

Fukushima Radiation Contamination Worse Than Initial Estimates⁽¹⁾

By Jack Loughran

Scientists using a new method of detecting radioactive particles have warned that there was a significant release during the Fukushima nuclear accident that could pose a risk to humans.

[The study was published in *Environmental Science & Technology*, Feb. 13, 2018.](2)

The method allows scientists to quickly count the number of cesium-rich micro-particles in Fukushima soils and quantify the amount of radioactivity associated with these particles.

The research, which was carried out by scientists from Kyushu University, Japan, and the University of Manchester, contradicts initial [government and industry] findings in the immediate aftermath of the 2011 Fukushima meltdowns.

It was thought that only volatile, gaseous radionuclides, such as cesium and iodine, were released from the damaged reactors. [*] However, it has become apparent that small radioactive particles, termed cesium-rich micro-particles, were also released.

Scientists have shown that these particles ... contain significant amounts of radioactive cesium as well as smaller amounts of other radioisotopes, such as uranium and technetium.

The abundance of these micro-particles in Japanese soils and sediments, and their environmental impact, is poorly understood. But the particles are very small and do not dissolve easily, meaning they could pose long-term health risks to humans if inhaled.

At present scientists don't know how many of the micro-particles are present in Fukushima. The new

method makes use of a technique called autoradiography, which uses an imaging plate placed over contaminated soil samples.... The radioactive decay from the soil is recorded on the plate as an image, which is then read onto a computer.

The scientists say radioactive decay from the cesium-rich micro-particles can be differentiated from other forms of cesium contamination in the soil.

The scientists tested the new method on rice-paddy soil samples retrieved from different locations within the Fukushima prefecture. The samples were taken close to and far away from the damaged nuclear reactors, at four kilometers and 40 kilometers. The new method found cesium-rich micro-particles in all of the samples and showed that the amount of cesium associated with the micro-particles in the soil was much larger than expected.

“There is a need for further detailed investigation on Fukushima fuel debris, inside, and potentially outside the nuclear exclusion zone.”

— Dr. Gareth Law, Center for Radiochemistry Research, School of Chemistry, Univ. of Manchester

Dr. Satoshi Utsunomiya, associate professor at Kyushu University, Japan, and the lead author of the study, said: “When we first started to find cesium-rich micro-particles in Fukushima soil samples, we thought they would turn out to be relatively rare. Now, using this method, we find there are lots of cesium-rich micro-particles in exclusion zone soils and also in the soils collected from outside of the exclusion zone.”

Locals Appalled that Contaminated Soil Could be Used in Road Building, Poisoned Water Could be Dumped



Members of the International Atomic Energy Agency covered up to tour the tank farm holding millions of gallons of radioactive cooling water at the devastated Fukushima-Daiichi reactor complex. They recommend dumping it in the ocean.

Japanese Protest Government Plans to Build Roads Using Cesium-Contaminated Soil, and to Dump Cooling Water Into the Pacific

Skeptical Japanese survivors of the Fukushima-Daiichi disaster are protesting state and federal plans to disperse and abandon large amounts of radioactive waste that was generated by the triple reactor meltdowns.

Rachel O'Donoghue wrote in the *London Daily Star* April 29: “The country's Environment Ministry wants to use the radiation-tainted material to rebuild a number of roads in the region that was devastated by a tsunami



A storage site for poisoned soil in the town of Tomioka, near the destroyed Fukushima reactors on Feb. 23, 2015. There are an estimated 29 million cubic yards of such soil. *Reuters/Toru Hanai*

in 2011. But the proposal has sparked fury among residents over fears they could be poisoned by the soil.” An April 26 briefing about the plan “saw angry scenes erupt, with locals in the city of Nihonmatsu yelling about how the roads will be ‘contaminated.’ Authorities have been desperately trying to convince people that it will be safe, saying the soil will be buried under clean earth that will ‘block’ any harmful radiation.” Of course locals reply that the same was said about the reactors themselves. Roughly 28.7 million cubic yards of contaminated soil have been collected in 1-ton bags stacked in vast outdoor areas after being scraped from school yards, play grounds, hospital grounds and other public areas. Likewise, angry protests by fishermen have stalled government plans to dump millions of gallons of contaminated water now in storage into the Pacific Ocean. Seafood workers and others say more radioactive waste in the water will ruin the fishery.

US plaintiffs Involved in Disaster Relief Seek \$1 Billion in Damages for Radiation Sicknesses

About 200 US citizens have re-filed a lawsuit against Tokyo Electric Power Co. which owns the Fukushima wreckage and an unnamed US firm seeking at least \$1 billion for medical expenses related to radiation exposure suffered during the triple meltdowns. The suit was filed March 14 with federal courts in the Southern District of California and the District of Columbia by US participants in the relief effort made in the wake of the disaster. Hundreds of sailors on the aircraft carrier *USS Ronald Reagan* and others were heavily contaminated when clouds of radioactive fallout inundated the ship during relief efforts. Many of the plaintiffs are suing for a second time after a similar suit was dismissed by the Californian federal court in January.

