

福島
その先の環境へ。

Revitalize Fukushima

For the reconstruction of Fukushima,
the national government is playing an active role
in implementing the landfill disposal project while
taking all possible measures to ensure safety.
We are grateful for your understanding and cooperation.

Information Website for the Specified Waste Landfill Project

https://shiteihaiki.env.go.jp/tokuteihaiki_umetate_fukushima

Contact the following number for questions regarding specified waste materials.



TEL: 0120-869-444 Toll-free number

Operating hours: 9:30 am – 6:15 pm (Except for Sundays and holidays)



Specified Waste Landfill Project

Landfilling waste contaminated with radioactive materials
in a leachate-controlled disposal facility

March 11, 2011

The Great East Japan Earthquake brought devastation on a tremendous scale to Japan.

The magnitude 9.0 earthquake was the largest earthquake in Japan's recorded history. The subsequent tsunami caused unprecedented damage, mainly along the Pacific coast of the Tohoku area. Additionally, large amounts of radioactive materials were released into the atmosphere due to the accident at the Fukushima Daiichi Nuclear Power Station operated by Tokyo Electric Power Company.

In order to minimize the impact of radioactive contamination on human health and the environment, the national government established the Act on Special Measures Concerning the Handling of Radioactive Pollution* and is enacting decontamination efforts, treatment of removed soil and other specified waste, and a range of other programs aimed at environmental restoration and recovery in Fukushima.

Safely disposing of contaminated waste involves reducing the volume of waste as much as possible through incineration before landfill. In April 2016, the Ministry of the Environment took over an existing leachate-controlled disposal facility (the former Fukushima Eco Tech Clean Center), and began processing waste here as the specified waste landfill site starting November 2017.

We are actively working to consider the surrounding environments, ensure multiple levels of safety controls, and promptly disclose information throughout the implementation of this project.

*Act on Special Measures concerning the handling of radioactive pollution, stipulating the system and standards decontaminate and handle waste polluted by radioactive materials attributed to the accident at the Fukushima Daiichi Nuclear Power Station on March 11, 2011 (Law No. 110, August 30, 2011)

○ The issue of waste contaminated with radioactive materials needs to be resolved as promptly as possible for the reconstruction of the eight municipalities in Futaba-gun, as well as Fukushima Prefecture.

○ Waste with a radioactivity concentration of 100,000 Bq/kg or less can be safely disposed of at a leachate-controlled landfill site. Specified waste will be promptly disposed of utilizing the existing leachate-controlled landfill site (the former Fukushima Eco Tech Clean Center). This site is located in Futaba-gun, where a large quantity of specified waste has been generated, and the center has an adequate storage capacity.

○ This landfill disposal project will be carried out responsibly as a national project based on the Act on Special Measures Concerning the Handling of Radioactive Pollution.

○ The Ministry of the Environment put this disposal site under government control in April 2016, and began disposing of specified radioactive waste here in November 2017.

○ October 31, 2023 marked the final day of specified waste landfill and the successful completion of this project. We will continue with landfill of household waste from the 8 municipalities in Futaba County until approximately November 2027.

○ In implementing the project, we are actively working to consider the environment surrounding the site and provide multiple management measures to ensuring safety and the prompt release of information.

Specified Waste

Based on the Act on Special Measures Concerning the Handling of Radioactive Pollution, specified waste refers to regional and industrial waste from the contaminated waste countermeasure area (hereinafter referred to as countermeasure area) and designated waste. The waste from the countermeasure area includes disaster waste or clean-up waste from areas such as the former restricted zones in Fukushima. Designated waste is waste that was designated by the Minister of the Environment and contains radioactive substances in concentrations over 8,000 Bq/kg and less than 100,000 Bq/kg.

INDEX

Environmental Regeneration in Fukushima.....P.3
Location of the Specified Waste Landfill Site.....P.5
Waste Being Landfilled.....P.7
Disposal Process.....P.9

〈Overview of Each Process〉

Landfill disposal.....P.11
Leachate treatment.....P.15

〈Programs to Ensure Safety〉

Management system.....P.16

Monitoring.....P.17
Response to disasters or accidents.....P.19
Management after completion of landfill.....P.20

Radiation dose in Fukushima.....P.21
Basic knowledge of radiation.....P.22
Reprun Fukushima.....P.23

Environmental Regeneration in Fukushima

The nuclear power station accident following the Great East Japan Earthquake caused radioactive contamination of the environment. In order to quickly minimize the effect this contamination could have on people's health or their living environments, contaminated waste disposal and soil decontamination measures have been in accordance with the Act on Special Measures Concerning the Handling of Radioactive Pollution. These ongoing measures proactively seek to reduce negative impact on the surrounding environment and people by implementing multiple safety measures and promptly sharing information. The national government takes responsibility for the storage and management of removed soil and contaminated waste in multiple locations within Fukushima Prefecture, and all initiatives are conducted in collaboration with municipal governments, with safety as a top priority.

Environmental Regeneration Efforts

Flowchart of disposal process for specified waste and removed soil as determined in the Act on Special Measures Concerning the Handling of Radioactive Pollution

Removed soil and waste

Removed soil and waste generated from efforts to remove radioactive substances released into the environment are stored safely at temporary storage facilities.

Soil

Subject to decontamination: Residential land, farmland, forest, road, etc.

Waste



Reduced as much as possible

Exceeding 100,000 Bq/kg

Interim Storage Facility

The accident at the Fukushima Daiichi Nuclear Power Station operated by Tokyo Electric Power Company produced large quantities of soil and waste that contain radioactive materials that were released into the atmosphere. The soil and other waste generated during the decontamination process within Fukushima Prefecture are temporarily stored at this facility.

Recycled/Reduced as much as possible, then moved to final disposal



Specified waste

This signifies waste from countermeasure areas and designated waste as determined in the Act on Special Measures Concerning the Handling of Radioactive Pollution.



Designated waste

Waste designated by the Minister of Environment with radioactive contamination levels exceeding 8,000 Bq/kg

examples:

- incineration ash
- agriculture and forestry waste (straw, compost)



Waste from the countermeasure area

Waste from the contaminated waste countermeasure area (designated by the Minister of Environment) meeting certain conditions

examples:

- rubble generated from the earthquake and tsunami
- residential demolition waste



Reduced as much as possible

100,000 Bq/kg or below

Specified Waste Landfill Site

Waste with radiation levels of 100,000 Bq/kg or less are disposed of safely at a leachate-controlled disposal facility.*

*Leachate-controlled disposal facility

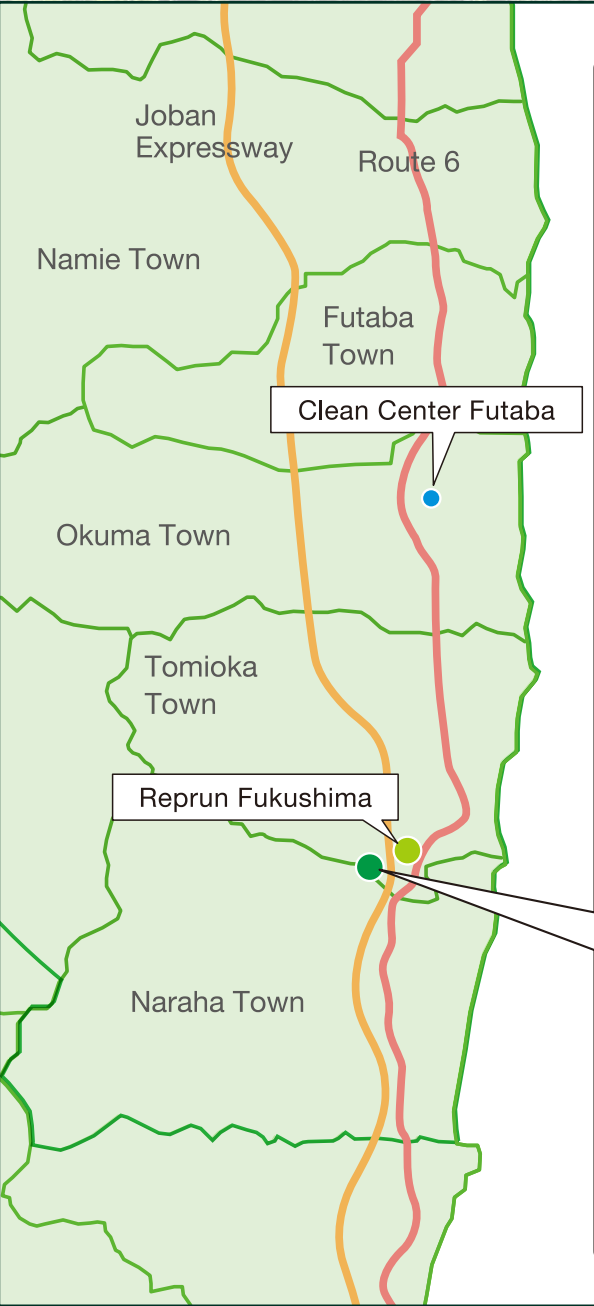
Leachate is liquid that drains or "leaches" from a landfill. It is generated from liquids present in the waste and from outside water, including rainwater, percolating through the waste.

