

New York Times – Asia Pacific

Removing Fuel Rods Poses New Risks at Crippled Nuclear Plant in Japan

By HIROKO TABUCHINOV. 10, 2013

TOKYO — It was the part of the Fukushima Daiichi nuclear power plant that spooked American officials the most, as the complex spiraled out of control two and a half years ago: the spent fuel pool at Reactor No. 4, with more than 1,500 radioactive fuel assemblies left exposed when a hydrogen explosion blew the roof off the building.

In the next 10 days, the plant's operator, the Tokyo Electric Power Company, is set to start the delicate and risky task of using a crane to remove the fuel assemblies from the pool, a critical step in a long decommissioning process that has already had serious setbacks.

Just 36 men will carry out the tense operation to move the fuel to safer storage; they will work in groups of six in two-hour shifts throughout the day for months. A separate team will work overnight to clear any debris inside the pool that might cause the fuel to jam when a crane tries to lift it out, possibly causing damage.

“We are making our final preparations,” Naomi Hirose, the president of the company, known as Tepco, said at a news conference on Friday. “We hope to be done by the end of next year.”

The attempt to remove the fuel rods underscores the complicated, potentially hazardous work that lies ahead at the plant, which was crippled by explosions and by meltdowns in three of its reactors in the wake of the earthquake and tsunami in March 2011.

The operation addresses a threat that has hung over the plant since the crisis started. Though the fuel has cooled significantly since the early days of the crisis, and Tepco has shored up the reactor building, it is still dangerous to have the fuel high up in a damaged structure that could collapse in another quake, experts warn.

But removing it poses dangers, too. The fuel rods must remain immersed in water to block the gamma radiation they emit and allow workers to be in the area, and to prevent the rods from overheating. An accident could expose the rods and — in a worst-case scenario, some experts say — allow them to release radioactive materials beyond the plant.

Plant engineers will use a crane to lift the fuel assemblies from the pool into giant casks that have been lowered into the water, and then lift the casks out of the building. Each cask will be placed on a trailer and moved to a more secure pool at ground level.

“There are potentially very big risks involved,” Shunichi Tanaka, the head of [Japan’s](#) nuclear regulator, said last week. “Each assembly must be handled very carefully.”

Tepco hopes that a smooth start to the removals will help it regain at least some of the credibility it lost in its response to the quake and tsunami that overwhelmed the plant and in the cleanup.

A string of blunders by Tepco, including underestimating the potential for large amounts of groundwater to become contaminated and reach the ocean, has some experts wondering whether the company is up to the task.



Members of the media inside the Fukushima Daiichi plant on Thursday. The plant’s operator plans to start moving radioactive fuel to safer storage. Pool photo by Tomohiro Ohsumi

Even minor problems with the fuel removal could strengthen calls for the decommissioning work to be taken out of Tepco’s hands.

“All I can do is pray that nothing goes wrong,” said Yasuro Kawai, a former plant engineer who now heads a group that is independently monitoring the decommissioning process.

He said much depends on whether the assemblies were damaged during removal — for example, if the casks carrying them were to accidentally fall to the ground, exposing the rods — and whether such damage was severe enough to force workers to evacuate.

“If they drop the rods, will the situation be easily contained, or do we need to worry about a more dangerous chain of events?” Mr. Kawai said. “There are just too many variables involved to say for sure.”

Tepco officials said the removal plan has been vetted by the company’s engineers and outside experts, including the International Atomic Energy Agency. But the work will be carried out by a Tepco-led team and without external supervision.

The company said it has taken extra precautions. The plant has been preparing for months, erecting a steel structure around and over the damaged reactor building and fitting it with a crane to lift the casks about 100 feet in the air. Underwater cameras will help engineers search for debris, left from the original explosion, that might jam the assemblies, and a robotic arm will be used to try to remove any debris that does get in the way.

The crane is designed to hold its load if power is lost, and Tepco said it has doubled the cabling that will lift the cask, which could weigh as much as 90 tons when filled.

The biggest fear is that an earthquake or tsunami will disrupt the fuel assembly transfer. Sizable aftershocks from the 2011 quake frequently jolt the region. Last month, a magnitude-7.1 quake off the coast near Fukushima caused a small tsunami.

Tepco has said the steel covering structure and crane can withstand an earthquake as strong as the magnitude-9.0 quake that damaged the plant in 2011.

Lake H. Barrett, a former United States Department of Energy official who was in charge of removing fuel from a stricken reactor after an accident at Three Mile Island in Pennsylvania in 1979, is now a special adviser to the president of Tepco. He said he believed that the risks in removing the fuel from the Reactor No. 4 pool at Fukushima were small and that a significant release of radioactive material was highly unlikely.

And when the job is done, Mr. Barrett said, the overall danger will be reduced.

This fuel “really needs to come back down to a ground-level pool that is not damaged,” he said. “That’s going to improve the risk situation.”

In the early days of the crisis, American officials were so worried about the pool that they advised Americans to stay farther from the plant than the Japanese government ordered, which many Japanese officials still remember with humiliation. The worst-case scenario of a breach in the pool, leaving the fuel rods uncovered, has not happened, and Tepco believes the fuel assemblies have relatively little damage.

Correction: December 11, 2013

Because of an editing error, an article on Nov. 11 about the risks involved in removing spent fuel rods from a crippled reactor at the Fukushima Daiichi nuclear power plant in Japan referred incorrectly to a step in the procedure. Plant engineers planned to use a crane to lift the fuel assemblies into giant casks that had been lowered into the spent fuel pool, where the rods are stored, then lift the casks out of the pool; the assemblies would not be lifted out of the pool and into the casks.

Makiko Inoue and Hisako Ueno contributed reporting from Tokyo, and Matthew L. Wald from Washington.

A version of this article appears in print on November 11, 2013, on Page A4 of the New York edition with the headline: Removing Fuel Rods Poses New Risks at Crippled Nuclear Plant in Japan.