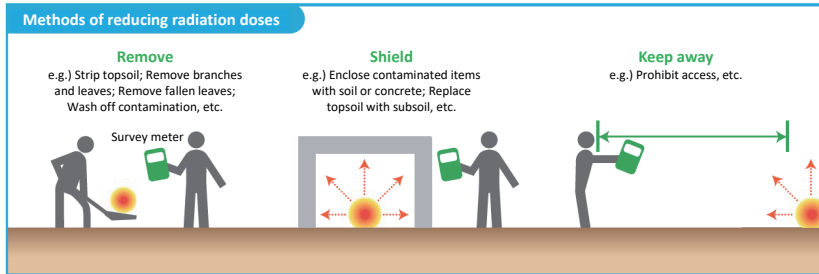


# What is Decontamination?

Radioactive materials released into the air due to the accident at Tokyo Electric Power Company (TEPCO)'s Fukushima Daiichi NPS fell onto the ground with rain, etc. and adhered to soil, vegetation, and buildings in people's living environment. Soil and vegetation, etc. thus contaminated are being removed through decontamination work. Removed soil and vegetation, etc. are shielded to prevent them from affecting the surroundings, thereby reducing radiation doses people receive from the environment.



Prepared based on the website, "Environmental Remediation," of the Ministry of the Environment

Radioactive materials released into the air due to the accident at TEPCO's Fukushima Daiichi NPS fell onto the ground with rain, etc. and adhered to buildings, soil, and vegetation, etc. across a wide area. Therefore, the national government has been striving to reduce additional exposure doses through decontamination such as removing those released radioactive materials.

There are three methods of reducing additional exposure doses to remove, to shield, and to keep away radioactive materials. Combination of these methods can reduce additional exposure doses efficiently.

The first is to remove radioactive materials adhering to soil, vegetation or buildings, etc. from people's living environment by such means as stripping topsoil, removing tree leaves, branches and fallen leaves, and washing and cleaning the surface of buildings.

The second is to cover radioactive materials with soil, etc. thereby shielding radiation and reducing ambient doses and exposure doses accordingly.

The third is to take advantage of the characteristic of radiation that the radioactivity intensity reduces as the distance increases (in inverse proportion to the square of the distance from the relevant radioactive material) (p.47 of Vol. 1, "Characteristics of External Exposure Doses").

If radioactive materials are kept away from people, exposure doses can be reduced. Therefore, one option is to prohibit access to places where radioactive materials exist.

At present, these methods are combined and employed to reduce people's additional exposure doses.

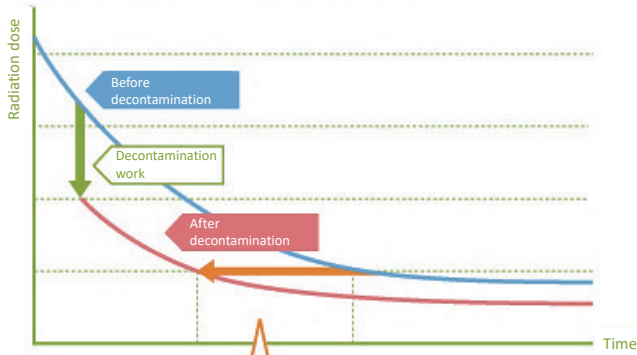
(Related to p.168 of Vol. 1, "Three Principles of Reduction of External Exposure")

Included in this reference material on March 31, 2013

Updated on February 28, 2018

## Decontamination and Decreases in Radiation Doses

### Decreases in doses of accident-derived radioactive materials



Compared with the level as of Aug. 2011, radiation doses naturally decreased by approx. 40% in two years and by approx. 60% in five years. Additionally, radiation doses can be reduced faster by removing radioactive materials through decontamination work.

Prepared based on the website, "Environmental Remediation," of the Ministry of the Environment

This is a conceptual figure showing decreases in doses of accident-derived radioactive materials.

Through decontamination work, radiation doses can be reduced faster, assisting the effects of physical attenuation of radioactive materials.

