

Report of Assessment of Radiological Impact on Public and Environment Regarding the Discharge of ALPS Treated Water into the Sea (Construction stage)

In November 2021, TEPCO released a report of an assessment of radiological impact on the public and the environment regarding the discharge of ALPS treated water into the sea assuming that designs and operations*¹ were considered by TEPCO based on the Japanese Government's Basic Policy on the Handling of ALPS Treated Water announced in April 2021. This assessment was conducted in accordance with internationally recognized methods.

In April 2022, the report had been revised in light of findings and observations by the International Atomic Energy Agency (IAEA), comments from the Nuclear Regulation Authority (NRA), and opinions submitted during the public comment process.

After that, based on the review of nuclides to be measured/assessed to confirm that the ALPS treated water meets the discharge criteria before it is discharged into the sea, it was additionally revised in November, 2022.

Furthermore, the nuclide composition of ALPS treated water to be assessed was reviewed in accordance with the explanation given at the Technical Meetings of the NRA, and concentrations of all the nuclides was also adjusted based on their half-life to March 2023, 12 years after the Accident. Findings from IAEA review mission in November 2022 were also reflected and these changes were included in the revised report made public in February 2023.

This leaflet provides an overview of the assessment results.

The content of the report will be revised as appropriate based on comments and reviews by experts and relevant parties.*²

TEPCO will continue to communicate scientific information about the radiological impact on the public and the environment in a transparent manner.

* 1 To secure the safety of the public and the environment, TEPCO will strictly comply with laws, regulations and regulatory standards that conform to international standards on the concentrations of radioactive materials contained in the water to be discharged.

* 2 These are present results and the assessment will be revised as appropriate based on progress in discussions around design and operation of plans regarding the discharge of ALPS treated water into the sea, comments from relevant parties, reviews by IAEA experts and assessments by third parties.

