

## Despite more water, radiation still high in Fukushima reactor

October 11, 2012

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### THE ASAHI SHIMBUN

More water than expected has been found, but dangerously high radiation levels will make it difficult to remove the melted fuel from the most heavily damaged reactor at the Fukushima No. 1 nuclear plant.

Tokyo Electric Power Co. said Oct. 10 that a maximum radiation level of 11.1 sieverts per hour was detected during its first full-scale survey inside the No. 1 reactor's containment vessel.

A person would die if he or she were exposed to that level of radiation for less than an hour.

However, the figure was lower than about 73 sieverts per hour detected in the No. 2 reactor's containment vessel in March, a level that would be fatal to humans in several minutes.

TEPCO inserted a camera into the No. 1 reactor's containment vessel on Oct. 9 for the first time since the plant was crippled by the March 2011 Great East Japan Earthquake and tsunami.

The surface of water could be seen 2.8 meters above the bottom of the containment vessel. TEPCO believes that the melted fuel, lying under the water, is being cooled.

TEPCO had earlier estimated the water was 2 meters deep based on pressure values in the containment vessel. But the company said water levels were within its expectations.

Images taken by the camera showed rust on equipment and piping in the containment vessel, as well as steam.

"Some data on radiation levels and water levels have become available," said Masayuki Ono, acting general manager of TEPCO's Nuclear Power and Plant Siting Division. "We think we have obtained important information in planning future responses."

Fumiya Tanabe, who was a senior researcher at the now-defunct Japan Atomic Energy Research Institute, said he was surprised that water levels were so high. He added that the water could have been maintained at these levels because the lower parts of the containment vessel escaped severe damage.

TEPCO said the camera has so far detected no major damage to equipment although the surfaces of some parts have been corroded.

However, Keiji Miyazaki, an expert on nuclear reactor engineering and professor emeritus at Osaka University, said detailed conditions will not become clear until control rod drives and other devices under the pressure vessel can be examined.

He said the investigations will take time because workers cannot enter the containment vessel due to high radiation levels.

The survey found what appeared to be a bolt on a platform for workers in the containment vessel. TEPCO said the bolt was probably not used to support a large structure, but some equipment may have been damaged in the hydrogen explosion that rocked the reactor building in the early days of the crisis.

Questions also remained about the location of the melted fuel.

The maximum radiation level of 11.1 sieverts per hour was detected at a height of 8.6 meters from the bottom of the containment vessel.

Radiation levels generally fell toward the lower parts of the containment vessel. The reading was 4.7 sieverts per hour near the water surface and 0.5 sievert in the contaminated water.

TEPCO's Ono said it is difficult to identify where the source of radiation is from the available data.

The company believed that almost all melted fuel fell through the bottom of the pressure vessel and accumulated in the outer containment vessel. Under that scenario, radiation levels would rise toward the bottom of the containment vessel.

Steam in the No. 1 reactor appeared not as dense as in the No. 2 reactor, where drops of water were falling when a camera was inserted in March.

TEPCO said radioactive materials may be flowing differently in the two reactors. The No. 1 reactor was successfully vented, while the No. 2 reactor was not.

The No. 1, 2 and 3 reactors melted down after the Fukushima No. 1 nuclear plant lost all power sources in the earthquake and tsunami on March 11, 2011.

The following day, the upper parts of the No. 1 reactor building were blown off in the hydrogen explosion.

TEPCO said the No. 1 reactor's pressure vessel was the most heavily damaged because of the speed at which the nuclear fuel melted.

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