>

On October 12, 1982, high winds cause salt accumulation on electrical equipment that led to an electrical fault and a **LOOP** lasting about 1 minute.<sup>16,17</sup>

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<sup>11</sup> *Ibid.* 10

<sup>12</sup> *Ibid.* 10

<sup>13</sup> Ackerman J. Jan. 20, 1982. \$550,000 fine asked for Pilgrim N-plant. Boston Globe.

<sup>14</sup> Pilgrim Watch. “Emissions” <<http://www.pilgrimwatch.org/emissions.html>>

<sup>15</sup> Source: available on request.

<sup>16</sup> [Pilgrim] Licensee Event Report LER 1982051. See Maurer W. Aug. 5, 2015 email to NRC. <<http://pbadupws.nrc.gov/docs/ML1521/ML15218A227.pdf>>

<sup>17</sup> *Ibid.* 10

**1983: Pilgrim loses off site power due to a February 1983 Nor'easter/blizzard.** High winds cause salt accumulation on electrical equipment that leads to an electrical fault and **LOOP** lasting about 1 minute.<sup>18</sup>

Pilgrim **shuts down** in December 1983 to replace cracked circulation system piping.<sup>19</sup>

In July 1983, EPA and MassDEP issue joint **water pollution permit** (National Pollutant Discharge Elimination System, or NPDES, permit) under the Federal Clean Water Act for Pilgrim's once-through cooling water system.

**1986-1989:** From April 1986 to January 1989, Pilgrim **shuts down** due to a series of mechanical failures.<sup>20</sup>

**1986:** In April 1986, there is a **nuclear meltdown at Chernobyl** nuclear power plant in the Ukraine.

In May 1986, the NRC identifies Pilgrim as **one of the most unsafe nuclear facilities in the U.S.**<sup>21</sup>

In July 1986, MASSPIRG, 50 state legislators, and more than a dozen citizen groups **file a petition with the NRC** requesting a formal hearing on suspension or revocation of Pilgrim's license to operate. The NRC failed to consider the petition fully and fairly.<sup>22</sup>

On November 19, 1986, while the plant is in cold-shutdown, ice buildup on electrical equipment causes a fault and a **LOOP** lasting about 1 minute.<sup>23</sup> Also in November 1986, voters in Plymouth and Kingston approve local referenda to shut down Pilgrim.

**1987:** On March 31, 1987, while the plant is in cold-shutdown, **heavy winds cause an electrical fault and a LOOP** lasting about 1 minute.<sup>24</sup>

Court testimony of Dr. Richard Clapp, epidemiologist, Boston University in 2014 states that, in 1987, **Pilgrim exposed more of its workers to radiation than any other commercial nuclear plant in the U.S.**<sup>25</sup>

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<sup>18</sup> *Ibid.* 9

<sup>19</sup> Sovacool BK. Jan. 2011. Questioning the safety and reliability of nuclear power: An assessment of nuclear incidents and accidents. Gaia, 20/2: 95-103. <<http://www.capecodbaywatch.org/wp-content/uploads/2012/06/Sovacool-Gaia-Nuclear-Accidents.pdf>>

<sup>20</sup> Lochbaum D. May 2004. U.S. nuclear plants in the 21<sup>st</sup> century: The risk of a lifetime. Report by the Union of Concerned Scientists. <<http://www.capecodbaywatch.org/wp-content/uploads/2012/06/nuclear04fnl.pdf>>

<sup>21</sup> Pertman A. May 23, 1986. Boston Globe article. Pilgrim on list of worst-run nuclear units; NRC cites potential hazards.

<sup>22</sup> Congressional Hearing. Jan. 7, 1988. Plymouth. Transcript available at <[https://archive.org/stream/restartofpilgrim00unit/restartofpilgrim00unit\\_djvu.txt](https://archive.org/stream/restartofpilgrim00unit/restartofpilgrim00unit_djvu.txt)> and U.S. Government Printing Office 83-478.

<sup>23</sup> *Ibid.* 10

<sup>24</sup> *Ibid.* 10; LER 1987005

A study is published in 1987 shows **5 towns around Pilgrim with a 60% increase in leukemia rate**, excluding leukemia not caused by radiation exposure. The rate of myelogenous leukemia (the type most likely to be triggered by exposure to radiation) among males in the 5 towns found to be 2.5x greater than statewide average.<sup>26</sup>

In 1987, protesters affiliated with Citizens Urging Responsible Energy and others opposed to Pilgrim coming back online after the 1986-1989 shutdown are **arrested for blocking the entrance to Pilgrim**. Issues include lack of adequate emergency planning.

In October 1987, critics including **Governor Dukakis ask the NRC to revoke Pilgrim's operating license** due to inadequate emergency plans and public safety hazards.<sup>27</sup>

On November 12, 1987, while the plant is in cold-shutdown, high winds caused **salt accumulation on electrical equipment that led to an electrical fault and a LOOP** lasting 21 hours and 3 minutes.<sup>28</sup>

**1988:** Before Pilgrim comes back online in 1989, a **congressional hearing is held in Plymouth on January 7, 1988 before the Senate Committee on Labor and Human Resources** (under Ted Kennedy) examining the proposed restart of Pilgrim and the potential implications for public safety and health.<sup>29</sup>

On January 21, 1988, a 5,000 cubic yard pile of dirt containing **radioactive cesium-134, cesium-137, and cobalt-60** is found in a parking lot near the reactor.<sup>30</sup>

In October 1988, at a public meeting about Pilgrim, the **NRC has an aide to Governor Dukakis removed** for saying that Boston Edison lacked an adequate emergency plan for Pilgrim. The NRC subsequently apologized.

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<sup>25</sup> Affidavit of Dr. Richard Clapp, MPH, in support of Plaintiffs' opposition to defendant Entergy's motion to dismiss plaintiffs' first amended complaint for lack of standing. June 2014. 19 pp.