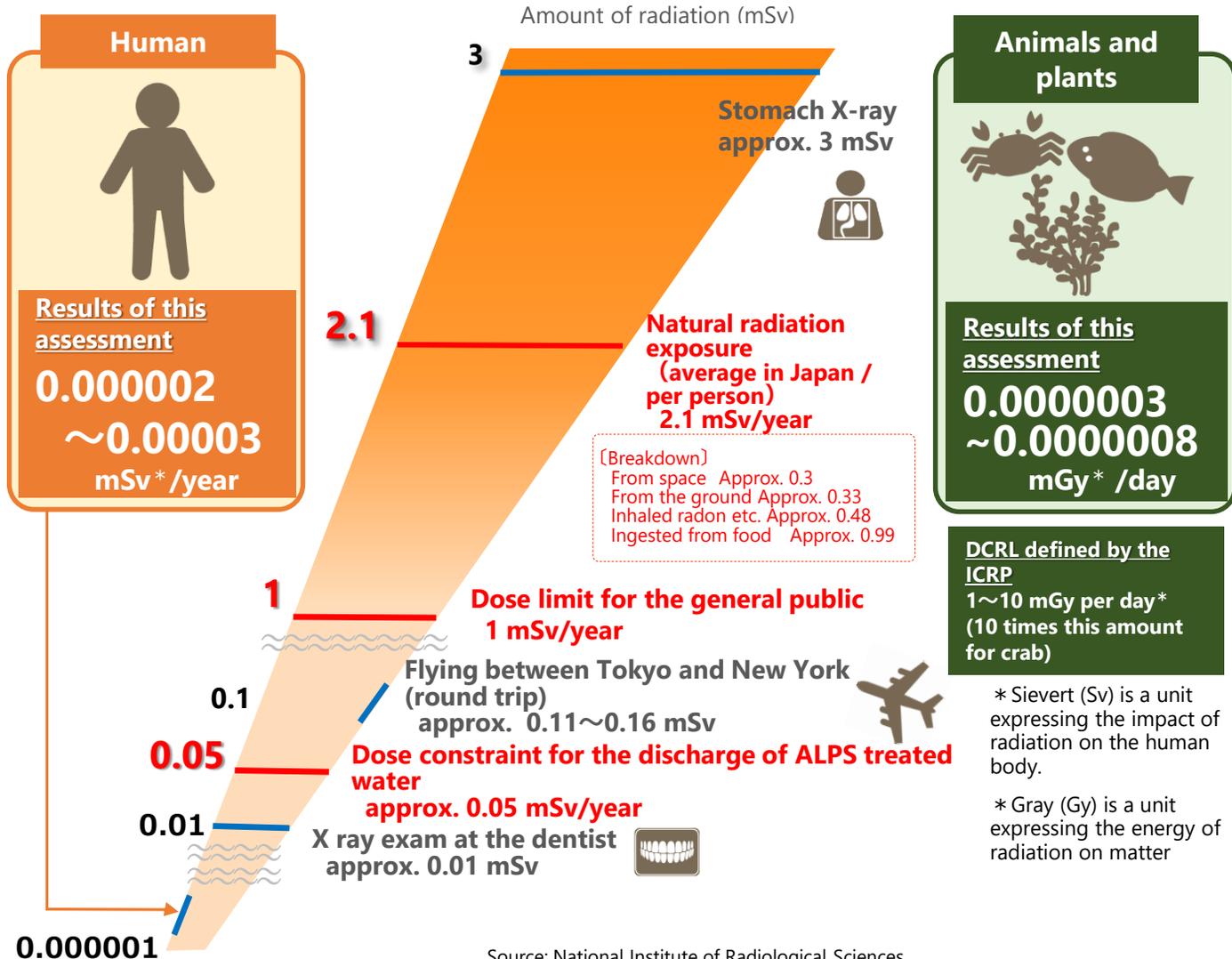
Results of the assessment

- The radiological impact on the public and the environment when discharging ALPS treated water into the sea **was assessed in accordance with internationally recognized methods**, assuming designs and operations being considered by TEPCO.
- Assessment indicated that **effects of the discharge of ALPS treated water into the sea on the public and the environment is minimal** as calculated doses were **significantly less** than the dose limits (1 mSv/year/person), dose constraint for the discharge of ALPS treated water (0.05 mSv/year/person), and the values specified by International Commission on Radiological Protection (ICRP) for each species.

Results of the assessment on the public found that the exposure dose was **approx. 1/500,000 to approx. 1/30,000 of dose limit for the general public (1 mSv/year)** and **approx. 1/1,000,000 to approx. 1/70,000 of 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 **approx. 1/3 million to approx. 1/1 million of the derived consideration reference level (DCRL) defined by the ICRP*** and results of the assessment on crab found that **approx. 1/30 million to approx. 1/10 million**.

