Fukushima: hydrogen, contaminated water, soil & rice...

Saturday 24 September 2011, by Jiji Press, KON Naoya, Kyodo News, Mainichi Shimbun, SATO Hisae, SUGIMOTO Takashi, Yomiuri Shimbun (Date first published: 24 September 2011).

HYDROGEN

Hydrogen detected in pipe at Fukushima No. 1 reactor

Hydrogen has been detected in a pipe at the No. 1 reactor at the Fukushima No. 1 nuclear power plant, but there is no possibility it will cause an explosion “in the immediate future,” the plant’s operator said Friday.

According to Tokyo Electric Power Co., hydrogen of at least 10,000 parts per million was detected at two spots in a pipe passing through the containment vessel on the reactor building’s first floor. This concentration was higher than TEPCO had anticipated.

Although TEPCO is not certain how much hydrogen is still inside the vessel, the utility believes it is possible the concentration of the highly flammable gas is higher than had been assumed.

In air and liquid, 10,000 ppm is equivalent to 1 percent. Air containing at least 4 percent hydrogen and 5 percent oxygen is at risk of causing explosion.

TEPCO has been injecting nitrogen into the containment vessel since April so it is assumed there is virtually no oxygen. As a result, the utility ruled out the possibility of an explosion “in the immediate future.”

The hydrogen was detected during an examination of the pipe before installation of a radioactive gas purification system inside the containment vessel. TEPCO said it had closely examined the hydrogen concentration and would inject nitrogen into the pipe to flush out the remaining hydrogen.

TEPCO said it had expected hydrogen would still be inside the containment vessel, but that it would have no effect on the radioactive gas purification system.

The nuclear plant’s Nos. 1, 3 and 4 reactors were damaged by hydrogen explosions in the days after the March 11 earthquake and tsunami knocked out the plant’s cooling systems.

Yomiuri Shimbun , September 24, 2011
http://www.yomiuri.co.jp/dy/national/T110923004917.htm

CONTAMINATED WATER

TEPCO to treat contaminated water for use at Fukushima

Tokyo Electric Power Co. unveiled a plan on Sept. 22 to treat low-contamination water and sprinkle the treated water on the Fukushima No. 1 nuclear power plant compound.

Low-contamination water has accumulated in the basement of the turbine building of the No. 6 reactor building, TEPCO said.

The operator of the nuclear plant said it plans to treat the contaminated water to reduce the density of radioactive materials to the legally permitted level. It will seek understanding from nearby municipalities.

The contaminated water is believed to be a large amount of seawater and groundwater that flowed into the turbine building containing radioactivity that leaked to the atmosphere due to the explosions. The amount of water has been increasing, TEPCO said.

TEPCO has moved about 10,000 tons of low-contamination water to temporary storage tanks and about 7,000 tons to the "Mega-float" tank.

While the contamination level is as low as the government standard of 0.01 becquerel per milliliter, TEPCO said it will further remove radioactive substances.

"Even if it soaks into the ground and flows into the sea, there won't be any effect to the surrounding environment," a TEPCO official said.

The industry ministry's Nuclear and Industrial Safety Agency requested that the company thoroughly remove radioactive materials, adding it will confirm if the levels have been lowered.

TEPCO plans to use the treated water for fire prevention for the piled wood that had been cut down to set up temporary storage tanks, or for sprinkling to suppress airborne dust on the road. The company did not specify when and how much such water will be sprinkled.

TEPCO planned to discharge the same level low-contamination water from the No. 2 nuclear power plant in June, but it refrained from doing so due to opposition from the Fisheries Agency and local municipalities.

Toshitsuna Watanabe, mayor of Okuma town, which hosts the No. 1 to No. 4 reactors, said, "I hope TEPCO will do decontamination work thoroughly before they sprinkle contaminated water and try to minimize the impact on the environment."

BY TAKASHI SUGIMOTO, *Asahi Shimbun* Staff Writer, September 24, 2011

Groundwater frustrates Fukushima cleanup

Groundwater flowing into the Fukushima No. 1 nuclear power plant is straining Tokyo Electric Power Co.'s efforts to control water levels and prevent radiation leaks at the stricken facility.

TEPCO says between 200 and 500 tons of groundwater is seeping into buildings and other structures on the site every day.

The company was supposed to have cut highly radioactive standing water at the No. 1, No. 2, No. 3

and No. 4 reactor buildings and the central waste treatment plant from 121,000 tons in late June to about 60,000 tons.

It has fallen far short of that target, with about 98,000 tons of radioactive water still in the buildings.

TEPCO says groundwater seeping through cracks in buildings and other channels accounts for most of the shortfall. One estimate is that, ignoring extra coolant water pumped in by TEPCO, about 35,000 tons of the difference is due to the flow of groundwater.

