



Ministry of Economy, Trade and Industry

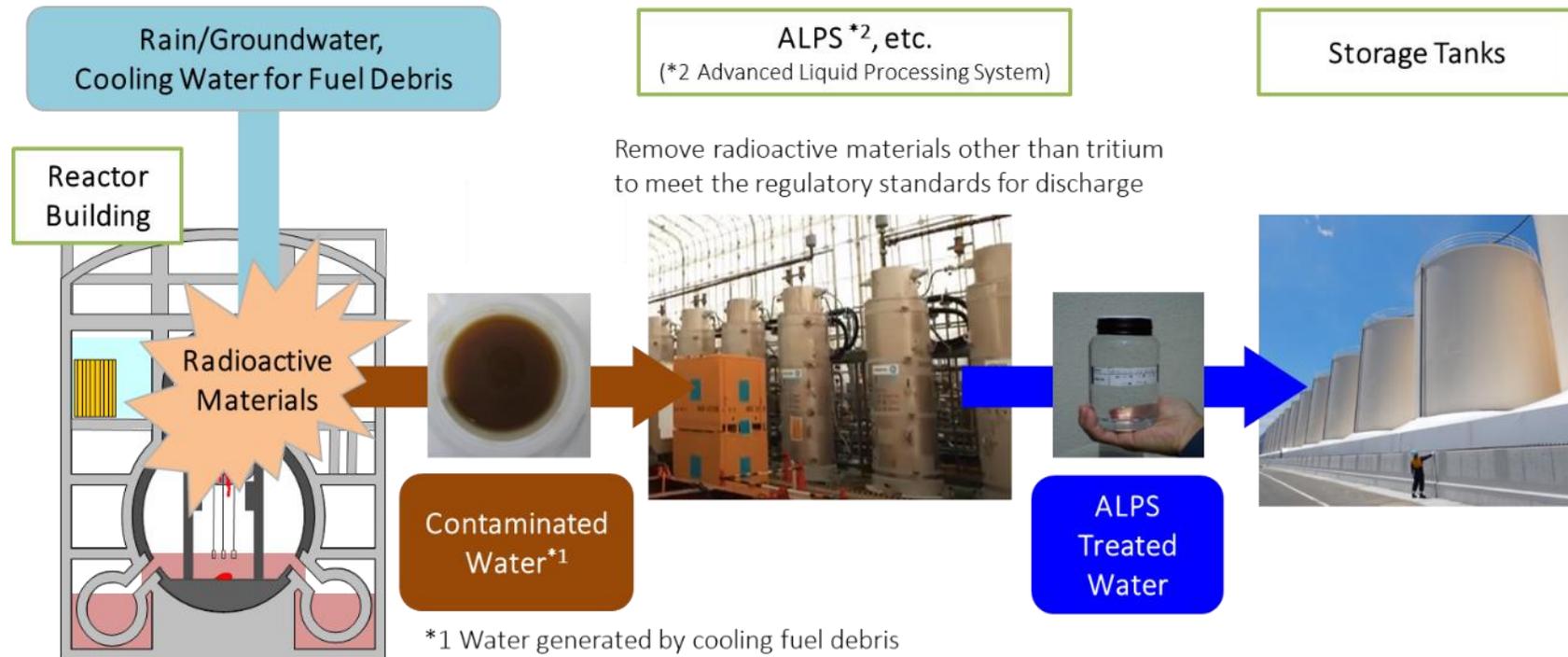
July 2023

Discharge of ALPS Treated Water



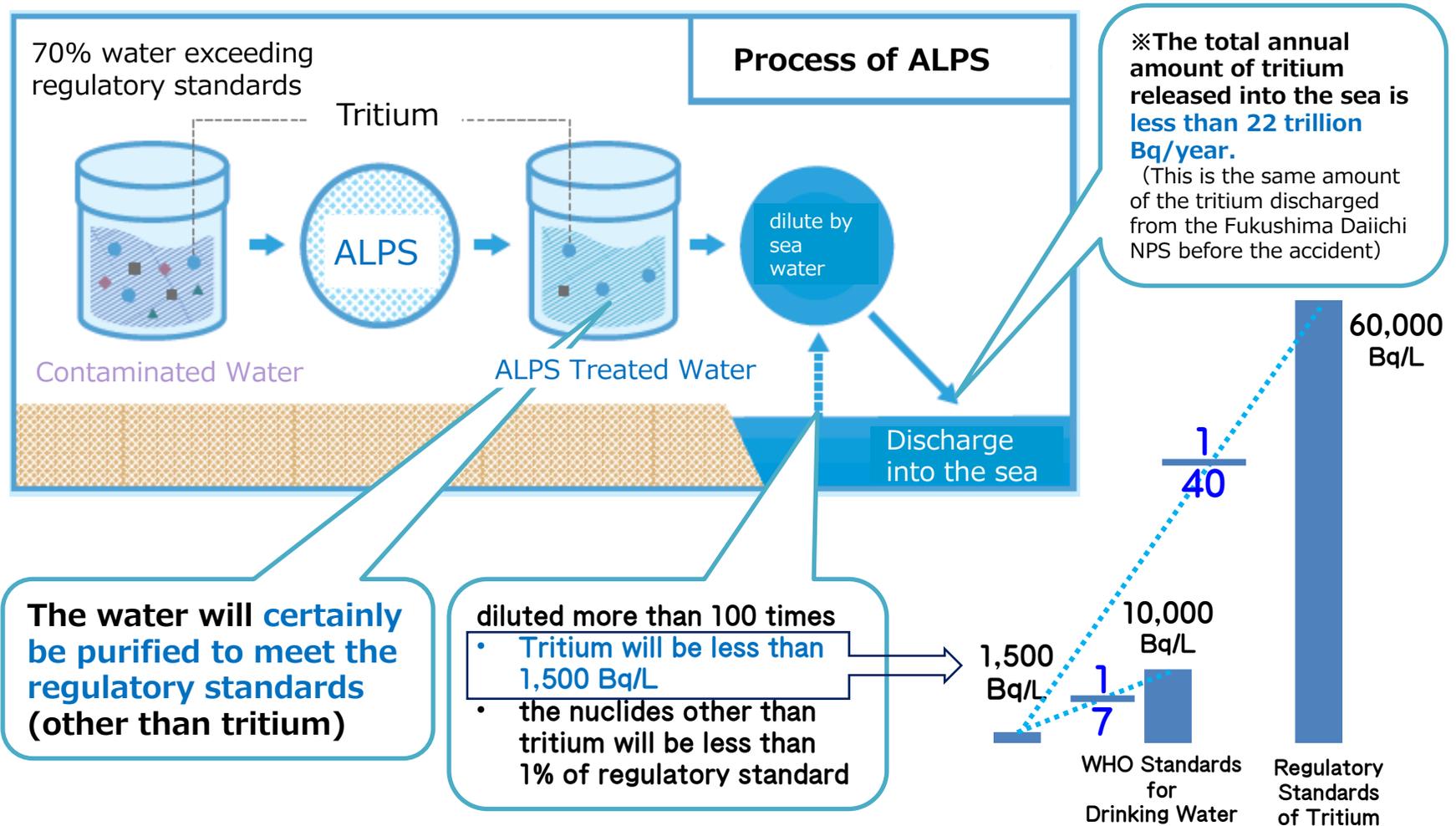
Why ALPS treated water needs to be discharged into the sea ?