A leachate-controlled disposal facility is equipped with water collection equipment, leachate treatment tool, and materials to cover the landfill to prevent the spread of pollution of groundwater and public water.



Location of the Specified Waste Landfill Site

The specified waste is disposed of in a leachate-controlled disposal facility, the site of the former Fukushima Eco Tech Clean Center, which began operation in 2001. The Ministry of the Environment put this facility under government control in April 2016, and has since been operating a national project to dispose of waste contaminated with radioactive materials at this site.



Specified Waste Landfill Site

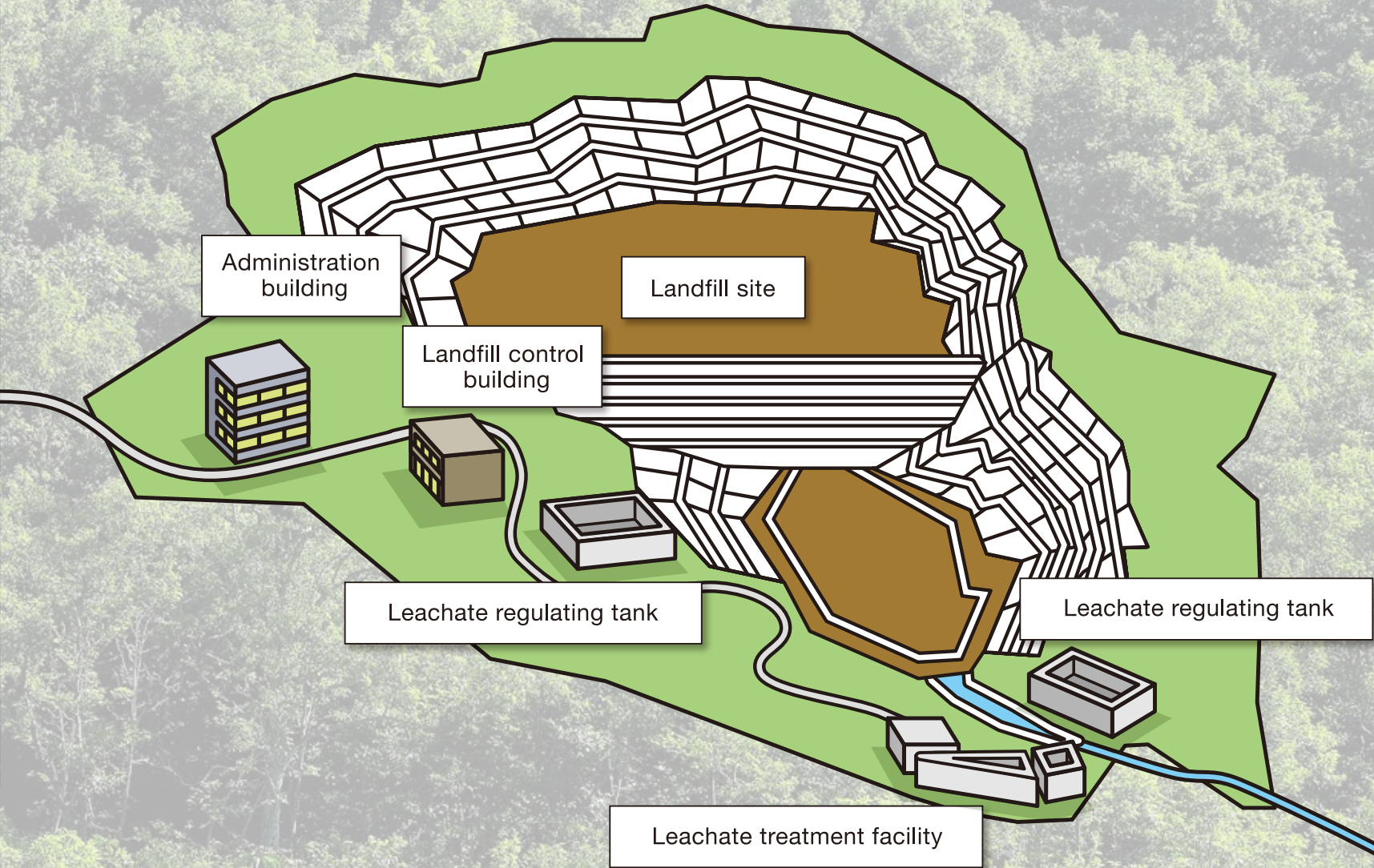


The Specified Waste Landfill Site (former Fukushima Eco Tech Clean Center) is located in Tomioka Town. The transport road is in Naraha Town.

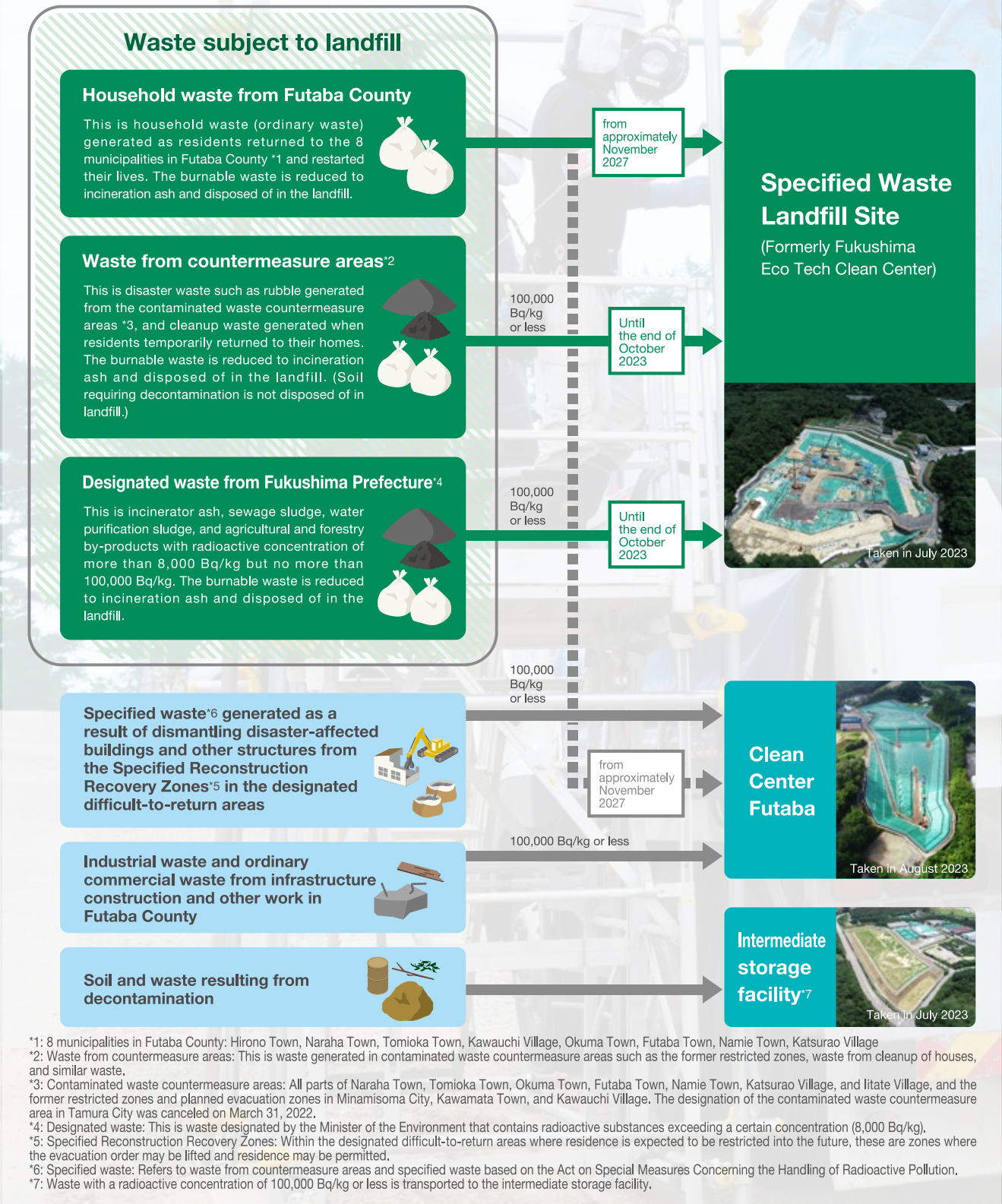
Overview	
Site area	: Approx. 9.4 hectares
Landfill area	: Approx. 4.2 hectares
Landfill capacity	: Approx. 960,000 m ³
Remaining capacity	: Approx. 740,000 m ³ (as of May, 2011)
[Available landfill capacity: Approx. 650,000 m ³ Earth dam: Approx. 90,000 m ³]	

*Available landfill capacity includes the soil layers, which are filled in alternate layers with the waste for the purpose of safe waste disposal.

