

## NUKE MATTERS: Groundwater pollution at Pilgrim Nuclear Station

**By Meg Sheehan and Genevieve Byrne, Cape Cod Bay Watch**  
Wicked Local Plymouth  
Posted Jan 17, 2013 @ 06:00 AM

Since 1972, the Pilgrim Nuclear Power Station has been operating in Plymouth on the shore of Cape Cod Bay. It is owned and operated by Entergy Corporation of Louisiana. The past 40 years of operations have polluted our groundwater, and the pollution is ongoing.

There are two types of groundwater pollution at Pilgrim. First, tritium, a radioactive form of hydrogen, has been found in the groundwater under Pilgrim. Tritium is a gas in its elemental form and combines with oxygen to make tritiated water, which is radioactive. Second, Entergy runs an onsite waste-water treatment facility that discharges other types of pollution, including nitrogen, into the groundwater. The presence of radioactive tritium, nitrogen and other pollutants is documented in Entergy's own reports.

Pilgrim sits on top of a unique and important aquifer, known as the Plymouth-Carver Sole Source Aquifer. In 1990, the U.S. Environmental Protection Agency (EPA) gave it this designation under the Safe Drinking Water Act. The EPA describes the aquifer as "the principal source of drinking water for the residents of the area." This aquifer is vulnerable to pollution because it has only a shallow layer of very permeable soil above it and throughout its layers. Pollution that enters the aquifer can travel easily and spread. According to EPA and Entergy's reports, the water in the aquifer flows generally toward and into Cape Cod Bay.

The radioactive tritium in the aquifer at Pilgrim is generated in the course of routine operations. It is released to both the atmosphere and into the Bay, and some is entering the groundwater from various locations at Pilgrim. There is a small amount of natural background tritium in groundwater – typically 6.4 to 12.8 picocuries per liter. At Pilgrim, groundwater tests taken since 2007 show tritium far above these low background levels.

The Massachusetts Department of Public Health (DPH) has identified 11 locations at Pilgrim that are potential sources of the tritium entering the aquifer. Recently, the watchdog group Pilgrim Watch asked the DPH to investigate yet another source – cracks in the concrete of the "torus" part of the reactor. The torus is a suppression pool used to remove heat released if an event occurs in which large quantities of steam are released from the reactor.

Tritium levels in the aquifer at Pilgrim in fall 2012 were as high as 3,088 picocuries per liter, based on tests from groundwater wells at the site. Levels in the recent past have been far above the EPA safe drinking water level of 20,000 picocuries per liter. DPH recently reported that since the tritium levels were "consistently above background levels established for this monitoring effort" more samples must be collected from the wells every month. Taxpayers are bearing a

good portion of the cost of overseeing this monitoring, and pay for independent testing of the well samples.

For tritiated water in the aquifer under Pilgrim, there is no threshold below which there is “zero risk.” The EPA expresses this by setting a *zero* “Maximum Contaminant Level Goal” for all radionuclides, including tritium. Thus, the consistent findings of tritium in the aquifer at Pilgrim at levels thousands of times higher than the background of 6.4 to 12.8 picocuries per liter, and far above the EPA level of zero, is clear evidence that this pollution is a concern.

The nitrogen and other pollution from Entergy’s onsite waste-water facility is also a concern. Pilgrim’s daily operations create waste water from general clean up, employee washrooms and kitchens. This wastewater is supposed to be treated to high standards to avoid contaminating the aquifer. The state Department of Environmental Protection (DEP) has failed to set permit requirements on the groundwater discharges that would prevent this pollution.

The biggest concern is nitrogen, which is being discharged at levels far above what municipal treatment plants in the area are allowed to have. Nitrogen is harmful to waterways, in part because it causes eutrophication and proliferation of algae. Nitrogen pollution on Cape Cod is a major focus of mitigation efforts by government agencies and non-profit groups. The New England Clean Energy Foundation and the Cape Cod Chamber of Commerce are all investing in stopping nitrogen pollution from septic systems on the Cape. Yet, Entergy’s nitrogen pollution levels are, as of yet, unaddressed by regulators.

Entergy’s pollution of the aquifer with radioactive tritium and nitrogen is yet another legacy of 40 years of Pilgrim’s operations. Ongoing efforts to address problems from prior operations will help ensure that our community has a more environmentally and economically viable future.

To learn more about Pilgrim’s groundwater pollution, visit [capecodbaywatch.org](http://capecodbaywatch.org).

*Meg Sheehan is Plymouth native and environmental attorney. Genevieve Byrne is an environmental attorney working with EcoLaw, a public interest group. Cape Cod Bay Watch is dedicated to protecting and restoring water quality and marine life in Cape Cod Bay through public education, networking and advocacy. Its current priority is addressing the harmful effects of the Pilgrim Nuclear Power Station – especially its destructive “once-through cooling” system – on water quality and marine life in the Bay.*