

Fuel Removal At Fukushima: What's At Stake?

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TOKYO (AP) — Workers started the difficult task Monday of removing nuclear fuel rods from a heavily damaged reactor building at the Fukushima Dai-Ichi nuclear power plant in Japan. It's the first major step toward decommissioning the plant, a decades-long process fraught with uncertainty and challenges.

Q: How many fuel rods are there, and how long will it take?

A: There are 3,106 fuel rod assemblies, each holding about 60-80 rods containing uranium-based pellets inside, in four reactors, Units 1-4. The goal is to remove them over the next five years. What started Monday was the removal of the 1,533 assemblies in Unit 4, which is the only one of the four reactors being decommissioned that didn't melt down. Units 4, 5 and 6 were offline for regular safety checks and maintenance at the time of the March 2011 earthquake and tsunami. Unit 4 had no fuel rods inside its reactor core. The rods have remained in a pool of cooling water 30 meters (100 feet) above the ground inside the reactor building, along with fuel that had been there previously, making them vulnerable to another major earthquake.

Q: How will the rods be removed, and what will happen to them?

A: A crane, mounted inside a massive steel structure built next to and partly over Unit 4, will pull the fuel assemblies one-by-one out of a rack that holds them and put them into a cask that can carry up to 22 assemblies for transport. Another crane, mounted higher up in the structure, will lift the cask out of the pool and place it on a trailer outside the building. Two casks will be alternated, and each cask will then be taken to a nearby pool just above the ground, a much safer storage place. The operation will run around the clock with 36 workers in six shifts. Each cask trip takes several days. The goal is to finish removing the fuel in Unit 4 by the end of 2014.

Q: What are the potential risks?

A: Fuel assemblies or the rods inside them may be damaged or break open if dropped or shaken violently. They may not come out of the rack smoothly. The fuel assemblies and their handles may have been damaged when big pieces of debris fell on them during explosions early in the crisis. A crane may drop a cask on the

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ground. Some fuel rods may be corroded because seawater was used to keep them cool during the emergency. As a safety measure, the crane is equipped with a system that will stop pulling on the assemblies if it encounters a certain level of resistance to prevent any rods from getting damaged or broken. An underwater camera will monitor the work, and an underwater vacuum cleaner will collect small debris. Tokyo Electric Power Co., the plant operator, removed two unused fuel assemblies last year, and an examination suggests the assemblies have generally remained intact.

Q: Is there any risk of a release of radioactivity?

A: Experts and TEPCO say the risk of a release of radiation outside of the plant is negligible, even if fuel assemblies or the cask is dropped on the ground during transportation. Nobody lives within several kilometers (miles) of the plant, and in case of a mishap that requires evacuation, the plant would notify via walkie-talkies anyone who might be in the area for a day visit.

Q: What will be the next step?

A: It will be a while before the fuel assemblies can be removed from the three other reactors, where radioactivity is much higher and accessibility is more limited. The plant hopes to set up a similar structure above Unit 3 to start removing fuel assemblies from its overhead storage pool in 2015, then at Units 1 and 2 in 2017 at the earliest. TEPCO hopes to start removing molten fuel debris from the reactors as early as 2020, but some experts say that's an overly ambitious goal given uncertainties and challenges ahead.

Q: What will happen to Units 5 and 6?

A: Units 5 and 6, which were offline at the time of the disaster, eventually went into cold shutdown and are considered to be in a safer, more stable state. They will most likely also be decommissioned.

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