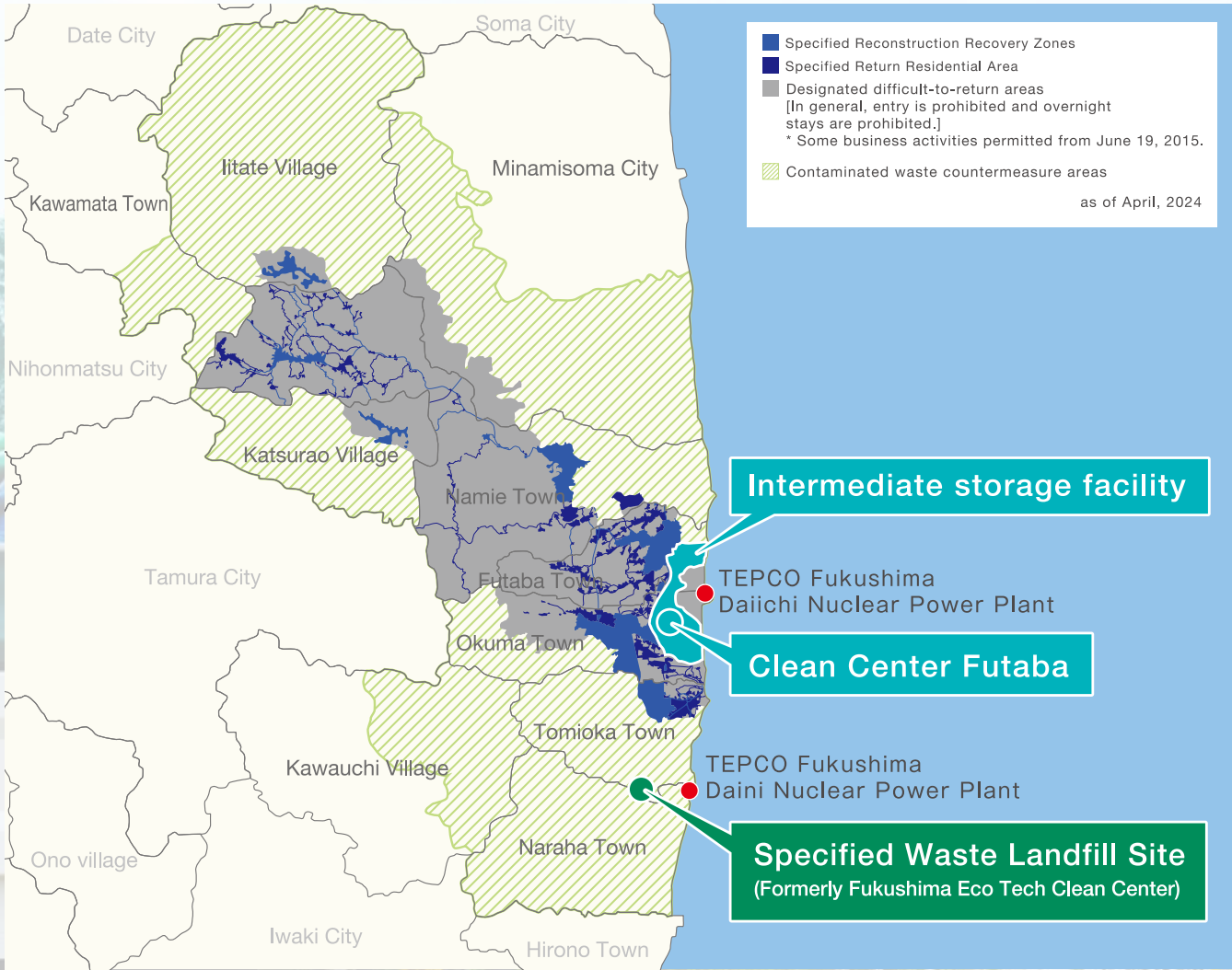
The disposal site is built on the Tomioka stratum, which consists of firm ground that has extremely low water permeability. The entire surface of the site is covered in a double geomembrane liner to prevent leachate from leaking outside the repository. Multiple safety measures are provided to identify any damaged areas. October 31, 2023 marked the final day of specified waste landfill and the successful completion of this project. We will continue with landfill of household waste from the 8 municipalities in Futaba County from approximately November 2027.



Waste Being Landfilled



The waste consists of incinerated ash and unrecyclable incombustibles with radioactivity concentrations limited to 100,000 Bq/kg or less.



Landfill Schedule

The planned landfilling period is approximately 6 years for waste from countermeasure area and specified waste, and approximately 10 years for household waste from the eight Futaba-gun municipalities.

	(2017)	6 years (2023)	10 years (2027)
Waste from the countermeasure area			
Specified waste from Fukushima Prefecture			
Household waste from the eight Futaba-gun municipalities			

Facility control and monitoring will continue after completion of the landfill.

Disposal Process

The waste will be managed from transport to landfill disposal with safety as a top priority.

<since 2025>

Storage site

Transport preparation

The radioactivity concentration of the waste is checked at the storage site to confirm that all waste does not exceed 100,000 Bq/kg. Then, the waste is sealed into containers.



Transport

Transport is carried out based on the transport plan. Drivers carry communication

devices and a notification system has been established.



Specified Waste Landfill Site

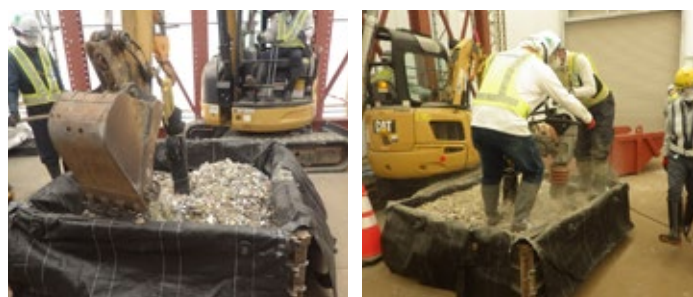
Arrival Inspection

Radiation from waste and condition of the containers are checked.



Repackaging

The transported household waste (non-burnable waste) is repackaged into ground-improvement containers.



Landfill disposal

The containers are buried while soil layers and impenetrable soil

layers are installed.