- Decommissioning of FDNPS is premise of reconstruction of Fukushima, which is continuous activity to gradually reduce the risk of radioactive materials to the surrounding area.
- The storage tanks exceeding one thousand become an obstacle to secure a site for the planned decommissioning of the FDNPS.
- Also, maintaining tanks could pose other risks (aging and leakage due to a disaster).
- Therefore, it is necessary to properly discharge ALPS treated water into the sea.



Safety of ALPS Treated Water

- Concentrations of the radioactive materials will be far below the regulatory standard values by 1) purifying/re-purifying the radionuclides other than tritium; and 2) diluting by sea water.



Tritium is familiar and weak radionuclide

- As a relative of hydrogen, tritium is generated 70,000 Trillion Bq/year and exists in rain, sea and tap water, as well as inside of our body as a form of tritiated water.
- Tritium emits weak radiation, which can be blocked by a sheet of paper. It is not accumulated in human body and is excreted together with water from the body.
- It is very difficult to remove tritium from water due to the same properties as hydrogen.



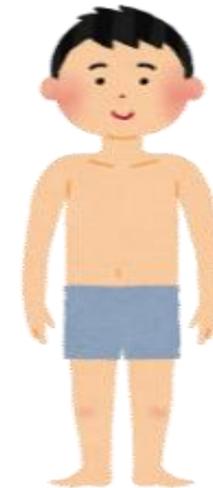
Tap water

≈ 1 Bq/L



Rain in Japan

= 220 Trillion Bq/year

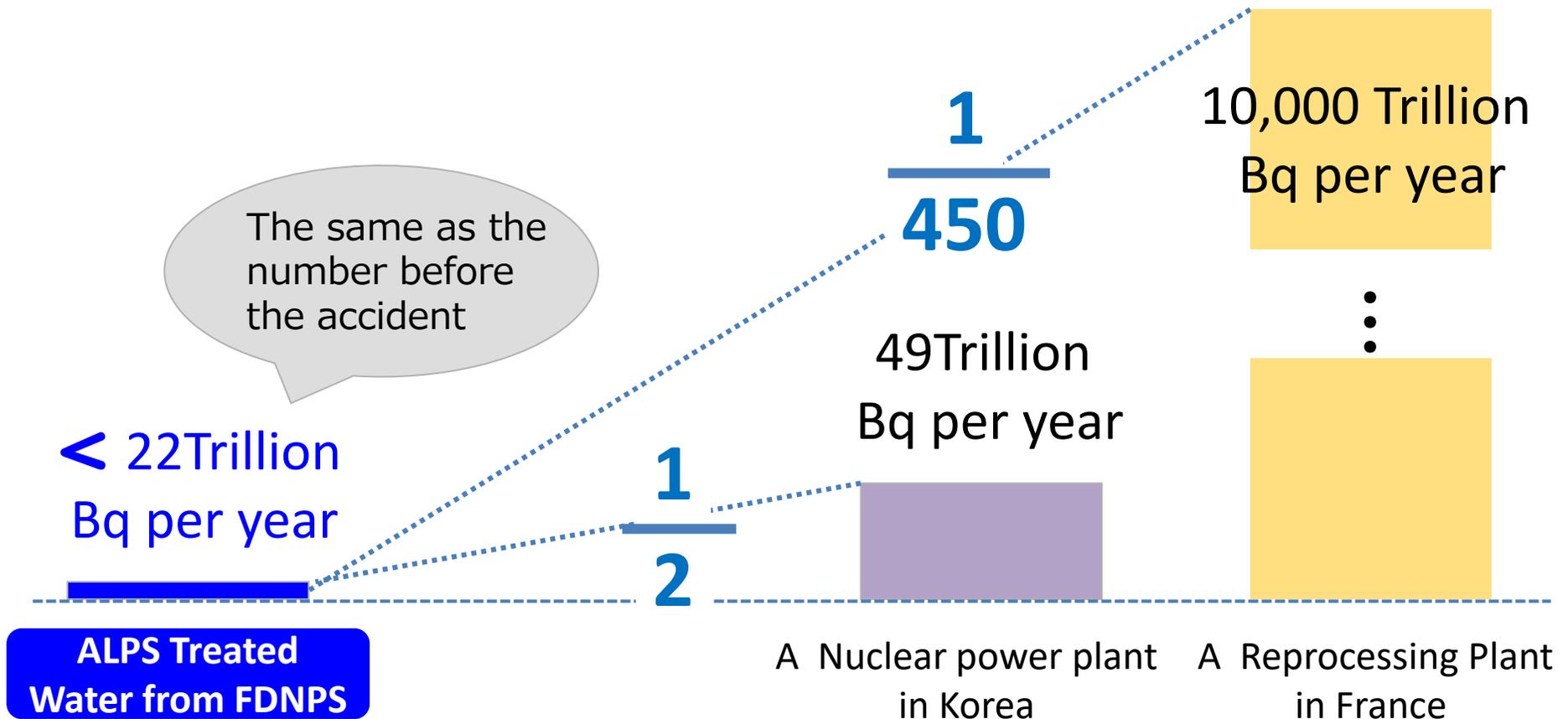


Human body

Tens of Bq

Annual discharge limit of tritium is less than many nuclear facilities over the world

