

# More radioactive water spills at Japan nuke plant



By SHINO YUASA, Associated Press

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TOKYO – Workers have discovered new pools of radioactive water leaking from Japan's crippled nuclear complex that officials believe are behind soaring levels of radiation spreading to soil and seawater.

Crews also detected plutonium — a key ingredient in nuclear weapons — in the soil outside the complex, though officials insisted Monday the finding posed no threat to public health.

Plutonium is present in the fuel at the complex, which has been leaking radiation for more than two weeks, so experts had expected to find traces once crews began searching for evidence of it this week.

The Fukushima Dai-ichi power plant was crippled March 11 when a tsunami spawned by a powerful earthquake slammed into Japan's northeastern coast. The huge wave destroyed the power systems needed to cool the nuclear fuel rods in the complex, 140 miles (220 kilometers) northeast of Tokyo.

Since then, three of the complex's six reactors are believed to have partially melted down, and emergency crews have struggled with everything from malfunctioning pumps to dangerous spikes in radiation that have forced temporary evacuations.

Confusion at the plant has intensified fears that the nuclear crisis will continue for months or even years amid alarms over radiation making its way into produce, raw milk and even tap water as far away as Tokyo.

The troubles have eclipsed Pennsylvania's 1979 crisis at Three Mile Island, when a partial meltdown raised fears of widespread radiation release. But it is still well short of the 1986 Chernobyl disaster, which killed at least 31 people with radiation sickness, raised long-term cancer rates and spewed radiation across much of the northern hemisphere.

Tokyo Electric Power Co., which runs the complex, said plutonium was found in soil at five locations at the nuclear plant, but that only two samples appeared to be plutonium from the

leaking reactors. The rest came from years of nuclear tests that left trace amounts of plutonium in many places around the world.

Plutonium is a heavy element that doesn't readily combine with other elements, so it is less likely to spread than some of the lighter, more volatile radioactive materials detected around the site, such as the radioactive forms of cesium and iodine.

"The relative toxicity of plutonium is much higher than that of iodine or cesium but the chance of people getting a dose of it is much lower," says Robert Henkin, professor emeritus of radiology at Loyola University's Stritch School of Medicine. "Plutonium just sits there and is a nasty actor."

The trouble comes if plutonium finds a way into the human body. The fear in Japan is that water containing plutonium at the station turns to steam and is breathed in, or that the contaminated water from the station migrates into drinking water.

When plutonium decays it emits what is known as an alpha particle, a relatively big particle that carries a lot of energy. When an alpha particle hits body tissue, it can damage the DNA of a cell and lead to a cancer-causing mutation.

Plutonium also breaks down very slowly, so it remains dangerously radioactive for hundreds of thousands of years.

"If you inhale it, it's there and it stays there forever," said Alan Lockwood, a professor of Neurology and Nuclear Medicine at the University at Buffalo and a member of the board of directors of Physicians for Social Responsibility, an advocacy group.

While parts of the Japanese plant have been reconnected to the power grid, the contaminated water — which has now been found in numerous places around the complex, including the basements of several buildings — must be pumped out before electricity can be restored to the cooling system.

That has left officials struggling with two sometimes-contradictory efforts: pumping in water to keep the fuel rods cool and pumping out — and then safely storing — contaminated water.

Hidehiko Nishiyama, a spokesman for Japan's Nuclear and Industrial Safety Agency, called that balance "very delicate work."

He also said workers were still looking for safe ways to store the radioactive water. "We are exploring all means," he said.

Meanwhile, new readings showed ocean contamination had spread about a mile (1.6 kilometers) farther north of the nuclear site than before, but was still within the 12-mile (20-kilometer) radius of the evacuation zone. Radioactive iodine-131 was discovered offshore at a level 1,150 times higher than normal, Nishiyama told reporters.

Closer to the plant, radioactivity in seawater tested about 1,250 times higher than normal last week and climbed to 1,850 times normal over the weekend. Nishiyama said the increase was a concern, but also said the area is not a source of seafood and that the contamination posed no immediate threat to human health.

The buildup of radioactive water in the nuclear complex first became a problem last week, when it splashed over the boots of two workers, burning them and prompting a temporary suspension of work.

Then on Monday, Tokyo Electric Power Co. officials said workers had found more radioactive water in deep trenches used for pipes and electrical wiring outside three units.

The contaminated water has been emitting radiation exposures more than four times the amount the government considers safe for workers.

The five workers in the area at the time were not hurt, said TEPCO spokesman Takashi Kurita.

Exactly where the water is coming from remains unclear, though many suspect it is cooling water that has leaked from one of the disabled reactors.

It could take weeks to pump out the radioactive water, said Gary Was, a nuclear engineering professor at the University of Michigan.

"Battling the contamination so workers can work there is going to be an ongoing problem," he said.

Amid reports that people had been sneaking back into the mandatory evacuation zone around the nuclear complex, the chief government spokesman again urged residents to stay out. Yukio Edano said contaminants posed a "big" health risk in that area.

Gregory Jaczko, head of the U.S. Nuclear Regulatory Commission, arrived in Tokyo on Monday to meet with Japanese officials and discuss the situation.

"The unprecedented challenge before us remains serious, and our best experts remain fully engaged to help Japan," Jaczko was quoted as saying in a U.S. Embassy statement.

Early Monday, a strong earthquake shook the northeastern coast and prompted a brief tsunami alert. The quake was measured at magnitude 6.5, the Japan Meteorological Agency said. No damage or injuries were reported.

Scores of earthquakes have rattled the country over the past two weeks, adding to the sense of unease across Japan, where the final death toll is expected to top 18,000 people, with hundreds of thousands still homeless.

TEPCO officials said Sunday that radiation in leaking water in Unit 2 was 10 million times above normal — a report that sent employees fleeing. But the day ended with officials saying that figure had been miscalculated and the level was actually 100,000 times above normal, still very high but far better than the earlier results.

"This sort of mistake is not something that can be forgiven," Edano said sternly Monday.

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