Leachate treatment

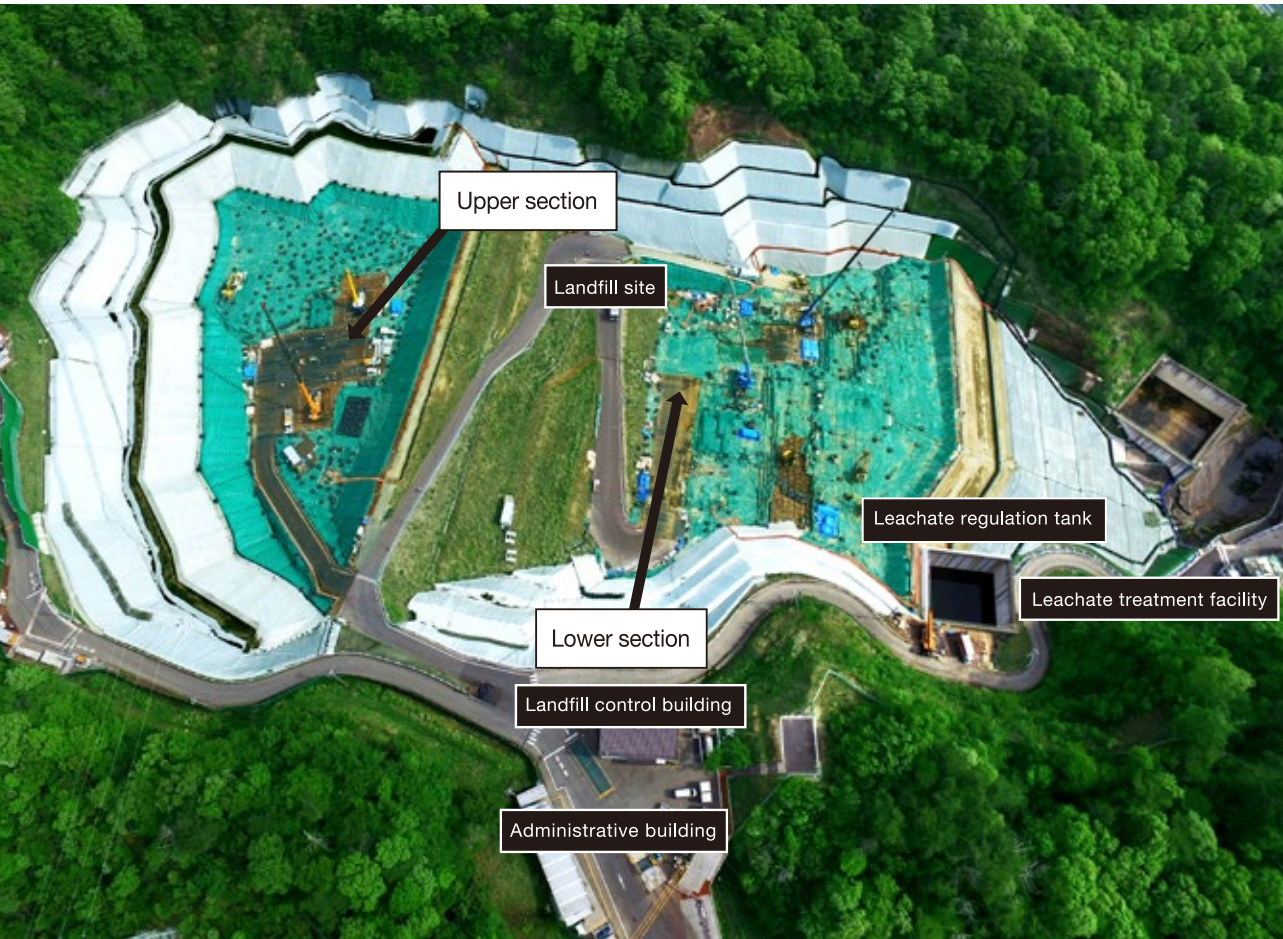
After treatment, such as disinfection and the removal of harmful substances, the leachate is checked to confirm that the standards for radioactivity concentration and other characteristics are met before it is discharged.



Overview of Each Process

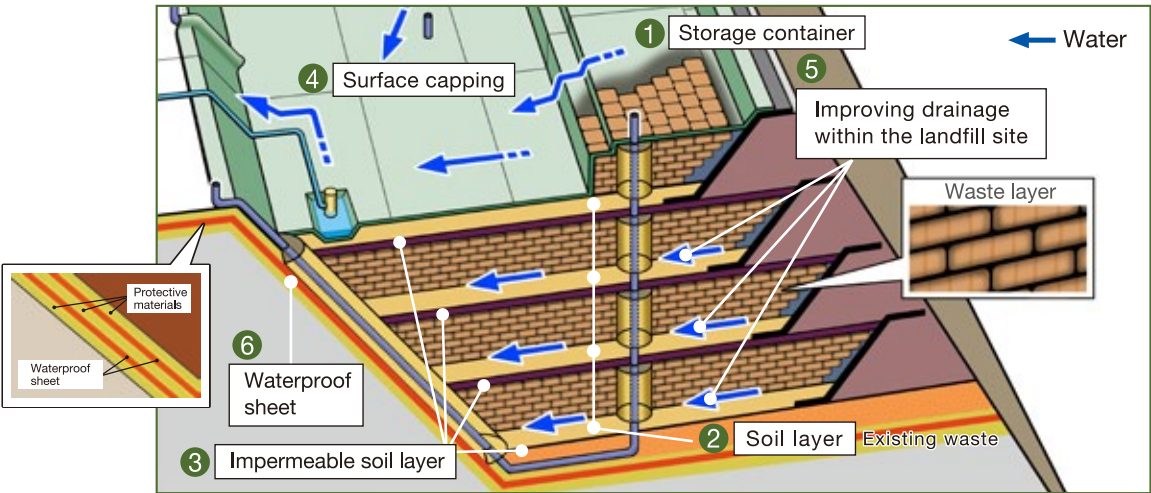
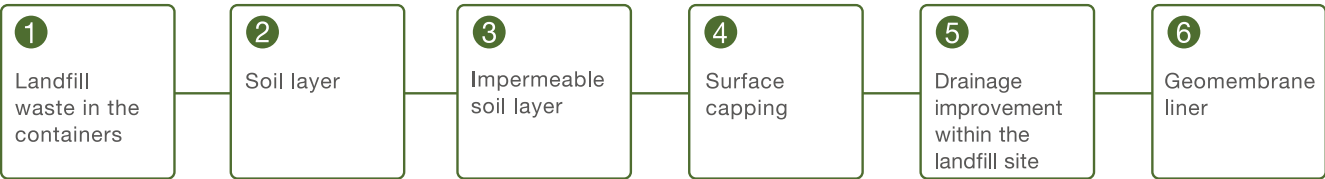
Landfill disposal

In order to restrict the impact of radioactive cesium on the environment, the specified waste is placed in the landfill sealed inside the containers, while layers of soil are laid in the landfill in accordance with the disposal standards in the Act on Special Measures Concerning the Handling of Radioactive Pollution.



Multiple safety measures are taken to prevent leakage of radioactive cesium from the landfill site.

Multiple safety measures



Cross-section of the landfill layer (internal image of the landfill site)

Bird's eye view



Specified Waste Landfill Site

Upper section

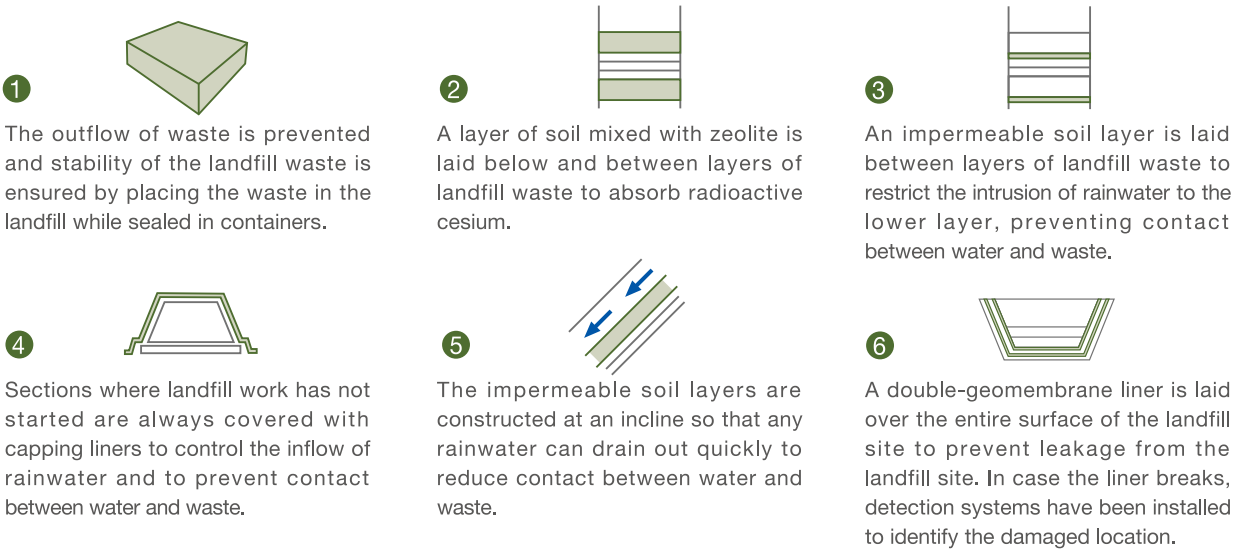


Upper section : Landfill of cement solidified waste and non-cement solidified waste

