

Radioactive contamination spreading from damaged Japanese nuclear plant

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Two weeks after the earthquake and tsunami that devastated northeast Japan, there is mounting evidence that the stricken Fukushima Daiichi nuclear power plant is emitting radioactivity more widely and at more toxic levels than acknowledged by the Japanese government.

On Friday, following an incident the previous day at the number three reactor in which two workers received nuclear burns, Japanese officials admitted that there could be a leak in the reactor core. During a press conference in Tokyo Friday night, Prime Minister Naoto Kan characterized the situation at the power plant as “grave.” He said: “We are doing our best to prevent a deterioration in the situation, but we are not yet in a position that allows us to be optimistic.”

Four of the six reactors at the complex have been seriously damaged by the loss of power resulting from the quake and tsunami, with repeated explosions and fires indicating partial meltdowns and the exposure of fuel rods and spent fuel rods. Power has now been connected to all of the reactor buildings, but the pumping system that keeps the reactors cool is not yet running.

On Wednesday, smoke poured out of the reactor three building and emergency workers were temporarily evacuated. No explanation was given for the smoke at the reactor, which is potentially the most lethal of the six reactors at the site because it is the only one that uses so-called “mox” fuel, a mixture of uranium and plutonium. Even very small amounts of plutonium released into the environment would be fatal.

The statement made at the time by Hidehiko Nishiyama, deputy director-general of Japan’s Nuclear and Industrial Safety Agency, was typical of the attempts by both the government and the plant operator, Tokyo Electric Power Company (TEPCO), to minimize

the dangers to health and safety from the crisis. “Adequate water is being supplied to the reactor and its spent fuel pool,” he said, adding, “We do not believe it is anything serious.”

The following day, however, three workers seeking to connect electrical cables from the turbine building to the adjacent reactor core building at reactor number three stepped into water that proved to be highly radioactive. All three of the workers were among the low-paid and poorly trained temporary employees being supplied to TEPCO by a contractor to serve as emergency workers at the plant. Two of them were not wearing high boots, and their feet and ankles sustained radiation burns from the contaminated water.

They have been transported to a Tokyo hospital, but the seriousness of their injuries has not yet been reported.

Officials determined that the radioactivity of the water was 10,000 times the level normally seen in coolant water at the plant. The workers were exposed to 2 to 6 sieverts of radioactivity. Two sieverts is eight times the 250 millisieverts *annual* exposure limit set for workers at the Daiichi complex.

On Friday, nuclear safety official Nishiyama mentioned damage to the number three reactor vessel as a possible explanation of how water in the adjacent building had become so highly radioactive. He also spoke of possible damage to the spent fuel pool and possible damage to pipes. There is “some sort of leakage,” he said, adding that “radiation levels are high.”

Miroslav Lipar of the International Atomic Energy Agency (IAEA), at a press briefing in Vienna said, “Most probably there is some small leak from the containment and that allows in atmospheric pressure.”

The *New York Times* on Friday cited a “senior

nuclear executive” with “broad contacts in Japan” as saying there was a “long vertical crack” running down the side of the reactor vessel. The newspaper wrote: “The crack runs down below the water level in the reactor and has been leaking fluids and gases, he said.”

The unnamed executive added that the severity of the burns suffered by the injured workers were “consistent with contamination by water that had been in contact with damaged fuel rods,” according to the *Times*.

The newspaper further quoted the executive as saying, “There is a definite, definite crack in the vessel—it’s up and down and it’s large. The problem with cracks is they do not get smaller.”

Also on Friday, Japanese officials called for a “voluntary evacuation” of people living between 12 and 19 miles from the Fukushima plant. This was the first official suggestion that remaining within 19 miles of the damaged facility was dangerous.

On March 15, four days after the earthquake and tsunami, the government had ordered all residents living within 12 miles of the plant to leave. The estimated 130,000 people living between 12 and 19 miles away had been advised merely to remain indoors.

Now, the government is saying it will provide aid to those who wish to move further away. The US has recommended that its citizens stay at least 50 miles from the stricken power plant.

This announcement followed warnings earlier in the week that the Tokyo water supply had elevated levels of radioactive iodine and a recommendation that infants not be allowed to drink tap water. It was also acknowledged that milk and vegetables from outside the evacuation zone around the plant had radioactive contamination.

A growing list of countries, beginning with the US on Wednesday, has banned imports of milk, vegetables and fruit from areas near the Fukushima plant. The list includes China, Singapore, Australia, Hong Kong and South Korea.

Other indications of the spread of radioactive contamination include:

* A report from the Japanese Science Ministry that daily radiation recorded 30 kilometers (18.6 miles) northwest of the Fukushima Daiichi plant exceeded the annual limit of natural doses on Friday.

* A report from the IAEA that Japanese scientists have found measurable concentrations of radioactive

iodine-131 and cesium-137 in seawater samples taken 30 kilometers from land.

* The announcement by Chinese authorities that Japanese travelers arriving in China were found to have very high levels of radiation.

Edward Lyman, a scientist with the Union of Concerned Scientists, said in a telephone briefing Thursday, “It looks like there are going to be areas considerably further than 12 [miles away from the plant] that may require significant decontamination or condemnation.”



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