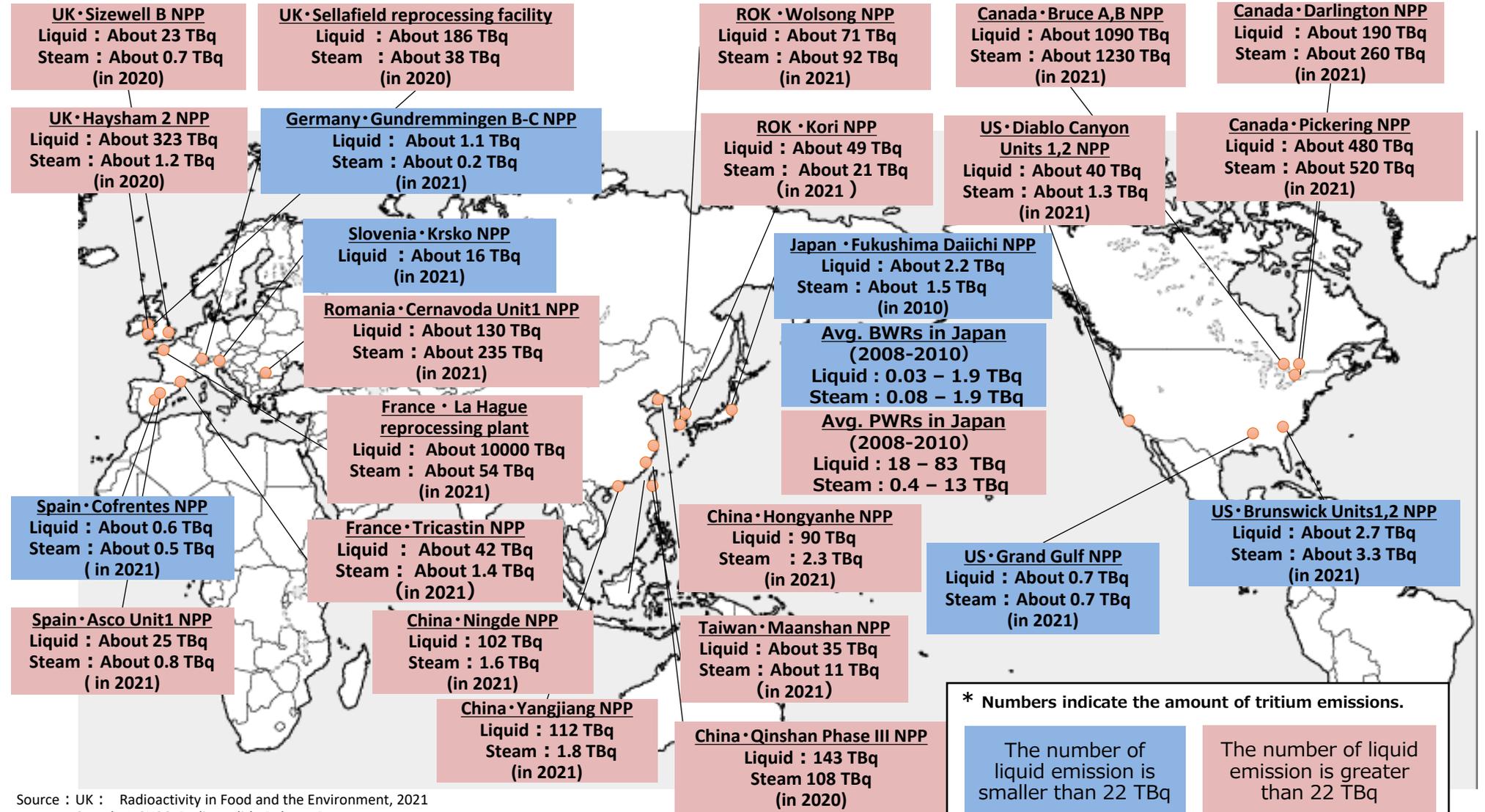
- The annual amount of tritium to be discharged will be at a level below the operational limit of FDNPS before the 2011 accident (22 Trillion Bq/year).
- It is lower than the ones of many nuclear facilities both at home and abroad.



Annual amount of discharge of tritium over the world

➤ At nuclear facilities in the world, tritium is discharged as liquid waste into rivers and the sea etc.*, and also into the atmosphere through the ventilation process, in compliance with the laws and regulations of each country and region.

*Discharge from vessels into the sea is prohibited by the London Convention



* Numbers indicate the amount of tritium emissions.

The number of liquid emission is smaller than 22 TBq

The number of liquid emission is greater than 22 TBq

Source : UK : Radioactivity in Food and the Environment, 2021
 Canada : CNSC, Radionuclide Release Datasets
 Other countries and regions : Prepared from reports published by electricity providers in various countries and regions.