Lower section



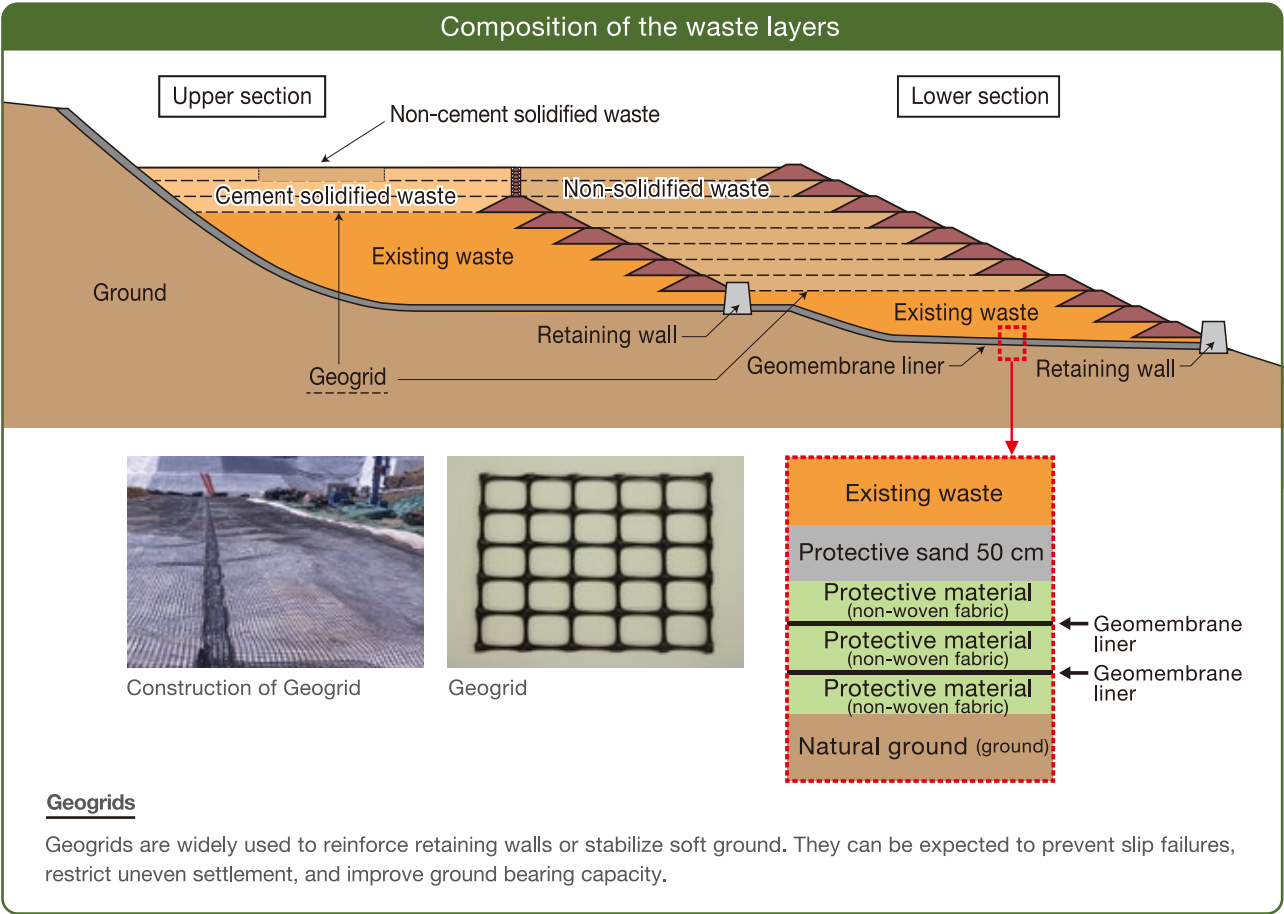
Lower section : Landfill of non-cement solidified waste



Landfill disposal (continued)

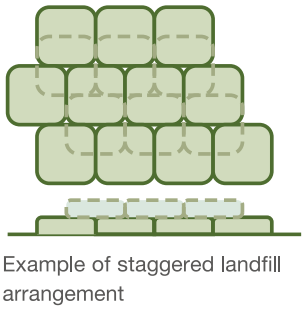
Waste layer reinforcement measures

Before commencing the disposal of specified waste, the existing waste in this site was relocated to the lower sections to ensure a safe and smooth landfilling process. The bearing capacity at the top surface of the existing waste was checked and a geogrid was constructed to reinforce the existing waste layer. Multiple layers of geogrids are also constructed over the landfill waste layers to further improve the stability of all waste layers.



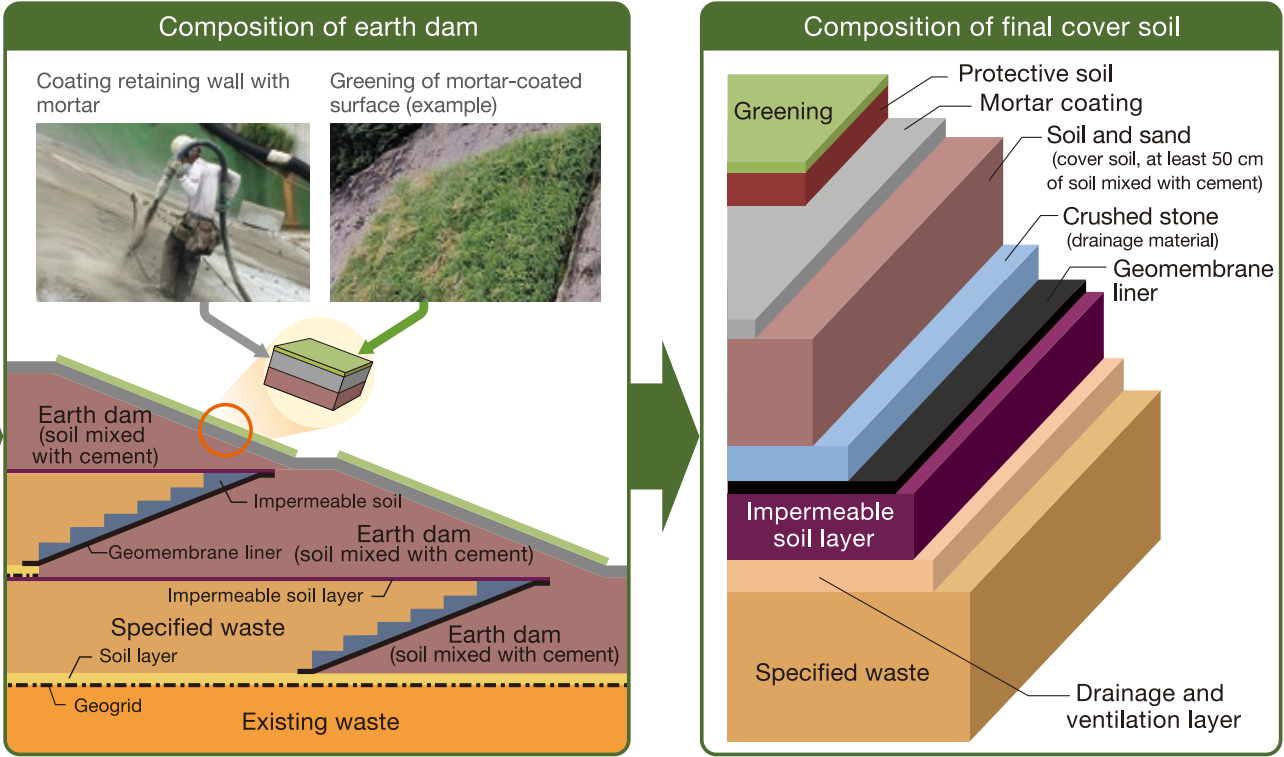
Layering of waste

The landfill is thoroughly managed so that deformation and settlement of the landfill waste layers will not occur. Waste sealed in containers is landfilled in a staggered arrangement. The gaps between the containers are filled with sand or other material to increase the stability of the waste layer. When soil-stabilization containers are placed in the landfill, surface compaction is performed by heavy equipment to ensure stability of the tiers.