<sup>26</sup> Cobb S. et al. Leukemia in Five Massachusetts Coastal Towns. Abstract for the American Epidemiologic Society. March 18, 1987.; and Clapp RW, Cobb S, Chan, Walker B. 1987. Leukemia near Massachusetts nuclear power plant. Lancet. 2:1324-5. PMID 2890916. <<http://www.ncbi.nlm.nih.gov/pubmed/2890916>>

<sup>27</sup> New York Times. Jan. 1, 1989. Pilgrim Reactor Restarted After 3-Year Shutdown. <[http://www.capecodbaywatch.org/wp-content/uploads/2012/06/1989.01.01\\_NewYorkTimes\\_RestartsAfter3Years.pdf](http://www.capecodbaywatch.org/wp-content/uploads/2012/06/1989.01.01_NewYorkTimes_RestartsAfter3Years.pdf)>

<sup>28</sup> *Ibid.* 10

<sup>29</sup> *Ibid.* 22

<sup>30</sup> Tye L. Boston Globe. Jan. 21, 1988. Radioactivity detected in dirt pile near Pilgrim. <[http://www.capecodbaywatch.org/wp-content/uploads/2012/06/1988.01.21\\_BG\\_RadioactiveDirtPile.pdf](http://www.capecodbaywatch.org/wp-content/uploads/2012/06/1988.01.21_BG_RadioactiveDirtPile.pdf)>

**1989:** In January 1989, **Pilgrim goes back online** after a two year and three month shut down following mechanical failures including radiological emissions resulting from blown air filters. National media covers the story, including New York Times.<sup>31</sup>

## 1990s

**1990:** In October 1990, the Massachusetts Department of Public Health (MassDPH), Division of Environmental Health Assessment publishes a report titled “The southeastern Massachusetts health study, 1978-1986,” to investigate if communities near Pilgrim have elevated leukemia mortality rates associated with radioactive plant discharges. The report found a **two to four fold increase in the risk of leukemia among residents of certain towns within a 20 mile radius from the plant.**<sup>32</sup>

**1991:** From July 22-25, 1991 a “**large impingement event**” occurs, and **4,200 rainbow smelt** are impinged on Pilgrim’s intake screens.

On October 30, 1991, a nor’easter that evolved into a hurricane, nicknamed the “**1991 Perfect Storm,**” forces shut down of Pilgrim when it **blows seaweed into the intake structure**, clogging the circulating water pumps, and causing a loss of condenser vacuum.<sup>33</sup>

EPA and MassDEP, in 1991, **renews Pilgrim’s Clean Water Act NPDES permit** for continued use of once-through cooling water system and discharges of heated water and other pollutants to Cape Cod Bay. Pilgrim’s cooling system remains unchanged, no technology improvements required. Impingement and entrainment of marine life continues. Permit set to expire in 1996 (pursuant to the five year term set by law). Boston Edison continues “monitoring” impact to marine life and discharges to Cape Cod Bay.

**1992:** On December 13, 1992 a **nor’easter/blizzard causes an emergency shut down.** Forced automatic scram occurs due to a generator load rejection caused by flashovers in the switchyard, which are caused by salt deposits during the severe storm.<sup>34</sup>

**1993:** On March 13, 1993 a superstorm nicknamed the “**Storm of the Century**” causes **Pilgrim’s reactor to automatically shut down** due to a generator load rejection caused by flashovers in the switchyard which are caused by wind-packed snow during blizzard conditions.<sup>35</sup>

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<sup>31</sup> *Ibid.* 26

<sup>32</sup> Morris, M., and Knorr, R.: The southeastern Massachusetts health study, 1978-1986. Report of Massachusetts Department of Public Health, Boston, October 1990.

<sup>33</sup> *Ibid.* 10; LER 1991024 Loss of Preferred and Secondary Offsite Power Due to Severe Coastal Storm While Shutdown.

<sup>34</sup> *Ibid.* 10; LER 1992016 Automatic Scram Resulting From Load Rejection at 48 Percent Reactor Power.

<sup>35</sup> *Ibid.* 10; LER 1993004

On September 10, 1993 **Pilgrim’s reactor automatically shuts down after lightning strikes** cause switchyard breakers to open.<sup>36</sup>

From December 15-28, 1993 a **“large impingement event”** occurs, and **5,100 Atlantic silversides** are impinged on Pilgrim’s intake screens.

**1994:** U.S. EPA and MassDEP **amend Pilgrim’s 1991 Clean Water Act NPDES permit** to allow discharges of additional pollutants.

From November 26-28, 1994 a **“large impingement event”** occurs, and **5,800 Atlantic silversides** are impinged on Pilgrim’s intake screens. Another “large impingement event” occurs from December 26-28, where **11,400 Atlantic silversides and rainbow smelt are killed**.

**1995:** In a two day period (September 8-9, 1995), **13,100 alewife** are killed in a **“large impingement event.”**

**1996:** Pilgrim’s Clean Water Act **NPDES permit expires**, but is “administratively extended” by U.S. EPA and MassDEP.

**1997:** Massachusetts **deregulates** the energy industry.<sup>37</sup>

In the late 1990s, Pilgrim’s consultants estimated that “entrainment of [winter flounder] larvae through the Pilgrim facility in 1997 resulted in a **loss to the adult Plymouth/Duxbury Bay population of 9-41%** (range based on projections from different models).”<sup>38</sup>

**1998:** In 1998, **one of the highest records of larval winter flounder entrainment occurred** (77,000 equivalent adults), which was nearly 30% loss of the adult population that year.<sup>39</sup>

**1999:** **Entergy Nuclear Generation Company purchases Pilgrim**, including 1,600 acres of land, from Boston Edison for \$80 million; \$13 million was for the facility and the 1,600-acres, and the remaining \$67 million was for the nuclear fuel. Pilgrim’s Clean Water Act NPDES permit transferred to Entergy.

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<sup>36</sup> *Ibid.* 10; LER 1993022

<sup>37</sup> Commonwealth of Mass. Legislature. 1997. Chapter 164. An Act Relative to Restructuring the Electric Utility Industry in the Commonwealth, Regulating the Provision of electricity and other services, and promoting enhanced consumer protections therein.

<sup>38</sup> Letter to EPA from Szal G.M. (PATC), Dec. 8, 1998. Re: Pilgrim Nuclear Power Plant.

<sup>39</sup> Letter to EPA from MassCZM, Jun. 27, 2000. Re: MCZM review of the Entergy-Pilgrim Station §316 Demonstration Report.

In August 1999, EPA and MassDEP designate the Plymouth-Carver Aquifer as a Sole Source Aquifer under the Safe Drinking Water Act. The designation states, “if contamination were to occur, it would pose a significant health hazard and a serious financial burden to the area’s residents.”<sup>40</sup>

**Pilgrim sits on top of the aquifer, and has been leaking radionuclides into the ground since at least 2007.**<sup>41</sup>

In a 2-day period (September 17-18, 1999), a “**large impingement event**” occurs where **4,910 Atlantic menhaden** are impinged on Pilgrim’s intake screens.