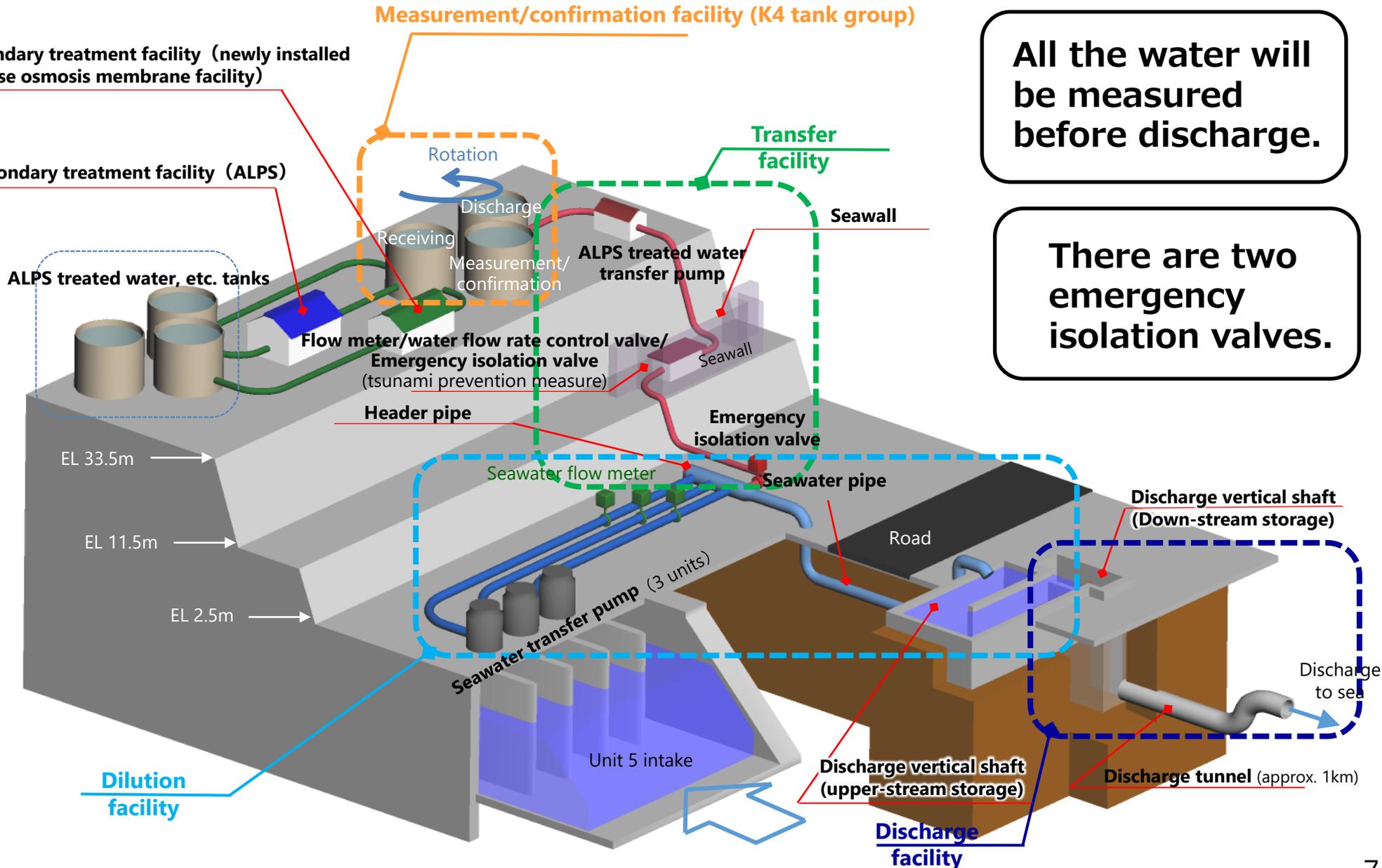
<Ref.> $1 \times 10^{12} \text{Bq} \approx \text{about } 0.019 \text{g}$ (Tritiated water)

Discharge related facilities

① Measurement → ② Transfer → ③ Dilution → ④ Discharge

All the water will be measured before discharge.

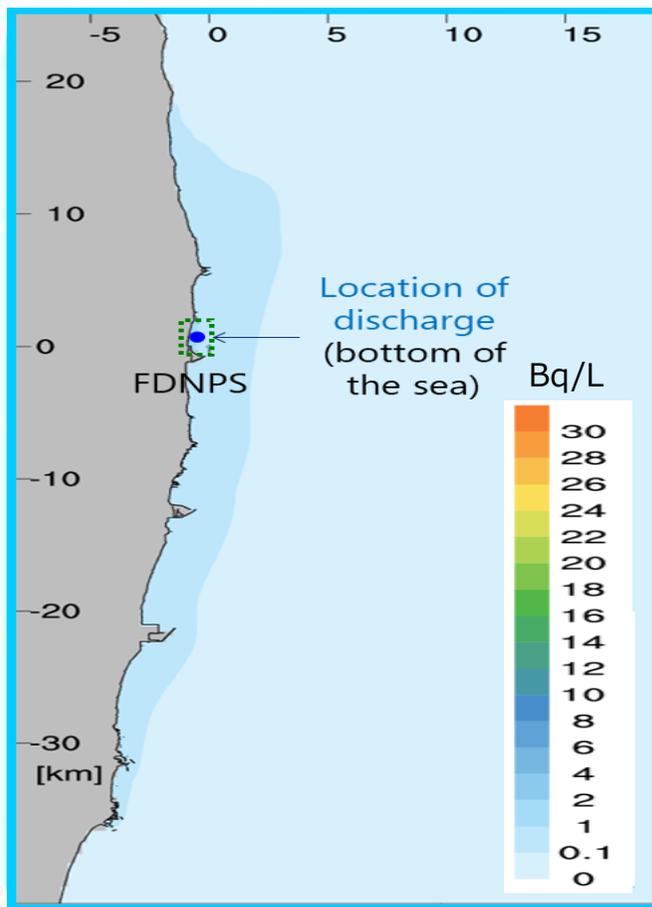
There are two emergency isolation valves.



Effect on the environment is quite limited

~ Assessment of Radiological Impact on public and environment ~

- According to the diffusion simulation, the concentration of tritium will be almost the same as the level of the natural sea water (< 0.1Bq/L).
- It means no transboundary effects.



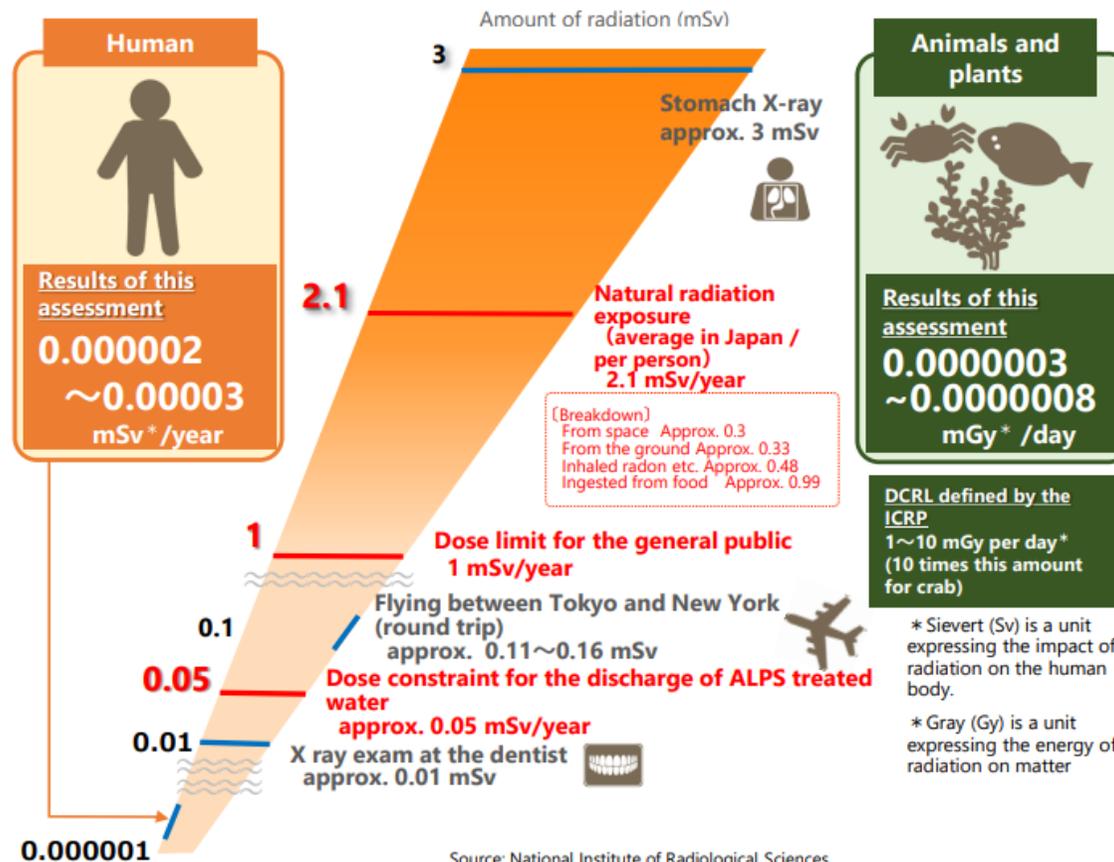
Discharged amount:
22 trillion becquerels/year



