

Fukushima: how to deal with the radioactive water?

Monday 6 June 2011, by [Asahi Shimbun](#), [Kyodo News](#), [Mainichi Shimbun](#) (Date first published: 6 June 2011).

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Water treatment system tested

Workers on Sunday began checking devices that will help decontaminate the radioactive water that is flooding the Fukushima No. 1 power plant, officials said.

Tokyo Electric Power Co., which manages the badly damaged plant, is building the system and hopes to activate it in about a week so it can start cleaning the massive amounts of highly dangerous water being created at the plant in Fukushima Prefecture.

The system is being set up at a facility where tainted water from reactors No. 2 and No. 3 has been transferred. It is expected to treat about 1,200 tons per day by reducing the concentration of radioactive substances in it to somewhere between one-thousandth and one-ten thousandth of what it is now.

The system includes an oil separator, a device to absorb radioactive cesium, decontamination equipment for cesium and strontium, and a desalination apparatus, the officials said. Some of the devices were made with technical cooperation from Kurion Inc. of the United States and Areva SA of France.

Workers held trial runs Sunday and are to test the equipment further to make sure it is all operating properly, they said.

The plant lost the ability to cool its six reactors when the March 11 quake and tsunami knocked out all power and ruined its backup generators.

Reactors 1 to 4 need perpetual injections of water from outside to keep the fuel rods and spent fuel from overheating. But vast pools of water are accumulating.

Kyodo, June 6, 2011

<http://search.japantimes.co.jp/cgi-bin/nn20110606a6.html>

Fukushima radioactive water could overflow soon

Raising fresh concerns about its ability to bring the nuclear crisis under control, Tokyo Electric Power Co. announced June 3 that highly radioactive water pooled in underground pits could start rising above ground in less than three weeks.

The company said there were 105,100 tons of stagnant water with high levels of radioactivity within the power plant as of the end of May.

The water contained an estimated 720,000 terabecquerels of radioactivity (1 tera is 1 trillion), according to the operator of the plant battered by the earthquake in March. That is more than the amount of radioactivity released from the plant into the atmosphere in the wake of the accident, which is estimated at 370,000 to 630,000 terabecquerels.

TEPCO warned that the contaminated water pooled in the basement of the buildings could start flowing out as early as June 20.

The company plans to treat the radioactive water in a new facility to be completed June 15 to prevent the overflow of polluted water, but it will also consider reducing the amount of fresh water being injected into the reactors.

Radioactive water is flowing into the basement of facilities within the compound as well as the buildings housing the Nos. 1 and 4 reactors, their turbine buildings, and the radioactive waste treatment facility, according to a report submitted by TEPCO to the Nuclear and Industrial Safety Agency of the Ministry of Economy, Trade and Industry.

The total radioactivity of the pools of contaminated water is equivalent to one seventh of the 5.2 million terabecquerels released into the atmosphere from the Chernobyl nuclear power plant disaster in 1986.

As TEPCO continues injecting water into the reactors at the Fukushima plant to cool their nuclear fuel, the amount of highly radioactive water leaking from the reactors is expected to continue increasing.

The utility made estimates of when the contaminated water in buildings' basements could leak aboveground, under several different scenarios, suggesting that it could happen as early as June 20.

It has been confirmed that highly radioactive water was leaked into the sea twice during the crisis: first 500 tons containing 4,700 terabecquerels gushed out, with 250 tons containing 20 terabecquerels following later.

TEPCO is building a new facility to treat the highly radioactive water while storing it in equipment located within the turbine buildings.

The expected overflow could take place earlier if there is heavy rain in the area, the utility said. In that case, the company will buy time by cutting the amount of water being injected into the reactors. The polluted water in the turbine buildings of reactors 2 and 3 had been transferred to the radioactive waste treatment facility until the company stopped this operation May 26 as the total amount approached the planned capacity of 14,000 tons.

Levels of contaminated water have since been rising, partly because of rainfall.

Radioactive water in the pits to the underground tunnels coming from the reactors 2 and 3 was 21.8

centimeters from the surface of the ground as of 7 a.m. on June 3, according to the company.

The water level in the pits had been rising at a daily rate of 5.9 centimeters for the No. 2 reactor and 2.1 centimeters for the No. 3 reactor.