TEPCO is trying to manage a delicate balancing act between the groundwater levels outside the plant buildings and the amount of water in the buildings' basements. The groundwater flow increases if the groundwater level is significantly higher than the water inside, but allowing the internal water level to rise to that of the groundwater increases the risk of radioactive water flowing out during heavy rains.

TEPCO said it wants to maintain the radioactive water levels about 1 meter below the groundwater levels, and plans to resume pumping groundwater as part of that effort.

The company said Sept. 21 that equipment for purifying highly radioactive water at the plant only operated at 46.0 percent of its designed capacity in the week to Sept. 20, down 37.3 percentage points from the previous week, partly because a component unit was not operating for about two days.

In late June, TEPCO began operating a cyclic water injection and cooling system at the plant. It purifies and then reuses radioactive water to cool the nuclear reactors, reducing the need to pump in coolant from outside.

BY NAOYA KON, *Asahi Shimbun* Staff Writer, September 23, 2011

Polluted Water Levels at Fukushima N-Plant Increase

Tokyo, Sept. 22 (Jiji Press)—Radioactive water that accumulates at various facilities at the crippled Fukushima No. 1 nuclear plant has increased due to heavy rain caused by a typhoon, operator Tokyo Electric Power Co. <9501> said Thursday.

The water level in the basement of the building that houses the No. 1 reactor rose 44 centimeters during the 24 hours to 7 a.m. Thursday (10 p.m. Wednesday GMT), TEPCO officials said.

Water levels also rose by 8-12 centimeters during the period in other facilities where tainted water leaked from damaged reactors accumulates.
Even though the rain has already stopped, rainwater is likely to keep flowing into these facilities for days to come, the officials said.

Typhoon No. 15, called Roke, did not cause any direct damage on the plant's crucial systems to inject water into the reactors and cool water in their spent fuel storage pools. But minor problems occurred.

Jiji Press, September 22, 2011
http://jen.jiji.com/jc/eng?g=eco&k=2011092200586

Groundwater flowing into Fukushima nuclear plant

TOKYO (Kyodo) — Tokyo Electric Power Co. said Tuesday it suspects that 200 to 500 tons a day of groundwater might be flowing through pits and wall cracks into reactor and turbine buildings at the Fukushima Daiichi nuclear plant crippled by the March 11 earthquake and tsunami.

The suspicion is based on the fact that a decline in water levels in these buildings has slowed down.

“The suspected groundwater inflow is now unlikely to cause problems as the plant is capable of treating nearly 1,000 tons of radiation-contaminated water,” said an official at the company known as TEPCO.

But the inflow is expected to affect efforts to contain the Fukushima nuclear crisis. “We should assess the groundwater inflow and readjust an overall plan for treating contaminated water,” said an official of the Nuclear and Industrial Safety Agency at the Ministry of Economy, Trade and Industry.

Kyodo, September 20, 2011
http://mdn.mainichi.jp/mdnnews/national/archive/news/2011/09/20/20110920p2g00m0dm103000c.html

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TEPCO burdened with task of treating contaminated water at damaged nuclear plant

The government is pouring effort into bringing the temperature at Unit 2 of the Fukushima No. 1 Nuclear Power Plant under 100 degrees Celsius to prevent the release of radioactive materials through steam, but workers are also faced with the task of dealing with huge amounts of contaminated water.

The process of bringing the temperature in the reactor core under 100 degrees Celsius is known as a “cold shutdown.” However, this normally applies to a properly functioning reactor, and experts are split over whether it is applicable at the Fukushima No. 1 complex, where meltdowns have occurred.

The government has stated that managing and controlling the release of radioactive materials is a condition for completing Step 2 of the roadmap for bringing the nuclear crisis under control. However, even though the temperatures of the plant’s Unit 1 and 3 reactors have been brought under 100 degrees Celsius, radioactive materials continue to be released.

According to data from the plant’s operator, Tokyo Electric Power Co. (TEPCO), the level of radioactive materials released from the plant between Sept. 1 and 15 reached 200 million becquerels per hour. Meanwhile, dosages of up to 0.4 millisieverts per year were estimated at the boundary of the nuclear power plant — about the same level as that announced by TEPCO in August. TECPO has included the installation of a system to remove radioactive materials from gas in the reactor containment vessels in its schedule for bringing the crisis under control.

In the plant’s circulatory cooling system, which is necessary in order to achieve a cold shutdown, TEPCO in mid-August managed to activate a cesium decontamination system dubbed “Sally,” which

was added to an existing low-performing system to purify decontaminated water. The amount of contaminated water it was able to process increased from 30 cubic meters per hour to 55 cubic meters per hour, and as of Sept. 7, the system was operating at 83 percent of capacity.

However, it has emerged that an estimated 200 to 500 cubic meters of underground water has seeped into the reactor and turbine buildings each day. TEPCO maintains that this will not affect its schedule and its achievement of a cold shutdown, but it remains a fact that this is one major cause for the slow progress in treating contaminated water. To clean up the underground water, TEPCO plans to restore a broken pump as part of Step 2 of its roadmap.

