

Chaos in Japan

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The troubles cascaded Tuesday at the Fukushima Dai-ichi plant, where there have already been explosions at two reactor buildings since Friday's disasters. An explosion at a third reactor blasted a 26-foot (8-meter) hole in the building and, experts said, damaged a vessel below the reactor, although not the reactor core. Three hours later, a fire broke out at a fourth reactor, which had been offline for maintenance.

In a nationally televised address, Prime Minister Naoto Kan said radiation had seeped from four of the plant's six reactors. The International Atomic Energy Agency said Japanese officials informed it that the fire was in a pool where used nuclear fuel rods are stored and that "radioactivity is being released directly into the atmosphere." Long after the fire was extinguished, a Japanese official said the pool might still be boiling.

Depending on how bad the blast was at Unit 2, experts said more radioactive materials could seep out. If the water in the storage pond in Unit 4 boils away, the fuel rods could be exposed, leaking more virulent radiation.

Experts noted that much of the leaking radiation was apparently in steam from boiling water — and the falling radiation levels suggest the situation could be stabilizing.

Government spokesman Yukio Edano said the radiation leak potentially affected public health. But authorities and experts said the risks to the public diminished the farther the distance from the plant. At its

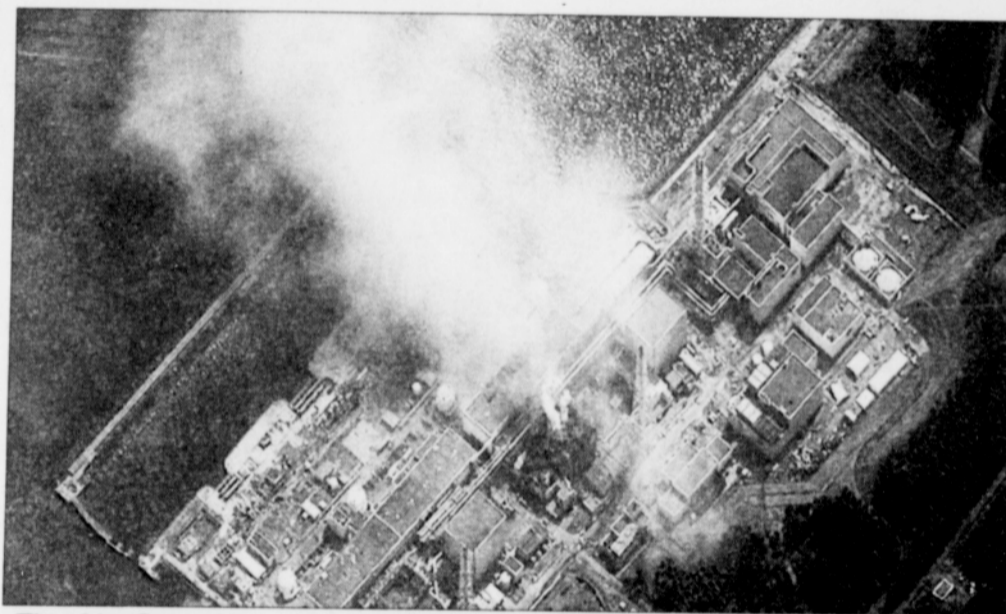


Japan Ground Self-Defense Force soldiers, mobilized to wash away radioactive material emitted from a nuclear power plant damaged by Friday's earthquake, put on protective gear Tuesday on their arrival in Nihonmatsu, Fukushima Prefecture, Japan. (AP photo)

most intense, the leak released a radioactive dose in one hour at the site 400 times the amount a person normally receives in a year. Within six hours, that level had dropped dramatically.

A person would have to be exposed to that dose for 10 hours for it to be fatal, said Jae Moo-sung, a nuclear engineering expert at Seoul's Hanyang University.