Asahi Shimbun , June 5, 2011

<http://www.asahi.com/english/TKY201106040157.html>

TEPCO plans to seal off water inlets at damaged nuclear plant by end of June

Tokyo Electric Power Co. (TEPCO) has submitted plans to the Nuclear and Industrial Safety Agency to finish blocking water inlets near intakes at its damaged Fukushima No. 1 Nuclear Power Plant by the end of the month, company officials said on June 2.

By June 2, TEPCO had filled in 28 of the 45 tunnel entrances and pits near intakes of the plant's No. 1 to 4 reactors. It plans to seal off the remaining 17 by the end of the month. The pits and tunnel entrances are connected to the reactors' turbine buildings, and it is possible they have contributed to the flow of contaminated water.

So far 4.7 petabecquerels of radiation have been detected near the intake of the plant's No. 2 reactor, while 20 terabecquerels have been recorded near the No. 3 reactor — far exceeding the limit allowed to be released into the sea. Responding to the massive leaks of radiation, the Ministry of Economy, Trade and Industry's Nuclear and Industrial Safety Agency asked TEPCO to submit a report by June 1 to rectify the situation.

On the evening of June 2, TEPCO announced that the temperature in the pool for spent fuel at the plant's No. 2 reactor had fallen to 40 degrees Celsius over a two-day period after it started a circulatory cooling system. In the near future, the company will examine if the humidity in the reactor building has decreased. Although the No. 2 reactor building was not greatly damaged, water that has evaporated from the pool for spent fuel has evaporated and filled the building with steam, increasing the humidity level to 99.9 percent. This has made it difficult for humans to enter and for robots to examine the building.

When the plant operator first started the cooling system, the temperature of the water stood at about 67 Celsius, but by 11 a.m. on June 2, it had fallen to 40 Celsius.

Mainichi Shimbun , June 3, 2011

<http://mdn.mainichi.jp/mdnnews/national/archive/news/2011/06/03/20110603p2a00m0na019000c.html>

TEPCO to resume transferring of tainted water at Fukushima plant

TOKYO (Kyodo) — The operator of the crippled Fukushima Daiichi nuclear power plant plans to resume transferring radioactive-contaminated water within the No. 3 reactor's turbine building by securing additional room to pool it, company officials said Thursday.

Tokyo Electric Power Co. was set to resume the operation at a time it is working to prevent the tainted water from spilling out of pits and other facilities at the plant before activating new equipment that can recycle the problem water to cool down reactors about two weeks later.

The utility sees the amount of tainted water increasing in turbine buildings and nearby pits at the station as a recent typhoon brought substantial rainfall to the complex, 220 kilometers northeast of Tokyo. The rainy season zone is also approaching Fukushima Prefecture and other areas in the northeastern Tohoku region.

The officials said the utility, known as TEPCO, has started to transfer water in a condenser to a temporary storage tank, and then will fill the condenser with the tainted water from the No. 3 unit's turbine building.

The plant operator could begin moving the contaminated water into the condenser as early as next week, considering that it is expected to take three to four days before emptying the condenser, which has a 3,000-ton capacity, the Nuclear and Industrial Safety Agency said.

Removal of the tainted water is essential to reduce the risk of workers being exposed to radioactive substances and facilitate efforts to contain the emergency at the plant which was ravaged by the devastating March 11 earthquake and tsunami.

The plant operator had stopped transferring the contaminated water from the Nos. 2 and 3 reactors' turbine buildings to storage facilities by May 26 as the total amount of water came close to the planned limit, the utility's officials said.

In other progress, TEPCO's newly established water circulation system aimed at cooling the spent nuclear fuel pool of the No. 2 unit is working steadily, with the water inside the pool falling to 42 C on Thursday morning from 67 C late Tuesday, according to the agency.

Still, the level of water accumulated in the basement of the No. 1 reactor's building has been found to be decreasing recently, it said, raising concerns that the tainted water may be leaking to the outside.

The agency said it will analyze the reason for the decline of the water level, while TEPCO will continue to monitor the development of events there.

Kyodo, June 3, 2011

<http://mdn.mainichi.jp/mdnnews/national/archive/news/2011/06/03/20110603p2g00m0dm009000c.html>
