

Fukumoni

Let's learn about the radiation around us
today here in Fukushima



Introduction

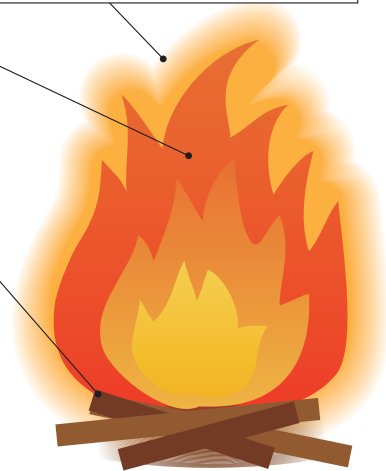
The Great East Japan Earthquake, which occurred on March 11, 2011 severely damaged the TEPCO Fukushima Daiichi Nuclear Power Station due to onslaught of a large tsunami that accompanied the earthquake. As a result, the fuel could not be cooled, and hydrogen, a flammable gas, which was generated, produced an explosion releasing radioactive substances, such as cesium and iodine, into the atmosphere. Fukushima Prefecture monitored environmental radiation before the Great East Japan Earthquake. After the earthquake, we have additionally installed measurement equipment, such as monitoring posts, added measurement points, and expanded the measurement area to enhance and strengthen our monitoring system.

What is radiation and radioactivity?

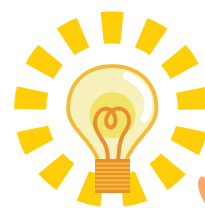
Heat and light = Radiation (Particles and electromagnetic waves emitted from radioactive substances)

Fire = Radioactivity
(Ability to emit radiation)

Firewood = Radioactive substance
(Substance with the ability to emit radiation (radioactivity))



What are radiation, radioactivity, and radioactive substances? Let's imagine them as a "campfire."



Unit

Becquerel (Bq)

→A unit that expresses the level of the ability of radioactive substances to emit radiation (radioactivity)

Gray (Gy)

→A unit that expresses how much radiation energy is absorbed by a substance

Sievert (Sv)

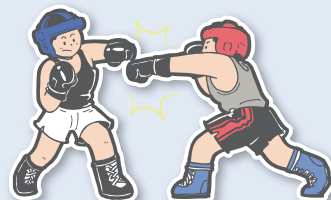
→A unit that expresses the impact on human body when exposed to radiation

0.001 Sv
||
1mSv
||
1,000 μSv

1mSv is 1,000 times more than 1μSv

If you compare these units of radiation to boxing

- Becquerel = The number of punches
- Gray = The power of punch
- Sievert = Body damage caused by punch



Monitoring of radiation in the environment in Fukushima Prefecture

Fukushima Prefecture measures the air dose rate *, analyzes radioactive substances contained in environmental samples (air, water, soil, etc.) and publishes the measurement results to ensure the safety and security of everyone concerned.

Monitoring the areas around the power plants

Fukushima Prefecture monitors the types, locations and levels of radioactive substances in the environment that came from nuclear power plants in the area.

Prefecture-wide monitoring

Fukushima Prefecture monitors various parts of the prefecture to keep track of the trends in contamination caused by the nuclear accident.

1 Monitoring of radiation in the environment

Measurement of environmental samples

We analyze radioactive substances contained in environmental samples, such as air, water and soil collected in the prefecture.

Measurement of air dose rate

● Station-type monitoring post

To monitor the radioactive substances newly released into the environment from the nuclear power plants, we have installed 42 monitoring posts in the areas within approximately 30 km from the nuclear power plants.



Measurement of air dose rate

● Real-time dosimetry system

In order to monitor air dose rates in areas where children gather, 2,800 units have been installed in schools, nurseries and other locations across the prefecture.



● Portable monitoring post

We installed approximately 540 units in public facilities in the prefecture to grasp changes in the radiation level in the air.



● Mobile monitoring

We use survey meters to measure the air dose rate in places where many people gather, such as schools and sightseeing spots.

● Car-borne survey

We installed radiation measuring devices in cars to measure the dose of radiation in the air along the driving route. We also installed the radiation measuring devices in some fixed-route buses for ease of radiation measurements.

2 Monitoring, analysis, evaluation and confirmation of data

● Monitoring and analysis

Fukushima Prefectural Centre for Environment Creation (FPCEC) constantly monitors the air dose rate, and analyzes the collected and accumulated environmental radiation data.

● Evaluation and confirmation

Fukushima Prefecture has set up an "Environment Monitoring Evaluation Subcommittee" to evaluate the monitoring data collected from around the nuclear power plants. The subcommittee is composed of experts in radiation management, environmental radioactivity and water resources studies, and the members from national, prefectural, and municipal governments who meet on a quarterly basis.

3 Publication of data

- Fukushima Prefecture website
- Fukushima Prefecture Radioactivity Measurement Map, etc.