## 2000 to 2005

**2000:** From November 17-20, 2000 a “**large impingement event**” occurs, and **19,900 Atlantic menhaden** are impinged on Pilgrim’s intake screens.

**2001:** The **September 11<sup>th</sup> terrorist attacks** on the U.S. raise new issues about the vulnerability of Pilgrim as a terrorist target. One of the planes flown by the terrorists took off from Boston and flew directly over Entergy’s Indian Point reactors outside New York City.

**2002:** In January 2002, the **U.S. Coast Guard unilaterally imposes a “safety security zone” along the shoreline in front of Pilgrim.**<sup>42</sup> The public is excluded from the area, which includes 1 mile of Massachusetts’ tidelands. The tidelands are public lands, held in trust for public benefit, and activities undertaken by private entities such as Entergy in the tidelands are governed by the Massachusetts Waterways Law, Chapter 91 and associated regulations. Entergy never obtained Chapter 91 approval for the safety and security zone in front of Pilgrim. This zone will exclude the public as long as Pilgrim operates and/or spent nuclear fuel is stored at the site. State regulators have failed to act to protect public interest in the tidelands in front of Pilgrim.

On February 5, 2002, Stratus Consulting publishes a report for EPA entitled “Habitat-based replacement costs: An ecological valuation of the benefits of minimizing impingement and entrainment at the cooling water intake structure of the Pilgrim Power Generating Station in Plymouth, Massachusetts.” The report estimates that, on average, **14.5 million fish and 160 billion blue mussels are killed each year at Pilgrim through impingement and entrainment combined.**<sup>43</sup>

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<sup>40</sup> 55 Fed. Reg. 32137.

<sup>41</sup> MassDPH. *Summary of Tritium Detected in Groundwater Monitoring Wells, Pilgrim Nuclear Power Station, Plymouth, MA, 2007.* <<http://www.mass.gov/eohhs/gov/departments/dph/programs/environmental-health/exposure-topics/radiation/environmental-monitoring.html>>

<sup>42</sup> 67 Fed. Reg. 4218

<sup>43</sup> Stratus Consulting. 2002. Habitat-based replacement costs: An ecological valuation of the benefits of minimizing impingement and entrainment at the cooling water intake structure of the Pilgrim Power Generating Station in Plymouth, Massachusetts. Report for the U.S. EPA, Region 1. <<http://www.capecodbaywatch.org/library/stratusreport>>

In August and September, 2002, a **“large impingement event”** occurs, and **33,300 Atlantic menhaden** are impinged on Pilgrim’s intake screens.

**2003:** On May 19, 2003 Pilgrim’s reactor **scrams** due to spurious operation of the turbine bypass valves.

On November 1, 2003 a **“large impingement event”** occurs, and **2,500 Atlantic menhaden** are impinged on Pilgrim’s intake screens. In the same month, **three more “large impingement events”** happen: From November 12-17, **63,900 Atlantic menhaden** are impinged, from November 19-21, **17,900 sand lance and Atlantic menhaden** are impinged, and on November 29, **3,900 Atlantic silversides** are impinged.

**2005:** 97% of the more than 300,000 fish Entergy impinged in 2005 were Atlantic menhaden. There were also 19 impingement events where more than twenty fish were collected off the intake screens per hour, which consisted primarily of Atlantic menhaden and Atlantic silversides. There was one large impingement event in 2005 (August 16-18) which involved exclusively young Atlantic menhaden. This event in 2005 was **the largest single impingement event in Pilgrim’s history** with a total of 107,000 fish impinged.

The National Academies of Science develops a report in 2005 called “Health Risks from Exposure to Low Levels of Ionizing Radiation,” which finds that there is **no safe level of exposure to radiation**; even low doses can cause cancer. To address this, EPA sets a Maximum Contaminant Level Goal (MCLG) for all radionuclides (including tritium) as ZERO. EPA defines MCLG as the “level of a contaminant in drinking water below which there is no known or expected risk to health.”

## 2006 to 2010

**2006:** Entergy files application seeking to renew its operating license with the NRC for a **20-year extension**, until 2032. The NRC process for relicensing Pilgrim begins. By the time Pilgrim is relicensed in May 2012, Pilgrim’s 6-year hotly contested relicensing application will make the proceeding the longest in NRC history.

In 2006, the Nuclear Energy Institute proposes that nuclear facilities in the U.S. begin **voluntary tritium monitoring in groundwater**. This recommendation came after tritium, a radioactive isotope of hydrogen, was being found at high levels at several nuclear facilities throughout the U.S.

In 2006, Pilgrim impinges an estimated total of **29,711 fish** consisting of 34 species, as well as **9,619 invertebrates** representing 13 taxa.<sup>44</sup>

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<sup>44</sup> Normandeau Associates. Mar. 2007. Impingement monitoring, Section 3.3. In: Entergy Nuclear – Pilgrim Station. 2007. Marine Ecology Studies Jan. 2006 – Dec. 2006, Report No. 69.

**2007:** In January 2007, **Entergy sues MassDEP to prevent implementation of new state Clean Waters Act regulations at Pilgrim.** The new regulations seek to prevent the “unique set of environmental harms” caused by Pilgrim’s once-through cooling system.<sup>45</sup> Entergy lost the case and the regulations take effect, but MassDEP fails to enforce the regulations. Entergy is allowed to continue to operate with an expired NPDES permit and outdated once-through cooling system.<sup>46</sup>

On March 17, 2007 operators **scram Pilgrim’s reactor due to an increasing trend in unidentified drywell leakage.**

On November 29, 2007 Entergy begins “voluntary” groundwater monitoring with its first 6 monitoring wells on the Pilgrim site (by 2015, 24 wells exist). **Radioactive tritium has found in groundwater at Pilgrim every year since testing began.** Other radionuclides also present.<sup>47</sup>

In 2007, due to marine monitoring efforts required by its Clean Water Act NPDES permit, Entergy reports an impinged annual extrapolated total of 162,991 fish consisting of 36 species. Atlantic menhaden accounted for 95% of the total (154,832 fish). Atlantic silversides (3,362 fish), rainbow smelt (1,191 fish; federally listed species of concern), and winter flounder (715 fish) were also dominants. The **2007 impingement total was nearly 4x the 27-year mean** due in part to the “**large impingement event**” of juvenile menhaden that occurred on September 14-15 (6,500 fish).<sup>48</sup>

In 2007, Pilgrim impinges an estimated annual total of **8,884 invertebrates** representing 12 taxa.

