Fukushima: Radiation Hazards in All Directions

Tanks hold over 1.2 million metric tons of radioactive waste water left from cooling melted fuel under the three destroyed reactors at Fukushima, Japan. The amount of contaminated waste water increases by about 150 tonnes a day because the hot melted wreckage requires cooling water to be continuously poured over it.

Japan Waffles Over Plan to Dump Radioactive Water Tainted with Tritium, Strontium, Cesium, etc.

News was leaked in early October that Japan had decided to release over one million metric tons of Fukushima's radioactive waste water into the Pacific.

But on October 23, the Minister of Economy, Trade, and Industry Hiroshi Kajiyama told a press conference "the government has no plan to make a decision on what to do with over [one million metric tons] of treated water," and *Kyodo News* reported that the government had "put off a decision."

Flipping again on October 28, the AP reported that "Japanese Prime Minister Yoshihide Suga says his government is working on the final details of a plan to release" the tainted cooling water, a process that would reportedly involve dilution and gradual dumping over many years' time.

Critics of the dumping proposal called the plan a bailout of Tokyo Electric Power Co. (Tepco), which owns the wreckage. Local and national representatives of the fishing community traveled to Tokyo in October to protest to federal ministers. Nongovernmental experts have recommended costlier alternatives to ocean dumping including evaporation, long-term storage, mixing with concrete for burial, or buying additional tank farm acreage.

Although the stored water has been through Tepco's novel filter system known as ALPS, the process has largely failed. About 70 percent of the stored waste water contains deadly isotopes that Tepco earlier claimed would be removed.

Dr. Gordon Edwards, president of the Canadian Coalition for Nuclear Responsibility, reported about the waste water Oct. 26: "Radioactive varieties of iodine, ruthenium, rhodium, antimony, tellurium, cobalt, and strontium have been reduced by ALPS but not eliminated. In 2017, more than half of the samples studied showed levels of radioactive contamination for these materials that are above legal limits. In the case of strontium-90, a bone-seeking radioisotope, some 65,000 tonnes of water had levels 100 times above the legal limit even after being treated by ALPS."

Tepco, trying to quell the uproar over the ALPS failure, announced that it can re-filter the waste before piping it into the Pacific. The fishing industry and neighboring countries including South Korea oppose any ocean release of tritium and other radioactive contaminants which would eventually contaminate seafood as the materials move up the food chain. An Oct. 9 editorial in the *Korea Times* that condemned the dumping threat warned of an "environmental disaster" that could "destroy the marine ecosystem."

Independent scientists argue that long-term food and environmental impacts from radioactive seawater are unknown and could pose higher risks than Japan's environmental, agricultural, and industrial ministries have claimed. Ken Buesseler, a marine biologist at the Woods Hole Oceanographic Institution, wrote recently that not only tritium but other isotopes that affect marine life should be carefully examined. ***—JL***

Radiation Again Reported at Japan's Summer Olympic Sites & in Tokyo

A new study has found consequential radioactive contamination at scores of sites in areas set for next summer's Olympic and Paralympic games in Fukushima Prefecture and Tokyo. The study follows on and corroborates a March report by Greenpeace—"Radioactivity on the Move 2020"—that found "the widespread presence of radioactive hotspots in Fukushima City and the (Olympic) J-Village" where "radioactive contamination is not under control."

The new peer-reviewed article, in the journal *Environmental Engineering Science*, explains the authors' study of radioactive dusts and dirt at Japanese Olympic sites and throughout Northern Japan. The report details findings that detected modest radioactive contamination at Olympic venues, and significant contamination at Japan's National Training Center.

To assess radioactive contamination caused by Fukushima's triple reactor meltdowns, a total of 146 independent samples were collected from sites in Fukushima Prefecture, Tokyo, and the heavily traveled corridors between these locations.

The study "Radioactive Isotopes Measured at Olympic and Paralympic Venues in Fukushima Prefecture and Tokyo, Japan" reached four major conclusions outlined by the authors:

1) Different types of alpha and beta radioactive micro-particles were released at other times and landed in various locations throughout Japan. "The exclusive use of cesium-137 beta activity levels as a proxy for total internal and external exposure, therefore, introduces dose assessment errors."