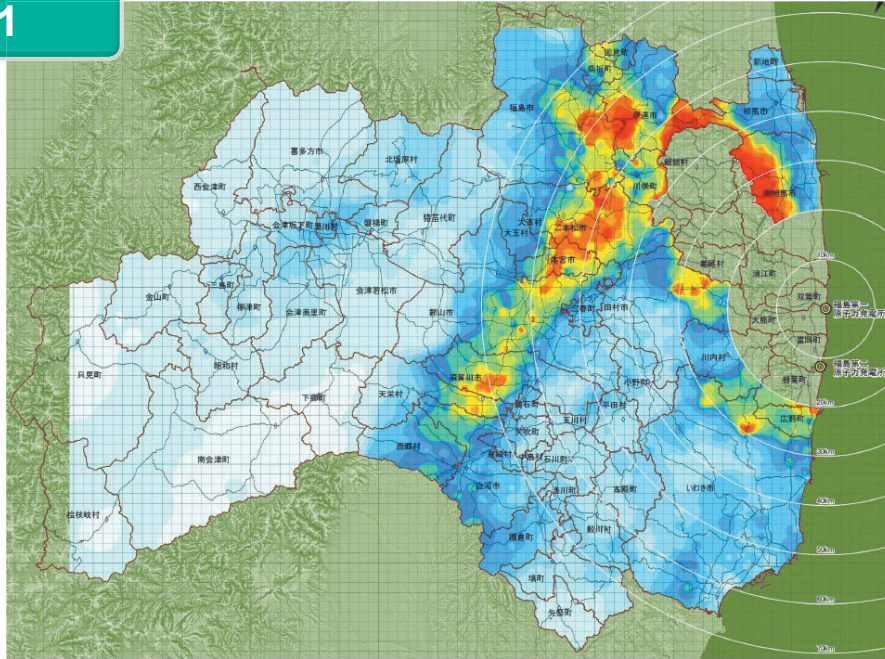
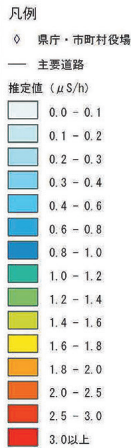
See page 11

* Air dose rate: Air dose is the amount (strength) of radiation in the air. This includes gamma radiation from the ground, cosmic radiation, etc. The air dose per unit of time (years, months, weeks, days, etc.) measured in a certain airspace is called the air dose rate.

Changes in air dose rates in Fukushima Prefecture

The air dose rates in Fukushima Prefecture has decreased significantly from that as of April 2011.

April, 2011



Created based on “Basic Map Information (Digital Elevation Model)”, (The Geographical Survey Institute) and “National Land Numerical Information (Administrative Areas, Roads)” (The Ministry of Land, Infrastructure, Transport and Tourism National Land Policy Bureau)



April-June, 2025



Created based on the “Basic Map Information (Digital Elevation Model)”, (The Geographical Survey Institute) and “National Land Numerical Information (Administrative Areas, Roads)” (The Ministry of Land, Infrastructure, Transport and Tourism National Land Policy Bureau)

* Results of a car-borne survey conducted in the Difficult-to-return Zones in November, 2025 were added to the measurement.

In the Nakadori and Hamadori regions, the effects of natural attenuation and decontamination of radioactive substances are definitely appearing.

Air dose rates in the Aizu region have restored to pre-accident levels.

Let's look at the numbers

Air dose rate in Fukushima Prefecture

unit: $\mu\text{Sv/h}$

Measurement date *1	Measurement point *2	Fukushima City	Koriyama City	Shirakawa City	Aizu-wakamatsu City	Minamiaizu Town	Minamisoma City	Iwaki City
Before the accident(2009) *3		0.04	0.04	0.04	0.05	0.04	0.05	0.06
April 2011		1.91	1.83	0.67	0.19	0.08	0.63	0.37
September 2011		1.00	0.88	0.42	0.13	0.08	0.42	0.18
September 2012		0.69	0.51	0.21	0.09	0.06	0.37	0.10
September 2013	*4	0.33	0.17	0.12	0.07	0.05	0.15	0.09
September 2014		0.24	0.14	0.10	0.07	0.05	0.12	0.08
September 2015		0.20	0.12	0.09	0.06	0.04	0.09	0.07
September 2016		0.18	0.10	*4 0.88	0.06	0.04	0.08	0.07
September 2017		0.15	0.09	0.07	0.05	0.04	*4 0.08	0.06
September 2018		0.14	0.09	0.07	0.05	0.04	0.07	0.06
September 2019		0.13	0.08	0.06	0.05	0.04	0.07	0.06
September 2020		0.13	0.07	0.06	0.05	0.04	0.06	0.06
September 2021		0.12	0.07	0.06	0.05	0.04	0.06	0.06
September 2022		0.12	0.07	0.06	0.05	0.04	0.06	0.06
September 2023		0.11	0.07	0.06	0.05	0.04	0.06	0.06
September 2024		0.11	0.06	0.05	0.05	0.04	0.05	0.06
September 2025		0.10	0.06	0.05	0.05	0.04	0.05	0.06

† Difficult-to-return Zones are not included in the above measuring points.

*1 Monthly averages are listed (except for 2009).

*2 Fukushima City is measured at Ken-poku Public Health and Welfare Office, and others are measured at the prefectural joint government building. (except for 2009)

*3 2009 figures are the results of the radiation level survey.

Fukushima City : August 18, 2009 (Prefectural East Branch Office)

Shirakawa City: August 11, 2009 (Shirakawa Joint Government Building)

Minamiaizu Town: August 11, 2009 (Maruyama Park)

Iwaki City: August 18, 2009 (Iwaki Joint Government Building)

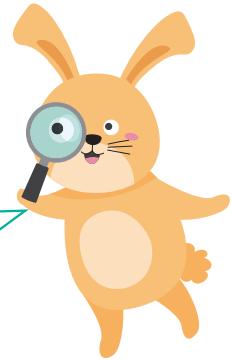
Koriyama City: August 11, 2009 (Hayama Park)

Aizuwakamatsu City: August 19, 2009 (Aizu Tsurugajo Castle Park)

Minamisoma City: August 19, 2009 (Nishiki Park)

