

Release of tritium-contaminated water into the ocean.

What is the problem?

~Inflicting real harm, not reputational damage~

Twelve years after the accident, decommissioning work at the Fukushima nuclear power plant has not progressed at all. He continues to accumulate 120 tons of contaminated water every day due to groundwater, rain inflow, and core cooling. The amount of contaminated water is 1.3 million tons. The government and TEPCO will run out of space for storage tanks, and plan to release it into the ocean after the end of the rainy season. This is an outrageous act of unilaterally trampling on the promise that TEPCO made with the prefectural fisheries federation in 2015 that it would not release the water into the sea without the understanding of those concerned. For those involved in the fishing industry, the “discharge of contaminated water into the ocean” is nothing but a recurrence of the accident. Also, ocean discharges, once initiated, continue for more than 30 years.

What is wrong with contaminated water?

Vast amounts of contaminated water naturally contain radioactivity. So far, it has been treated with the multi-nuclide removal system (ALPS). However, 70% of them still contain cesium, strontium, etc., and need to be reprocessed. The problem is "tritiated water" that cannot be treated with ALPS. Tritium (T), a relative of hydrogen (H), is radioactive, emitting beta rays, and water containing tritium cannot be removed by ALPS. Tritium is also contained in normal nuclear power plant wastewater. However, since it cannot be processed, it is released as it is. Experts of the closed society in nuclear energy who are ignorant of biology, claim that beta rays have little energy and little effect.

Living organisms cannot distinguish between normal water (H₂O) and tritiated water (T₂O). When it enters the body of living organisms, it causes various biochemical reactions. For example, in the hydrolysis reaction of starch or protein, hydrogen in water is incorporated into products such as glucose and amino acids. Tritiated water produces tritium-contaminated amino acids and glucose. Using this as a raw material, organisms synthesize proteins and nucleic acids such as DNA and RNA in their own bodies. This is called Organically Bound Tritium contamination (OBT contamination). Unlike hydrogen, tritium decays and becomes a stable element called helium (He). Since He cannot bond with other elements, when tritium bound to DNA changes to He, DNA breaks down . In other words, it is the collapse of genes.

In addition, fish that eat contaminated plankton and small fish will have higher levels of tritium through bioaccumulation through the food chain.

These facts have been studied since the atmospheric nuclear tests in the 1950s and are “common knowledge” in radiation biology. However, TEPCO has never measured organic tritium contamination in contaminated water. The government and TEPCO allege that the tritium-contaminated water will lead to harmful rumors. However, actual harm will occur, not rumors.

Tritiated water (T2O) and normal water (H2O) can be separated

Tritiated water (T2O) and normal water (H2O) cannot be separated chemically. However, they can be separated by using the difference in physical properties. H2O has a mass of 18, but T2O has a mass of 22, which means the weight is 1.2 times different. Of course, the size is also different. The boiling point of H2O is 100°C and that of T2O is 101.5. The freezing point is 0°C for H2O and 4.5°C for T2O. That is, T2O freezes at 4.5°C. Various separation methods using such physical differences have been developed. These are proposed by researchers and companies, but TEPCO and the government are ignoring them.

Methods have been proposed that can treat 500 to 1,000 tons of contaminated water from TEPCO per day. If T2O can be separated from 1.3 million tons of contaminated water to a purity of 100%, it will be only 8.8g. If such processing technology had been put into practical use 10 years ago, there is a possibility that it could be processed by now. The problem is processing costs. This is because it is cheaper to release or discharge into the ocean. Think about it. Uranium-235, which has a mass difference of only 1.2%, is separated and refined from natural uranium-238, enriched to 5% and used as fuel for nuclear power plants, and enriched to 100% and used as raw material for atomic bombs. If it becomes possible to treat tritiated water, they may be afraid that they will also have to treat the cooling water from nuclear power plants and the wastewater from reprocessing plants that are currently being discharged.

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