Assessment of Radiological Impact on public and environment

~ Effects on the public and the environment are minimal~

- Results of the assessment on the public found that the exposure dose was **very small compared with the natural radiation exposure** (average in Japan : 2.1 mSv/year).
- Results of the assessment on animals and plants (flatfish, brown seaweed) found that the exposure dose was also minimal compared with the derived consideration reference level (DCRL) defined by the ICRP.

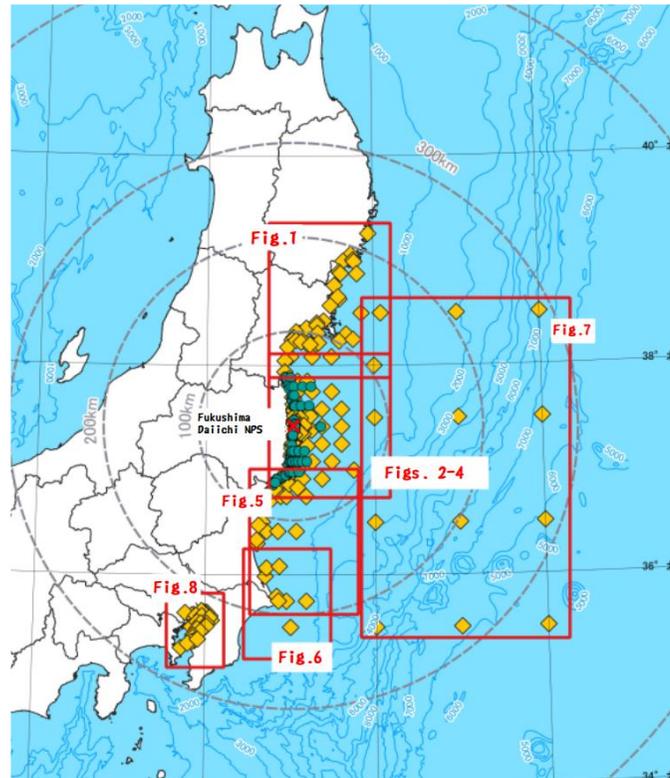


Source: National Institute of Radiological Sciences

Reference :
Radiological Impact
Assessment Report
Regarding the
Discharge of ALPS
Treated Water into
the Sea
(construction stage)

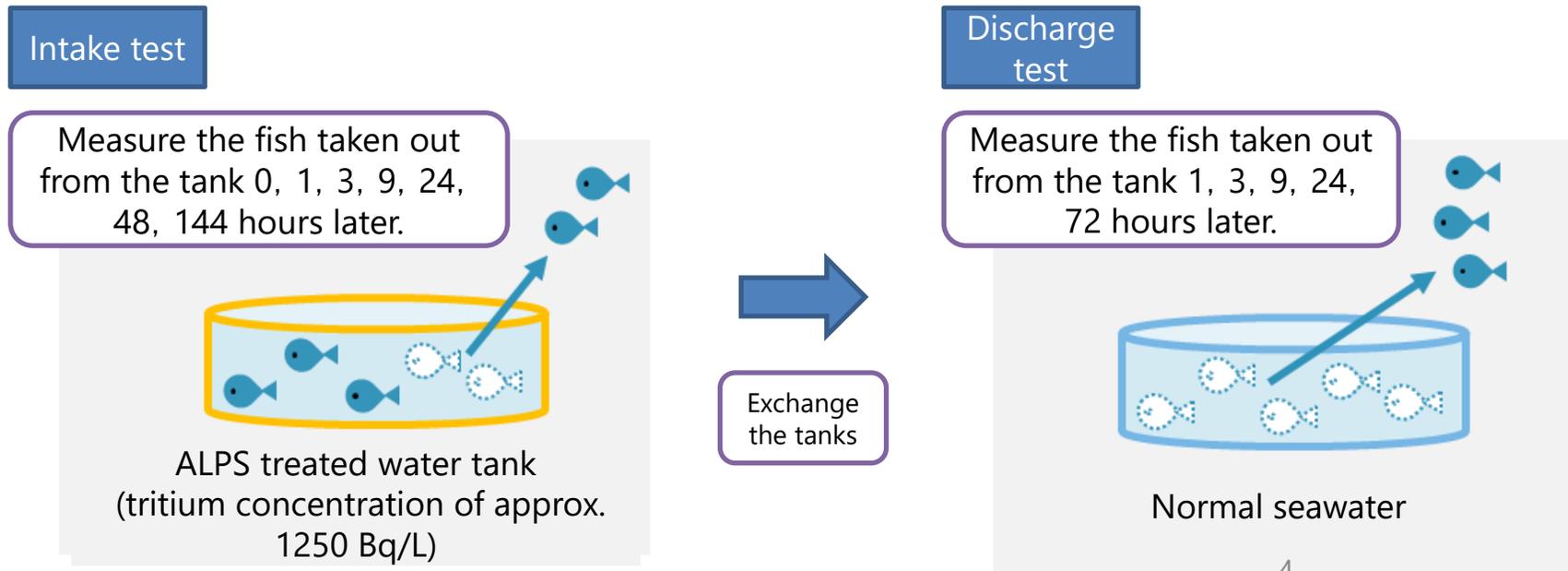
Strengthen GoJ Environmental Monitoring Plan

- Under **the Comprehensive Radiation Monitoring Plan**, the Government of Japan, TEPCO, and other related organizations have been conducting sea area monitoring since 2011.
- **Samples of sea water, sediment and marine biota** in the Pacific Ocean side of Japan, mainly in the vicinity of TEPCO's FDNPS, are **regularly collected and analyzed** to monitor, assess and research the dispersion, deposition, and migration of radioactive materials.
- Discharge into the sea at the FDNPS **will be monitored/reviewed by third parties such as International Atomic Energy Agency (IAEA)**.