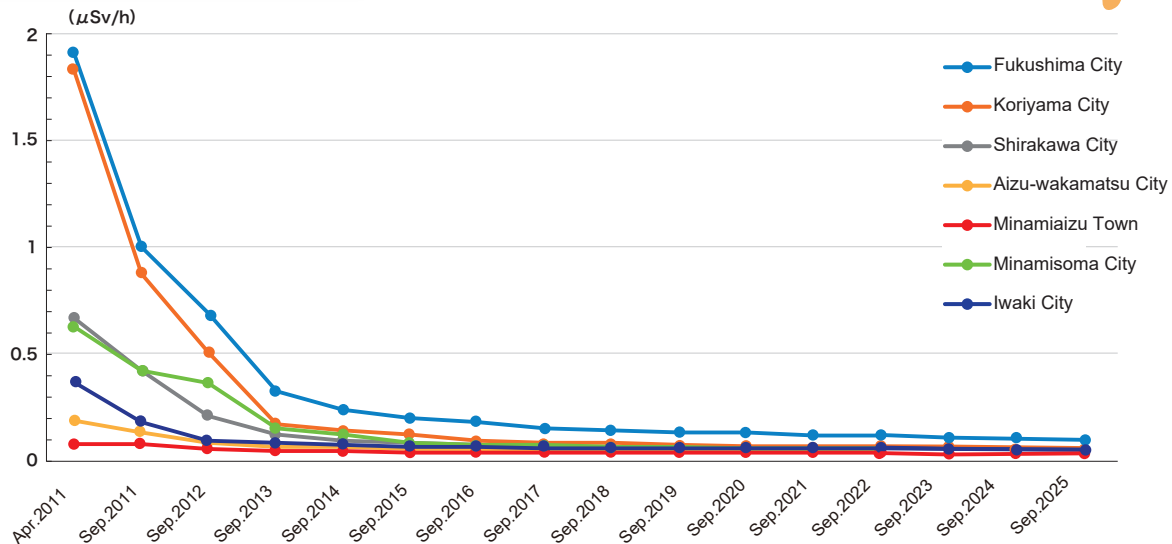
*4 Decontamination was conducted in Fukushima City and Koriyama City from April to May 2013, Shirakawa City in June 2016, and Minamisoma City in December 2016.

Currently, the entire prefecture is stable at a low value!



Let's look at the graph

Air dose rate in Fukushima Prefecture



* Monthly averages are listed.

* For measurement locations, prefectural north health and welfare office for Fukushima City, and prefectural joint government buildings for other cities.

* Decontamination was conducted in Fukushima City and Koriyama City from April to May 2013, Shirakawa City in June 2016, and Minamisoma City in December 2016.

Trivia

Changes in radiation dose due to weather

The radiation dose varies depending on the weather.

For example, when it rains, naturally occurring radioactive substances in the atmosphere can fall to the ground, increasing the radiation dose. When snow accumulates, the radiation dose may fall because the radiation from the ground is blocked.

Air dose rate at Kaibama Bureau, Minamisoma City (October 15, 2025 to November 13, 2025)



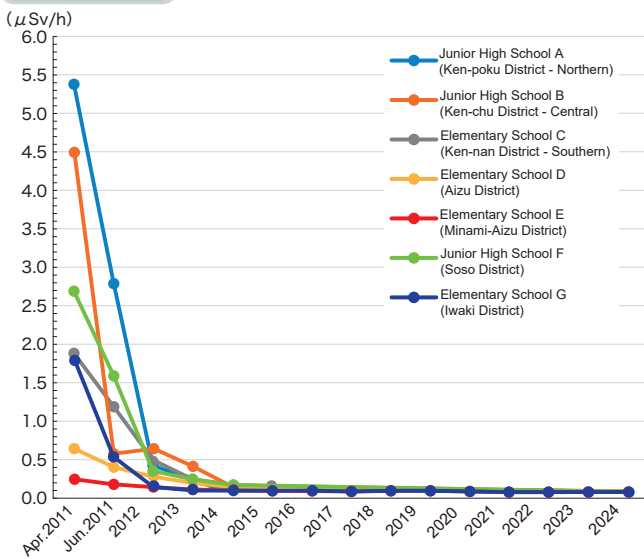
† The light blue lines indicate the time when it rained. It can be seen that the rain increases the air dose rate (red line).

Mobile monitoring results using survey meters

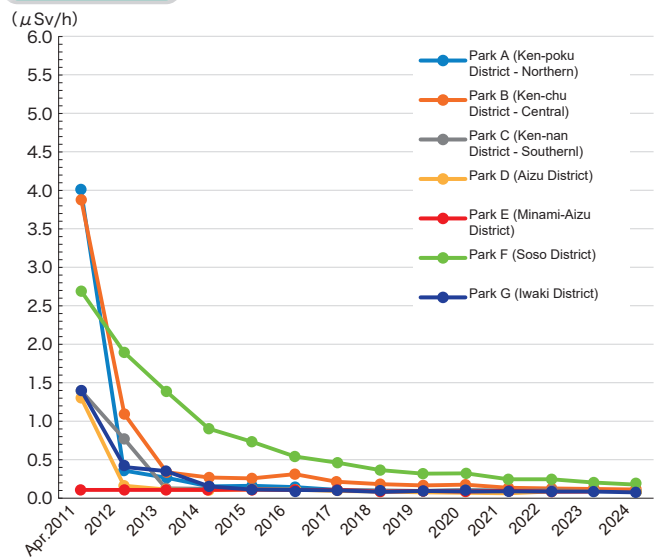
Fukushima Prefecture regularly surveys air dose rates at schools, urban parks, tourist spots, and other locations within the prefecture. In the Nakadori and Hamadori regions, the effects of natural attenuation and decontamination of radioactive substances are definitely appearing. Air dose rates in the Aizu region have restored to pre-accident levels.

