

# Meltdown of Japanese nuclear reactor confirmed

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Despite the lack of coverage in the international media, the situation at the Fukushima Dai-ichi nuclear plant in Japan remains, in the words of the International Atomic Energy Agency's weekly bulletin, "very serious".

The continuing crisis was underscored yesterday when the plant's operator, the Tokyo Electric Power Company (TEPCO), reported that the reactor 1 had been far more seriously damaged than believed and its fuel rods had undergone a meltdown.

Workers entered the reactor building last week, for the first time in two months, in order to restore ventilation and reduce the ongoing high levels of radiation inside the structure. Having achieved those initial steps, engineers repaired an important gauge used to measure water levels inside the reactor's pressure vessel.

Previous readings had shown the water level at 1.6 metres below the top of the fuel rods in the reactor core. As it turned out, these measurements were false. The actual water level was five metres below the top of the fuel rods, leaving them fully exposed.

At the same time, temperature readings inside the pressure vessel have stabilised at between 100 and 120 degrees centigrade. If the fuel rods were still largely in place, the temperature would be far higher. As a result, TEPCO engineers now believe that at the height of the crisis, when the reactor's cooling systems failed, molten fuel fell to the bottom of the pressure vessel.

TEPCO has been pumping water into the pressure vessels of reactors 1, 2 and 3 for weeks in a bid to

lower temperatures. The low level of water in reactor 1 indicates that the molten fuel might have created a hole in the bottom of the steel pressure vessel.

TEPCO general manager Junichi Matsumoto told a press conference yesterday: "There must be a large leak... The fuel pellets likely melted and fell, and in the process may have damaged... the pressure vessel itself and created a hole."

TEPCO and the Japanese government attempted to put the best possible face on the news, pointing out that the new readings did not change the apparently stable state of reactor 1. However, the discovery that the pressure vessel is leaking certainly complicates efforts to permanently stabilise the reactor and prevent the further spread of radiation.

TEPCO spokesman Matsumoto acknowledged: "We will have to revise our plans". Under pressure from the government, TEPCO had announced plans last month to bring the three damaged reactors to cold shutdown in six to nine months. Almost certainly there will now be further lengthy delays.

The situation could be far worse if some of the molten fuel has fallen through the pressure vessel into the base of the reactor's primary containment vessel—a thick concrete structure that surrounds the steel pressure vessel.

US nuclear expert Gene Corley told Reuters: "If it is assumed the fuel did melt through the reactor, then the most likely solution is to encapsulate the entire unit. This may include constructing a concrete wall around the unit and building a protective cover over it. Because

of the high radiation that would be present if this has happened, the construction will take many months and may stretch into years.”

In comments to Bloomberg.com, American physicist Paul Padley said: “What this means is this is probably going to be a much more difficult cleanup than they originally planned for.” He was scathing in his assessment of TEPCO and the Japanese government, saying they “have consistently appeared to be underestimating the severity of the situation”.

The discovery of the faulty water gauge highlights the fact that engineers working to stabilise the reactors at the Fukushima plant still do not know the full scale of the disaster. The extent of the damage to the core of reactor 1, where the melted fuel is located, and the state of the pressure vessel and primary containment vessel are all the subject of educated guesswork based on limited, and possibly misleading data.

Late last month, TEPCO revised its estimates of the damage to the reactor cores as follows: for reactor 1, it was lowered from 70 to 55 percent; for reactor 2, it was raised from 30 to 35 percent; and for reactor 3, from 25 to 30 percent. In light of the latest information, the figure for unit 1 will have to be lifted sharply, and the estimates for the other two reactors are just as dubious.

Workers have yet to enter reactors 2 and 3, where extensive damage has also taken place. Last month TEPCO was compelled to take emergency measures to prevent highly radioactive water in a maintenance trench associated with reactor 2 from spilling into the sea. The source is still not known.

On Wednesday, TEPCO announced that it had sealed a new leak, near a seawater intake, of highly contaminated water found in a pit associated with reactor 3. It was not clear where the water had come from or if it had been leaking into the sea.

For thousands of residents near the Fukushima plant who have been forced to evacuate, the latest news will only further delay the cold shutdown of the plant, the clean-up of the surrounding areas and any return to their homes and businesses. Outside the 20-kilometre

exclusion zone, a deadline will shortly expire for thousands more residents to leave five towns where dangerous levels of radioactivity have been detected.

The media downplaying of the continuing Fukushima disaster serves definite interests. In response to the latest news, TEPCO shares plunged another 8.8 percent yesterday, making the total loss 77 percent since the March 11 earthquake and tsunami. On Tuesday, the giant energy corporation appealed to the government for financial aid so that it could pay compensation, sustain electricity production and stabilise the Fukushima plant.

Even before the quake, Prime Minister Naoto Kan and his government were in political crisis, with opinion polling at rock bottom. Facing widespread popular distrust and hostility, Kan has been compelled to announce that the government will set up an inquiry into the nuclear catastrophe and re-examine plans to increase the country’s dependence on nuclear power for electricity production.

Nevertheless, Kan has left TEPCO, which is notorious for safety breaches and cover-up, in charge of operations at the crippled Fukushima plant. In what amounts to a symbiotic relationship, the company and the government both want to downplay the nuclear catastrophe and to get it out of the media as quickly as possible.



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