Reinforcement of earth dam and final cover soil

Soil mixed with cement is used for earth dams and the final cover soil to improve stability. Covering the surfaces with mortar restricts the infiltration of rain into the landfill. In addition, greening on the mortar-covered surfaces improves the landscape and also protects the covering.



Containers for landfill waste



Cubic container

Cubic container

Fly ash elutes radioactive cesium relatively easily. They are cement solidified and sealed in cubic containers before being placed in the upper section of the landfill. Cement solidification can restrict the elution of radioactive cesium.



Soil-stabilizing container

Soil-stabilizing container

Bottom ash and non-combustible waste do not easily elute radioactive cesium. They are sealed in soil-stabilization containers and placed in the lower section of the landfill (From June 2023, the upper section). Unlike ordinary containers, waste that is sealed in soil-stabilization containers can be compacted, enabling the formation of more stable landfill layers.

Information website for
the Specified Waste Landfill Project

This website provides information including an overview and details of the project, project safety measures, and the actions of the Committee for Environment and Safety.

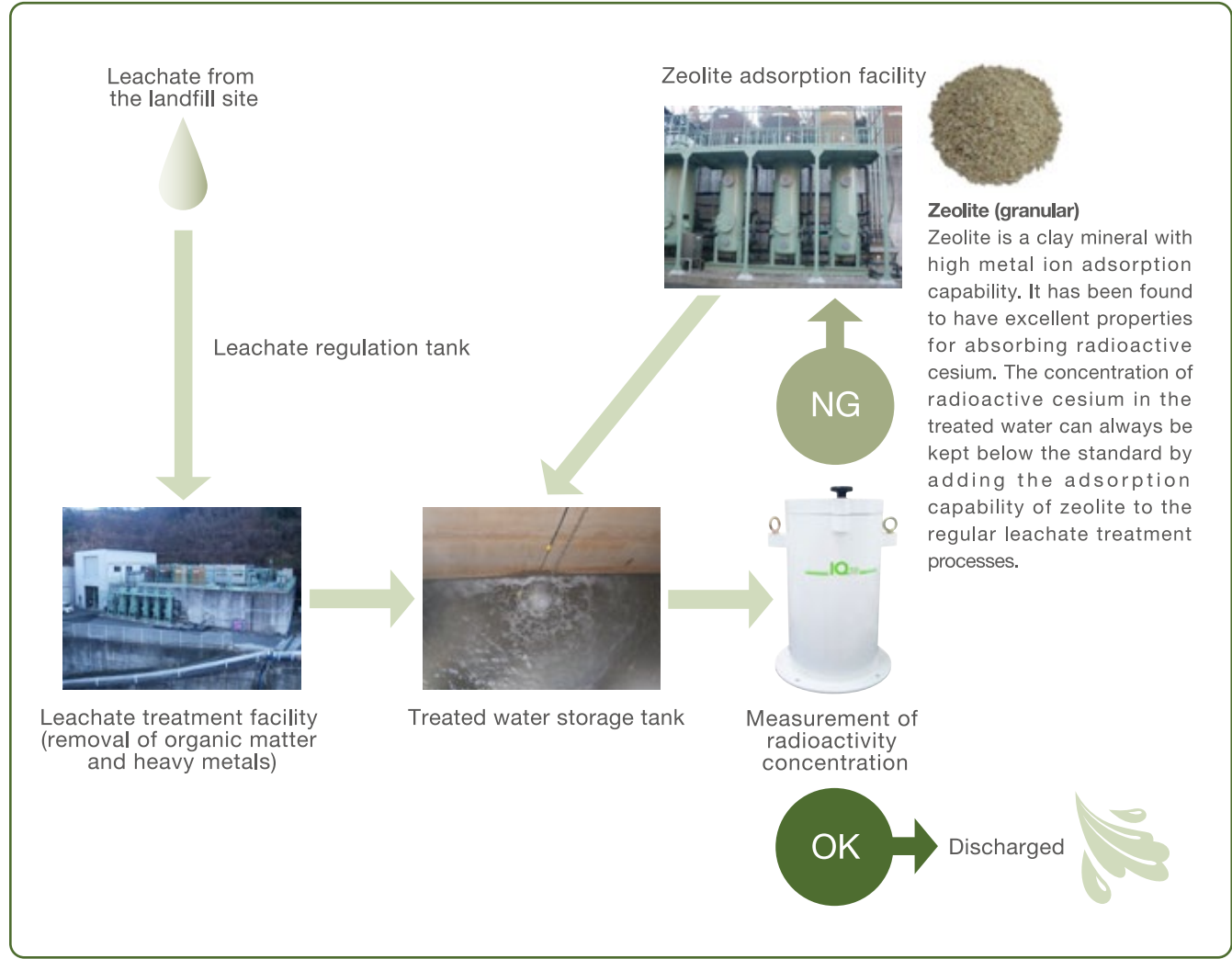
Specified waste landfill Search

Leachate treatment

Leachate generated from the landfill is treated by a disinfecting process, coagulating sedimentation, filtering, active carbon adsorption, and other processes, and organic substances, heavy metals, and other substances are removed. After a series of such treatments, the treated water is temporarily stored in the storage tanks, where the concentration of radioactive cesium is measured. When it has been confirmed that the treated water meets the standard*, the treated water is discharged. If the radioactive cesium contained is found to exceed the standard, the radioactive cesium is removed in a zeolite adsorption facility. The concentration of radioactive cesium in the treated water is then measured again. The treated water is discharged only after confirming that it meets the standard.

* The sum of the radioactivity concentrations of cesium-134 and cesium-137 divided by 60 Bq/L and 90 Bq/L respectively should not exceed 1.

$$\frac{\text{Concentration of } ^{134}\text{Cs (Bq/L)}}{60 \text{ (Bq/L)}} + \frac{\text{Concentration of } ^{137}\text{Cs (Bq/L)}}{90 \text{ (Bq/L)}} \leq 1$$



Programs to Ensure Safety

Management system

The Ministry of the Environment is responsible for management during and after landfill disposal under the Act on Special Measures Concerning the Handling of Radioactive Pollution.

- **Administration:** Ministry of the Environment
- **Site management:** Ministry of the Environment (site manager is always stationed on location)
- **Monitoring system:** Committee for Environment and Safety

Agreement on Ensuring the Safety of Areas Surrounding the Landfill Site

- Concluded in June 2016, this is an agreement between Fukushima Prefecture, Tomioka and Naraha towns and the Ministry of the Environment with the aim of conserving the environment and ensuring the safety of the areas surrounding the landfill site.
- When disposing of specified waste and other waste at the landfill site, the Ministry of the Environment is responsible for taking all necessary measures to ensure safety, and these measures shall be checked by Fukushima Prefecture along with Tomioka and Naraha towns.



Monitoring

In addition to conventional monitoring at the leachate-controlled landfill site, measurement data including radioactivity concentration of the discharged water and air dose rate is also monitored. Monitoring results are published on the website of the Specified Waste Landfill Project.



- ★ Site boundary air dose rate measurement checkpoint (6)
(★ including 1 background location)

★ Landfill site air dose rate measurement checkpoint (4)

★ Air dose rate checkpoint (monitoring post)

■ Groundwater quality checkpoint
(groundwater collection and drainage pipe) (1)

■ Leachate quality checkpoint (1)

■ Treated water quality checkpoint (1)

■ Discharged water quality checkpoint (1)
- Odor (2)

● Landfill gas (2)

● Noise and vibration (1)

◆ Dust radioactivity concentration(4)

■ Rainwater radioactivity concentration (2)

● Plant (pine needles) radioactivity concentration(3)

■ Groundwater radioactivity concentration

◆ Dust radioactivity concentration

Monitoring at the landfill site

★ Air dose rate checkpoint

The air dose rate is measured continuously at the entrance of the landfill site and at the site boundary.



Monitoring post

◆ Radioactivity concentration in dust

The radioactivity concentration in dust is measured continuously around the landfill site.



Continuous measurement system for radioactivity concentration in dust

■ Groundwater radioactivity concentration

Radioactivity concentration is measured for groundwater in the groundwater collection pipes.



Continuous measurement system for groundwater radioactivity concentration

■ Treated water quality checkpoint

Treated water is temporarily stored, and is discharged only after its radioactivity concentration is measured.



Spectrometer

Monitoring of the surrounding environment

● Radioactivity concentration in river water and surroundings

Radioactivity concentrations are measured in river water, river sediment, surface soil and plants at 8 points downstream of the disposal site.