Let's look at the graph

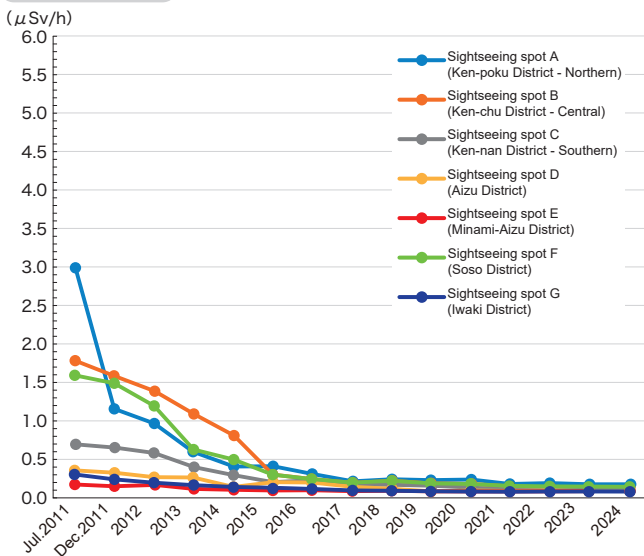
School



Urban Park



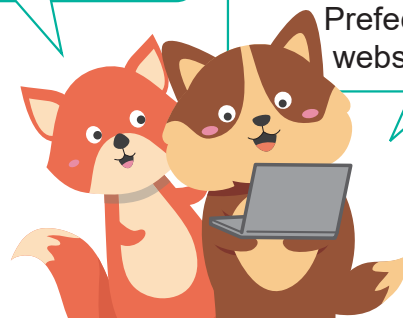
Sightseeing Spot



The number of places surveyed
14,900 as of 2011
13,000 as of 2024

They're still surveying more than 10,000 locations.

What other places are they surveying? Let's check it out on the Fukushima Prefecture's website!



Publication of data



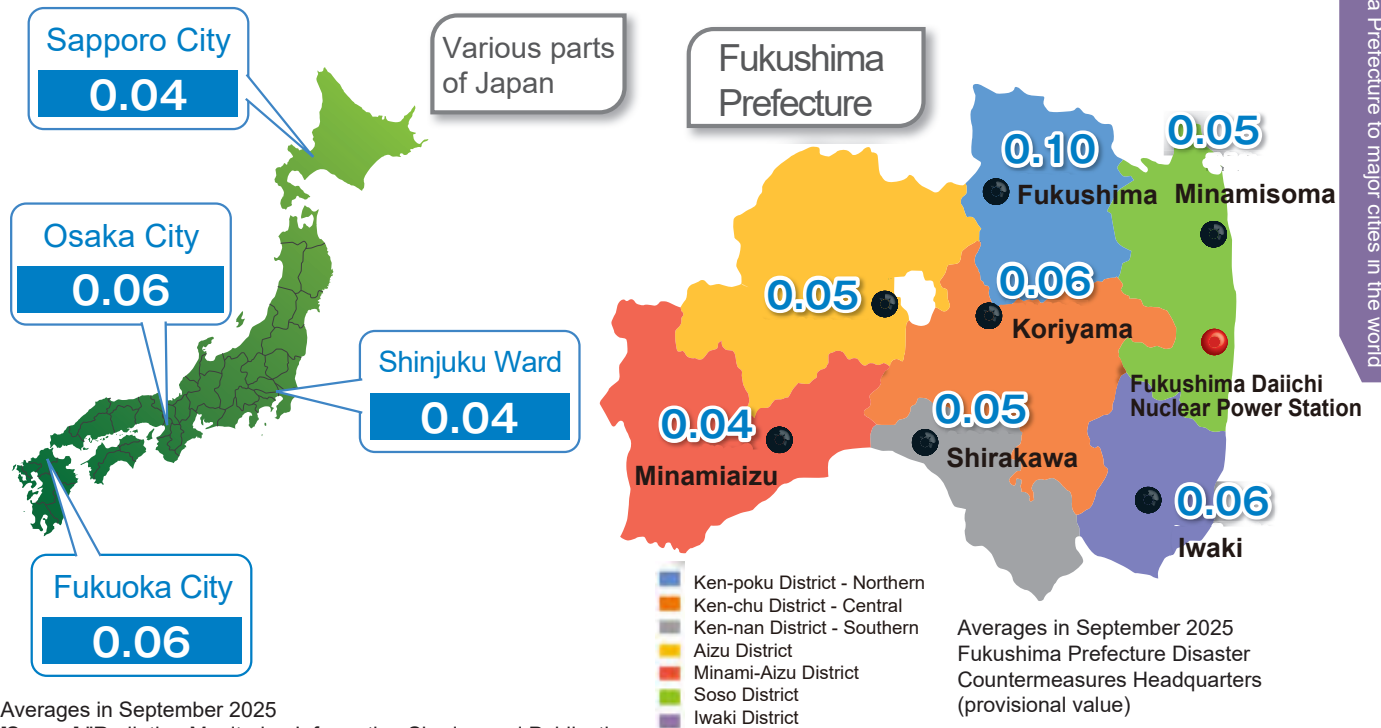
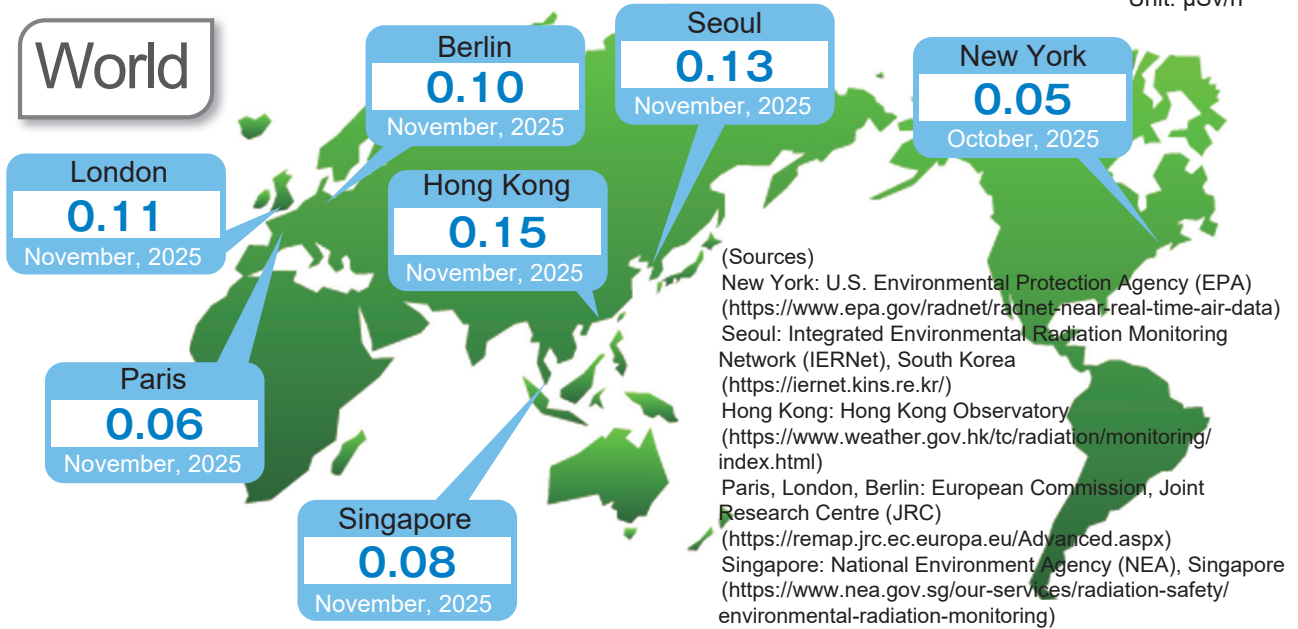
See page 11

