



# Safety debate delays new license for Japan-type reactor

## Decision expected within months on Pilgrim plant in Massachusetts



Microsoft  
The Pilgrim Nuclear Power Station in Plymouth, Mass., has been in license limbo since January 2006. Recently, tritium leaks and cracked coolant rod blades have raised alarms.



By **Alex Johnson** Reporter

msnbc.com

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A new license for one of the U.S. nuclear plants most similar to Japan's Fukushima Dai-ichi facility has been on hold for more than five years, offering a uniquely extensive record of safety and security concerns with its reactor and others like it.

Of the 104 active nuclear reactors in the United States, [23 use GE or GE Hitachi boiling water systems](#) featuring the same upgraded Mark I containment system as the reactors at the Fukushima Dai-ichi Nuclear Power Station.

Only six of those, however, are Mark I systems paired with General Electric Model 3 reactors, closely resembling the configuration of the first reactor to fail at the Fukushima plant, according to records of the Nuclear Regulatory Commission.

And just one of those six — the Pilgrim Nuclear Power Station in Plymouth, Mass., about 40 miles south of Boston — has a new license application currently before the NRC. (The others are in Monticello, Minn., and two each at the Dresden and Quad Cities facilities in Illinois. Their licenses are all in order for many more years.)

As it happens, Pilgrim and its parent company, Entergy Corp. of New Orleans, have been tied up in court and legislative hearings on the license since January 2006 — the longest such delay on record. That has generated a years-long docket of regulatory filings, responses, claims and counterclaims.

The records show that Pilgrim is still vexed by leaks of radioactive tritium into the groundwater and extensive cracking in control rod blades that help regulate its nuclear reactions, as well as unspecified security violations.

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### Heated debate over plant's future

Such disclosures have generated widespread debate over the future of Pilgrim, whose original projected lifespan of 40 years is up next year. Entergy is seeking a 20-year license extension for the plant, which the NRC considers the second most vulnerable in the United States to an earthquake-caused catastrophe.

Getting a 20-year license extension is usually a 2- to 2½-year process, NRC records indicate, but Pilgrim Watch, a local nonprofit activist group, has opposed the Pilgrim relicensing at every turn, arguing that the plant is at the end of its safety widow. It also argues that Pilgrim is riddled with design flaws and defective parts and has been subject to lax safety oversight.

After accepting written submissions at a hearing last week, the NRC's Atomic Safety and Licensing Board is expected to issue a ruling on Entergy's request within a few months, regulators said. Should the extension be denied, the plant would be scheduled to shut down in June 2012.

The NRC has never denied a license extension. Just last week, the agency announced that it would approve a 20-year extension for the Yankee Vermont plant in Vernon, Vt. — also owned by Entergy — over the strenuous objections of local and state elected leaders, including Gov. Peter Shumlin.

GE representatives said they couldn't discuss the issues at Pilgrim because they were focusing on helping the Japanese containment effort. [In a statement](#), the company said that, in any event, the earthquake wasn't the root cause of the Fukushima crisis, which it blamed on a power failure that began when tsunami waves that followed the quake "took out the diesel motor powering back-up generators."

(Msnbc.com is a joint venture of Microsoft Corp. and NBC Universal, which is 49 percent owned by GE.)

David Tarantino, a spokesman for the Pilgrim facility, acknowledged the similarities between the Massachusetts and Japanese reactors but said New Englanders had little to fear because the risk of a significant earthquake is considered low and the likelihood of a tsunami in that region is virtually nonexistent.

"The big difference ... is not so much in the mechanical area or the design area, but it's in the geology," Tarantino said.

The NRC and the U.S. Geological Survey don't necessarily agree.

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In fact, the NRC ranks Pilgrim No. 2 on its list of reactors most at risk of severe core damage from an earthquake in the East and the Midwest. That ranking holds up even when reactors in earthquake-prone Western states, including California, are added, [msnbc.com reported](#) .

Tarantino pointed out that Pilgrim is nowhere near a fault line and that it's built to withstand an earthquake up to magnitude 6.0. But at least two earthquakes that size or bigger are believed to have occurred in the area in the last three centuries, according to the USGS, which classifies Greater Boston as "a region of historic seismicity."

While earthquakes occur less frequently in the East, urban areas in that part of country could face especially devastating damage, [the agency said in a 2006 fact sheet](#), which listed Boston among the 26 urban areas most vulnerable to severe earthquake damage.

That makes Pilgrim's age especially important as the NRC considers its application to extend its license, which was originally issued in 1972 — about the same time experts began raising questions about the basic design of the Mark I containment system. [Story: Reactor design in Japan has long been questioned](#)

The plant was last formally sanctioned by the NRC in 2005, when Entergy was fined \$60,000 because a Pilgrim control room supervisor fell asleep at his post, records show. It has been written up in inspection reports for a handful of violations in the past year, all of which were classified as of "very low safety significance" and carried no punishment. The most recent event was in December, when the plant was cited for [failing to properly manage a test of its coolant injection system](#).