※International Commission on Radiological Protection



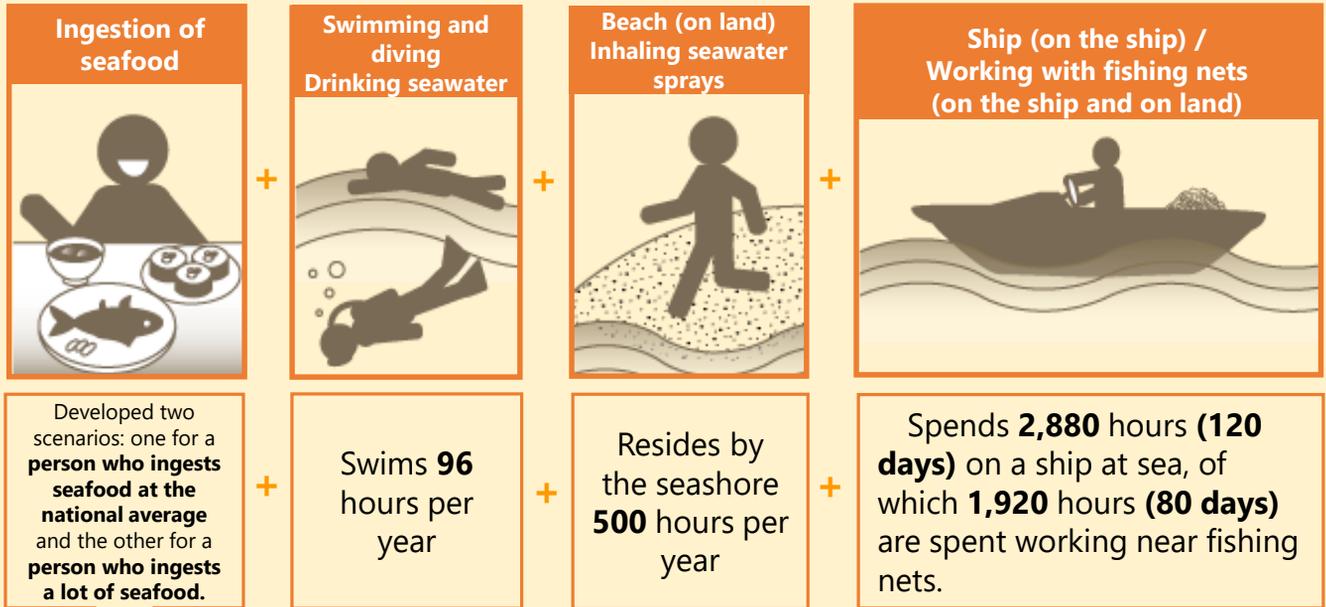
Methods of the assessment

- The assessment was conducted in accordance with the International Atomic Energy Agency (IAEA) Safety Standard documents and ICRP recommendations.

Impact assessment on the public

The assessment was conducted assuming a case that a person who frequents the sea area around the discharge point would be the "person who is most affected".

Pathways and lifestyle, etc.



<Amount of seafood* ingested by a person at the national average (g/day)>

	Fish	Invertebrate	Seaweed
Adult	58	10	11
Toddler	29	5.1	5.3
Infant	12	2.0	2.1

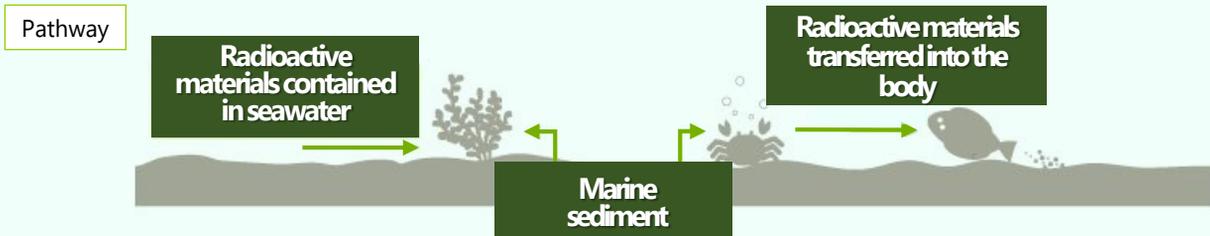
<Amount of seafood* ingested by a person who takes a lot of seafood (g/day)>

	Fish	Invertebrate	Seaweed
Adult	190	62	52
Toddler	97	31	26
Infant	39	12	10

*Fish includes processed products. Invertebrates include squid, octopus, shrimp, crab, shellfish, etc.

Impact assessment on animals and plants

Flatfish, crab and brown seaweed that inhabit in the surrounding sea area were selected among the reference organisms indicated by the ICRP to be used in assessment.