New Public TV Documentary Meltdown: Cooling Water Crisis

A shocking new 49-minute documentary from Japan's public television broadcaster NHK titled “MELTDOWN: Cooling Water Crisis,” reveals new information on how corporate policy undermined efforts to keep the three destroyed Fukushima-Daiichi reactors stable one week after the triple reactor meltdown disaster began. **See the film here: nuclearhotseat.com/2018/06/06/tepco-nuclear-error-fukushima-terror-nancy-foust-on-newly-discovered-2011-fukushima-radiation-releases/**

“We hope that our method will allow scientists to quickly measure the abundance of cesium-rich micro-particles at other locations and estimate the amount of cesium radioactivity associated with the particles....” Utsunomiya said.

In March 2018, a Greenpeace survey found that even seven years after the catastrophic disaster, the people, towns and villages in the surrounding area are still being exposed to excessive levels of radiation.

Dr. Gareth Law, an analytical radiochemistry lecturer at the Univ. of Manchester in England and one of the paper's authors, said in a news release, “Our research strongly suggests there is a need for further detailed investigation on Fukushima fuel debris, inside, and potentially outside the nuclear exclusion zone.”(3)

—Loughran wrote this article for *Engineering & Technology*, May 25, 2018

[*] Early Analysis Found Hot Particles at Far Distances

Contrary to reports that only gaseous radionuclides such as cesium and iodine were released by the Fukushima disaster, scientists reported early on that “hot particles” were released and carried long distances by winds.

According to a Sept. 19, 2012 report from Bellona Foundation(4) “radionuclides from the Fukushima-Daiichi nuclear power plant's triple meltdown last year radioactively contaminated the entire northern hemisphere within days and the US west coast bore a significant brunt of so called hot particles, an independent scientific paper released yesterday claims.”

Even earlier, field sampling of vehicle air filters done in April 2011 by Marco Kaltofen, of the Department of Civil & Environmental Engineering at Worcester Polytechnic Institute in Massachusetts, discovered breathable hot particles contaminated with cesium-137 in Seattle, Washington.(5)

Arnie Gundersen, a former reactor engineer now with Fairewinds Associates, reported June 12, 2011 that “Air filters in Seattle indicate that people there were absorbing five hot particles every day for the month of April [2011]. That means that that hot particle gets absorbed in your lung, or winds up in your intestines, or it winds up in your muscle, or it winds up in your bone. [There, they] constantly bombard a very narrow piece of tissue.”

On July 18, 2011, Dr. Chris Busby, scientific secretary of the Low-Level Radiation Campaign in England and co-author of *Fukushima and Health: What to Expect*, said in an interview, “When we put the elements from the air filter next to x-ray film and we develop the film we see different light sources and flashes of light. These are called ‘hot particles.’ They are very small. You cannot see them—they are almost like a gas. If they are in the car filters, because cars ‘breathe’ air—then they are inside of people, inside the lungs, inside the nose, inside the guts... and they will be causing significant harm.”

Science of the Total Environment reported on December 31, 2017 that detectable levels of hot particles of cesium-134 and C-137 were collected across Northern Japan and analyzed over a 5-year period, from 2011 to 2016. The hot particles were found in dusts and soils in 80 percent of the samples. Authors Marco Kaltofena and Arnie Gundersen said, “Some of the hot particles detected in this study could cause significant radiation exposures to individuals if inhaled. Exposure models ignoring these isolated hot particles would potentially understate human radiation dose.”(6) — *John LaForge*

Notes

(1) <https://eandt.theiet.org/content/articles/2018/05/fukushima-radiation-contamination-worse-than-initially-thought/>; (2) “Uranium Dioxides and Debris Fragments Released to the Environment with Cesium-Rich Microparticles from the Fukushima Daiichi Nuclear Power Plant”; (3) Univ. of Manchester, Feb. 28, 2018 (4) “Impact to US West Coast from Fukushima disaster likely larger than anticipated, several reports indicate,” Bellona, Sept. 19, 2012; (5) “Radiation Exposure to the Population in Japan after the Earthquake,” Marco Kaltofen, MS, PE, Dept. of Civil & Environmental Engineering, Worcester Polytechnic Inst., October 31, 2011 (6) Kaltofen & Gundersen, “Radioactively-hot particles detected in dusts and soils from Northern Japan,” <sciencedirect.com/science/article/pii/>