Fukushima plant readies for delicate fuel rod removal

November 7 2013, by Shingo Ito

In this file photo, Fukushima Governor, Yuhei Sato (in orange helmet), inspects the spent fuel pool in the unit 4 reactor building of Tokyo Electric Power Co. (TEPCO) Fukushima Dai-ichi nuclear power plant, on October 15, 2013

Nuclear engineers in Japan are preparing to move uranium and plutonium fuel rods at Fukushima, their most difficult and dangerous task since the plant's runaway reactors were brought under control two years ago.

Tokyo Electric Power (TEPCO) is expected this month to begin removing fuel rods from a pool inside a reactor building at the tsunami-hit plant after months of setbacks and glitches.

Experts say the operation is a challenging but essential step in the decades-long decommissioning after the worst atomic accident in a generation.

But, they add, it pales in comparison with the much more complex task that awaits engineers who will have to remove the misshapen cores of three reactors that went into meltdown—probably relying on technology that has not yet been invented.

More than 1,500 nuclear fuel assemblies—bundles of rods—must be pulled out of the storage pool where they were being kept when a tsunami smashed into Fukushima in March 2011.

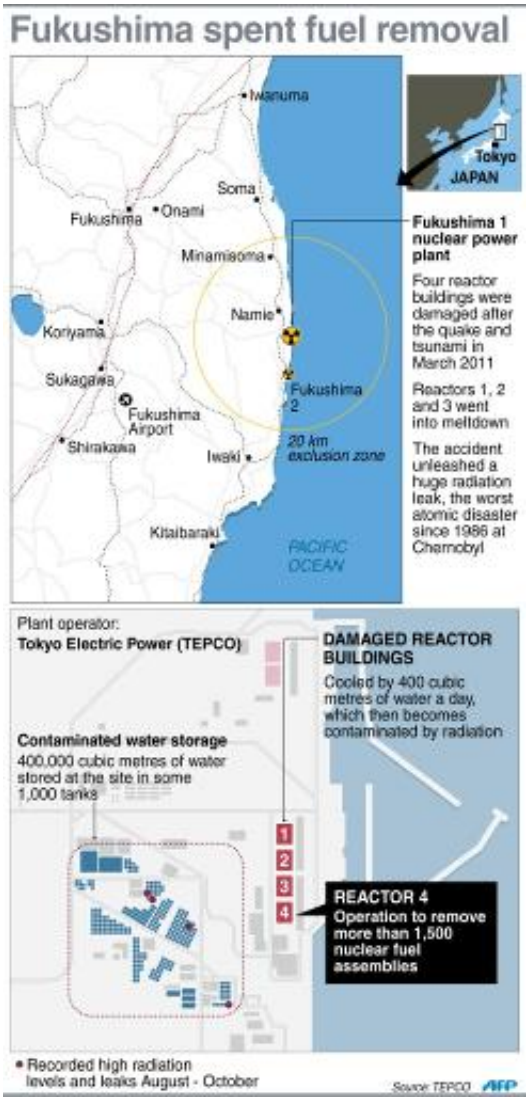
The reactor which the pool serves—No. 4—was not in operation at the time. But hydrogen from Reactor No. 3 got into the building and exploded, tearing the roof off and leaving it at the mercy of earthquakes, storms or another tsunami.

TEPCO says it has not yet found any damage to the assemblies at No. 4, but will be monitoring for abnormalities, such as rust.

The removal of fuel is routine at nuclear power plants, but "conditions are different from normal because of the disaster", said company spokeswoman Mayumi Yoshida.

"It is crucial. It is a first big step towards decommissioning," she said.

"This is an operation TEPCO cannot afford to bungle"



Graphic showing Japan's Fukushima nuclear power plant where engineers are readying to move uranium and plutonium fuel rods from one of the reactor buildings damaged by the March 2011 quake and tsunami

A crane has been installed in the building, which is now concealed under a new L-shaped structure. On one side hangs a banner that reads: "With one heart. Let's keep going, Fukushima!"

Reporters at the plant Thursday were taken to the fourth floor, approximately 30 metres (100 feet) up, where they saw the remotely-controlled grabber that will plunge into the pool and hook onto a fuel assembly, placing it inside a fully immersed cask.

The 4.5-metre (15-foot) bundles, weighing 300 kilogrammes (660 pounds), have to be kept in water throughout the operation to keep them cool.

"If, for some reason, the water levels dropped, the fuel would quickly heat up," said Takashi Hara, a TEPCO employee in charge of fuel removal.

The 91-tonne cask will then be hauled from the pool—containing as many as 22 fuel assemblies and a lot of water—to be loaded onto a trailer and taken to a different storage pool, where the operation will be reversed

Plant chief Akira Ono told reporters a lot of preparation work had been done, for example in removing debris from the pool, including with the use of an underwater vacuum cleaner.

"But there is a possibility that very small pieces of debris were left behind," he said, adding that this would impede the smooth removal of the assemblies.

Experts warn that slip-ups could quickly cause the situation to deteriorate. Even minor mishaps will create considerable delays to the already long and complicated decommissioning.

This file video grab, taken by Tokyo Electric Power Co. (TEPCO) on May 7, 2011, shows the spent fuel pool of the unit four reactor building at TEPCO's Fukushima Daiichi nuclear power plant at Okuma town in Fukushima prefecture

"This is the first practical milestone for the project," said Hiroshi Miyano, a nuclear systems expert and visiting professor at Hosei University in Tokyo.

"Any trouble in this operation will considerably affect the timetable for the entire project," he said. "This is an operation TEPCO cannot afford to bungle."

The comments reflect an increasingly widespread view that the giant utility is not capable of dealing with the mess its nuclear plant has created.

Months of setbacks have included multiple leaks from tanks storing radioactive water, and a power outage caused when a rat electrocuted itself on a circuit board.

TEPCO's management of the problems has been criticised as haphazard and uncoordinated, with one government minister saying it was like watching someone playing "whack-a-mole".

The full decommissioning of Fukushima is likely to take decades and include tasks that have never been attempted anywhere in the world.

Meanwhile, villages and towns nearby remain largely empty; fear of radiation makes residents unable or unwilling to return to live in the shadow of the leaking plant.