

Fukushima: controversies over seawater injection into nuclear reactor

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Tainted Waterin Fukushima Reactor Building Basement Increase

Fukushima, May 27 (Jiji Press)—The surface of radioactive water in the basement of the Fukushima No. 1 nuclear power plant's No. 1 reactor building was five meters above the floor, rising by some 80 centimeters in a week, the Tokyo Electric Power Co. <9501> said Friday.

The rise was confirmed after workers at the nuclear plant crippled by the March 11 earthquake and tsunami installed a water gauge in the basement, the power utility said, adding the visually monitored water surface was slightly over 4.2 meters above the floor as of May 20.

The workers also collected water samples from the basement.

Tokyo Electric has been pouring six tons of water per hour to cool the No. 1 reactor. Water is believed to be leaking into the basement from damaged portions of the reactor containment vessel, experts said.

If the basement's tainted water is to increase rapidly, it would slow work to set up a cyclic cooling system for the reactor, they said.

Jiji Press, May 27, 2011

<http://jen.jiji.com/jc/eng?g=eco&k=2011052800009>

Gov't sparks confusion over seawater injection into troubled nuclear reactor

The government has corrected a controversial comment by the head of a nuclear watchdog that is believed to have prompted Tokyo Electric Power Co. (TEPCO) to suspend the injection of seawater into the No. 1 reactor at the crippled Fukushima nuclear plant for about 55 minutes on the evening of March 12.

The suspension of the injection of seawater could be partly to blame for a meltdown that occurred at the reactor, some experts say. On March 12, a day after the magnitude-9.0 earthquake and ensuing tsunami struck northeastern Japan, Haruki Madarame, head of the Nuclear Safety Commission (NSC), is said to have suggested the possibility of the reactor having “recriticality” — a recurrence of nuclear fission reactions — if seawater were to be injected into the reactor.

On May 21, the government said in a statement that Madarame had said, “There is a danger of recriticality.” On May 22, however, the government issued a correction, stating that Madarame had actually said, “The possibility of recriticality is not zero.” The correction was issued after Madarame asked Deputy Chief Cabinet Secretary Tetsuro Fukuyama to issue a correction on his comment on May 22.

At 6 p.m. on March 12, TEPCO started to consider injecting seawater into the No. 1 reactor, but mindful of Madarame’s comment, the utility considered taking steps, such as also using boracic acid, to prevent recriticality. In the meantime, Minister of Economy, Industry and Trade Banri Kaieda is said to have instructed TEPCO to make preparations to inject seawater into the reactor.

At 7:04 p.m. on March 12, TEPCO started injecting seawater based on the judgment made by the head of the nuclear plant. But at 7:25 p.m. on the same day, the utility decided on its own to suspend the seawater injection as it thought the Prime Minister’s Office was discussing the possibility of recriticality. But, at 8:20 p.m. — 55 minutes later — the utility resumed the injection of seawater at the instruction of Prime Minister Naoto Kan.

At one time, Madarame had said, “There was no way I said anything about recriticality. My knowledge of nuclear power generation has been underestimated. That’s an insult.”

But he later told the Mainichi, “I now recall myself saying something to the effect that the possibility of recriticality was not zero (from the standpoint of the academic world). Administrative officials overreacted to my comment.” He said he had accepted the amended government statement quoting him as saying, “When asked about the possibility of recriticality, he said something to the effect that the possibility would not be zero.”

On May 23, Prime Minister Kan said at a House of Representatives special panel meeting on post-disaster reconstruction that he had not instructed TEPCO to suspend the seawater injection. Madarame also told the same panel, “I was instructed by the prime minister to clarify possible problems that could be caused by the injection of seawater. Then, I told him that the possibility of recriticality is not zero.” He also said, “I have advised for a long time that seawater should be injected if there is no fresh water.”

Many experts believe that there was almost no possibility of recriticality at the reactor. Kenji Sumita, honorary professor of nuclear engineering at Osaka University, said, “Even if seawater is injected into a reactor building that contains a lot of fresh water, the amount of absorbed neutrons necessary for recriticality will not change. If mixed with impure substances, it could absorb neutrons in a way to prevent recriticality.” He added, “There was a possibility of the temperature in the reactor rising fast or boiling after the injection of seawater was suspended.”

Mainichi , May 23, 2011

<http://mdn.mainichi.jp/mdnnews/national/news/20110523p2a00m0na009000c.html>

New storage sites needed at Fukushima No. 1

Facility for tainted water almost full

A nuclear waste disposal facility being used to store radioactive water from the crippled Fukushima No. 1 power plant will soon be full, Tokyo Electric Power Co. officials said Monday.

The operator, known as Tepco, plans to suspend the extraction operation until mid-June once the facility becomes filled and until a new water treatment facility begins operating.

A temporary storage tank is being prepared but will not be ready until around early July, the officials said.

Meanwhile, the amount of contaminated water is expected to rise as the crippled reactors continue to leak and the rainy season sets in, possibly posing another challenge to stabilization work at the plant.

A Tepco official, however, said that levels are unlikely to rise rapidly even if extraction operations are suspended.