○ Radioactivity concentration on the transport route

Radioactivity concentration in air, noise, vibration, air dose rate and traffic volume are measured and surveyed at 3 points on the transport route.



Air dose rate measurement and river water collection

Real-time monitoring of the specified waste landfill site

Monitoring data such as air dose rates and radioactivity concentrations in air and groundwater are posted in real time.

Specified waste real-time monitoring

Search

Response to disasters or accidents

We, the Ministry of the Environment, have created manuals and established a system to ensure a rapid on-site response. In case of an emergency such as a disaster or accident, emergency measures are carried out, the fire department and/or police department, and other relevant personnel are notified. In addition, based on the advice of experts, we will investigate the cause and discuss countermeasures, and every effort is made to restore the situation.

Traffic accident during transport



- The drivers or other personnel immediately report the accident to the police department, fire department and the person in charge of operations. The driver also moves the vehicle to a safe place to prevent secondary disasters.
- The person in charge of operations immediately contacts the relevant organizations, and if waste leakage occurs, dispatches staff to the site.

Earthquake



- In case of an earthquake, landfill work will immediately be suspended, and the surrounding areas and equipment inspected.

Fire



- In case of fire, landfill work will be suspended and initial fire extinguishing activities conducted. The facility will be checked for damage when the fire has been extinguished. The facility is equipped with fire alarms and fire extinguishers.

Blackout



- In case of a power failure, the emergency generator will start automatically and the system will switch to an emergency power system. During the blackout, controls will be implemented to prevent the discharge of untreated water from the leachate treatment facility.

Typhoon, strong winds, heavy rain and heavy snow



- In case of typhoon, strong winds, heavy rain, or heavy snow, landfill work will be suspended and the work area will be covered with a capping liner. In order to prevent them from curling, sandbags are placed on the liner to fix it firmly in place.

Management after completion of the landfill

The national government will continue to be responsible for managing the landfill site after the completion of disposal process. In the same way as during the disposal period, the government will continue to treat the leachate, and to inspect and maintain the facilities in order to ensure safety. Moreover, the government will continuously monitor the quality of groundwater and treated water from the leachate treatment facility, as well as the air dose rate at the site boundaries.

Major equipment to be inspected and maintained



Retaining wall



Earth dams



Flood control reservoir



Seepage control work



Leachate regulation tank



Leachate treatment facility



Image after completion of the landfill

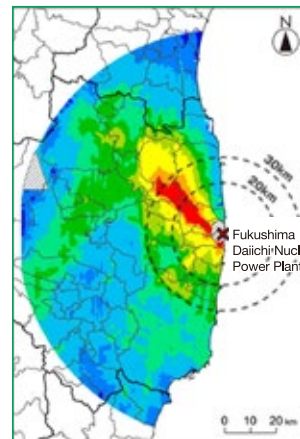
*Use of the site after completion of the landfill will be studied with consideration for the intentions of local residents.

Radiation dose in Fukushima

Changes in the radiation dose in Fukushima

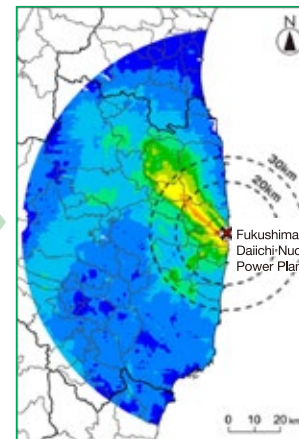
The air dose rate within these regions is declining steadily over time as a result of the natural attenuation of radioactive materials and decontamination efforts.

Distribution map of the air dose rates in an 80 km range within the prefecture



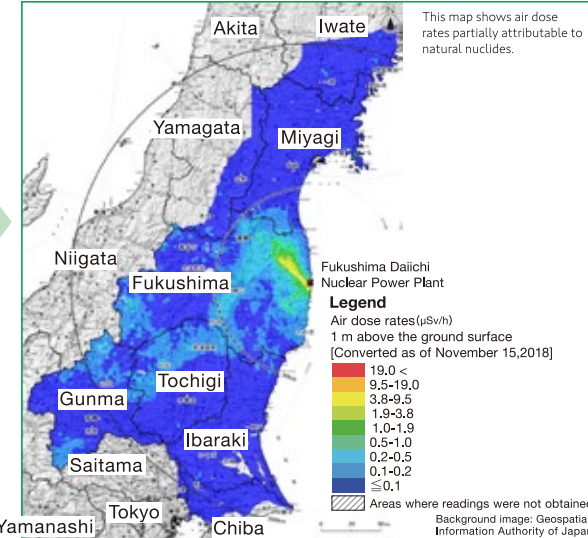
1 month after the accident (April 29, 2011)

*The map from 1 month after the accident was created using a different method than the current map.



54 months after the accident (September 29, 2015)

Distribution map of air dose rates in Fukushima Prefecture and neighboring prefectures

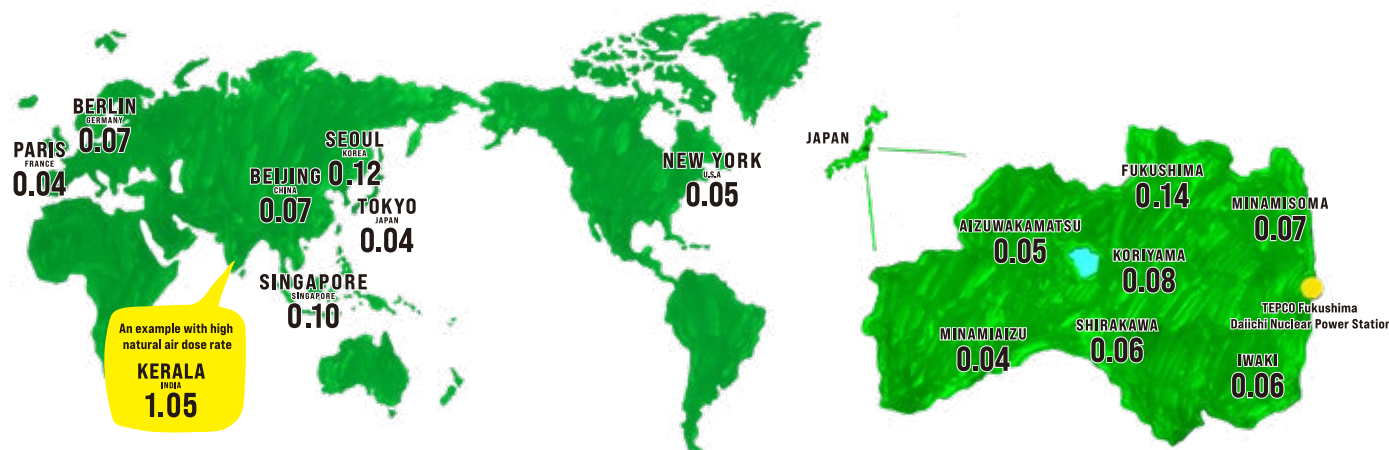


92 months after the accident (November 15, 2018)

Measurement Results from Aircraft Monitoring of Fukushima Prefecture and Neighboring Prefectures (Nuclear Regulation Authority, March 8, 2019)

Comparison of Fukushima and world air dose rates

Today, Fukushima is at approximately the same level as major cities around the world.



The air radiation dose conditions in Fukushima Prefecture are continuing to change year by year. Compared with immediately after the accident at the Fukushima Daiichi Nuclear Power Station, the current air dose rate is decreasing over time and is nearly at the same level as major cities around the world.