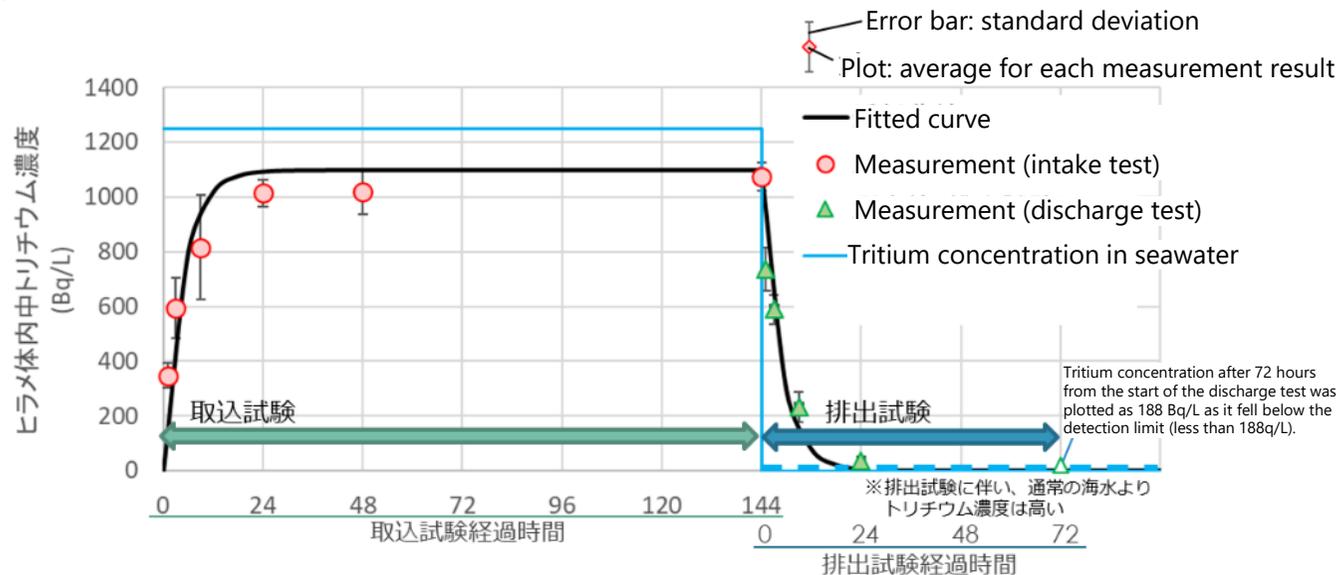
Testing Methods

- To verify that after a certain period of time the tritium in flounder reaches equilibrium at a lower concentration than the rearing environment, an *intake test* was conducted measuring tritium concentrations in flounder at 0, 1, 3, 9, 24, 48 and 144 hours after the flounder is brought into the ALPS treated water.
- Afterward, to verify that the tritium concentration in the flounder will be reduced by discharging the tritium from the flounder that had been moved from ALPS treated water tanks to normal seawater tanks, a *discharge test* was conducted measuring tritium concentrations in flounder at 0 hours (the 144-hour point in the intake test) after the flounder is placed in the normal seawater tank, and 1, 3, 9, 24, 72 hours afterward.



Results of tritium concentrations in flounder (tritium concentration of less than 1500Bq/L) and insights

- Tritium concentrations changed with time in both intake and discharge tests. The relationship between the measurement values and the fitted curve for the data drawn based on the approach to fitted curve developed based on past data is as follows.



(Reference) On the fitted curve:
Based on previous findings, the changes in tritium concentration within marine organisms were represented by the following formula.

$$dC_A(t) = A\{-C_A(t) + C_B(t)\}$$

A : constant t : time

$C_A(t)$: tritium concentration within the marine organism

$C_B(t)$: tritium concentration in seawater

※1 Similar analysis results have been reported in the following literature in the past.
FY 2009 Experimental Study on Carbon Transfer in Land and Aquatic Ecosystems, Research Institute of Environmental Science and Technology

Referring the data from graph above, the following results are confirmed same as previous findings. ※1

【Intake test】

- The tritium concentration in living bodies does not exceed that of the environment which it was reared in (i.e., does not exceed the tritium concentration in ALPS treated water diluted with seawater in this test).
- The tritium concentration reaches an equilibrium after a certain period of time.