Mainichi Shimbun , September 21, 2011
http://mdn.mainichi.jp/mdnnews/national/news/20110921p2a00m0na013000c.html

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SOIL & RICE

High levels radioactive iodine found in soil northwest of stricken plant

High levels of radioactive iodine-131 were detected in soil samples collected in areas extending northwest of the Fukushima No. 1 nuclear power plant.

The finding emerged from maps released by the science ministry on Sept. 21.

The northwesterly pattern mirrors that of high levels of radioactive cesium-137 concentrations indicated on maps released Aug. 29.

The survey was conducted from June 6 to July 8. Soil was sampled at about 2,200 locations within a radius of 100 kilometers of the Fukushima No. 1 plant, and was analyzed by the Japan Chemical Analysis Center, the University of Tokyo and other institutions.

Iodine-131 has a short half-life of eight days, meaning it decreases to only about one-2,000th of the initial amount in three months. Iodine-131 was detected at about 400 locations.

The highest concentration of 55,000 becquerels per square meter was detected at one location in Tomioka town, within 20 km of the stricken nuclear plant. Locations of high concentrations spread to the northwest, well beyond a 30-km radius.

Relatively high iodine-131 concentrations were also found south of the nuclear plant. The ratios of iodine-131 to cesium-137 in the soil were different in the south than in the northwest. This possibly indicates that the radioactive substances in the northwest and in the south were discharged from the nuclear plant at different times, ministry officials said.

BY HISAE SATO, *Asahi Shimbun* Staff Writer, September 23, 2011

Upper-Limit Radioactive Cesium Found in Fukushima Rice

Fukushima, Sept. 23 (Jiji Press)—The Fukushima prefectural government said Friday 500 becquerels per kilogram of radioactive cesium, Japan's upper legal limit, was detected in preharvest rice in the northeastern prefecture.

Given the provisional monitoring result in Nihonmatsu, the prefecture will focus its postharvest radiation checks on rice in the city to decide whether to give the go ahead for shipment, Fukushima officials said.

This will be the first focused radioactivity tests, which are required by the state government to be conducted if 200 or more becquerels per kilogram of cesium is detected in rice before harvesting.

The Fukushima government initially planned to check postharvest radiation levels at two locations in each of 19 former municipalities in the prefecture. But it will increase the number of investigation spots to two per 15 hectares in the postharvest program.

In Nihonmatsu, radiation measurement will be conducted at a total of 300 locations, including a paddy with the 500-becquerel rice, the officials said.

Jiji Press, September 23, 2011
http://jen.jiji.com/jc/eng?g=eco&k=2011092400011

First shipments of regular season rice from Fukushima growers begin

AIZUBANGE, Fukushima — The first shipments of regular harvest season rice this year from Fukushima Prefecture growers began at an agricultural cooperative here on Sept. 20, with all of the rice getting the highest grade in a quality test.

Because of concerns about possible radioactive cesium contamination from the disaster at the Fukushima No. 1 Nuclear Power Plant, the prefecture began conducting screenings on the rice from Sept. 15.

For the radiation screenings, the prefecture was divided into 370 zones, with local municipalities as a basis. Rice samples are being taken from locations in each zone. If the rice of all locations tested in a municipality show levels beneath the country's temporary safety standard of 500 becquerels per kilogram, farmers there are given permission to send their harvests to market.

As of Sept. 19, screening had been completed for 67 locations. All were at or below 10 becquerels, the smallest amount the screening machine can detect.

"The soil of Fukushima Prefecture is clay-like and cesium easily adheres to it, which may have kept it from being sucked up by rice plants," said an official of the prefecture's agriculture department.

Mainichi Shimbun , September 21, 2011
http://mdn.mainichi.jp/mdnnews/national/news/20110921p2a00m0na021000c.html

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FUKUSHIMA n°2

Density of cesium over Fukushima plant's No. 2 reactor declines sharply

The density of cesium and other radioactive materials in the air over the Fukushima No. 1 nuclear plant's No. 2 reactor has dropped radically, Tokyo Electric Power Co. (TEPCO) said on Sept. 18.

Samples taken Sept. 17 from two openings at the top of the No.2 reactor building showed that the cesium density was one-10,000th to one-100,000th of a becquerel per cubic centimeter, a sharp decline from the end of August.

TEPCO said the density of cesium-134 and cesium-137 was less than one-100th of the permissible level and that of iodine-131 was below the detectable level.

Commenting on the drops in radioactive substance densities, TEPCO said, "The release (of radioactive substances) has been curtailed due to the ongoing cooling of the reactor, but wind outside the building may have influenced (the results)."

Mainichi Shimbun , September 19, 2011
http://mdn.mainichi.jp/mdnnews/national/archive/news/2011/09/19/20110919p2a00m0na003000c.html