

The Washington Post

Japan evacuates thousands from vicinity of two nuclear power plants

By Steven Mufson and William Branigin
Washington Post Staff Writers
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Japanese authorities began evacuating more than 200,000 people Saturday from areas around two nuclear power plants after an explosion at one of them damaged a building housing an aging U.S.-supplied reactor.

The unit, built 40 years ago by General Electric, is one of as many as seven reactors imperiled by the earthquake and subsequent disruptions in the power supply that the reactors use for cooling systems.

One nuclear worker was killed, at least six were injured and two were missing at the plants in the aftermath of Friday's 8.9 magnitude earthquake and the blast Saturday afternoon, according to the Tokyo Electric Power Co., which operates the Fukushima I and II nuclear power stations.

The company said it was taking steps to relieve pressure that has built up in seven of the plants' 10 reactor containment vessels. It said this would be done through a "partial discharge of air containing radioactive materials." The three other reactors - at the Fukushima I plant - had already been shut down for a regular inspection when the earthquake struck.

The International Atomic Energy Agency

(IAEA) said Saturday that Japanese authorities informed it that the explosion at the Unit 1 reactor of the Fukushima I plant "occurred outside the primary containment vessel," a steel structure that houses the reactor.

Japan's chief government spokesman, Yukio Edano, told reporters that the blast occurred when vapor from the steel container turned into hydrogen and mixed with outside oxygen. Edano said the explosion blew off the roof and walls of the building around the containment vessel but did no serious damage to the vessel itself.

The explosion sent white smoke billowing into the air and prompting Japanese officials initially to warn people in the vicinity to cover their mouths and stay indoors.

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Authorities ordered an estimated 170,000 people to evacuate from a 20-kilometer (12.4-mile) radius around the Fukushima I plant and about 30,000 people to leave a 10-kilometer (6.2-mile) radius around the Fukushima II plant. The two plants, also known respectively as Fukushima Daiichi and Fukushima Daini, are about seven miles away from each other in Fukushima Prefecture.

To limit damage to the reactor core at the site of the blast, plant officials began injecting sea water mixed with boron into the primary containment vessel at 8:20 p.m. Saturday local time.

The IAEA said Japan classified the event at Unit 1 as a Level 4 "accident with local consequences" on the International and Radiological Event Scale.

Tokyo Electric Power said four workers were injured in the explosion, one was exposed to radiation and two were missing. It said a worker who was trapped in the crane operating console of the exhaust stack at the Fukushima Daini plant died of his injuries and that another worker there was slightly injured.

Japanese government officials suggested Saturday evening that a widespread radioactive leak could be avoided.

But local officials of Fukushima Prefecture said at least three patients at a hospital less than two miles from the damaged nuclear plant have been exposed to radiation, Japanese news media reported. The three, chosen for random radiation testing from 90 patients and staff who were awaiting evacuation by helicopter, needed to be decontaminated, although they have not yet shown physical symptoms of radiation poisoning, officials said.

Authorities were preparing to distribute potassium iodide tablets to help protect against thyroid cancer from radiation exposure, officials said.

Earlier, Japan's Nuclear and Industrial Safety Agency (NISA) had warned that the Unit 1 reactor, whose cooling system had been crippled by the giant earthquake Friday, could be nearing a meltdown and that two

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radioactive substances, cesium and radioactive iodine, had already been detected nearby.

The full extent of the blast remained unclear, but footage on Japanese television showed that the walls of the building housing the reactor crumpled, leaving a skeletal metal frame, according to the Associated Press.

Construction of Unit 1, a 439-megawatt boiling water reactor, started in 1967, and commercial operation began in 1971. It was reportedly scheduled to be shut down on March 26.

Japanese authorities declared a state of emergency for the Fukushima reactors as military and utility officials scrambled to tame rising pressure and radioactivity levels inside the units and stabilize the systems used to cool the plants' hot reactor cores.

Radiation had earlier surged to about 1,000 times the normal level in the control room of one reactor, NISA said. Meanwhile, Tokyo Electric Power Co. said Saturday that the temperatures at two other reactors at a different power plant were rising and that it had lost control over pressure in three reactors there.

The explosion at the reactor is certain to rattle confidence in nuclear power in Japan, victim of the only nuclear weapons

explosions and where people have long been sensitized to the dangers of radioactive releases. In the United States, it was likely to deal a severe blow to advocates of a nuclear power renaissance.

In Tokyo late Saturday afternoon, news of the explosion sparked a run on bottled water supplies. At a Tokyo convenience store that had been well stocked earlier in the day, a line of a half-dozen customers was picking up the last bottles.

"I saw a chain letter e-mail from my friend telling about the explosion in Fukushima," said one shopper who, as is typical there, wanted only to give his first name, Masahito. "Right now they're saying it's a nuclear accident. I have been trying to buy enough water for one week, just in case, but I can't find it anywhere. I've already been to four places, including a supermarket."

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The earthquake has led to the shutdown of 11 of the Japan's 55 nuclear power reactors, representing nearly 20 percent of the country's capacity. It will deal an economic blow to Japan, which relies on nuclear power for one-third of its electricity generation, and could complicate economic recovery efforts.

"It's a very serious situation for the reactors and might ultimately render those reactors unusable," said Howard Shaffer, a former Navy submarine engineer and a member of the American Nuclear Society's public information committee.

