

Situation still unstable at crippled nuclear plant in Japan

By Chris Talbot
24 March 2011

The events at the Fukushima Daiichi nuclear power plant are slipping off the front pages, but the situation in is still not under control despite reassuring words from the Japanese and other government agencies. Radioactive contamination has been detected in Tokyo tap water, in vegetables grown outside the evacuation zone and in seawater near the plant.

Radioactive iodine was found in drinking water at a central Tokyo treatment plant. City officials reported levels of iodine-131 twice the permitted level had been found in the water supply. Residents have been warned not to use tap water for babies under 12 months old.

Seawater samples taken near the Fukushima plant were found to have 126.7 times the safety limit for iodine-131. The Japanese government has begun monitoring seafood for radioactive contamination.

The government has banned the sale of vegetables and milk produced in four provinces surrounding the plant after radioactive contamination was found. Some green leafy vegetables were found to have radioactive caesium levels of 164 times the legal limit. Radioactive iodine levels in spinach from Ibaraki province was found to be 27 times higher than accepted safety levels. Milk from Fukushima was found to be 17 times over the limit. The US authorities have imposed restrictions on the import of some Japanese foodstuffs.

Japanese officials insisted that the danger was minimal. The health ministry claimed that if someone were to eat 4 ounces or 100 grams of the contaminated vegetables every day for 10 days, they would only have been exposed to half the annual level of natural background radiation. But the World Health Organisation (WHO) was less sanguine about the health dangers of this environmental contamination.

“Quite clearly, it is not what we thought in the early stages. It is more serious,” Peter Cordingley of the

WHO Western Pacific office said as the evidence of contamination mounted.

The levels of contamination are currently low. But they are a matter of concern for a number of reasons. Firstly, the radioactive material has already spread further than was initially expected. Water and foodstuffs from well beyond the exclusion zone have been found to be contaminated. Secondly, the amount of contamination will increase in proportion to the length of time that the radioactive emissions from the Fukushima plant continue. Thirdly, while radioactive contamination is currently at low levels in water and vegetables, it can increase as it moves up the food chain and becomes concentrated in animal and human tissue.

Caesium-137 and iodine-131 are among the common products of nuclear fission and are highly volatile. They are given off as gases from the fuel rods and give the first indication of radioactive contamination.

Caesium-137 has a half-life of 30 years. It is water-soluble, and the body absorbs it as though it were potassium, allowing it to easily enter the food chain. It causes many different types of cancer, and its effects can be difficult to isolate from cancers caused by other factors in the environment.

Iodine-131 has a half-life of 8 days. The danger from iodine-131 is that it accumulates in the thyroid gland. High doses of iodine-131 are used medicinally in cases of hyperthyroidism to kill tissue in the thyroid. Paradoxically, low doses can be more dangerous because the tissue survives and the resultant mutations can lead to cancer. The dangers are greatest for children and adolescents.

After the Chernobyl accident, the population was exposed to radioactive isotopes from contaminated milk and vegetables, resulting in a significant increase

in cancers. The main contaminant is caesium-137, which led to the creation of an exclusion zone around the reactor. The number of deaths caused by cancers at Chernobyl is highly disputed, but the increase of thyroid cancers—usually treatable—is now well established after the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) produced a major report on the subject in 2008.

It found “A substantial increase in thyroid cancer incidence has occurred in the three republics (the whole of Belarus and Ukraine, and the four most affected regions of the Russian Federation) since the Chernobyl accident among those exposed as children or adolescents.”

The increase in thyroid cancer did not begin to appear until five years after the Chernobyl disaster. The researchers identified 6,000 cases of thyroid cancer that could be attributed to radioactive contamination.

The other major nuclear accident, which has been shown to result in an increase of cancers of various types was the fire at the Windscale reactor in Cumbria, northwest England, in 1957. Only in 1990 did epidemiologists discover that some 200 cases of cancer could be attributed to the radioactive plume that spread across Britain and northern Europe. In 2007, Professor Richard Wakeford of Manchester University revised that figure upwards after a fresh study of the data. He concluded that “Several dozen more cancer cases may have to be added to our total.”

In both cases, the evidence for harmful effects has taken many years to emerge. In part, this has been due to outright suppression of the evidence. The British government went to great lengths to prevent the full story of the accident at Windscale coming out because the facility was vital to the UK’s nuclear weapons programme. But it is not only a result of government and commercial secrecy. This is a developing technology and the epidemiological effects of population-wide exposure to radioactive fallout is still not sufficiently understood. Each major accident, and the more numerous cases of leaks, is, in effect, an experiment that is being conducted on a public kept in the dark about what is being done to them.

The crisis at Fukushima is by no means over. Power is now connected to all the reactor buildings, but the pumping system that keeps the reactors cool is not yet

running. A high-powered concrete pump has been brought on to the site to pump water, and fire trucks are being used in a desperate attempt to bring down the temperatures. Even assuming that cooling is restored, it will take several weeks for the situation to be stabilised. It is by no means certain that this can be achieved. The area has been shaken by further earthquakes, and spikes of radioactive emissions have been detected.

As black smoke poured out of reactor building three on Wednesday and emergency workers were again evacuated, officials hurried to calm anxieties.

“Adequate water is being supplied to the reactor and its spent fuel pool. We do not believe it is anything serious,” Hidehiko Nishiyama, deputy director-general of the Nuclear and Industrial Safety Agency (NISA), said. No satisfactory explanation has yet been given for the smoke.

Lake Barrett, who was site director for the US Nuclear Regulatory Commission during the clean up at Three Mile Island, added his voice to the media campaign of public reassurance. He described the black smoke as a “burp”. Speaking on ABC television, he said that this was the kind of thing that could be expected in the weeks to come.

Fukushima was, he said, an “industrial catastrophe”, and he admitted that “there are areas of the building where human beings are not going to go for quite some time”, but he claimed it was “not a health catastrophe”.

However, the evidence of earlier nuclear accidents suggests it is far too soon to say with certainty what the health impact of the Fukushima accident will be. It is currently rated at a level five on the international scale for nuclear accidents, which puts it on a par with Three Mile Island. But the two incidents are not really comparable, since at Three Mile Island there was no off-site contamination and at Fukushima there clearly has been.

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