* The values shown are the maximum measured values from each of the facilities and spots used as examples.
* Locations surveyed were selected from facilities and spots with relatively high measured values at the time of the disaster and that are still open as of FY2025.
* The 2011 values for the sightseeing spots are from July, as measurements began that month.
* Difficult-to-return Zones are not included in the above measuring points.

Comparison of air dose rates in Fukushima Prefecture to major cities in the world

The air dosage rate in Fukushima Prefecture (excluding the areas where evacuation was ordered) is now about the same level as that of major cities in the world.

Unit: $\mu\text{Sv/h}$



Averages in September 2025
 [Source] "Radiation Monitoring Information Sharing and Publication System"(The Nuclear Regulation Authority)
 (<https://www.erms.nsr.go.jp/nra-ramis-webg/>)

Environmental radiation monitoring work was carried out all over Japan even before the nuclear accident. Monitoring posts are also installed all over the country.



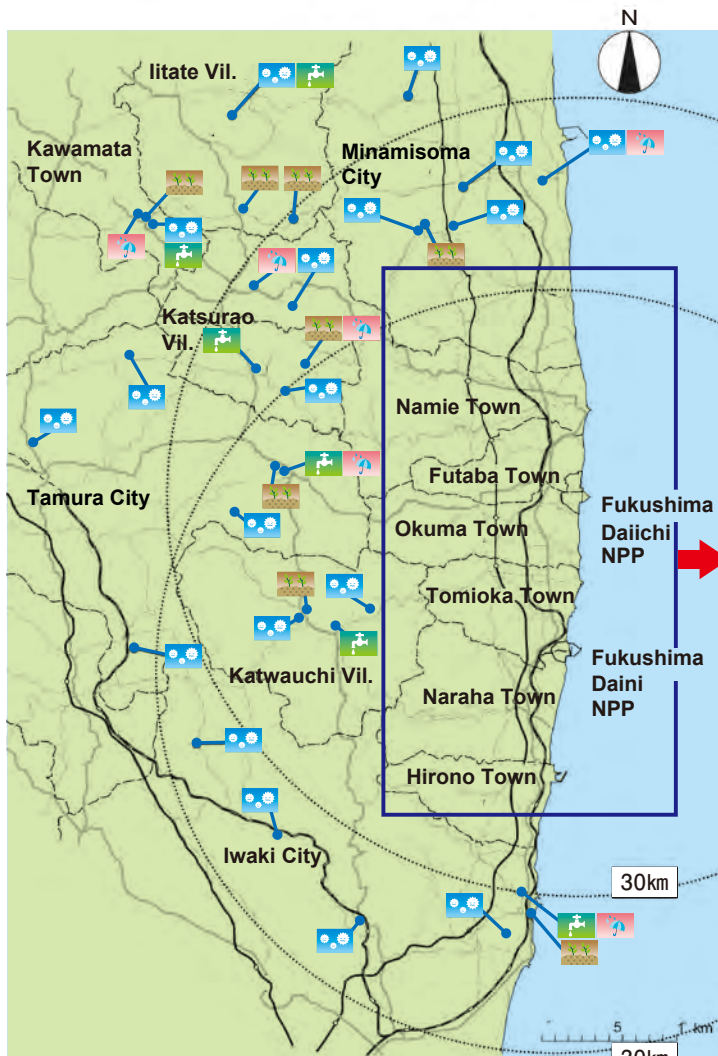
Comparison of air dose rates in Fukushima Prefecture to major cities in the world

