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Nuclear Waste, Terror And Intrigue

The Industry That Promised Energy

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Most of the Maine Yankee Atomic Power Station is cold, dark, and empty. Our footsteps echo in the warren of barren concrete chambers that, a few short years ago, were filled with pipes and machinery, noise and activity. Here and there an area is roped off with bright yellow tape or signs warning of radiological contamination, but for the most part Maine Yankee looks like what it is: a large industrial site awaiting demolition.

My guide opens a door to reveal a small, well-lit room and a uniformed guard with a sidearm and metal detector. The guard frisks us and we proceed through a security door into a chamber that, unlike its neighbors, is warm, noisy, well lit. At the top of a flight of metal stairs another guard confronts us to make sure we leave our bags, hardhats, and other easily dropped objects behind as we approach what is now the heart of Maine Yankee's operations: the spent fuel pool.

We peer over the railing and there it is, the source of all the controversy: 1,434 spent nuclear fuel rods standing at the bottom of an enormous pool of crystal clear water. Here sits Maine Yankee's total nuclear fuel output, from the first atom it split in 1972 until the reactor finally shut down in 1997. The pumps humming around us circulate demineralized water through the pool, keeping the radioactive rods cool and absorbing radiation so effectively that we can have a short look at them in our street clothes.

Within three years Maine Yankee itself will be gone, completely demolished and carted away to landfills and out-of-state low-level waste facilities. But the spent fuel will be staying here in the seaside town of Wiscasset, in the midst of Maine's "mid-coast" tourism region. The most contaminated parts of the reactor vessel and other plant components will also remain. There's nowhere else for it to go.

That's because no one has yet solved the nuclear industry's most intractable problem: how to safely dispose of the more than 40,000 metric tons of highly-radioactive wastes that the Nuclear Energy Institute says the industry has produced to date, nor the estimated 65,000 tons that will soon come. Now -- even while the Bush administration promotes more nuclear power -- the issue has become urgent. Many aged plants are closing down for good. And all of the 81 commercial nuclear power stations across the country are reassessing their vulnerability to terrorism.

Take a look at the situation in Wiscasset. Like the other nuclear plants in the United States, Maine Yankee stored all of its spent fuel at the plant itself, pending the completion of a federal high-level nuclear waste disposal site. Now time has run out for Maine Yankee.

In the 1960s and 1970s, the problem of discarding the dangerous waste was delegated to the marvels of future technology.

"But for the spent fuel, we'd be able to turn out the lights, go out of business, and dissolve the corporation," says attorney Jerry Stouck of Spriggs and Hollingsworth, who represents Maine Yankee and two other decommissioned plants that are suing the Department of Energy for not taking their spent fuel.

Back in the 1960s and 1970s, when nuclear advocates promised power too cheap to meter, the problem of discarding the dangerous and long-lasting waste was delegated to the marvels of future technology. The future is upon us, but the technology is not. Under the Nuclear Waste Policy Act of 1983, DOE was to take possession of all of the nation's spent nuclear fuel by January 31, 1998.

Yet despite spending 15 years and more than \$4 billion on its prospective repository, Yucca Mountain in Nevada, the project remains embattled and the federal government hasn't even begun construction on a long-term disposal site. Its failure to do so has forced Maine Yankee to build a new \$60 million "dry cask" storage facility so it will have somewhere to put its spent fuel before it demolishes the rest of the plant and its cooling pool. Over the next two years, spent fuel will be taken from the storage pool, placed in 64 transportable casks, and interred in a fence-lined yard where they will be attended to at a cost of \$4 million a year. And there the waste will sit for at least a decade waiting for the federal government to find a more suitable place to keep it. About 50 such sites will dot the country by 2005 as more of the nation's reactors close or run out of space in their storage pools.

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Terrorist Fears

For years, the industry has pressured the federal government for a solution. After September 11, that pressure is likely to get stronger. In the past, concerns in Wiscasset were mostly focused on the economic effects of not being able to develop the site and worries that, over time, the site might attract more high-level waste from other facilities outside of Maine. But the terrorist attacks on the Twin Towers have moved basic security concerns front and center.