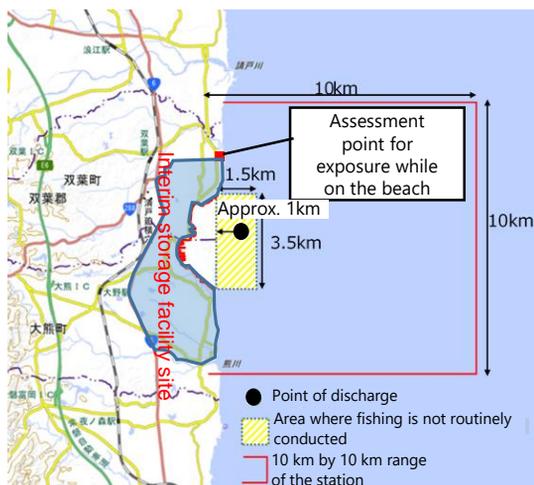
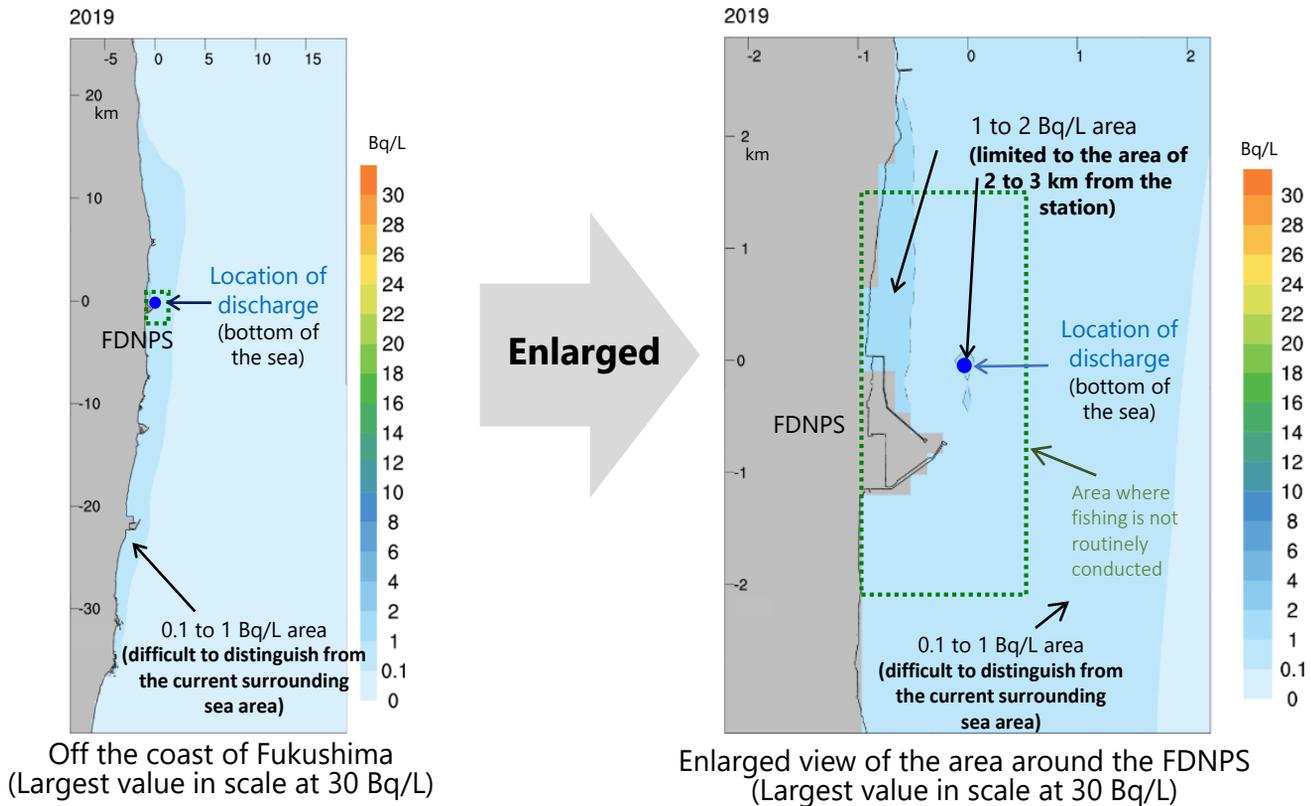


- (Reference) Flatfish: Flounders widely inhabit in the surrounding sea area, and are important fish for the local fishery industry
 Crab : Many types of crabs (e.g., portunus trituberculatus, ovalipes punctatus) widely inhabit the surrounding sea area
 Brown seaweed : Many types of seaweed including gulfweed and sea oak widely inhabit the surrounding sea area

Results of dispersion simulation at sea

- If the diluted ALPS treated water is discharged at the bottom of the sea (undersea tunnel exit) approximately 1 km off the coast of TEPCO's Fukushima Daiichi Nuclear Power Station (FDNPS), the simulation (annual average) found that the area assessed to have higher tritium concentration on the surface layer than current levels in the surrounding sea area (0.1 to 1Bq/L) will be **limited to the area of 2 to 3 km from the FDNPS for the annual average.**
- **The concentration swiftly falls** in areas directly above the undersea tunnel exit and is **significantly below the WHO Guidelines for drinking-water quality (10,000 Bq/L).**

※ These results were not significantly different from those of the assessment that used meteorological and sea condition data from 2014 (published March 24, 2020).



Assessment points for seawater concentrations used in dose assessment*

Scope of modeling

490 km (North-South), 270 km (East-West) with Fukushima Prefecture at the center

Meteorological and sea condition data

Used the data of wind speed, atmospheric pressure, temperature, humidity, precipitation, sea current off the coast of Fukushima in 2019 (January to December)

* The annual average concentration of tritium was calculated for the 10km x 10km area around the station. In order to evaluate the uncertainty of the results depending on the size of sea area subject to assessment, exposure assessments were also conducted for the 5 km x 5 km area and the 20 km x 10 km area.