Japanese authorities initially evacuated about 3,000 residents living within 1.9 miles of the Fukushima Daiichi plant, on the east coast about 150 miles north of Tokyo and south of the heavily damaged city of Sendai. Later they widened that evacuation to a six-mile radius and, after the explosion, extended the evacuation area to 12.5 miles.

According to NHK news, the Japanese Health Ministry had dispatched an emergency medical team, including experts on radiation exposure, to the Fukushima Daiichi complex nuclear plant.

The problems at the nuclear plants came in waves, starting with two of the six Daiichi units.

The quake disrupted the electric power the

reactors used to run their cooling facilities, which pump water into the reactor core to cool the fuel rods there. The reactors switched to backup diesel generators, but the tsunami then swept in and shut down the generators used for the No. 2 reactor at Fukushima Daiichi. The unit then tapped excess steam in the core to power a turbine and switched to battery power, which would last only a few hours.

"There's a basic cooling system that requires power, which they don't have," said Glenn McCullough, former chairman of the Tennessee Valley Authority, who was tracking the Japan situation.

Japanese utility and government officials raced to get another generator to the site to prevent a possible partial meltdown similar to what took place in 1979 at Three Mile Island in Pennsylvania. By Saturday morning

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they said they had succeeded. The utility said it had restored power from the grid, but the IAEA said power was restored from "mobile electricity supplies."

But it appeared that some of the fuel rods inside the reactor remained exposed rather than submerged in water.

Later Saturday, an official with Japan's nuclear safety commission said a meltdown was possible because of the overheating, the Associated Press reported. Ryohei Shiomi added that even if there were a meltdown, it wouldn't affect residents outside the evacuated radius.

Meanwhile, Tokyo Electric said it had decided to vent slightly radioactive steam and gas to relieve pressure that had increased sharply in the containment building at unit No. 1. The company said on its Web site that the increase was "assumed to be due to leakage of reactor coolant." It remained unclear where the leak was. The company said it did not think there was leakage of reactor coolant in the containment vessel "at this moment."

The purpose of a containment building, which surrounds the reactor core, is to contain unplanned releases of steam or gases from the core. If there is not enough water in the reactor core, water turns to steam and is released through special valves into the containment building, nuclear experts said.

That could cause an increase in pressure inside the sealed containment building and ultimately force a release of gas and steam through filters meant to keep most, though not all, of the radiation inside the building.

There were also reports of elevated radiation levels inside the control room of that reactor unit. NISA said levels were 1,000 times the norm. The AP later quoted an official from NISA as saying that a measurement of radiation levels outside the plant was eight times as high as normal. Even that level of radiation still posed little danger to residents, nuclear experts said. They also said the release of steam and gas from containment buildings posed little danger.

But in an update on its Web site, Tokyo Electric said one of its employees working in unit No. 1 was treated for radiation exposure by a special physician. Tokyo Electric also

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said, shortly before the explosion, that even though it was injecting water into the reactor vessel, levels were still dropping. It said water levels in unit No. 1 were lower than normal but stable.

The status of Tokyo Electric's Daina plants remained unclear. Earlier, they had been said to have completed automatic shutdowns. But Saturday, Tokyo Electric suggested that they were having problems similar to the ones at the other nuclear complex because of disruptions in the power supply needed to run cooling facilities.

"The danger is the very thermally hot reactor cores at the plant must be continuously cooled for 24 to 48 hours," said Kevin Kamps, a specialist in nuclear waste at Beyond Nuclear, a group devoted to highlighting the perils of nuclear power. "Without any electricity, the pumps won't be able to pump water through the hot reactor cores to cool them."

President Obama said at a news conference that he had told Energy Secretary Steven Chu to offer help to Japan.

In a statement that confused nuclear experts, Secretary of State Hillary Rodham Clinton said Friday morning that U.S. Air Force planes in Japan had delivered "coolant" to a nuclear power plant affected by the quake. Nuclear reactors do not require special

coolants, only large amounts of pumped water.

"They have very high engineering standards, but one of their plants came under a lot of stress with the earthquake and didn't have enough coolant," she said, "and so Air Force planes were able to deliver that."

An Air Force spokesman at the Pentagon, however, said he was unaware of any deliveries being made by Air Force planes related to the reactor issues.

"To our knowledge, we have delivered nothing in support of the nuclear power plant," Lt. Col. John Haynes said. "Obviously, we stand by to assist with anything they might need." He said the Air Force had received no formal request for help.

State Department officials later said Clinton

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In addition to the efforts to get Tokyo Electric's nuclear reactors under control, Japan's NISA said Friday that a fire had broken out at the Onagawa nuclear power plant but was later extinguished. The three reactors at the Onagawa site remained closed.

The key buildings in the Onagawa plant are about 45 feet above sea level, according to the Web site of Tohoku Electric Power, owner of the plant. The company said that was about twice the height of the previous highest tsunami.

The IAEA said it is seeking details on Japan's nuclear power plants and research reactors, including information on off-site and on-site electrical power supplies, cooling systems and the condition of the reactor buildings.

Nuclear fuel requires continued cooling even after a plant is shut down, the IAEA noted.

"This is the most challenging seismic event on record, so it is a severe test," McCullough said. "Clearly the Japanese government is taking this very seriously."

Correspondent Chico Harlan in Tokyo and staff writer Mary Beth Sheridan contributed to this report.

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