

# Fukushima: Crisis Without End

## November 2016 Earthquake Was Continuation of 2011 Catastrophe

By John LaForge

A powerful offshore earthquake at 6 a.m. Tuesday, Nov. 22 shook Fukushima-Daiichi in northeast Japan, site of the March 2011 “catastrophe cubed”—the combined 8.9 mega-quake, deadly tsunami, and three reactor meltdowns which resulted in 19,000 fatalities—sending shudders of fear across the prefecture, and bringing new meaning to the word “aftershock.” As sirens screamed, the national public television service NHK ran a continuous banner in the tsunami zone all morning demanding: “Flee Immediately.”

The magnitude 7.4 quake generated a three-foot tsunami near the three destroyed Fukushima reactors and the site’s sprawling collection of over 1,307 large makeshift tanks of radioactive water. A least 3,000 people in Fukushima Prefecture ran to evacuation centers, and schools were closed, but only 17 people were reported injured across Fukushima, Chiba, Tokyo and Miyagi Prefectures.

Terrible memories of the 2011 disaster—the strongest quake ever recorded in Japan—were brought to mind as



Members of the press wearing suits and masks near tanks of highly-contaminated water after receiving a briefing from Tokyo Electric Power Co. employees during a tour of the earthquake-&-tsunami-crippled Fukushima Daiichi nuclear reactor site on February 10, 2016. (Photo: Toru Hanai/AFP/Getty Images)

the cooling water system for one pool of highly radioactive and hot waste fuel rods was knocked out of commission, risking overheating of the uranium waste. Waste reactor fuel stays thermally and radioactively hot for eons and can cause enormous radiation releases if cooling water circulation is lost leading to the fuel catching fire. Cooling water was later restored.

The *Washington Post* put it this way: “At first, it was 2011 all over again. ‘It really came back. And it was so awful. The sways to the side were huge,’ Kazuhiro Onuki said after northeastern Japan was jolted Tuesday by a magnitude-7.4 earthquake, the strongest since a devastating quake and tsunami five years ago.”

Critics of Japan’s governmental push to restart the country’s closed-down fleet of over 42 reactors urged legislators to heed the quake’s warning. Centered 30 miles off the coast of Fukushima, and about 6 miles under the surface, the quake was felt in Tokyo, 150 miles away.

Even five years after the 2011 catastrophe, the Nov. 22 quake was identified as an aftershock stemming from the massive tectonic plate “snap” that caused the Fukushima quake, tsunamis and meltdowns. The devastating tsunami killed at least 16,000 people outright, and 2,500 others were reported missing and never found. Decontamination work, soil collection and incineration, water management, repair of leaking storage tanks, and the robotic search for the melted uranium fuel under the three melted reactors is expected to continue for over 40 years and cost over \$350 billion.

Aftershocks have repeatedly rocked Fukushima’s radioactive exclusion zone, the site’s large waste fuel cooling pools, the 1,300-plus giant tanks of contaminated water, and the reactor complex’s 7,000 clean-up workers.

In 2013, *National Geographic* reported that, “The company [Tokyo Elec. Power Co. or Tepco] continues to add to a massive tank farm on the site, with capacity to store about 400,000 tons (95 million gallons/360 million liters) of contaminated water, and is planning to add an additional 300,000 tons of capacity [by 2016]. [And] Tepco must deal with an ever-increasing amount of contaminated water—nearly 150,000 tons (35.9 million gallons) a year...”

Kiyoshi Kurokawa, an adjunct professor at the National Graduate Institute for Policy Studies, told the *New York Times* that clean-up attempts don’t address the real dangers of an earthquake-prone country relying on nuclear power. Kurokawa said Japan’s government and utilities should invest in solar or wind technology. “I think we expect more of such readjusting plate movements ... and earthquakes have been rampant over the last five years, so why are we continuing to restart nuclear plants?” (Only two have been restarted, and one of them was soon shutdown.)