The waste disposal facility consists of four buildings. Tepco plans to use two that have been altered to better secure the highly contaminated water, with about 10,000 tons to be transferred from a tunnel near the No. 2 reactor.

As of Monday morning, roughly 8,700 tons had been diverted from the tunnel to the facility at a rate of 12 tons per hour, leaving space for about 1,300 tons of water, which will take about five more days to fill.

Tepco plans to extract 4,000 tons of tainted water from the No. 3 reactor's turbine building as well. As of Monday morning, 2,700 tons had already been transferred after being diverted at 20 tons per hour, leaving space for about 1,300 tons, which will take about three days to fill.

Meanwhile, over 80,000 tons of water remains in or around reactors 1 to 4. Tepco plans to recycle it so it can be used to cool the cores of units 1 to 3.

Of the six reactors at the plant, units 1 to 3 still have fuel and must be stabilized.

The No. 4 reactor has no fuel in its core, but has spent-fuel assemblies sitting in a damaged storage pool above the reactor that need to remain submerged and cooled by constant water injections. Work intensified Monday to reinforce the pool by July, the officials said.

A blast at No. 4 in the early days of the crisis that was apparently triggered by hydrogen from No. 3 badly damaged one of the pool's supporting walls.

Quake effect ruled out

The magnitude 9 earthquake on March 11 did not cause loss of cooling water at the Fukushima power plant, Tokyo Electric Power Co. said Monday, denying it played a role in the meltdown at

reactor No. 1.

“We have determined that water cooling the reactors was not lost between the time of the earthquake and tsunami,” said Tepco official Junichi Matsumoto.

Tokyo said it will submit a report to the government, attributing the meltdown to the tsunami and make it public Tuesday.

The core of the No. 1 reactor melted within 16 hours of the quake, but high radiation levels inside on March 11 hinted the shaking damaged key facilities.

Kyodo, May 24, 2011

<http://search.japantimes.co.jp/cgi-bin/nn20110524a1.html>

20 Terabecquerels of Radioactive Materials Leak into Sea from N-Plant

Fukushima, May 21 (Jiji Press)—Tokyo Electric Power Co. <9501> said Saturday that some 250 tons of water including 20 terabecquerels of radioactive substances flowed into the sea from the No. 3 reactor of its stricken Fukushima No. 1 nuclear power plant earlier this month.

The amount of radioactive materials is some 100 times the maximum allowable level of leaks a year from the northeastern Japan plant, which was badly damaged by the March 11 earthquake and tsunami, according to the company.

The water is believed to have contained radioactive iodine-131, cesium-134 and cesium-137, the company said.

Most of the leaked water is believed to be remaining within the port area of the plant because silt fences have been installed in waters around the plant following the nuclear crisis triggered by the disaster.

The contaminated water, which is estimated to have come from the No. 3 reactor via the reactor's turbine building, spilled into the Pacific Ocean from around the water intake of the reactor on May 10-11, Tokyo Electric Power said.

Tokyo Electric to Halt Toxic Water Transfer for Weeks

Fukushima, May 23 (Jiji Press)—Tokyo Electric Power Co. <9501> will suspend for weeks the transfer of highly radioactive water from two nuclear reactors to waste disposal facilities at the Fukushima No. 1 plant.

The disposal facilities will reach their storage limits within days, but equipment to clean up the contaminated water will not start operating until mid-June, company officials said.

Tokyo Electric has been collecting highly radioactive water that leaked from the No. 2 and No. 3

reactors into nearby facilities including the basements of the reactor turbine buildings.

At present, Tokyo Electric is pumping 12 tons of water per hour from the No. 2 reactor and 20 tons per hour from the No. 3 reactor.

So far, Tokyo Electric has transferred 8,676 tons to the facility that is taking water from the No. 2 reactor, compared with its storage capacity of about 10,000 tons.

Jiji Press, May 23

<http://jen.jiji.com/jc/eng?g=eco&k=2011052300517>

Tokyo Electric to Install Cooling System on No. 2 Reactor Pool

Fukushima, May 22 (Jiji Press)—Tokyo Electric Power Co. <9501> said Sunday it will install a cooling system on the spent nuclear fuel pool for the No. 2 reactor of the crippled Fukushima No. 1 power station and put the system in operation by the end of this month.

The system is expected to bring down the pool's water temperatures, estimated at 70-80 degrees Celsius, to 65 degrees in one and half days from the operation start and to around 41 degrees in a month, company officials said.

The operator of the nuclear power plant in Fukushima Prefecture, northeastern Japan, which has been discharging radioactive substances into the environment since it was ravaged by the March 11 earthquake and tsunami, also plans to start using similar cyclic cooling systems for fuel pools for the No. 1-3 reactors in June and for the No. 4 reactor the following month, they said.

The cooling equipment comprises the primary system to remove heat from water by circulating it through a heat exchanger located outside the reactor building and the secondary system to release the heat taken out by the exchanger from a cooling tower to the outside of the building.

Tokyo Electric aims to introduce the same system to cool down the Fukushima plant's reactors.

Jiji Press, May 22, 2011

<http://jen.jiji.com/jc/eng?g=eco&k=2011052200195>