**2008:** On December 19, 2008 a **nor’easter/blizzard causes Pilgrim’s reactor to automatically scram** when icing occurs in the main switchyard.<sup>49</sup>

In 2008, Entergy impinges an estimated annual total of **11,821 fish, consisting of 37 species, as well as 8,309 invertebrates.**

**2010:** In January 2010, Vermont Yankee Nuclear Power Station (also owned by Entergy) notifies the Vermont Department of Health that samples taken in November 2009 from a groundwater monitoring well contains dangerously high tritium levels (a radioactive form of hydrogen). The Vermont leak prompts Plymouth-area citizens groups to demand more test wells at Pilgrim.

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<sup>45</sup> Entergy v. Mass. Department of Environmental Protection, 459 Mass. 319 (2011).

<sup>46</sup> Pilgrim’s 1991 NPDES permit is still not renewed or updated as of August 2015.

<sup>47</sup> MassDPH reports available at <<http://www.mass.gov/eohhs/gov/departments/dph/programs/environmental-health/exposure-topics/radiation/environmental-monitoring.html>>

<sup>48</sup> Normandeau Associates. Oct. 2008. Impingement monitoring, Section 3.3. In: Entergy Nuclear – Pilgrim Station. 2008. Marine Ecology Studies Jan. 2007 – Dec. 2007, Report No. 71.

<sup>49</sup> *Ibid.* 10; LER 2008006; LER 2008007.

Due to **rising levels of tritium** in Pilgrim’s groundwater testing well #205 in July 2010 (more than 25,000 picocuries per liter (pCi/L) is found), DPH recommended that Entergy install even more wells and start testing surface water as well. By August 2010, 6 additional wells were installed.

On July 29, 2010 a **“large impingement event”** occurs, and **1,061 alewife** are impinged on Pilgrim’s intake screens.

Overall in 2010, Pilgrim impinges an estimated total of **32,962 fish consisting of 33 species, as well as 12,454 invertebrates** representing 13 taxa.

## **2011 to 2012**

**2011:** On March 11, 2011 a massive earthquake off the northeastern coast of Japan and the devastating tsunami that followed set off a chain of problems at the **Fukushima Daiichi Nuclear Power Station** that eventually led to the worst nuclear accident since Chernobyl. Tsunami floods backup generators, causing failures and cutting power to pumps – overheating and meltdowns ultimately occur. Pilgrim’s reactor is the same General Electric Mark I design as those at Fukushima. Unconfirmed reports say that the reactor parts built by General Electric for the cancelled Units 2 and 3 at Pilgrim were sent to Japan for use at Fukushima.

On May 10, 2011, Pilgrim’s reactor automatically **scrams** on high-high flux on the intermediate range monitors during startup.

**2012:** On March 12, 2012 the NRC sends a letter to all U.S. nuclear reactors **requesting information to support the NRC’s Near-Term Task Force (NTTF) review of the Fukushima Dai-ichi nuclear accident.**<sup>50</sup> The NRC establishes the NTTF after the Fukushima accident to review what happened and improve response and readiness of the U.S. nuclear fleet to beyond design basis events. The NTTF developed a report and recommendations. The NRC requires the nuclear industry, including Pilgrim, to implement **Diverse and Flexible Coping Strategies (“FLEX Strategy”)** to address certain mitigation strategies for “Beyond-Design-Basis External Events” such as flooding and earthquakes that can disable Pilgrim’s cooling systems. Part of the NRC’s March 12, 2012 request addressed NTTF’s Recommendation 2.1, and directed licensees to **reevaluate flood hazards** at reactor sites.

On March 30, 2012 the **Cape Cod National Seashore Advisory Commission sends letter to NRC asking that Pilgrim not be relicensed.**

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<sup>50</sup> NRC, Mar. 12, 2012. <<http://pbadupws.nrc.gov/docs/ML1205/ML12053A340.pdf>>

On May 3, 2012 State **Senator Dan Wolf calls for the closing of Pilgrim** in a letter to the NRC.<sup>51</sup>

On May 11, 2012 the NRC provides nuclear licensees with a prioritization plan and the resultant list of due dates for all for individual plants to complete flood reevaluations (based on their March 12<sup>th</sup> Request for Information).<sup>52</sup> **Entergy's Hazard Reevaluation Report for flooding at Pilgrim is due March 12, 2015.**

Later in May (12<sup>th</sup>), **Plymouth voters approve a referendum 59% to 41%** asking the NRC to not relicense Pilgrim until their recommendations learned from Fukushima could be implemented.<sup>53</sup> At this point Duxbury, Provincetown, Kingston, Scituate, Marshfield, Truro, Mashpee and Brewster all approve referendums saying the same thing.

A **labor dispute** at Pilgrim begins in May 2012. On May 16, 2012<sup>54</sup> Pilgrim Watch and Jones River Watershed Association (JRWA) file a legal petition asking the NRC to close Pilgrim since the plant can't be operated safely with replacement workers that have not received site specific training; do not have years of experience at the site; do not have a history specific to Pilgrim. Pilgrim Watch, on May 18<sup>th</sup>, files a supplemental petition.<sup>55</sup>

On May 22, 2012 operators **shut down, or scram,** Pilgrim's reactor from 35% power due to increasing condenser pressure.

On May 25, 2012 **NRC votes 3-1 to extend Pilgrim's operating license for another 20 years, until 2032.** NRC Chairman Jazcko opposes relicensing and in lengthy comments cites to the unprecedented situation of the NRC commissioners voting to relicense Pilgrim despite pending citizen challenges that have been referred to the NRC's administrative appeal board.