In April this year, two large earthquakes and a series of aftershocks on the Japanese island of Kyushu killed at least 41 people. While tremors shake Japan every day, since 2011, serious earthquakes have occurred across Japan April 7 and 11, 2011, July 10, 2011, Jan. 11, 2012, Dec. 12, 2012, May 30, 2015, and April 14 and 16, 2016.

## Housing Aid for Some Evacuees to End in Winter; Government Pushes Return

Since the March 2011 disaster began, Federal and provincial governments, and reactor owner Tepco have provided some housing assistance for tens of thousands of Fukushima evacuees. But last June, with 89,000 people still living away from their abandoned homes, Fukushima’s Prefectural government announced that its support would end in March 2017 for families that fled contaminated areas outside the officially designated evacuation zones—the so-called “voluntary evacuees.”

The federal government had been paying for evacuees’ housing assistance regardless of whether people fled on their own or were ordered to leave. In addition, Tepco, which helped cause the disaster (by placing backup emergency generators in basements instead of outside the tsunami zone), has been providing monthly damages of about \$879 for “mental suffering”—but only to people who were ordered to leave evacuation zones.

According to the *Times*, 89,000 Fukushima evacuees still live away from their homes — 48,000 inside Fukushima prefecture and 41,000 elsewhere in Japan — after they fled from the radiation exposures emanating from fallout from the three reactor meltdowns.

Many fled their homes well outside the designated evacuation areas suspecting that radiation exposure, particularly for their children, was more dangerous than officials were indicating. The government was well known to have increased its allowable limit of radiation exposure for the public after large airborne releases started spewing from the meltdowns.

As the *Japan Times* noted in a Dec. 3 editorial, the government in Tokyo claims it is safe for evacuees to return to contaminated areas if a person’s yearly radiation dose is 20 millisieverts (mSv) or less. However, this dose of radiation “is much higher than the legal limit of 1 mSv allowed for people in ordinary circumstances,” the *Times* reported. By way of comparison, the paper noted that in Ukraine, site of the 1986 Chernobyl catastrophe, mandatory evacuation is imposed if one’s annual radiation dose is 5 mSv or more and have “the right to evacuate” if the rate is between 1 mSv and 5 mSv.

The cut-off of housing aid is aimed at forcing evacuees to return to the fallout zones. According to the prefectural governor Masao Uchibori and Tokyo authorities, clean up of radiation-contaminated soil has improved living conditions.

The announcement caused a public outcry among evacuees and their supporters. One group helped circulate a petition, delivered to the federal government in December 2015, with over 200,000 signatures urging it to reverse the prefecture’s plans. The cut-off would halt assistance to some 12,436 households. — *Japan Times*, Dec. 3, 2016

## Car Wash Tanks Called Radiation Threat

New radioactive twists seem endless in the aftermath of the triple meltdown’s airborne radiation releases. In Fukushima Prefecture, where cesium-137 and other “hot particles” were dispersed by explosions, fires, and fuel meltdowns, automobile owners drove their vehicles through car washes to clear off dangerous radiation.

Now, five years since radioactive fallout wafted across Japan’s largest island of Honshu, sludge in septic tanks at car washes is being found to be highly radioactive. Several thousand tons of accumulated sludge at some of the prefecture’s 1,700 auto repair operations is giving off 57,400 Becquerels of radiation per-kilogram (a Becquerel is one atomic disintegration per-second), according to information obtained by the Kyodo News service. A government-set maximum of 8,000 Becquerels-per-kilogram (Bq/Kg) is used to separate “ordinary” trash that can be disposed of in regular unregulated landfills, from more severely contaminated debris that must be treated as radioactive waste. At 57,400 Bq/Kg the car wash sludge is seven times more radioactive than the limit for ordinary waste.

Kyodo reported, “To prevent the septic tanks from overflowing, some of the maintenance facilities are manually

scooping up the mud which has prompted industry groups to warn authorities about the health hazards workers face, the [auto industry] officials said.” The Japan Automobile Dealers Association, Japan Automobile Service Promotion Association and Japan Light Motor Vehicle and Motorcycle Association have complained that the Environment Ministry and Tepco have ignored their concern over what to do with the radioactive wastes.