### [Interactive: How a nuclear plant works](#)

Three recently reported problems, however, could turn out to be more serious.

Plant operators still don't know for sure what's causing tritium to leak into the groundwater. [Elevated levels were recorded beginning in July](#) — spiking on at two occasions above federal safety guidelines. Massachusetts Gov. Deval Patrick has asked for a formal investigation.

The NRC says the cause of the leaks hasn't been determined, but similar leaks, which have been uncovered at or near at least two dozen reactors among the 104 in the United States, have often been blamed on decaying underground pipes. The deteriorating pipes have long been a concern to lawmakers representing areas where older reactors are nearing the end of their original projected lifespans — like Pilgrim.

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replaced "prior to the end of the revised service life."

The rods are also in use at each of the five other Model 3, Mark I plants in Illinois and Minnesota.

Meanwhile, the Pilgrim plant has struggled with security.

In October, the NRC found a violation of an unspecified security directive that it said created a "low to moderate" risk. The agency refuses to discuss the nature of the violation, saying simply that Entergy took corrective action. But it also said Pilgrim would receive "additional oversight" from the agency.

Because it's security-related, the incident doesn't appear in NRC daily "event reports." In that respect, it's like an undetermined number of other security-related violations at the plant that have been disclosed in media reports and other government documents since the relicensing process started in early 2006.

The NRC won't discuss those, either. Otherwise, Pilgrim's latest security inspection gives it a "green" security rating, meaning it

"Sadly, this appears to be just another in a long line of failures of buried piping systems at our nation's nuclear plants," Rep. Edward Markey, D-Mass., a prominent critic of nuclear energy, said in a letter to the NRC in July.

Pilgrim's reactor is also one of 26 across the country using [control rod blades that are developing distortions and cracks](#) after only 40 percent of their projected lifespans. GE, which made the rods in question beginning in 1997, formally reported the problem in October, saying it "could create a substantial safety hazard" unless the rods were more closely monitored and the blades were

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found no significant security concerns.

None of these issues is particularly unusual for a U.S. nuclear plant; the NRC generates hundreds of "event reports" every year, the vast majority of them — including most of those involving Pilgrim — categorized as "non-emergency." But the combination of the red flags, assessed in the context of Pilgrim's earthquake risk, has residents and officials in Plymouth on edge.

"Everybody says: 'We don't have anything to worry about,'" Shawn Walton, who lives near the Pilgrim plant, told NBC station WHDH-TV of Boston. "And I was like, they had fail-safe (systems) in Japan, too.

"Whoever thought we would have an 8.9 earthquake?" Walton asked, referring to the Japanese quake, which has since been recategorized at magnitude 9.0.

Plymouth Fire Chief Ed Bradley agreed that the catastrophe in Japan was a wakeup call for his town.

"Hopefully, the rest of the world, and including Plymouth, we can learn from it," Bradley said. "If there's something to pick up — something we've missed — hopefully we'll be able to get it and correct it before we have a problem like that."

Bradley urged all residents to take a fresh look at the city's evacuation plan. And for good measure, he said, they should make sure to keep potassium iodide pills, which can help prevent thyroid radiation poisoning, on hand.

They're handed out free in Plymouth. Just in case.

*NBC station WHDH of Boston contributed to*

*this report.*

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A look at the worst earthquakes in recorded history, in loss of human life. (These figures do not include the March 11, 2011, temblor off eastern Japan, the death toll of which is still not known.) Sources: United States Geological Survey, Encyclopedia Britannica

### **1: Shensi, China, Jan. 23, 1556**

**Magnitude about 8, about 830,000 deaths.**

This earthquake occurred in the Shaanxi province (formerly Shensi), China, about 50 miles east-northeast of Xi'an, the capital of Shaanxi. More than 830,000 people are estimated to have been killed. Damage extended as far away as about 270 miles northeast of the epicenter, with reports as far as Liuyang in Hunan, more than 500 miles away. Geological effects reported with this earthquake included ground fissures, uplift, subsidence, liquefaction and landslides. Most

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towns in the damage area reported city walls collapsed, most to all houses collapsed and many of the towns reported ground fissures with water gushing out.

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**2: Tangshan, China, July 27, 1976**



Keystone / Getty Images  
1976: Workers start rebuilding work following earthquake damage in the Chinese city of Tangshan, 100 miles east of Pekin, with a wrecked train carriage behind them. (Photo by Keystone/Getty Images)

**Magnitude 7.5. Official casualty figure is 255,000 deaths. Estimated death toll as high as 655,000.**

Damage extended as far as Beijing. This is probably the greatest death toll from an earthquake in the last four centuries, and the second greatest in recorded history.