"In light of what's happened, it's even more important for the federal government to decide what they want to do with this stuff," says state senator Marge Kil Kelly, who lives in Wiscasset and has been closely involved with Maine Yankee's decommissioning. "Do we really want this material stored in small amounts all over the country next to watersheds and waterbodies and large populations or do we want it in one site with the protection it deserves?"

In the aftermath of September 11, a great deal of attention has been paid to nuclear power plants themselves, which are vulnerable to a World Trade Center type of attack. Like the Twin Towers, reactor containment buildings were designed to withstand hurricanes, floods, or accidental aircraft collisions of a certain scope. They were not designed with homicidal 767 operators in mind. "If you postulate the risk of a jumbo jet full of fuel, it is clear that their design was not conceived to withstand such an impact," International Atomic Energy Agency spokesman David Kyd told reporters in Vienna, Austria. Such a strike could disrupt a plant's cooling systems, triggering a steam explosion and releasing a radioactive cloud.

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But spent fuel facilities are far softer targets. They are generally located outside the containment structure, and are thus more vulnerable to attack. A recent report by the Nuclear Regulatory Commission says that the consequences of a serious spent fuel pool accident "could be comparable to those for a severe reactor accident." The NRC analysis, published in February, also assumed that in the event of an accidental direct hit by an aircraft, there was a 45 percent chance it would breach a five-foot thick containment structure. Dry-cask storage facilities -- like the one under development at Wiscasset -- are probably even more vulnerable. There are 16 such facilities already in operation and many more planned or under construction. They are usually unenclosed and, in the case of decommissioned plants, are not subject to the same level of security. Each has guards, fences, and motion detectors to repel an infantry-style assault or an attempt to steal waste; but the two-story tall casks stand in even rows under the open sky. Steve Kerekes, a spokesman for the industry-funded Nuclear Energy Institute, said dry cask facilities are "fairly robust sites" but that questions about their vulnerability to terrorist attack were "a bit ahead of the curve."

"These facilities are designed to survive more serious events than the average building, but they haven't been designed to survive a direct hit from a large commercial airplane," says Kelley Smith, spokesperson for two other decommissioned power plants -- Connecticut Yankee and Yankee Row -- which are also building dry cask sites. All the more reason, she says, for the government to take the waste to Yucca Mountain.

"If this fuel was a mile underground at Yucca, towns like Haddam [site of Connecticut Yankee] would not be faced with the burden of having to store it in the town, says Kelley Smith.

A Mountain of Trouble

But Yucca Mountain has plenty of problems of its own.

Early on, Congress doomed the government's effort to find the safest possible storage site for the nation's nuclear waste. In 1986, the Department of Energy was comparing three sites: Yucca Mountain in Nevada, Deaf Smith County in Texas, and Washington's Hanford Nuclear Reservation. A final decision was to be based on in-depth scientific evaluation of all three. But that's not what happened.

In a cynical political move, Congress passed a legislative amendment directing the Department of Energy to study the merits of only one site: Yucca Mountain. Not coincidentally, the speaker of the House at the time was Texas' Jim Wright and Washington's Tom Foley was House majority leader. Nevada (which has no nuclear reactors and has already hosted a nuclear weapons test site) is unenthusiastic about its potential role as the country's nuclear landfill. "Congress acted on political, not scientific criteria in choosing this site," says Robert Loux, head of the Agency for Nuclear Projects at the Governor of Nevada's office in Carson City. "We really haven't looked at any site other than Yucca Mountain, and it's not a good site."

High level wastes must be isolated from the environment for 10,000 years, otherwise highly-radioactive material could be transported long distances in the wind, rivers, and aquifers, rendering large areas toxic. Since our civilization may not be around several thousand years from now, scientists concluded that the repository should rely on geologic characteristics rather than human engineering. But after nearly two decades of analysis, DOE has found that, geologically speaking, Yucca has little to recommend it.

About a hundred miles northwest of Las Vegas, Yucca lies between two seismic faults and is only 12 miles from the epicenter of a 1992 earthquake that measured 5.6 on the Richter scale. Scientists have found evidence that the mountain may have flooded from below in the distant past, raising the possibility it might happen again during the project's 10,000-year lifetime. Even barring such events, Yucca has turned out to be far wetter than originally thought. Its volcanic rock is laced with tiny fractures that allow