Kunikazu Noguchi, associate professor of radiation protection studies at Nihon University in Tokyo, told Kyodo “The fact that the government failed to act on this problem for 5½ years shows its negligence. To remove sludge that contains nearly 60,000 becquerels of radioactive material per-kilogram, you need to do so with extra caution, in line with guidelines set by the Environment Ministry.”

—Kyodo, *Japan Times*, Nov. 6, 2016

## Cesium Hits US Coast, Canadian Salmon

Radioactive cesium and other dangerous elements pouring from Fukushima have spread throughout the Pacific Ocean and accumulated at sufficient concentrations to have reached the Oregon coast. The *Oregon Statesman Journal* reported December 8 that researchers from the Woods Hole Oceanographic Institution had found cesium-134, the so-called fingerprint of Fukushima, in seawater samples taken from Tillamook Bay and Gold Beach in Oregon.

The same article reported that cesium-134 had been detected in Canadian salmon. The salmon study was led by Jay Cullen, a University of Victoria chemical oceanographer who heads a study group called the Fukushima In-FORM project.

Strangely, the *Statesman Journal* reported that “For the first time, sea borne radiation from Japan’s Fukushima nuclear disaster has been detected on the West Coast of the United States.” (emphasis added) This was an odd way of highlighting the pollution since it was hardly the first time:

- On April 10, 2012, ABC News reported that kelp along the California coast was found to be contaminated with radioactive material from Fukushima. Researchers at California State University, Long Beach found that the kelp contained radioactive iodine, cesium, xenon and other particles at levels much higher than the amounts measured before the disaster.

- In 2012 and again in 2013, researchers reported that the levels of cesium-137 and cesium-134 measured in Bluefin tuna captured off the California coast near San Diego in August 2011, five months after the disaster began, were 10 times higher than what had been found in previous years. Bluefin tuna picked up the cesium by feeding on contaminated prey such as krill and squid, according to scientists Nicholas Fisher, Zofia Baumann and Daniel Madigan of Stony Brook University in New York who conducted the study. —*Los Angeles Times*, May 8; & Stanford Report, May 30, 2012, & March 4, 2013

- On Oct. 27, 2013 the *Seattle Times* reported that albacore tuna, one of the West Coast’s most popular fish, caught off the coasts of Washington and Oregon were contaminated with cesium-134 that could only have come from the Fukushima releases.

- On April 30, 2014 researchers found that 26 albacore tuna caught off the Oregon coast between 2008 and 2012 contained three times as much cesium as was found in fish before the disaster. Devlan Neville, a graduate research assistant in the Department of Nuclear Engineering and Radiation Health Physics at Oregon State University and lead author of a study, told the *Statesman Journal* that finding any amount of radiation is significant. “You can’t say there is absolutely zero risk because any radiation is assumed to carry at least some small risk.” The research also found that cesium concentrations were higher in 4-year-old fish than 3-year-old fish, confirming that some of the cesium poisoning accumulates rather than being excreted. No Oregon agency does any radiation testing on seafood, whether caught locally or imported. —*Oregon Statesman Journal*, April 28; & Reuters, April 29, 2014

- A May 19, 2014 report by the California Coastal Commission said, “The leading edge of the plume appears to have reached North America off of Vancouver Island, and could possibly reach California within the next year.”

Prof. Ken Buesseler of the Woods Hole Oceanographic Institution says the seafloor is a major reservoir for Fukushima’s cesium. Buesseler told *Science* in October 2012: “It looks to me like the bottom fish, the fish that are eating, you know, crabs and shellfish..., they seem to be increasing their accumulation of the cesium isotopes because of their habitat on the seafloor.” Beyond the well-known contamination of Bluefin and albacore tuna, the BBC reported on Oct. 25, 2012 that flounder, conger, Pollock, rockfish, skate and the popular US imports cod, sole and halibut—all bottom feeders—“consistently showed the highest cesium counts.”