On June 4, 2012 Pilgrim's **labor dispute boils over, with Entergy management locking out 250 unionized workers for more than a month** and both sides accusing the other of compromising public safety. Entergy demands "major concessions on health care, salary and staffing." Pilgrim implements an emergency staffing plan. Pilgrim Watch files five supplemental requests in June 2012 based on new facts and events they say show Entergy is violating its NRC operating license.<sup>56</sup>

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<sup>51</sup> <http://www.pilgrimcoalition.org/wp-content/uploads/2012/05/050312-Wolf-to-NRC.pdf>

<sup>52</sup> <http://www.capecodbaywatch.org/wp-content/uploads/2012/06/May-11-2012-NRC-Response-Dates.pdf>

<sup>53</sup> Pilgrim Coalition press release: Plymouth Votes to ask NRC to Suspend Relicensing of Pilgrim Reactor.

<sup>54</sup> <http://www.capecodbaywatch.org/wp-content/uploads/2012/06/05.-16.12-STRIKE-2.206.pdf>

<sup>55</sup> <http://www.capecodbaywatch.org/wp-content/uploads/2012/06/05.-16.12-STRIKE-2.206.pdf>

<sup>56</sup> <http://www.capecodbaywatch.org/2012/06/supplement-to-2-206-enforcement-petition-regarding-labor-dispute-at-pilgrim/>

On June 8, 2012 **Entergy responds by letter to the NRC's Request for Information regarding the flooding aspects** of Recommendations 2.1 and 2.3 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident.

On October 3, 2012 the **Mass. Emergency Management Agency (MEMA) publicly admits the Bourne and Sagamore Bridges will be closed if there is an accident at Pilgrim**. MEMA says Cape Cod residents and visitors must "shelter in place" and then will "relocated" after everyone north has been evacuated.<sup>57</sup>

On October 5, 2012 local residents send EPA, MassDEP, and Entergy an "**intent to sue**" notice letter under state and federal water pollution laws for Entergy's violations of the Clean Water Act.<sup>58</sup> Entergy threatens to sue citizens in return. Due to the intent to sue, EPA and MassDEP promise to renew expired Clean Water Act NPDES permit by December 2012 - promise broken.

On October 29, 2012 Hurricane Sandy hits New York. Oyster Creek Nuclear Station in New Jersey declares a rare "emergency alert" due to power outages and equipment dangerously close to being submerged. **America's nuclear safety, including at Pilgrim, comes under scrutiny after Oyster Creek's Sandy alert.**

In 2012, Pilgrim **impinges an estimated extrapolated total of 9,287 fish representing 34 species, as well as a total of 11,931 invertebrates.**

## 2013

**2013:** On January 10, 2013 operators **shut down** Pilgrim's reactor (scram) after both recirculation pumps tripped.

On Jan 12, 2013 a **critically endangered North Atlantic right whale mother named Wart and her newborn calf are seen swimming close to Pilgrim**. This is the first mother-calf right whale sighting in Cape Cod Bay in January in 27 years, and the only mother-calf pair ever documented occurring near Pilgrim. Local groups ask the National Marine Fisheries Service and the NRC to reinstate consultation under Section 7 of the Endangered Species Act (ESA).

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<sup>57</sup> Remarks by MEMA director Kurt Schwartz at the Barnstable County Regional Emergency Planning Committee Oct. 3, 2012 Harwich Community Center <[http://capedownwinders.org/wp-content/uploads/pdf/MEMA\\_Dir\\_Schwartz\\_BCREPC\\_121003\\_highlighted.pdf](http://capedownwinders.org/wp-content/uploads/pdf/MEMA_Dir_Schwartz_BCREPC_121003_highlighted.pdf)>

<sup>58</sup> <http://www.capecodbaywatch.org/wp-content/uploads/2012/10/10.05.12-noi-w-exhibits.pdf>

On February 8, 2013 Pilgrim’s reactor automatically shuts down when a blizzard nicknamed “**Nemo**” causes a **LOOP**.<sup>59</sup>

In April 2013, an underground line leading to the discharge canal (“neutralization sump discharge line”) is suspected to have separated and begun **leaking tritium**. The tritium leak is accidentally discovered when water was discovered coming out of an electrical junction box at the facility.<sup>60</sup>

On April 14, 2013 operators manually **shut down** Pilgrim’s reactor (scram) due to reactor pressure lowering beyond established control bands.

On June 10, 2013 the **Cape Cod National Seashore Advisory Commission** sends a letter to Governor Patrick asking him to support 14 Massachusetts towns on Cape Cod that have passed warrant articles or ballot questions calling on NRC to shut Pilgrim.<sup>61</sup>

During the July 2013 heatwave, **Cape Cod Bay’s water temperature rose above 75°F**, requiring Pilgrim to shut down in order to comply with its NRC license.

In July 2013, the U.S. Department of Energy published a **report outlining vulnerabilities to climate trends at energy facilities, including nuclear power stations**. The report specifically cites climate change patterns such as increasing air and water temperatures, increasing intensity of storm events, sea level rise, and storm surges as having potential negative implications for thermoelectric forms of power generation (including nuclear facilities).<sup>62</sup>

In August 2013, a report commissioned by the Pentagon and published in August 2013 highlights the vulnerability of nuclear power plants nationwide to terrorist attacks. The report specifically **cites Pilgrim as one of eight plants most vulnerable to a water-borne attack**.<sup>63</sup>

In August 2013, local residents file **legal appeal over Entergy’s failure to comply with Town of Plymouth’s zoning laws** for Pilgrim’s dry cask storage facility for long term storage of high-level nuclear waste. (Legal appeal pending in Massachusetts Land Court as of September 2015.)

On August 22, 2013 operators **shut down** Pilgrim’s reactor (scram) due to lowering reactor water level. The cause of the lowering water level was due to the trip of all three feedwater pumps.

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<sup>59</sup> NRC. Event Report 48736. <<http://www.nrc.gov/reading-rm/doc-collections/event-status/event/2013/20130211en.html>>

<sup>60</sup> Old Colony Memorial. Apr. 20, 2013. PILGRIM STATION: Tritium source accidently discovered. <<http://www.capecodbaywatch.org/wp-content/uploads/2012/10/Print.pdf>>

<sup>61</sup> Cape Cod National Seashore Advisory Commission Letter to Governor Patrick, Jun. 10, 2013. <<http://www.nps.gov/caco/learn/management/upload/Adv-Com-letter-to-Gov-Patrick-re-Pilgrm-nuclear-plant-6-10-13.pdf>>

<sup>62</sup> U.S. Dpt. of Energy. 2013. U.S. Energy Sector Vulnerabilities to Climate Change and Extreme Weather. 84 pp.