Environmental samples in Fukushima

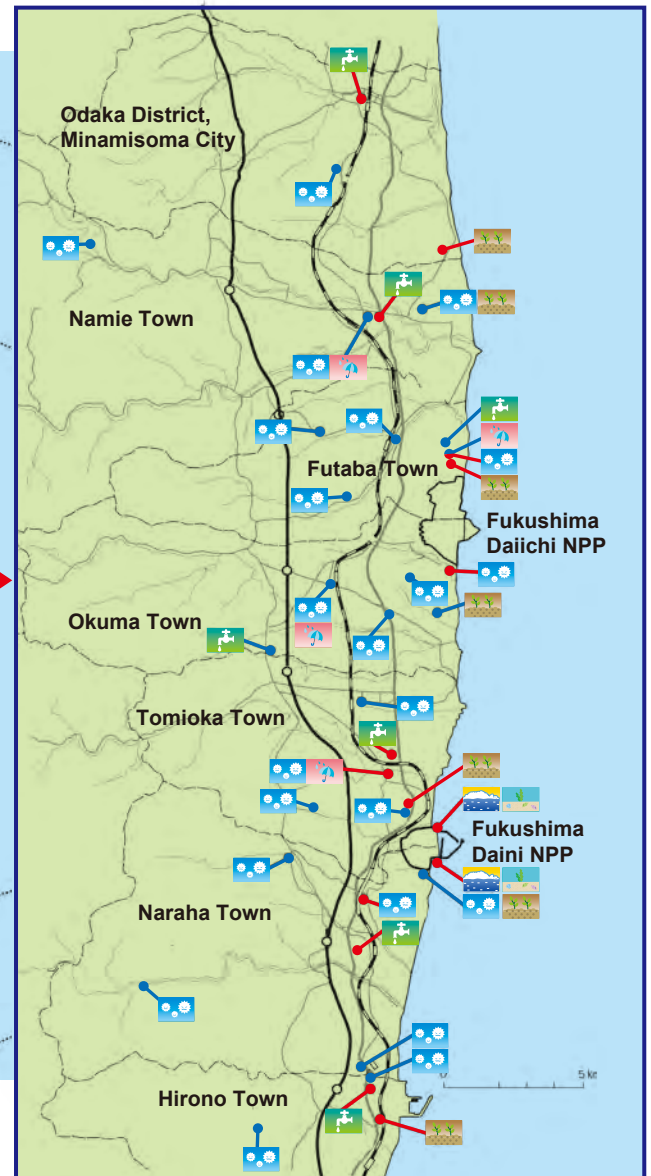
In Fukushima Prefecture, the concentration of radioactive materials is measured in environmental samples, including the air, water, and soil, around the power plant.







● Sampling points for environmental samples

Wide areas around the power plants



Immediate areas around the power plants



-  Dust*1
-  Water supply
-  Fallout*2
-  Seawater*3
-  Soil
-  Marine sediment*3

-  Measured before the accident
-  Measured after the accident

*1 Dust floating in the air.

*2 Rainwater and particles.

*3 Refer to page 10 for the sampling locations of seawater and marine sediment around the Fukushima Daiichi NPP.

Look at the measurement results from 2024

Range of measurement values before the accident

Maximum value after the accident

Tips on how to read the graph

Cs-137



Radioactivity of environmental samples

Range of measurement values in 2024

Maximum value after the accident (Apr., 2011-Mar., 2024)

Range of measurement values before the accident (since 2001)

Types	Radioactive materials detected	Measurement results					Results for 2023		Measurement values from 2021 to 2024	Maximum value after the accident (Apr., 2011-Mar., 2024)	Range of measurement values before the accident (since 2001)		
							Measurement values	Trends					
Dust	Unit (mBq/m ³)	0.01	0.1	1	10	100	1,000	10,000					
	Cs-134								ND	Same level as before the accident	ND-0.034	1,100	ND
	Cs-137								ND-0.60	Remained at the same level	ND-0.89	990	ND
Fallout	Unit(mBq/m ² month)	1	100	10,000	1,000,000								
	Cs-134								ND-1.1	Decreased	ND-5.4	5,000,000	ND
	Cs-137								0.13-73	Decreased	0.24-240	5,600,000	ND-0.15
Soil	Unit (Bq/kg dry)	1	10	100	1,000	10,000	100,000	1,000,000					
	Cs-134								ND-4,200	Decreased	ND-14,000	230,000	ND
	Cs-137								9.7-310,000	Decreased	27-400,000	400,000	ND-16
	Unit (Bq/kg dry)	1	10	100									
	Sr-90								ND-17	Decreased	ND-55	81	ND-3.5
	Unit (Bq/kg dry)	0.01	0.1	1									
	Pu-238								ND-0.02	Same level as before the accident	ND-0.10	0.1	ND-0.03
	Pu-239+240								ND-0.49	Same level as before the accident	ND-0.36	1.4	ND-0.44
Tap water	Unit (Bq/L)	0.1	1	10									
	Cs-134								ND	Same level as before the accident	ND	0.17	ND
	Cs-137								ND-0.029	Decreased	ND-0.036	0.29	ND
	Tritium								ND-0.62	Same level as before the accident	ND-0.60	0.96	ND-1.2
	Unit (Bq/L)	0.0001	0.001	0.01									
	Sr-90								ND-0.0013	Same level as before the accident	ND-0.0014	0.002	0.001-0.002
	Pu-238	Pu-238 was not detected.					ND	ND	ND	ND	ND	-	
	Pu-239+240	Pu-239+240 was not detected.					ND	Same level as before the accident	ND	ND	ND	ND	
Seawater	Unit (Bq/L)	0.001	0.01	0.1	1								
	Cs-134								ND	Same level as before the accident	ND-0.010	2.4	ND
	Cs-137								ND-0.12	Decreased	ND-0.31	5.0	ND-0.003
	Tritium								ND-3.4	Same level as before the accident	ND-1.6	6.2	ND-2.9
	Sr-90								ND-0.0066	Same level as before the accident	ND-0.015	2.9	ND-0.002
	Unit (mBq/L)	0.01	0.1	1									
	Pu-238								ND	ND	ND	0.010	-
	Pu-239+240								ND-0.012	Same level as before the accident	ND-0.019	0.020	ND-0.013
Marine sediment	Unit (Bq/kg dry)	1	10	100	1000								
	Cs-134								ND-4.9	Decreased	ND-11	450	ND
	Cs-137								19-310	Remained at the same level	20-350	1,000	ND-0.97
	Unit (Bq/kg dry)	0.01	0.1	1	10								
	Sr-90								ND-0.75	Remained at the same level	ND-0.51	4.6	ND
	Pu-238								ND-0.01	Remained at the same level	ND-0.01	0.02	-
	Pu-239+240								0.10-0.51	Same level as before the accident	0.09-0.50	0.61	0.15-0.61