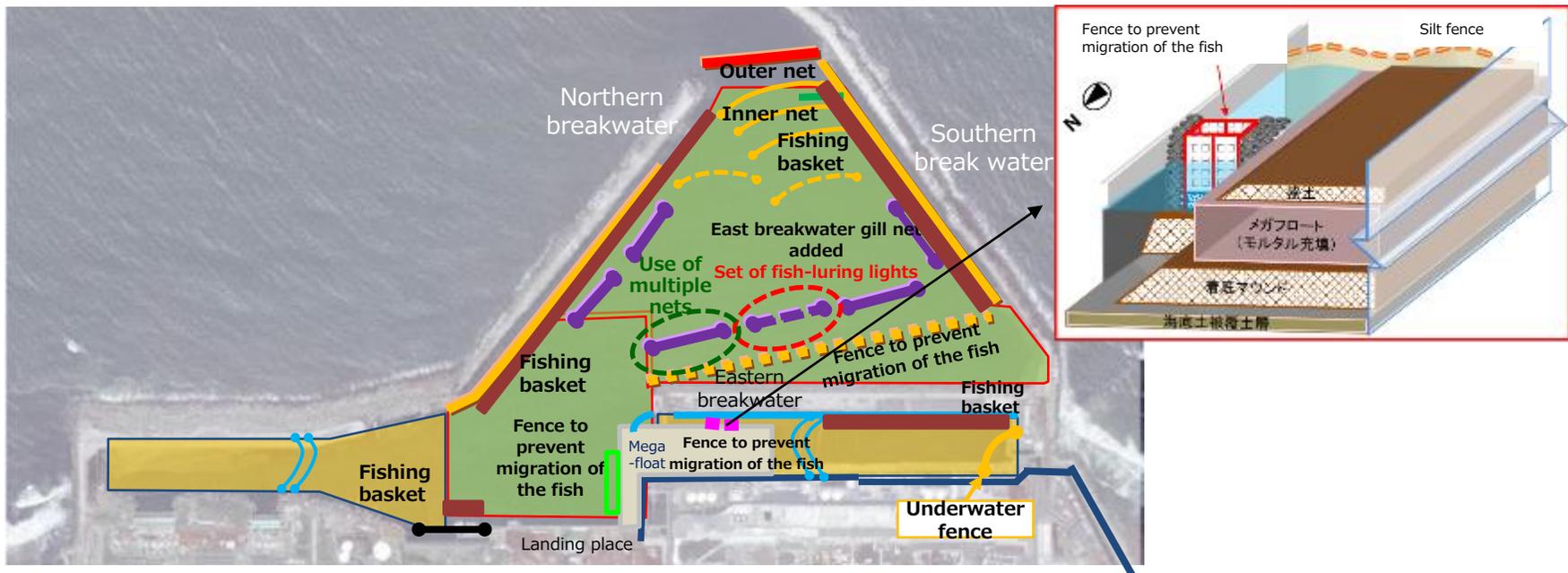
【Discharge test】

- The tritium concentration in the flounder will be reduced as time passes after the flounder, which has reached equilibrium in higher tritium concentrations than that of normal seawater, is returned to normal seawater.

Fish (Black Rockfish) with high cesium concentration detected at FDNPS

The fish with high cesium concentration is irrelevant to the discharge of ALPS treated water into the sea. It was caught at the area of the open channel at the innermost part of the port, where fish cannot escape to the outside of the open channel, and it has never been shipped to the market.

- The fish (black rockfish), in which **cesium of 18,000 Bq/kg was detected** on June 5, was collected in the open channel closest to the power plant in the port of the FDNPS. The open channel is fenced off to prevent the fish from escaping to outside of the port. In addition, commercial fishing is prohibited in the port and the fish are not shipped to market.
- **As for safety standards, while Codex's cesium standard is 1,000 Bq/kg, Japan has established a strict standard of 100 Bq/kg and conducts examination, so no fish exceeding the standard is distributed and there is no problem with the safety of Japanese food products.**
- The detection of such fish in the port of FDNPS is **due to the effects of the accident** at that time, and has **nothing to do with the ALPS treated water** that is currently being prepared for release into the sea



IAEA Review on Safety Aspect of ALPS treated water

Background:

- This review mission was conducted based on the **Terms of Reference (TOR)** on a comprehensive framework for cooperation on the handling of ALPS treated water, which was signed between the Government of Japan and the IAEA July, 2021.
- The IAEA Task Force which consists of IAEA staff members and international experts **reviews the safety aspects of the handling of ALPS treated water into the sea based on international safety standards.**
- IAEA assistance will be provided before, during and after the discharge.

Task Force Members:

- **Mr. Gustavo Caruso**, Director and Coordinator for the Fukushima ALPS project, in the Department of Nuclear Safety and Security of the IAEA (Head of Team)
- IAEA Secretariat officials
- **11 International Experts** from Argentina, Australia, Canada, China, France, Marshall Islands, ROK, Russia, UK, US and Vietnam

Components of the Review:

- 1) **Assessment of Protection and Safety (TEPCO/METI)**
- 2) **Regulatory Activities and Process (NRA)**
- 3) **Independent Sampling, Data Corroboration and Analysis (TEPCO/METI/NRA/MOE etc)**



Schedule of the IAEA Review Mission

- Feb 2022 **1st Safety Review Mission**
- Mar 2022 **1st Regulatory Review Mission**
- April 2022 **The Report of 1st Safety Review Mission ([Report 1](#)) was published**
- June 2022 **The Report of 1st Regulatory Review Mission ([Report 2](#)) was published**
- Nov 2022 **2nd Safety Review Mission**
- Dec 2022 **The Report of IAEA'S corroboration activities ([Report 3](#)) was published**
- Jan 2023 **2nd Regulatory Review Mission**
- April 2023 **The Report of 2nd Safety Review Mission ([Report 4](#)) was published**
- May 2023 **The Report of 2nd Regulatory Mission ([Report5](#)) was published**
- May 2023 **The Report on Analysis Result of Radionuclides in ALPS Treated Water**



The IAEA notes that these findings provide confidence in TEPCO's capability for undertaking accurate and precise measurements related to the discharge of ALPS treated water.

Points that are assessed as being consistent with safety standard in the Comprehensive Report

- ※The report is compiled under IAEA's authority based on the previous reviews by Task Force (IAEA staff and eleven international experts).
- ※IAEA D.G. Grossi also stated that there were no objections among the international experts involved in the comprehensive report.

Radiological impact on humans and the environment

- The discharge of the ALPS treated water will **have a negligible radiological impact on people and the environment.**
 - A Radiological Environmental Impact Assessment(REIA) has been produced and is compliant with the international safety standards.
 - The IAEA has accepted the rationale presented by TEPCO for a sufficiently conservative, yet realistic, source term*. (*characteristic of radioactive materials in the ALPS treated water assessed before discharge)
 - Based on the results of the marine dispersion model used by TEPCO, activity concentrations in international waters will not be influenced by the discharge of ALPS treated water into the sea **and the transboundary impacts are therefore negligible.**

Safety related aspects of systems

- The IAEA notes that **the systems and processes in place to control the discharges of ALPS treated water are robust.**
- **Redundancy was built into the system** for some components, such as emergency isolation valves and detectors.

Regulatory control and authorization

- NRA serves as the independent regulatory body within Japan, **has promulgated and implemented an appropriate legal and regulatory framework for safety.**

Analysis/Monitoring

- The IAEA has concluded that the monitoring activities and approach taken by TEPCO and GOJ are consistent with the relevant international safety standards.
- According to the IAEA report, the results of the first interlaboratory comparison provide confidence in **TEPCO's capability for undertaking accurate and precise measurements** related to the discharge of ALPS treated water. Based on the observations of the IAEA, **TEPCO has demonstrated that it has a sustainable and robust analytical system.**

The IAEA is committed to engaging with Japan on the discharge of ALPS treated water **not only before, but also during, and after the treated water discharges occur.** Additional review and monitoring activities are envisaged that will continue and which will provide additional transparency and reassurance to the international community.