<sup>63</sup> Kirkham L., and A.J. Kuperman. Aug. 2013. Protecting U.S. nuclear facilities from terrorist attack: re-assessing the current “design basis threat” approach. Nuclear Proliferation Prevention Project, LBJ School of Public Affairs, University of Texas at Austin. Working paper #1. 33 pp.

In September 2013, MassDPH reported that **tritium levels from one of Pilgrim’s groundwater sampling wells was trending higher** than other wells on the site (4,882-5,307 pCi/L of tritium detected in well #216 in August). MassDPH reported that the leak could be related to the separated “neutralization sump discharge line” and more investigation would be needed.<sup>64</sup>

On Oct 14, 2013, a **LOOP** occurs due to the loss of the second 345kV line 355 (power line out of service).

In October 2013, tritium levels in Pilgrim’s groundwater monitoring well #216 continue to trend higher than the other wells (3,330-5,720 pCi/L). **Tritium** levels in wells #209 and #211 are also trending higher (797-1,350 pCi/L). The separated “neutralization sump discharge line” is again cited as a possible source by MassDPH. Tritium, cobalt-60, and cesium-137 is also found in soil at levels above normal.<sup>65</sup>

In 2013, led by Cape Downwinders, **all 15 towns on Cape Cod vote to support a nonbinding ballot question or a town meeting warrant article** that gives citizens the opportunity to vote yes on a statement asking Governor Patrick to call upon the Nuclear Regulatory Commission (NRC) to shut down Pilgrim based on safety concerns.

## 2014

**2014:** By January 2014, nine months since Pilgrim’s neutralizing sump pump discharge line was originally suspected to have separated and begun leaking tritium, the leak(s) continue. **Excessive levels of tritium (69,000-70,000 pCi/L) were detected in monitoring well #219.**<sup>66</sup>

On January 2-3, 2014 **Winter Storm “Hercules”** and simultaneous high tides affect the Massachusetts coast. The storm drops 8-13 inches of snow in Plymouth County – along with high winds, frigid temperatures, and coastal flooding. What is different about this storm is that at least 2 astronomical high tides occur at the same time as the storm – a relatively rare event. JRWA sends a letter to the NRC suggesting that the storm/tidal events could be a valuable opportunity for the NRC to assess the flooding potential at Pilgrim more accurately.

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<sup>64</sup> MassDPH. PNPS groundwater monitoring update as of Sept. 3, 2013. <<http://www.capecodbaywatch.org/wp-content/uploads/2013/09/PNPSUpdate-9-3-20131.pdf>>

<sup>65</sup> MassDPH. PNPS groundwater monitoring update as of Oct. 18, 2013. <<http://www.capecodbaywatch.org/wp-content/uploads/2013/11/PNPSUpdate-10-18-2013.pdf>>

<sup>66</sup> Cape Cod Bay Watch. Jan. 28, 2014. Pollution of the Plymouth-Carver Sole Source Aquifer Continues. <<http://www.capecodbaywatch.org/2014/01/pollution-of-the-plymouth-carver-sole-source-aquifer-continues/>>

On January 28, 2014 Cape Cod Bay Watch (CCBW) **asks EPA to retire Pilgrim’s Clean Water Act NPDES permit** - 18 years expired at this time. In a letter to EPA Administrator Gina McCarthy, CCBW points out EPA’s broken promise to renew Pilgrim’s permit by December 2013, and that the 18-year delay is unacceptable.<sup>67</sup>

In February, 2014 NRC identifies Pilgrim as **one of the nine worst performing nuclear reactors in the U.S.** because it had the most emergency shutdowns or reactor “scrams” in 2013.

On March 10, 2014 about **65 Cape Codders gathered at Mass. Statehouse** to provide testimony to Governor Patrick, urging him to comply with non-binding referenda passed in every Cape town and ask the NRC to close Pilgrim. About 50 people “occupy” the Governor’s office, and a meeting occurs. A week later (March 17), Governor sends letter to NRC Chairman expressing concern about Pilgrim. In his letter he states, ***“I urge you to require that the plant be decommissioned should Pilgrim not comply with all health, safety and environmental regulations.”***

On March 18, 2014 a criminal trial is held involving **11 activists charged with criminal trespass** at Pilgrim. The activists asserted the “necessity defense,” claiming that their actions were necessary to prevent the unacceptable danger caused by Pilgrim’s operations. Dr. Richard Clapp, epidemiologist from Boston University, testifies that Pilgrim’s continued operation is “a risk and an unacceptable risk in my view.” The activists were found guilty and sentenced to one day in jail.<sup>68</sup>

In March 2014, The Association to Preserve Cape Cod issues a position statement regarding threats to Cape Cod’s environment from Pilgrim, and **calls on public officials and regulatory agencies to revoke Pilgrim’s permits and require that Pilgrim be decommissioned.**<sup>69</sup>

On May 10, 2014 **Plymouth residents overwhelmingly voted to approve Question 1, with 83% of voters voting yes.** Question 1 encourages town leaders to ensure that spent nuclear fuel assemblies (nuclear waste) stored at the Pilgrim Nuclear Power Station are transferred from wet pool to dry cask storage quickly and in the safest way possible.

May 14, 2014 Entergy **applies to MassDEP for a 30-year Chapter 91 permit under the Public Waterfront Act** (Mass. General Laws chapter 91) to use the public lands along the Cape Cod Bay shoreline in front of Pilgrim to install equipment for an emergency cooling water system. Entergy needs to install the equipment to comply with the NRC’s “Fukushima Fixes” order and as part of its FLEX strategy.<sup>70</sup>

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<sup>67</sup> CCBW. Letter to EPA, Jan. 28, 2014. <[http://www.capecodbaywatch.org/wp-content/uploads/2014/01/NPDESletter\\_Final\\_2014Jan28.pdf](http://www.capecodbaywatch.org/wp-content/uploads/2014/01/NPDESletter_Final_2014Jan28.pdf)>

<sup>68</sup> Gellerman B. Mar. 21, 2014. 12 Protesters Found Guilty of Trespassing at Pilgrim Nuclear. WBUR.

