May 24, 2011

Risk From Spent Nuclear Reactor Fuel Is Greater in U.S. Than in Japan, Study Says

By MATTHEW L. WALD

WASHINGTON — The threat of a catastrophic release of radioactive materials from a spent fuel pool at Japan's Fukushima Daiichi plant is dwarfed by the risk posed by such pools in the United States, which are typically filled with far more radioactive material, according to a study released on Tuesday by a nonprofit institute.

The report, from the Institute for Policy Studies, recommends that the United States transfer most of the nation's spent nuclear fuel from pools filled with cooling water to dry sealed steel casks to limit the risk of an accident resulting from an earthquake, terrorism or other event.

"The largest concentrations of radioactivity on the planet will remain in storage at U.S. reactor sites for the indefinite future," the report's author, Robert Alvarez, a senior scholar at the institute, wrote. "In protecting America from nuclear catastrophe, safely securing the spent fuel by eliminating highly radioactive, crowded pools should be a public safety priority of the highest degree."

At one plant that is a near twin of the Fukushima units, Vermont Yankee on the border of Massachusetts and Vermont, the spent fuel in a pool at the solitary reactor exceeds the inventory in all four of the damaged Fukushima reactors combined, the report notes.

After a March 11 earthquake and tsunami hit the Japanese plant, United States officials urged Americans to stay at least 50 miles away, citing the possibility of a major release of radioactive materials from the pool at Unit 4. The warning has reinvigorated debate about the safety of the far more crowded fuel pools at American nuclear plants.

Adding to concern, President Obama canceled a plan for a repository at Yucca Mountain in the Nevada desert last year, making it likely that the spent fuel will accumulate at the nation's reactors for years to come.

The Nuclear Regulatory Commission maintains that both pool and cask storage are safe, although it plans to re-examine the pool issue in light of events at Fukushima.

Nearly all American reactors, especially the older ones, have far more spent fuel on hand than was anticipated when they were designed, Mr. Alvarez, a former senior adviser at the Department of Energy, wrote.

In general, the plants with the largest inventories are the older ones with multiple reactors. By Mr. Alvarez's calculation, the largest amount of spent fuel is at the Millstone Point plant in Waterford, Conn., where two reactors are still operating and one is retired. The second-biggest is at the Palo Verde complex in Wintersburg, Ariz., the largest nuclear power plant in the United States, with three reactors.

Companies that run reactors are generally reluctant to say how much spent fuel they have on hand, citing security concerns. But Mr. Alvarez, drawing from the environmental impact statement for the proposed repository at Yucca Mountain, estimated the amount of radioactive material at all of the nation's reactors.

In the 1960s, when most of the 104 reactors operating today were conceived, reactor manufacturers assumed that the fuel would be trucked away to factories for reprocessing to recover uranium. But reprocessing proved a commercial flop and was banned in the United States in the 1970s out of concerns that the plutonium could find its way into weapons worldwide.

Today roughly 75 percent of the nation's spent nuclear fuel is stored in pools, the report said, citing data from the Nuclear Energy Institute. About 25 percent is stored in dry casks, or sealed steel containers within a concrete enclosure. The fuel is cooled by the natural flow of air around the steel container.

But spent fuel is transferred to dry casks only when reactor pools are nearly completely full. The report recommends instead that all spent nuclear fuel older than five years be stored in the casks. It estimated that the effort would take 10 years and cost $3.5 billion to $7 billion.

"With a price tag of as much as $7 billion, the cost of fixing America's nuclear vulnerabilities may sound high, specially given the heated budget debate occurring in Washington," Mr. Alvarez wrote. "But the price of doing too little is incalculable."

The casks are not viewed as a replacement for a permanent disposal site, but as an interim solution that would last for decades.

The security of spent fuel pools also drew new attention after the attacks of Sept. 11, 2001, partly because one of the planes hijacked by terrorists flew down the Hudson River, over the Indian Point nuclear complex in Westchester County, before crashing into the World Trade Center in Manhattan.

Indian Point has pressurized water reactors with containment domes, but its spent fuel pools are outside the domes. The pools themselves are designed to withstand earthquakes and other challenges, but the surrounding buildings are not nearly as strong as those that house the reactors.

In a 2005 study ordered by Congress, the National Academy of Sciences also concluded that the pools were a credible target for terrorist attack and that consideration should be given to moving some fuel to dry casks.