**3: Aleppo, Syria, Aug. 9, 1138**

**Magnitude not known, about 230,000 deaths.**

Contemporary accounts said the walls of Syria's second-largest city crumbled and rocks cascaded into the streets. Aleppo's citadel collapsed, killing hundreds of residents. Although Aleppo was the largest community affected by the earthquake, it likely did not suffer the worst of the damage. European Crusaders had constructed a citadel at nearby Harim, which was leveled by the quake. A Muslim fort at Al-Atarib was

destroyed as well, and several smaller towns and manned forts were reduced to rubble. The quake was said to have been felt as far away as Damascus, about 220 miles to the south. The Aleppo earthquake was the first of several occurring between 1138 and 1139 that devastated areas in northern Syria and western Turkey.

**4: Sumatra, Indonesia, Dec. 26, 2004**



Keystone / Getty Images  
MEULABOH, INDONESIA - DECEMBER 29: In this handout photo taken from a print via the Indonesian Air Force, the scene of devastation in Meulaboh, the town closest to the Sunday's earthquake epicentre, is pictured from the air on December 29, 2004. Meulaboh, Aceh Province, Sumatra, Indonesia. The western coastal town in Aceh Province, only 60 kilometres north-east of the epicentre, has been the hardest hit by Sunday's underwater earthquake in the Indian Ocean. Officials expected to find at least 10,000 killed which would amount to a quarter of Meulaboh's population. Three-quarters of Sumatra's western coast was destroyed and some towns were totally wiped out after the tsunamis that followed the earthquake. (Photo by Indonesian Air Force via Getty Images)

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### Magnitude 9.1, 227,898 deaths.

This was the third largest earthquake in the world since 1900 and the largest since the 1964 Prince William Sound, Alaska temblor. In total, 227,898 people were killed or were missing and presumed dead and about 1.7 million people were displaced by the earthquake and subsequent tsunami in 14 countries in South Asia and East Africa. (In January 2005, the death toll was 286,000. In April 2005, Indonesia reduced its estimate for the number missing by over 50,000.)

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### 5: Haiti, Jan 12, 2010

According to official estimates, 300,000 were also injured, 1.3 million displaced, 97,294 houses destroyed and 188,383 damaged in the Port-au-Prince area and in much of southern Haiti. This includes at least 4 people killed by a local tsunami in the Petit Paradis area near Leogane. Tsunami waves were also reported at Jacmel, Les Cayes, Petit Goave, Leogane, Luly and Anse a Galets.

### 6: Damghan, Iran, Dec. 22, 856

#### Magnitude not known, about 200,000 deaths.

This earthquake struck a 200-mile stretch of northeast Iran, with the epicenter directly below the city of Demghan, which was at that point the capital city. Most of the city was destroyed as well as the neighboring areas. Approximately 200,000 people were killed.

### 7: Haiyuan, Ningxia , China, Dec. 16, 1920

#### 7.8 magnitude, about 200,000 deaths.

This earthquake brought total destruction to the Lijunbu-Haiyuan-Ganyanchi area. Over

73,000 people were killed in Haiyuan County. A landslide buried the village of Sujiahe in Xiji County. More than 30,000 people were killed in Guyuan County. Nearly all the houses collapsed in the cities of Longde and Huining. About 125 miles of surface faulting was seen from Lijunbu through Ganyanchi to Jingtai. There were large numbers of landslides and ground cracks throughout the epicentral area. Some rivers were dammed, others changed course.

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### 8: Ardabil, Iran, March. 23, 893

#### Magnitude not known, about 150,000 deaths

The memories of the massive Damghan earthquake (see above) had barely faded when only 37 years later, Iran was again hit by a huge earthquake. This time it cost 150,000 lives and destroyed the largest city in the northwestern section of the country. The area was again hit by a fatal earthquake in 1997.

### 9: Kanto, Japan, Sept. 1, 1923

#### 7.9 magnitude, 142,800 deaths.

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This earthquake brought extreme destruction in the Tokyo-Yokohama area, both from the temblor and subsequent firestorms, which burned about 381,000 of the more than 694,000 houses that were partially or completely destroyed. Although often known as the Great Tokyo Earthquake (or the Great Tokyo Fire), the damage was most severe in Yokohama. Nearly 6 feet of permanent uplift was observed on the north shore of Sagami Bay and horizontal displacements of as much as 15 feet were measured on the Boso Peninsula.

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## 10: Ashgabat, Turkmenistan, Oct. 5, 1948

### 7.3 magnitude, 110,000 deaths.

This quake brought extreme damage in Ashgabat (Ashkhabad) and nearby villages, where almost all the brick buildings collapsed, concrete structures were heavily damaged and freight trains were derailed. Damage and casualties also occurred in the Darreh Gaz area in neighboring Iran. Surface rupture was observed both northwest and southeast of Ashgabat. Many sources list the casualty total at 10,000, but a news release from the newly independent government on Dec. 9, 1988, advised that the correct death toll was

110,000. (Turkmenistan had been part of the Soviet Union, which tended to downplay the death tolls from man-made and natural disasters.)

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