<sup>69</sup> APCC. Pilgrim Position Statement, March 17, 2014. <<http://www.apcc.org/positionstatements/statements/2014/Pilgrim-3-17-14.pdf>>

<sup>70</sup> <<http://www.capecodbaywatch.org/wp-content/uploads/2014/10/Entergy-Chapter-91-Application.pdf>>

In May 2014, the NRC orders Entergy to reevaluate Pilgrim’s vulnerability to earthquakes, based on new data from the U.S. Geological Survey that says that **Pilgrim is more at risk than previously thought.**<sup>71</sup>

On July 10, 2014 as required by the Clean Water Act, **EPA consults with the NRC on Entergy’s claims that it cannot improve the cooling water intake operations** at Pilgrim to prevent environmental destruction because of “nuclear safety” concerns.

On July 21 and July 31, local groups, including JRWA, submit comments to MassDEP concerning Entergy’s **Chapter 91 application** to install equipment for an emergency cooling water system in Cape Cod Bay.<sup>72</sup>

MassDPH issues its August 2014 report on groundwater testing at Pilgrim. **Tritium levels in wells #216, #218, and #219 are still trending higher.**<sup>73</sup>

In September 2014, Pilgrim Watch and Cape Downwinders **file a petition with the NRC** to “modify, suspend, or take any other action to the operating license of Pilgrim Station until the NRC can assure sufficient land-based security at Pilgrim Station is in place to provide reasonable assurance to satisfy its obligation to protect public health and safety.” (Petition still pending).

In November 2014, a **public hearing takes place** on Entergy’s MassDEP application for a Chapter 91 Waterways License under state law Chapter 91. Approximately 100 people attend the public hearing in Plymouth held by MassDEP. Entergy needs the Waterways License to implement part of its **“Fukushima Fix”** FLEX plan to provide emergency cooling water from Cape Cod Bay.

On November 4, 2014 **74% of voters in the Cape & Islands Senatorial District vote in favor** of the question: “Shall the state senator from this district be instructed to vote in favor of legislation to expand the radiological Plume Exposure Emergency Planning Zone around the Pilgrim Nuclear Power Station in Plymouth, an approximately 10 mile-radius area, to include all of Barnstable, Dukes and Nantucket counties?”

In 2014, according to Pilgrim’s October and December Discharge Monitoring Reports (DMRs),<sup>74</sup> there were **3 significant impingement events**. On October 25, 2014, an impingement rate of 114 fish/hour was recorded during a screenwash (most were juvenile Atlantic menhaden). On December 3, 2014, an impingement rate of 33 fish/hour was recorded during a routine screenwash.

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<sup>71</sup> Legere C. May 1, 2014. Seismic activity exceeds Pilgrim nuke plant’s design. Cape Cod Times.

<[http://www.capecodbaywatch.org/wp-content/uploads/2012/06/2014.05.01\\_CCT\\_Seismic.pdf](http://www.capecodbaywatch.org/wp-content/uploads/2012/06/2014.05.01_CCT_Seismic.pdf)>

<sup>72</sup> <<http://www.capecodbaywatch.org/2014/07/Opportunity-for-public-comments-on-Entergy's-Use-of-Public-Land>>

<sup>73</sup> MassDPH. PNPS groundwater monitoring update as of Aug. 5, 2014. <[http://www.capecodbaywatch.org/wp-content/uploads/2014/08/DPH\\_Tritium\\_Aug-2014.pdf](http://www.capecodbaywatch.org/wp-content/uploads/2014/08/DPH_Tritium_Aug-2014.pdf)>

<sup>74</sup> Entergy. Nov. 2014. Discharge Monitoring Report – October 2014.; and Entergy. Jan. 20, 2015. Discharge Monitoring Report – December 2014.

On December 10, 2014, an impingement rate of 223 fish/hour was recorded during a routine screenwash (most were Atlantic silversides). All 3 events, according to Entergy, were not caused by Pilgrim's operations but were due to "natural circumstances." **Entergy blames the fish for getting trapped in the Pilgrim's cooling system.**

## 2015

**2015:** On January 26, 2015 the **NRC issues a Supplemental Inspection Report**<sup>75</sup> based on an inspection carried out from November 3, 2013 to December 12, 2014. This was a response to the NRC's third quarter 2013 finding that Pilgrim had crossed the threshold for allowable unplanned scrams in 2013. The NRC found that after inspection, **Entergy had not adequately addressed problems that had caused the scrams.** The inspection report found "deficiencies in the implementation of corrective action plans, as well as in understanding of the issues' causes. In its report, the team cites several examples where fixes were not completed as intended or were closed prematurely."<sup>76</sup> In the report the NRC also announces it will continue to place Pilgrim in the "**degraded cornerstone.**"

In January-February 2015, Entergy **fills the first 3 dry casks with nuclear waste** on the Pilgrim site.

On January 27, 2015 the nor'easter "**Juno**" causes an unplanned shutdown at Pilgrim due to a **LOOP and a variety of other problems.**<sup>77</sup> It remains offline until February 8. This event triggers the NRC to send a **Special Inspection Team (SIT)** on Feb. 2, 2015 to evaluate Pilgrim's equipment problems following the shutdown. The SIT's final report identifies **8 violations of federal safety requirements.** Pilgrim earns 1 "white" finding, 6 green findings, and 1 Severity Level IV non-cited violation. By early June, Entergy appeals the "white finding."

On February 14, 2015 winter storm "**Neptune**" causes **planned shutdown.**

In February 2015, **MassDEP approves Entergy's Chapter 91 Waterways application** to install emergency cooling equipment in Cape Cod Bay by issuing a determination letter.

In February 2015, JRWA asks the NRC and Entergy to provide an updated site assessment for the Pilgrim site (for **vulnerability to flooding, storm and wave impacts**). In a letter to the NRC dated February 12, 2015, JRWA states that "Thus far, the information and maps that Entergy has provided to your agency is misleading and inaccurate."<sup>78</sup>

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<sup>75</sup> NRC 9002 Supplemental Inspection Report 05000293/2014008

<sup>76</sup> NRC Blog, [www.nrc.gov](http://www.nrc.gov), 1/28/15.

<sup>77</sup> *Ibid.* 10

<sup>78</sup> <<http://www.capecodbaywatch.org/2015/02/press-release-pilgrim-site-maps-cut-and-paste-local-group-wants-updates/>>

One month later, on March 12, 2015 Entergy submits Pilgrim’s **“flooding reevaluation report”** to NRC, which has many deficiencies.