Radiation elsewhere never reached that level. In Tokyo, 170 miles to the southwest, authorities reported radiation levels nine times a normal level — too small, officials said, to threaten the 39 million people in and around the capital. Weather



The No.3 nuclear reactor of the Fukushima Daiichi nuclear plant at Minamisoma is seen burning after a blast following an earthquake and tsunami in this handout satellite image taken on Monday.

patterns helped, shifting Tuesday night to the southeast, blowing any potential radiation from the plant toward the sea.

"It's not good, but I don't think it's a disaster," said Steve Crossley, an Australia-based radiation physicist. "If the radioactive material gets out, it's a major problem. That doesn't appear to be happening in Japan, and that's the big difference. As long as you are not near it, it doesn't pose a health risk."

Though Kan and other officials urged calm, the developments fueled a growing panic in Japan and around the world amid widespread uncertainty over what would happen next. In the worst case scenario, one or more of the reactor cores would completely melt down, a disaster that could spew large amounts of radioactivity into the atmosphere.

The radiation fears added to the catastrophe that has been unfolding in Japan. Four days after the 9.0-magnitude earthquake and tsunami, millions of people strung out along the east coast had little food, water or heat, and already chilly temperatures dropped further as a cold front moved in. Up to 450,000 people are in temporary shelters.

Officials have only confirmed about 3,300 deaths, but officials have said the toll was likely to top 10,000 in one of the four hardest-hit areas. Experts involved in the 2004 Asian tsunami said there was no question more people died, despite Japan's high state of preparation, and like the earlier disaster, many thousands may never be found.

Low Risk of Radiation Fallout in Oregon

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the normal radiation experienced from the environment.

For radioactive particles to reach the U.S., air currents would require them to be deposited into the upper atmospheric jet stream, which would involve the kind of explosion than seems highly unlikely at the Fukushima Daiichi plant says Kathryn Higley, head of the Oregon State Nuclear Engineering and Radiation Health Physics department.

"For any particles to reach the U.S., they would have to reach into the upper atmosphere and that would require a significant event that would need to generate a lot of

heat," Higley said Monday. "Of course, once it gets up there, it can stay up there for some time, but even then it's going to be mostly cleaned up simply by rain."

Higley said the atomic bombs dropped on Hiroshima and Nagasaki in 1945 would have been far more likely to have deposited radioactive particles that might have reached the U.S. simply because the plumes that were created by the blasts.

"Even then, you'd get more radiation exposure from a chest X-ray than you'd get from that," she said, noting that a person would need hundreds of X-rays to develop cancer.

The threat of nuclear radiation

caught the world's attention in 1979 when the core of one of the two units at the Three Mile Island nuclear plant in Londonberry, Pa., suffered a meltdown, which resulted in the threat of radiation exposure for thousands of nearby residents and livestock.

In 1986, the nuclear reactor at Chernobyl in the Ukraine, experienced a much more severe explosion and large-scale radiation fallout that caused more than 300,000 residents to be resettled. The nearby city of Pripyat was abandoned.

Higley said the Chernobyl disaster, though, showed how nuclear fallout is restricted.

"That was a significant disaster, but exposure to radiation was con-

tained to the surrounding areas," she said. "Even at Chernobyl, the explosion did not send particles high enough for them to travel great distances."

At the time of the Three-Mile Island and Chernobyl accidents, Oregon received power from the Trojan nuclear facility located in Rainier, where protests had begun as early as 1977, two years after its construction.

The Trojan plant produced as much as 12 percent of the state's energy needs at one point, but it had several design problems that caused it to be shut down at least once. Portland General Electric shut the plant down permanently in 1992 following a release of documents

that showed a number of scientists believed the plant might not be safe to operate.

Decommissioning began in 1993.

Nuclear power continues to be a significant resource for power-hungry nations despite the threat of accidents.

Although one study showed infant mortality rates to be higher in areas downwind of the Three Mile Island plant, a 1999 report by a Columbia University epidemiologist found that no deaths or significant long-term health problems were associated with the accident.

The plant at Three Mile Island remains operational and is expected to continue operations through 2034.