Robot probes show Japan reactor cleanup worse than expected

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This Feb. 16, 2017 photo released by Tokyo Electric Power Co. (TEPCO) shows a remote-controlled "scorpion" robot inside the Unit 2 reactor's containment vessel at Fukushima Dai-ichi nuclear power plant in Okuma town, Fukushima prefecture, northeastern Japan. Robot probes sent to one of Japan's wrecked Fukushima nuclear reactors have suggested worse-than-anticipated challenges for the plant's ongoing cleanup. (TEPCO via AP Photo)

Robot probes sent to one of Japan's wrecked Fukushima nuclear reactors have suggested worse-than-anticipated challenges for the plant's ongoing cleanup.

The plant's operator Tokyo Electric Power Co. said the remote-controlled "scorpion" robot was sent into the Unit 2 reactor's containment vessel Thursday to investigate the area around the core that had melted six years ago, but its crawling function failed while climbing over highly radioactive debris.

The robot, carrying a dosimeter, thermometer and two small cameras, transmitted some data and visuals but could not locate melted fuel—key information to determine how to remove debris out of the reactor. The robot was abandoned inside the vessel at a location where it won't block a future probe.

Preliminary examinations over the past few weeks have detected structural damage to planned robot routes and higher-than-expected radiation inside the Unit 2 containment chamber, suggesting the need to revise robot designs and probes.

Similar probes are being planned for the two other melted reactors. A tiny waterproof robot that can go underwater will be sent to Unit 1 in coming weeks, but experts haven't figured out a way to access badly torn Unit 3.

TEPCO needs to know the melted fuel's exact location and condition and other structural damage in each of the three wrecked reactors to figure out the best and safest ways to remove the fuel.

Despite the incomplete probe missions, TEPCO stuck to its schedule to determine methods for the melted fuel removal this summer and start work in 2021, company spokesman Yuichi Okamura said.

TEPCO is struggling with the plant's decommissioning, which is expected to last decades, following the 2011 earthquake and tsunami that led to the meltdown. Tens of thousands of residents had evacuated their homes, many of them still unable to return due to high radiation.

Earlier this month, another robot, designed for cleaning debris for the main "scorpion" probe, had to return midway through because two of its cameras became inoperable after two hours when its total radiation exposure reached a maximum tolerance of 1,000 Sievert—a level that can kill a human within seconds. The original duration planned for the robot was 10 hours, or 100 Sievert per hour.

Inadequate cleaning, high radiation and structural damage could limit subsequent probes, and may require more radiation-resistant cameras and other equipment, TEPCO officials said.

TEPCO officials said that despite the dangerously high figures, radiation is not leaking outside of the reactor.

Images captured from inside the chamber have showed damage and structures coated with molten material, possibly mixed with melted nuclear fuel, and part of a disc platform hanging below the melted core.

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