LOWDOWN ON PILGRIM'S SO-CALLED "LOW-LEVEL RADIOACTIVE WASTE"

What is so-called "Low-Level Radioactive Waste" (LLRW)?

There are two categories of waste, "high-level waste" and "low-level waste." The categories have nothing to do with actual radioactivity level or how long the waste will remain radioactive – a few days or thousands of years. Instead the waste is defined solely by the process which produced it.

"High-level waste" is defined as spent reactor fuel, or wastes resulting from the reprocessing of spent nuclear fuel.

"Low-level waste" is a catch-all; it includes all radioactive waste that is not high-level waste, transuranic wastes (material contaminated with radioactive elements heavier than uranium, such as plutonium, neptunium, americium and curium that have extremely long hazardous lives), or uranium mill tailings. So, for example, a typical reactor's stream of low-level waste is significantly more radioactive that some of the military's "high-level waste." Pilgrim's LLRW for example, includes: the control rods, resins, sludge, filters, and will include the entire nuclear power reactor when it is dismantled.

What are the Low-Level Waste Categories**?**

The NRC subdivides commercial low level waste into four classes which are determined by the types of radionuclides and their concentrations in the waste. These classes are labeled Class A, Class B, Class C, and Greater-than-Class C. Class A waste is the least radioactive on average and is contaminated primarily by short-lived radionuclides. Class B and C are more radioactive, with C having larger amounts of long-lived radionuclides. Greater–than-class-C waste is the most radioactive and generally considered unacceptable for near-surface disposal.

How much LLRW at Pilgrim are we talking about? More LLRW is generated during refueling outages than during normal operations, largely as a result of maintenance and repairs that are accomplished during refueling. The most LLRW is generated during decommissioning.

LLRW from Daily Operations**:** According to Mass Dept of Public Health, the state agency responsible for keeping track of waste generated, Pilgrim generated from 2009-2012:

> **2009** – 32,980 cubic feet of class A waste with a total activity of 125.2 curies; 550 cubic feet of class B waste with a total activity of 119.6 curies; 15 cubic feet of class C waste with a total activity of 47.7 curies.
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> **2010** – 14,400 cubic feet of class A waste with a total activity of 180 curies; 284 cubic feet of class B waste with a total activity of 1,070 curies; 15 cubic feet of class C waste with a total activity of 47.7 curies;
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> **2011** – 32,700 cubic feet of class A waste with a total activity of 243 curies; 184 cubic feet of class B waste with a total activity of 53.3 curies; 15 cubic feet of class C waste with a total activity of 47.7 curies.

2012 – 19,500 cubic feet of class A waste with a total activity of 157 curies; 80 cubic feet of class B waste with a total activity of 625 curies; 15 cubic feet of class C waste with a total activity of 47.7 curies.

We understand that Pilgrim now can send its Class A, B and C waste to Clive, Utah. The A, B and C waste is "blended" so that the resulting blended waste qualifies as Class A. Pilgrim's Greater-than-Class C waste has no forwarding address. It will stay in Plymouth, along with the spent fuel assemblies, until a suitable repository is developed.

LLRW from Decommissioning: Huge amounts of LLRW will result from decommissioning. If a licensee chooses immediate dismantlement about 40% of the total volume of LLRW produced by a BWR in its 40-year life-time is from decommissioning. If a BWR chooses "Safstor" and waits 30-60 years before decommissioning, the LLRW will decay and substantially decrease in volume.

Where does Pilgrim store its LLRW? We do not have all the information, but here is what we know. The 20-30 white containers pictured in the foreground, close to Cape Cod Bay are LLRW containers.

We were told by NRC on May 1, 2014 that only one container contains Greater-than-Class C waste, the most toxic, and that all of the others are now empty. The Greater-than-Class C waste will remain here, like the spent fuel, until an offsite repository is developed. The Class A, B and C wastes were sent to Utah.

We are waiting for answers estimating how many more containers of LLRW waste are expected to be produced. Certainly there will be a very large amount resulting from decommissioning. There will also be a significant amount during continued operations. We do not know whether any Greater-than-Class C LLRW is expected to be produced. With respect to Classes A, B and C LLRW, we are waiting to learn from the NRC how many containers are or will be stored outside,

and for how long they will be stored before they are shipped to Utah or some other LLRW disposal site.

What's the Problem? It should be clear from the photo that the LLRW containers are very close to Cape Cod Bay and that is our concern. We know that:

- Climate change results in increasing sea level rise; increased frequency and intensity of storms (Nor'easters and Hurricanes); and increased acidity in sea water exacerbating corrosion, along with the salt.
- Mean Sea Level (MSL) is a misleading use of the term with regard to Pilgrim Station because we have significant tides - at Plymouth high tide typically is between about 4.5 ft. to 6 ft. above MSL. Therefore container placement and any contaminant should be considered from the highest tide mark.
- On top of sea level at high tide, it is necessary to add storm surge plus wave height. For example, in Hurricane Sandy seas built to between 20 and 25 feet just off the east coast; and the Perfect Storm caused waves over 30 ft. high along the Massachusetts coast.

What's the solution? The LLRW containers should be securely stored at a higher elevation away from Cape Cod Bay. This appears to be fairly simple to accomplish at Pilgrim. There now seems to be only one filled container that would have to be moved; and there is ample storage space for however containers may be used in the future at higher elevations within Pilgrim's security area.