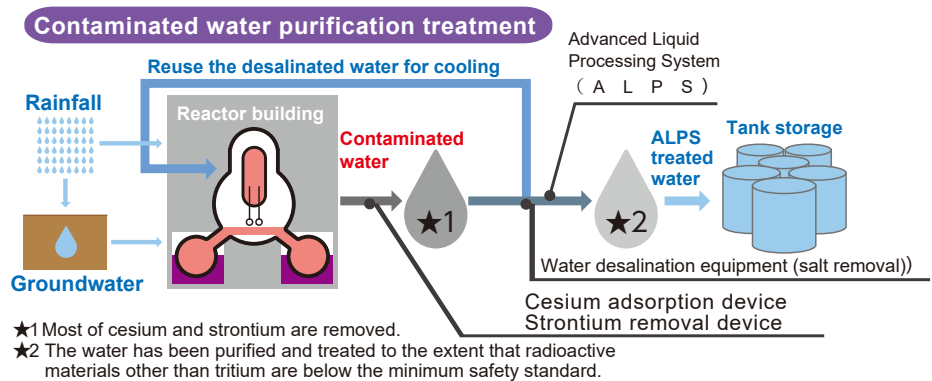
*ND: less than limit of detection

Radioactivity of environmental samples

Discharging ALPS treated water into the sea

What is ALPS treated water?

At the Fukushima Daiichi NPP (Units 1-3), water is injected into the reactors to cool the fuel debris that melted and solidified during the accident. This cooling water becomes contaminated with radioactive materials when it comes in contact with the fuel debris. Even more “contaminated water” is produced when it mixes with groundwater or rainwater flowing into the reactor building.



The contaminated water in the buildings is treated to remove cesium and strontium, and some of it is reused to cool the fuel debris in the reactor after the salt is filtered out (desalination). The remaining water is purified using the 'Advanced Liquid Processing System' (ALPS). This 'ALPS treated water,' which has been treated and purified to radiation levels below the minimum safety standards for radioactive materials (other than tritium), is stored in on-site tanks.

Why do we need to dispose of ALPS treated water?

As of August, 2023, the number of giant tanks storing ALPS treated water at the Fukushima Daiichi NPP exceeded 1,000. Disposing of the treated water and reducing the number of tanks are essential for decommissioning the plant, as space is needed for decommissioning facilities.

As a method of disposal, the government decided in April 2021 on a policy to discharge the ALPS treated water into the sea. Ocean discharge began on August 24, 2023.

It was carried out in compliance with safety standards, and is not expected to have any adverse effects on the environment or human health. However, it is very important to take measures to ensure safety by checking the operation status of the discharge facilities and tritium concentrations in ALPS treated water. Careful monitoring of the ocean area must also be done, due to the long period of time involved.

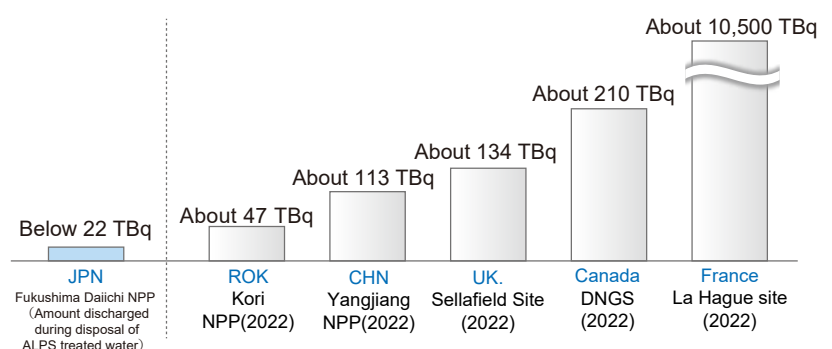
What is tritium?

Tritium is a common form of hydrogen (hydrogen-3), that occurs naturally every day. It can be found in rainwater, tap water, and the human bodies. It is a radioactive material that is broadly present in the natural environment.

Tritium exists as a liquid that combines with oxygen and has almost the same properties as water, making it difficult to separate from water.

How much is tritium being discharged by each country around the world?

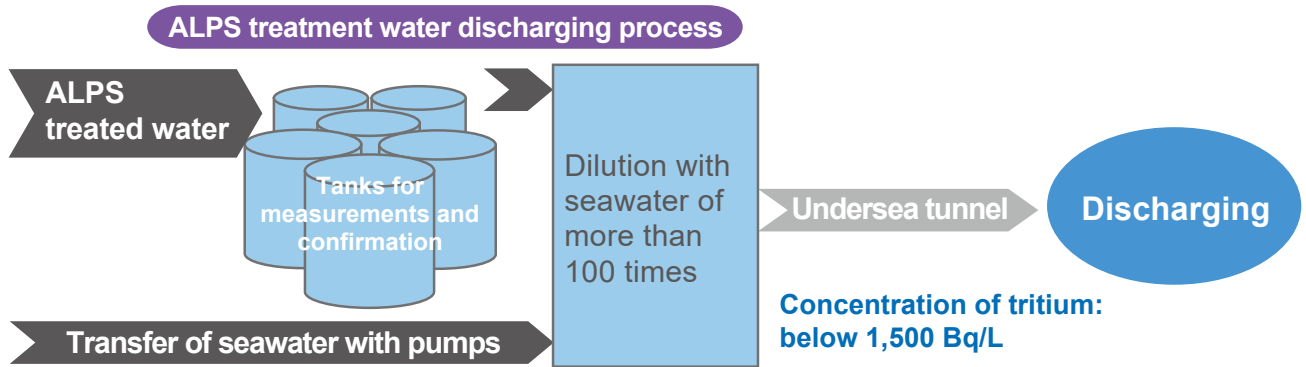
Many nuclear facilities around the world release tritium in compliance with safety standards.