2) "Rooftops previously decontaminated in Minamisoma are re-contaminated by airborne atmospheric dust containing radionuclides … from the Fukushima meltdowns. The data show a need for continuing reassessment and potentially, additional remedial work on many sites in Fukushima Prefecture."

3) The Tokyo Olympic venues had radioactivities similar to sample sites in the US. In contrast, Olympic sites in Northern Japan near Fukushima contained an average of about twice as much radioactivity as Tokyo, with plutonium identified at the J-Village National Training Center.

4) Non-Olympic sites throughout Japan averaged 7.0 times greater beta activity than the Tokyo Olympic venues. These data show that clean-up efforts emphasized the Olympic venues over cleaning other contaminated parts of Japan.

The Japanese government's aggressive portrayal of the North and its Olympic sites as decontaminated and safe disregard the health and safety of the athletes, spectators, officials, and journalists who are expected to participate in the games, and of course of the year-round residents. ***—JL***

—Data and links to the peer-reviewed article are available from Fairewinds Energy Education.

Health Risks of Tritium: The Case for Stronger Standards

Editor's note: Japanese government ministers, nuclear industry lobbyists, and some academics claim that releasing huge volumes of radioactive tritium into the Pacific is so commonplace that the danger it poses to health is negligible. What follows are excerpts from a detailed article about tritium risks by Arjun Makhijani, Brice Smith, and Michael C. Thornel of the Institute for Energy and Environmental Research, in the group's magazine Science for Democratic Action*, February 2007. The excerpts are introduced by a note from Arjun sent Nov. 25, 2020:*

These excerpts regarding tritium refer to tritium-contaminated freshwater. The risks of contaminating seawater with tritium relate to the ways tritiated water will become part of oceanic ecosystems. It will be incorporated, literally, by everything from algae to fish. Pregnant women consuming tritium-contaminated seafood could be vulnerable to impacts like those described in the article excerpted below. A thorough investigation of such impacts, with public comment, is essential before any decision to discharge tritium-contaminated water accumulated at Fukushima to the ocean is made.

—Arjun Makhijani

With a relatively short half-life of 12.3 years, tritium is highly radioactive. For example, one gram (approximately the weight of a quarter of a teaspoon of salt) of tritium in tritiated water will contaminate almost 500 billion gallons of water up to the current drinking water limit of 20,000 picocuries per liter set by the US Environmental Protection Agency. One ounce of tritiated water would contaminate the entire annual flow of the Savannah River above the present drinking water limit.

… [T]ritiated water and organically bound tritium can cross the placental barrier. This tritium can then be incorporated into an embryo/fetus and irradiate rapidly dividing cells, thereby raising the risk of birth defects, early miscarriages, and other problems.

… A related concern is the fact that low-energy beta particles, like those emitted by tritium, are often much more effective at causing harm than currently assumed by regulations.

... As noted, the low energy of the tritium beta particle can result in the deposition of all the energy in a short distance, which could be particularly damaging if the tritium is in the DNA.

… Considering that ova are formed once per lifetime, the effects of radiation on the reproductive system of female fetuses, and the possible effect on the children of females irradiated in the womb, could be significant.

… The increased risks to pregnant women and the embryo/fetus include early miscarriages, malformations, and genetic defects. Risks can also be multi-generational given that a woman's ova are produced while she is in her mother's womb.

… We have concluded that 400 picocuries per liter for surface water should be considered as an interim target limit for off-site surface water at all nuclear power plants and US Department of Energy nuclear sites while a better understanding of the impacts of tritium is developed. This level is 50 times lower than the EPA's current drinking water limit and corresponds to a lifetime risk of a fatal cancer of about one in a million.

… The case for tightening the tritium limits as a preventive measure is even more persuasive when one considers the higher RBE [relative biological effectiveness] of tritium, its possible non-cancer health effects, its possible synergisms with chemical toxins, and its potential effects arising from exposure in utero at certain crucial times during pregnancy….

—See the full article at: https://ieer.org/wp/wp-content/uploads/2012/01/SDA-14-4.pdf