In March 2015, local residents and JRWA **file a legal appeal challenging MassDEP’s decision to issue a Waterways (Chapter 91) License for Entergy’s “FLEX” Fukushima plan**, which will to put an emergency cooling water system on the Cape Cod Bay shoreline. [Appeal pending]

Also in March 2015, the **NRC holds its annual public meeting** to review Pilgrim’s performance. Unlike past years, hundreds of people attend the meeting in Plymouth. Entergy organizes employees, grantees, and others to speak in favor of Pilgrim. Opponents seek answers from NRC on continuing groundwater pollution, inadequate emergency planning, pollution, etc.

In May 2015, Entergy’s **Clean Water Act NPDES permit become 19 years expired** (1996).

On May 26, 2015 **loss of condenser vacuum causes an unplanned shutdown**.

On June 8, 2015, Cape Cod Bay Watch issues a report documenting Entergy’s 43-year history of polluting Cape Cod Bay and destroying marine resources. The report, entitled **“Entergy, Our Bay is Not Your Dump,” calls on EPA and MassDEP to terminate Clean Water Act NPDES permit**. Twenty-four state and regional groups endorse the report.<sup>79</sup>

On June 11, 2015 Pilgrim Watch, Cape Downwinders, and the Town of Duxbury Nuclear Advisory Committee **file a 2.206 petition to the NRC** to “modify, suspend, or take any other action to the operating license of Pilgrim until the NRC can provide reasonable assurance that adequate protective measures based on accurate information can and will be taken to satisfy the NRC’s obligation to protect public health and safety.”

From June 13-16, 2015 the **“March for Our Children,”** organized by the Mass. Downwinders, takes place. The march is a 4-day, 54-mile event to raise public awareness and to let elected officials know that Pilgrim is a danger to health, economy, and environment. The event ends with a rally (June 16) at Mass. Statehouse. Speakers include former Gov. Mike Dukakis, State Sen. Dan Wolf, and Paul Gunter, founder of Clamshell Alliance and Subrata Ghoshroy, research affiliate at the Program in Science, Technology, and Society at MIT speaking on his recent trip to Fukushima.

On July 28, 2015 the State’s **Joint Committee on Public Health and Safety** hears testimony on several bills relating to emergency planning and radiological monitoring at Pilgrim.

On August 9, 2015 Pilgrim is **forced to reduce power due to the water in Cape Cod Bay being too warm. Later in the month**, on August 22, Pilgrim experiences an **unplanned shutdown**, or scram, due to a valve problem.

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<sup>79</sup> CCBW. June 8, 2015. Entergy, our bay is not your dump. <<http://www.capecodbaywatch.org/2015-water-pollution-report/#toc>>

On September 1, 2015 in response to Entergy's appeal of the SIT's investigation report identifying a "white finding" based on failure to anticipate and/or prevent a safety valve problem during Winter Storm "Juno," the **NRC announces it maintains its "white finding."** One day later (September 2) Pilgrim is **degraded to category IV** by the NRC – the bottom of the performance list of the nation's 99 reactors. This downgrade is based on numerous forced shutdowns and equipment failures, and is **just one step away from mandatory shutdown by federal regulators**. Only 2 other reactors in the country are currently in that category: Arkansas Nuclear One and Arkansas Nuclear Two. These two, like Pilgrim, are Entergy-owned.

On September 17, 2015 Entergy officials announce that **closure of Pilgrim is on the table.**<sup>80</sup> If Entergy cannot afford the multi-million dollar safety improvements and other updates required by federal regulators, then the plant will go offline.

On September 24, 2015 **a hearing takes place at the MassDEP offices** in Lakeville, Mass. The hearing is held before an administrative law judge, and concerns a residents/JRWA appeal that challenges MassDEP's decision to issue a Waterways (Chapter 91) License to Entergy for its "FLEX" Fukushima plans at Pilgrim. The appeal is still pending.

On October 2, 2015 an NRC inspection Of Pilgrim revealed **malfunctioning meteorological towers** at the facility. About a week later, on October 7, media reports reveal that Pilgrim has **posted workers on fire watch** after realizing the plant never addressed a 1992 federal advisory regarding remote reactor shutdown.

On October 13, 2015 Entergy announces that **Pilgrim will close no later than June 2019.**

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<sup>80</sup> Abel, D. Sept. 17, 2015. Pilgrim nuclear plant says it may shut down. Boston Globe.

[http://www.capecodbaywatch.org/wp-content/uploads/2015/09/2015.09.17\\_BosGlobe\\_PilgMayShutDown.pdf](http://www.capecodbaywatch.org/wp-content/uploads/2015/09/2015.09.17_BosGlobe_PilgMayShutDown.pdf)

## **Additional Resources:**

Beyond Nuclear [www.beyondnuclear.org](http://www.beyondnuclear.org)

Cape Cod Bay Watch [www.capecodbaywatch.org](http://www.capecodbaywatch.org)

Cape Downwinders [www.capedownwinders.info](http://www.capedownwinders.info)

Cape Downwinders Cooperative [www.capedownwinders.org](http://www.capedownwinders.org)

Concerned Neighbors of Pilgrim [www.concernedneighborsofpilgrim.org](http://www.concernedneighborsofpilgrim.org)

Massachusetts Downwinders [www.madownwinders.org](http://www.madownwinders.org)

Pilgrim Coalition [www.pilgrimcoalition.org](http://www.pilgrimcoalition.org)

Pilgrim Watch [www.pilgrimwatch.org](http://www.pilgrimwatch.org)

Nuclear Information Resource Service [www.nirs.org](http://www.nirs.org)

Union of Concerned Scientists [www.ucsusa.org/nuclear-power](http://www.ucsusa.org/nuclear-power)

U. S. Nuclear Regulatory Commission [www.nrc.gov](http://www.nrc.gov)

## **Acronyms:**

EPA	U.S. Environmental Protection Agency
FLEX	Diverse and Flexible Coping Strategies
JRWA	Jones River Watershed Association
LOOP	loss of offsite power
MassDEP	Massachusetts Department of Environmental Protection
MassDPH	Massachusetts Department of Public Health
MEMA	Mass. Emergency Management Agency
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
NTTF	NRC's Near-Term Task Force
pCi/L	picocuries per liter
SIT	Special Investigation Team
ZBA	Town of Plymouth's Zoning Board of Appeals