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Indian Point

The challenge of storing irradiated fuel

By Abby Luby

Some of the dry casks at Indian Point where spent fuel rods will be stored.

The Indian Point nuclear power plants in Buchanan will start storing radioactive fuel waste on site by late fall.

Plant owner Entergy Nuclear Northeast expects to start “dry runs” in October, which will practice taking spent fuel assemblies from Unit One, the oldest unit that is purportedly the cause of numerous leaks of the irradiated groundwater.

The plan includes putting the spent fuel in stainless steel casks now stored in the spent fuel pool and then transferring them to larger, fortified storage casks on a concrete pad on the north side of the site.

Currently, over 1,500 tons of irradiated fuel is stored on site. But Entergy is running out of space for storage in their pools. They announced in 2003 their plan to store irradiated nuclear fuel in dry casks on the site by 2005.

“We are just completing the road from the reactors to the pad,” said Entergy spokesman Jim Steets on a recent tour of the site with North County News. “We hope to have some practice runs in a few months.”

Dry casks on site

The concrete pad covers roughly 18,000 square feet and is located on the Hudson River just behind a thin strand of trees. Construction of the pad required 2,100 yards, or 4,100 tons, of concrete. A drainage system has been installed with several collection basins.
“This is so nothing flows down to the river,” said Steets.

The pad is large enough to hold 78 casks. A newly installed crane several hundred feet high in Unit Two is poised to lift the fuel assemblies from the spent fuel pools and place them in the dry casks. The crane weighs about 110 tons. Installation costs to Entergy were about $8 million.

Neil Sheehan, spokesman for the Nuclear Regulatory Commission (NRC) said nuclear facilities have had a lot of experience using dry cask storage.
“In the country there are 43 facilities in 28 states using dry cask storage,” he said. “An additional 14 reactors have just announced plans to also store spent fuel this way. With over 800 loaded dry casks in the country, we have a lot of experience.”

Security issues
Two surveillance towers are posted at the corners to be manned at all times, said Steets. Entergy will be using the Holtec Hi-Storm 100 casks, large tubular concrete and lead casks that are 11 feet in diameter.

Critics have said the casks are among the cheaper and least robust models, not designed to repel a September 11-type attack.
“These casks are one of the least expensive models,” said Lisa Rainwater of the environmental group Riverkeeper. “The casks have been criticized by managers at Holtec itself.”

Rainwater also said no one knew if the casks could withstand a terrorist attack, which is a major concern, considering the plant is located 25 miles north of New York City.
“Entergy is storing high-level fuel on the banks of the Hudson River and on the Ramapo fault line. Surely a company that makes $3 million a day could have invested in the most expensive cask to protect 20 million people.”

Security on protecting the casks from possible air or missile attacks is not for public knowledge, said Sheehan. “We wouldn’t get into those details, but our security reviews tell us it’s a safe method of storing the fuel.”

Sheehan said after September 11, the NRC required power plants to make a number of physical changes addressing safety.

“Different plants have complied in different ways,” he said. “We can’t share what a plant’s protective strategy is. But we believe the casks themselves are safe.”
The casks will be stored without any cover or bunkers. Rainwater fears the casks could be attacked by air.

“Riverkeeper and IPSEC [Indian Point Safe Energy Coalition] have raised concerns about the best way to store the casks,” she said. “They could be underground or protected against aircraft strikes by partial earthen berms to mitigate a possible air or missile attack. But this was dismissed years ago as unnecessary.”

Rainwater added that Riverkeeper has long supported a dry cask method of storage as long as there is ample fortification.

Waiting for Yucca Mountain Repository
According to Steets, the on-site storage will be large enough to hold all the current irradiated fuel plus the spent fuel generated into the renewed license period beginning 2013.
“But we can’t store fuel we produce for the entire time of the new license period,” he said.
Over the next 20 years, the plant is expected to produce approximately 1,000 tons of additional irradiated fuel.

Until a few years ago, the plan to store the nation's nuclear waste at the Yucca Mountain Repository just 100 miles from Las Vegas seemed a certainty. The repository would store the radioactive waste underground from commercial nuclear-power plants, which takes centuries to decay.

But concerns of how the high density waste would be shipped began to lessen the prospects of Yucca Mountain being a viable site. Locally, residents were concerned about possible accidents with the trucks carrying casks of spent fuel through towns and neighborhoods along Route 9 before reaching major highways.

Yucca Mountain also became a politically charged environmental issue. Tests showed that Nevada’s desert ground wasn’t as impervious to water as initially thought. Sophisticated testing showed water percolating through Yucca Mountain’s underground caverns and then heading toward the Colorado River, providing drinking water for 16 million Californians.
The Congressional battle to stall the completion of the repository could take decades.

An explanation of irradiated fuel and spent rods

The operation of nuclear reactors results in spent reactor fuel. The reprocessing of that spent fuel produces high-level radioactive waste. The fuel for most nuclear reactors consists of pellets of enriched uranium dioxide that are sealed in hundreds of metal rods, or fuel rods.

These rods are bundled together to form what is known as a "fuel assembly." As the nuclear reactor operates, uranium atoms fission (split apart) and release energy.

Over time, the build-up of neutron-absorbing poisons resulting from the chain reaction reduces the ability of the fuel to sustain an efficient chain reaction, and the rods become irradiated or “spent” and must be replaced.

Depending upon the type and size of the reactor, a fuel assembly can weigh up to 1,500 pounds.

Most spent fuel is stored in water pools at the reactor site where it was produced. The water removes leftover heat generated by the spent fuel and serves as a radiation shield to protect workers at the site.

The operation of nuclear reactors over the last 20 years has substantially added to the amount of radioactive waste in this country. By 2020, the total amount of spent fuel is expected to increase

significantly.

Source: Environmental Protection Agency website