Mr. Rafael Mariano Grossi, Director General of the IAEA (left), with Prime Minister Kishida Fumio (right), on July 4, 2023.
Photo: Courtesy of Cabinet Public Affairs Office

Discharge into the Sea of ALPS Treated Water from Fukushima Daiichi Nuclear Power Station

ALPS treated water[1] refers to water from inside the buildings of the Tokyo Electric Power Company's (TEPCO) Fukushima Daiichi Nuclear Power Station (NPS) that has been purified and treated using the ALPS purification system to remove radioactive materials. On August 24, 2023, TEPCO began discharging ALPS treated water into the sea. This article covers the discharge of ALPS treated water into the sea, focusing on the safety of this discharge.

Safety of discharge into the sea of ALPS treated water

ALPS is the acronym for Advanced Liquid Processing System, which purifies and treats water, removing various radioactive substances. ALPS treated water is water that has been purified and treated until it satisfies safety standards for all radioactive materials other than tritium.[2] To address tritium too, the water is significantly diluted with seawater before discharge so that it fully satisfies safety standards. The tritium concentration after dilution is less than 1/40 of the safety standard (or 1/7 of the WHO standards for drinking water). Because the water satisfies safety standards before it is discharged and the total amount of radioactivity discharged is also limited to a maximum of 22 trillion Bq (becquerels) per year, there is no concern about effects on human health or the environment.

ALPS is stable and performs well, and it also comprises multiple devices that can be replaced in the event of inspections or breakdowns.

In addition to analysis by TEPCO itself, the Japan Atomic Energy Agency (JAEA) and the International Atomic Energy Agency (IAEA)[3] also implement independent third-party analyses of the concentration of radioactive materials in the ALPS treated water, to ensure the thorough objectivity of the data.

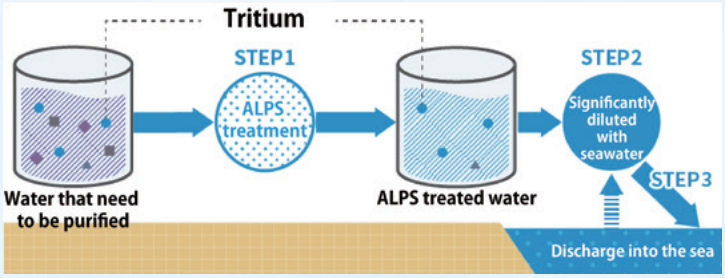
IAEA has confirmed the safety of discharge into the sea of ALPS treated water

The IAEA is an authoritative UN-related organization with expertise in the field of nuclear energy (possessing the authority to formulate and apply nuclear safety standards). It is the IAEA that conducted an expert, objective review of the ALPS treated water discharge into the sea. The results of the review were announced on July 4, 2023 in a comprehensive report that concluded that the discharge into the sea of ALPS treated water is "consistent with relevant international safety standards," and that the discharge "will have a negligible radiological impact to people and the environment."

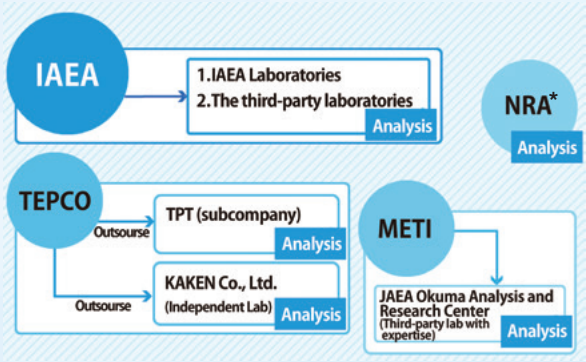
The IAEA is committed to confirming the safety of the discharge into the sea of ALPS treated water not only

IAEA experts visit Fukushima Daiichi Nuclear Power Station to conduct a comprehensive review
Photo: Tokyo Electric Power Company Holdings, Incorporated

Comprehensive Report published by the IAEA on July 4, 2023.



ALPS treatment process



Analytical body for ALPS treated water
*Nuclear Regulation Authority, Japanese Government

before discharge at the review stage, but also during and after the treated water discharges occur. An IAEA site office has been established at TEPCO Fukushima Daiichi NPS, which will continue with onsite activities, providing real-time data on the discharge to the international community, as well as continuing with additional reviews and monitoring to provide transparency and reassurance to the international community. Rafael Grossi, Director General of the International Atomic Energy Agency, has also stated that the IAEA will remain involved in the process until the last drop of water has been discharged.

Following the release of the IAEA's Comprehensive Report, many countries and regions expressed support for Japan's efforts regarding the discharge into the sea of ALPS treated water and the results of the IAEA report, noting that these are based on scientific evidence.

Monitoring of ALPS treated water

ALPS treated water is discharged under strict controls, including measuring the concentration of radioactive materials contained in the water before discharge and confirming that the concentration fulfils the regulatory standard. Accordingly, there are no food safety-related issues for fish and other organisms living in the vicinity. In addition, other organizations concerned, including TEPCO, the Ministry of the Environment, and the Fisheries Agency are implementing marine monitoring relating to ALPS treated water. The results of analysis conducted after the start of the discharge of ALPS treated water have confirmed that no anomalies have been found in tritium concentrations, and that there is no impact on people or the environment. Details about the results of monitoring are updated regularly on the "ALPS Treated Water Marine Monitoring Information" website (https://shorisui-monitoring.env.go.jp/en/).

1. See "Ensuring the Safety of Discharging ALPS Treated Water into the Sea," in *HIGHLIGHTING Japan*, October 2022 edition. https://www.gov-online.go.jp/eng/publicity/book/hlj/html/202210/202210_09_en.html
2. Tritium (H-3) is a relative of hydrogen and is present in tap water, rainwater and also in our bodies. The radioactive energy emitted by tritium is extremely weak and can be blocked by a single sheet of paper.
3. An international organization established in 1957 as an autonomous body under the auspices of the United Nations (UN) to promote international cooperation relating to nuclear energy.

Note: This article was written with the consent of the Ministry of Economy, Trade and Industry (METI) and on the basis of publicly available data from the Ministry.