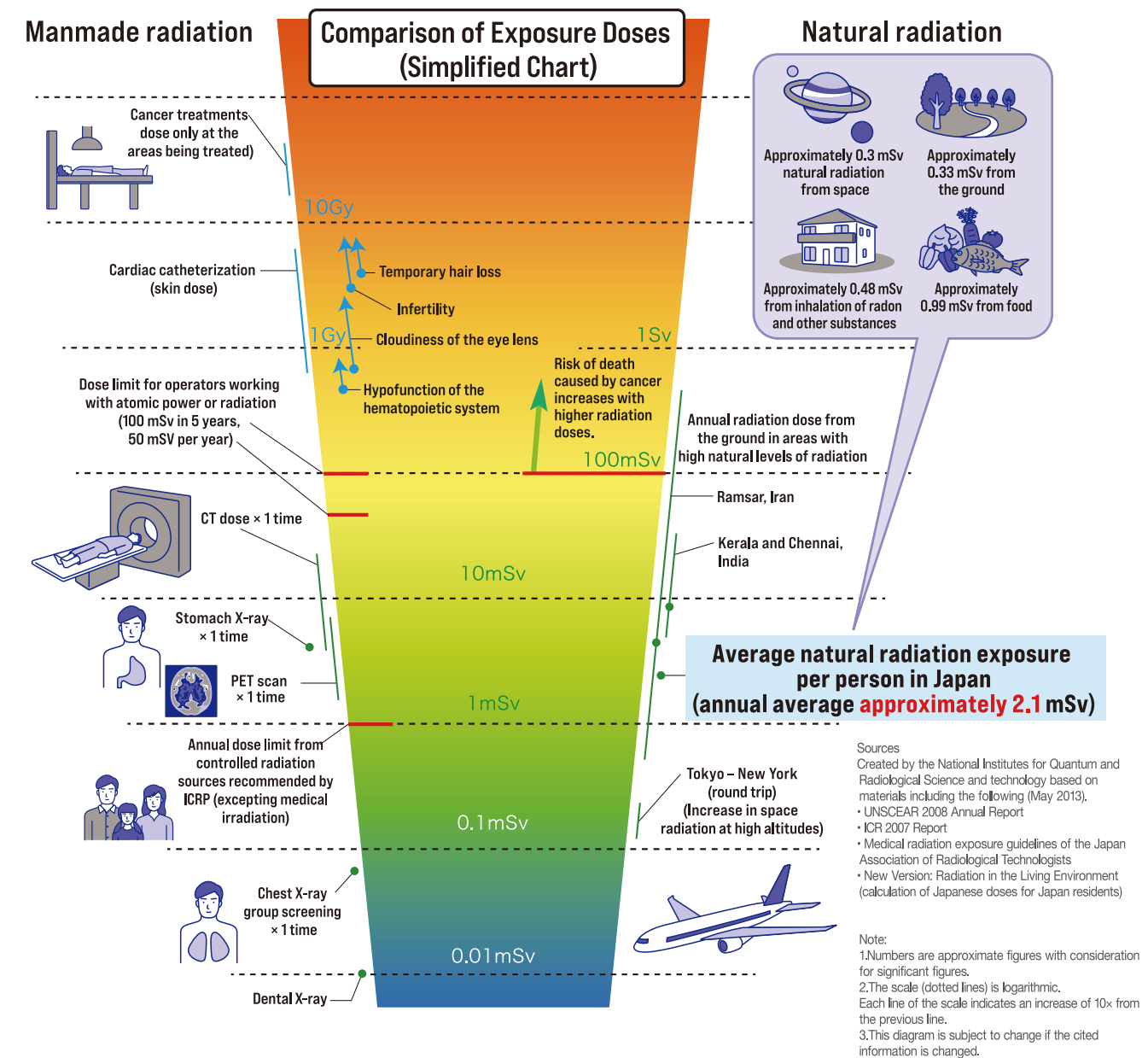
*Values for major cities in Fukushima Prefecture are from May 31, 2019. The Tokyo value is from January 23, 2018, Paris from October 15, 2017, New York from January 23, 2018, Singapore and Berlin from January 24, 2018, and Beijing and Seoul from January 25, 2018.

Source: Fukushima Radiation Measurement Map (as of May 31, 2019), Japan National Tourism Organization and the UNSCEAR 2008 Report

Basic knowledge of radiation

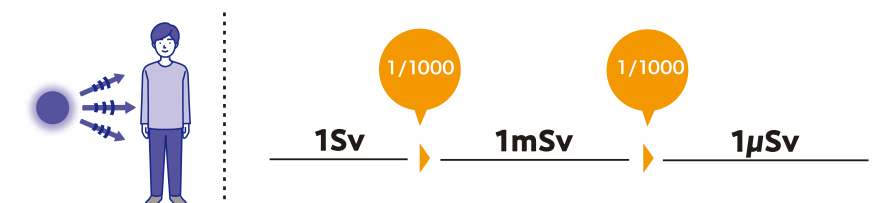
Common sources of radiation exposure

There is radiation on the food we eat and the land around us, and everyone is affected by it. We also get exposed to radiation from treatments and tests at hospitals.



What are units of Sieverts (Sv)?

These are units that indicate the intensity of radiation effects on the human body.



Reprun Fukushima



As part of efforts for open communication of information related to the specified waste landfill project, the Ministry of the Environment opened Reprun Fukushima in August 2018. This is a specified landfill information facility located in Tomioka Town, Futaba-gun, Fukushima Prefecture. By introducing the contents of the specified waste landfill project and programs for ensuring safety, and by openly disclosing the latest information including the progress of disposal and monitoring results, it aims to help alleviate questions and unease among local residents and ensure peace of mind, as well as to promote understanding of project safety by a wide range of persons within and beyond the prefecture.

Programs for environmental regeneration in Fukushima

Learn

Hands-on exhibits based on concepts of *moving, touching, and playing*

Visitors can learn about an overview and the necessity of the specified waste landfill project, safety measures, the progress status, and other matters through hands-on experiences with permanent exhibits utilizing digital contents.



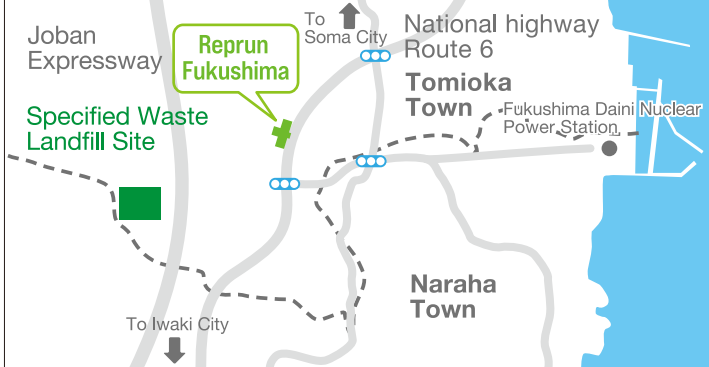
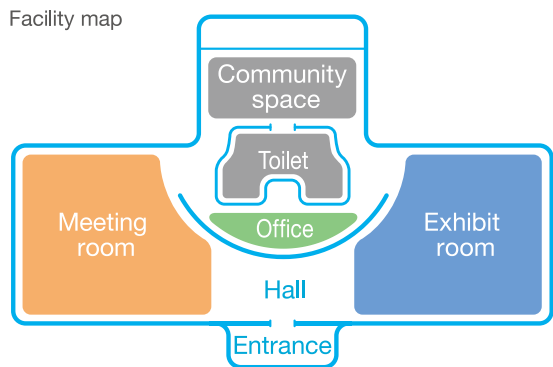
The facility staff will carefully explain the exhibits and the environmental regeneration programs of the Ministry of the Environment, centering on the specified waste landfill project.



Through experience-type exhibits, learn about the disposal process of removed soil and waste, and about measures to ensure safety and security.



A broad range of contents have been prepared that can provide enjoyable learning about the properties of radiation for everyone from children to adults.



〈Open hours〉 9:00 – 17:00 〈Admission〉 Free 〈Closed〉 On Mondays, year-end and New Year holidays * Open when Monday is a holiday (closed on the following weekday)
〈Address〉 526-7 Oaza Koriyama Ota, Tomioka-cho, Futaba-gun, Fukushima-ken TEL: 0240-23-7781 (9:00 – 17:00)

Actual monitoring

Experience

Adjacent monitoring field

Directly behind the facility is a field where visitors can experience actual environmental monitoring through activities such as measuring the air dose rate, investigating water quality, and measuring radioactivity concentration in the soil.



A field where visitors can actually experience monitoring



Promote understanding of radiation through actual experience of measurement

See the specified waste landfill site for yourself

Think

Tours of the specified waste landfill site

As one part of openly communicating information about the specified waste landfill project, tours for visitors are conducted of the specified waste landfill site. (*Reservations are necessary.) Participants can see the actual conditions of the facility and of waste treatment and disposal.



At the landfill site, participants can listen to an explanation from an observation platform at the facility and learn about the actual landfill conditions.

Specified Waste Landfill Project
Information Center - Reprun Fukushima Site

Provides a facility overview of the Specified Waste Landfill Project Information Center “Reprun Fukushima”.

Reprun Fukushima

Search

MEMO

MEMO