Prepared based on "Let's learn and think about the decommissioning and future of the Fukushima Daiichi NPP!" published by the Agency for Natural Resources and Energy

How high is the tritium concentration that's discharged into the sea?

Before discharging, the concentration of tritium is reduced to 1,500 Bq/L, through a dilution of more than 100 times with seawater.



What is the tritium concentration when discharging ALPS treated water into the sea? → Below 1/40 of the Regulatory Standards (60,000Bq/L)
 Below 1/7 of the WHO Standards for Drinking Water (10,000 Bq/L)*
 *Guidelines for drinking-water quality, 4th edition

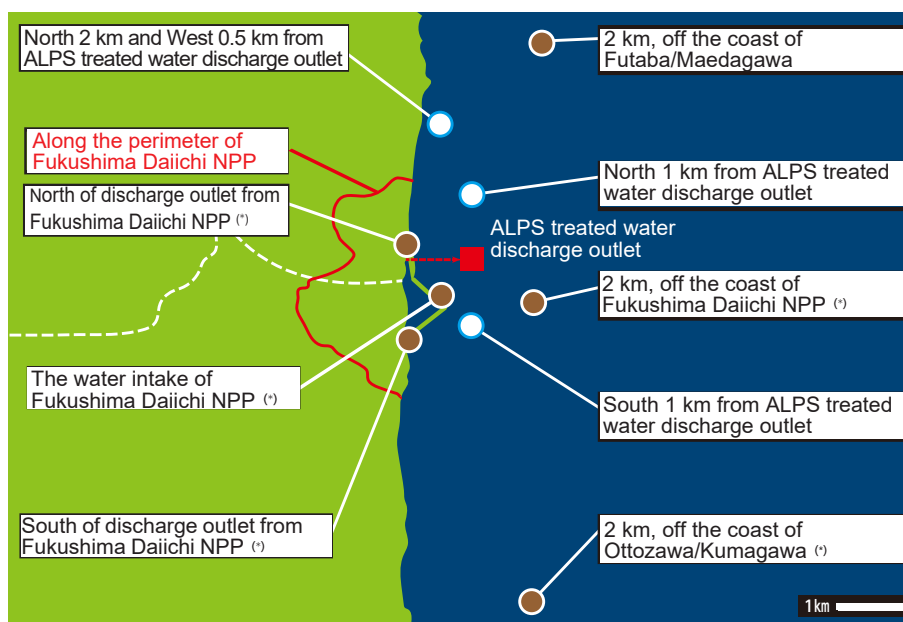
Is discharging into the sea really safe?

Fukushima Prefecture conducts sea area monitoring at nine locations around the Fukushima Daiichi NPP to assess the impact of discharging ALPS treated water into the sea.

Monthly analyses of tritium and other radionuclides in seawater following the discharge have consistently remained far below the national safety standards and the WHO drinking water standards, at levels that would not affect human health or the environment.

Results of tritium analysis

After discharging into the sea (September, 2023–September, 2025)	Before discharging into the sea (April, 2022–August, 2023)
Below the detection limit (<0.05) Up to 3.0Bq/L	Below the detection limit (<0.04) Up to 0.66Bq/L



Measurement points for seawater and marine sediment

(*) Measured before the accident

○ = Seawater only

● = Seawater and marine sediment

How high is the tritium concentration that's discharged into the sea?

Fukushima Prefecture website



<https://www.pref.fukushima.lg.jp/sec/16025d/>

You can see the results of measurement by the monitoring posts and measurement of environmental samples on the “Fukushima Prefecture website” and “Fukushima Prefecture Radioactivity Measurement Map.”



POINT

Click the desired icon and check the results of measurement of radioactive substances with monitoring posts or survey meters. You can also see the report on the measurement results of environmental radioactivity around the nuclear power plants and the materials of the Environmental Monitoring Evaluation Subcommittee.

The screenshot shows a grid of icons for different monitoring categories:

- 空間線量率の測定結果** (Spatial Dose Rate Measurement Results): Includes icons for monitoring posts (モニタリングポスト), environmental samples (環境検体), and specific locations like Fukushima Prefecture Radioactivity Measurement Map (福島県放射能測定マップ) and Fukushima Prefecture Environmental Monitoring Evaluation Subcommittee (福島県環境放射能評価委員会).
- 放射性物質の測定結果** (Radioactive Substance Measurement Results): Includes icons for air (空気), water (水), soil (土), food (食品), and other environmental samples.

Fukushima Prefecture Radioactivity Measurement Map



<http://fukushima-radioactivity.jp/pc/>

POINT

foreign language

Information is also available in English, Chinese, and Korean.

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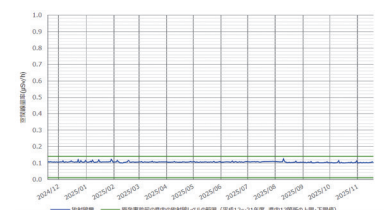
Other date and time Search

You can search for measurement results for other dates and times.

POINT

See the graph

Displays a graph of air dose rate.



福島県放射能測定マップ

The screenshot shows a map of Fukushima with various monitoring points. A pop-up window displays measurement data for a specific location:

- 地点No: 3750
- 福島県 県北保健福祉事務所
- 測定日時: 2025/11/19 13:00
- 空間線量率: 0.10μSv/h
- 福島第一原発からの方位・距離: 東(東) 約63km
- 出力: 福島県

 The interface also includes search filters and a legend for measurement methods.

POINT

The icon colors are displayed according to the air dose rate.

POINT

The icons are displayed according to the measurement method. You can check the measurement results by clicking a desired icon.

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