Certificate of Completion Received for the Pre-Use Inspections of ALPS Treated Water Dilution/Discharge Facility and Related Facilities at the Fukushima Daiichi Nuclear Power Station



Announcements

Certificate of Completion Received for the Pre-Use Inspections of ALPS Treated Water Dilution/Discharge Facility and Related Facilities at the Fukushima Daiichi Nuclear Power Station

July 7, 2023

Tokyo Electric Power Company Holdings Inc.

Considering the Basic Policy on handling of ALPS treated water at the Tokyo Electric Power Company Holdings' Fukushima Daiichi Nuclear Power Station decided by the Japanese government in April 2021, TEPCO has been reviewing the details of the design and operation of facilities for securing safety regarding the handling of ALPS treated water at the Fukushima Daiichi Nuclear Power Station. In December 2021, TEPCO submitted the "Application Documents for Approval to Amend the Implementation Plan for Fukushima Daiichi Nuclear Power Station Specified Nuclear Facility" to the Nuclear Regulation Authority, and in July 2022, it was approved by the Nuclear Regulation Authority. Thereafter, in August 2022, TEPCO began construction on ALPS treated water dilution/discharge facility and

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South Korea Government Report

<https://www.opm.go.kr/opm/news/press-release.do?mode=view&articleNo=154181>

후쿠시마 오염수 처리 계획에 대한 과학기술적 검토

2023. 7. 7.



Visit to the Fukushima Daiichi Nuclear Power Station by the Delegation of Taiwanese Nuclear Experts (June 19, 2023)



United States and UK



The screenshot shows the U.S. Department of State website. The header includes the Department of State logo and navigation links for Newsroom, Business, Employees, Job Seekers, Students, Travelers, and Visas. Below the header, there are dropdown menus for Policy Issues, Countries & Areas, Bureaus & Offices, and About. The main content area features a breadcrumb trail: Home > Office of the Spokesperson > Press Releases > IAEA Task Force Report on Fukushima. The title 'IAEA Task Force Report on Fukushima' is prominently displayed, followed by 'PRESS STATEMENT' and 'MATTHEW MILLER, DEPARTMENT SPOKESPERSON'. The date 'JULY 5, 2023' is also visible.

The United States welcomes the International Atomic Energy Agency's (IAEA) report noting Japan's plans to release treated water from the Fukushima Daiichi nuclear site are safe and consistent with internationally accepted nuclear safety standards. Since the 2011 nuclear accident, Japan has proactively coordinated with the IAEA on its plans and conducted a science-based and transparent process. We look forward to Japan's continued cooperation with the IAEA as its process moves forward.

TAGS

- Bureau of East Asian and Pacific Affairs
- Climate and Environment
- Japan
- Office of Nuclear Energy, Safety, and Security
- Office of the Spokesperson
- The Secretary of State



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[Home](#) > [International](#) > [Foreign affairs](#)

News story

IAEA Report on the Fukushima Daiichi ALPS Treated Water Discharge

A Foreign, Commonwealth and Development Office spokesperson statement on the 4 July International Atomic Energy Agency Task Force Report.

From: [Foreign, Commonwealth & Development Office](#)

Published 7 July 2023



A Foreign, Commonwealth and Development Office spokesperson said:

" The UK welcomes the International Atomic Energy Agency's (IAEA) report which demonstrates that Japan's plans to release treated water from the Fukushima Daiichi nuclear site are safe and consistent with internationally accepted nuclear safety standards.

" This report was produced by a specialist Task Force which included experts from the IAEA Secretariat alongside internationally recognised independent experts from Argentina, Australia, Canada, China, France, the Marshall Islands, the Republic of Korea, the Russian Federation, the United Kingdom, the United States and Vietnam.

" We welcome the continuing close cooperation between the Japanese Government and the International Atomic Energy Agency in this matter."

Media enquiries

Email newsdesk@fcdo.gov.uk

State Minister Ota Holds Meeting with Mr. Algernon Yau, Hong Kong's Secretary for Commerce and Economic Development

On Tuesday, June 20, State Minister of Economy, Trade, and Industry Ota held a meeting with Mr. Algernon Yau, Secretary for Commerce and Economic Development of Hong Kong.

State Minister Ota held a meeting with Mr. Algernon Yau, Secretary for the Commerce and Economic Development Bureau of Hong Kong. During the meeting, State Minister Ota congratulated the Hong Kong Special Administrative Region on the 35th anniversary of the establishment of the Hong Kong Economic and Trade Representative Office in Tokyo. **She also thoroughly explained the safety of the discharge of ALPS treated water into the sea and that it would not adversely affect human health or the environment and requested that import restrictions on Japanese food products resulting from accident at TEPCO's Fukushima Daiichi Nuclear Power Station be lifted.**



Status of countries and regions introduced import measures on Japanese food after the TEPCO Fukushima Daiichi NPS accident

Total 55 countries and regions have introduced import measures on Japanese food following the nuclear power station accident, and more than 75% of them, 43 have eliminated the measures.

(As of September 2022)

Type of measures and number of countries or regions			Name of countries or regions	
Introduced additional measures after the accident	Lifted all the measures		43 Canada, Myanmar, Serbia, Chile, Mexico, Peru, Guinea, New Zealand, Colombia, Malaysia, Ecuador, Vietnam, Iraq, Australia, Thailand, Bolivia, India, Kuwait, Nepal, Iran, Mauritius, Qatar, Ukraine, Pakistan, Saudi Arabia, Argentina, Turkey, New Caledonia, Brazil, Oman, Bahrain, Congo DR, Brunei, Philippines, Morocco, Egypt, Lebanon, United Arab Emirates, Israel, Singapore, USA, UK, Indonesia	
	Remaining the measures	Import ban		5 China, Korea, Taiwan, Hong Kong , Macau
		Test certificate requirement		7 EU*, Iceland, Liechtenstein, Norway and Switzerland (EFTA member states), French Polynesia, Russia *Including Northern Ireland
55	12			

Recent examples of Countries/regions that have (partially) lifted the import measures

2022	July	Indonesia (all)
	June	UK (all)
	February	Taiwan (partially)
2021	October	EU (partially)
	September	US (all)
	May	Singapore (all)
	January	Israel (all)