(Related to p.11 of Vol. 1, "Half-lives and Radioactive Decay")

Included in this reference material on March 31, 2014

Updated on January 18, 2016

# Decontamination Methods

Decontamination has been conducted in accordance with the circumstances of respective areas.  
Specific methods differ by location.

Effective methods differ depending on the status of contamination with radioactive materials. First, ambient dose rates are measured, and an optimal method is selected on a case-by-case basis. Radiation doses are measured before and after decontamination work to confirm the effects.



This figure explains specific decontamination methods.

Even in areas where radiation doses are relatively low, fallen leaves and dirt containing radioactive materials are apt to accumulate under the leaves or in gutters of houses or in ditches on the street, causing higher ambient doses in the surrounding areas. At such locations, fallen leaves and dirt are removed and the relevant places are washed and cleaned.

There are areas where radioactive materials adhere to the shrubbery, underbrush or fallen leaves. Radioactive materials are removed through mowing of vegetation, pruning and removal of fallen leaves.

In areas where radiation doses are relatively high, other decontamination methods, in addition to those employed at areas with relatively low radiation doses, may need to be employed. For example, as radioactive materials mostly exist within a layer a few centimeters below the ground surface, effects of radioactive materials can be mostly diminished by stripping topsoil (for example, to a depth of 5cm) or replacing topsoil with subsoil.

Areas where radioactive materials adhere to roofs and walls of buildings or on the paved road, relevant parts are washed and cleaned but such method may not be effective in cases where radioactive materials adhere firmly depending on the nature of their raw materials.

For farmland, proper methods need to be selected in consideration of the effects on agricultural products, as well as the effects on people due to exposure. In farmland plowed after the accident, radioactive materials exist little deeper from the ground surface. However, if all contaminated soil is removed, the farmland becomes unsuitable for farming. Therefore, at such farmland, various methods such as deep tillage (plowing soil as deep as 30 cm in principle) or inversion tillage (replacing topsoil with subsoil) (p.57 of Vol. 2, "Measures for Reducing Transfer of Radioactive Materials to Crops (1/5) - Decontamination of Farmland -") are being employed.

Included in this reference material on March 31, 2013

Updated on February 28, 2018

## Decontamination

## Special Decontamination Areas and Intensive Contamination Survey Areas

In line with the Act on Special Measures Concerning the Handling of Environment Pollution by Radioactive Materials enforced in full on January 1, 2012, and the Basic Policy based thereon, decontamination has been carried out. Areas especially necessary from the perspective of protecting human health were prioritized.

Soil, etc. removed through decontamination work is collected, transported to Temporary Storage Sites, and disposed of safely.

## Special Decontamination Areas

- Areas where the national government directly conducts decontamination work; Basically, 11 municipalities\* in Fukushima Prefecture which were once designated as a Restricted Area or a Deliberate Evacuation Area are designated.
- A decontamination plan should be formulated for each Special Decontamination Area, while taking into account respective municipalities' needs, and decontamination should be conducted in line with the plan.

\* The entire areas of Naraha Town, Tomioka Town, Okuma Town, Futaba Town, Namie Town, Katsurao Village and Iitate Village, and parts of Tamura City, Minamisoma City, Kawamata Town and Kawauchi Village which were once designated as a Restricted Area or a Deliberate Evacuation Area

## Intensive Contamination Survey Areas

- Areas where municipalities take the initiative in decontamination work; 92 municipalities in eight prefectures\* are designated as Intensive Contamination Survey Areas (as of the end of December 2017) from among municipalities including areas where measured ambient dose rates were 0.23  $\mu\text{Sv/h}$  or higher.
- Each municipality should carry out a measurement and survey, formulate a decontamination plan based on the results thereof, and conduct decontamination in line with the plan.
- The national government takes financial measures and technical measures to assist these municipalities.

\* Iwate Prefecture, Miyagi Prefecture, Fukushima Prefecture, Ibaraki Prefecture, Tochigi Prefecture, Gunma Prefecture, Saitama Prefecture and Chiba Prefecture

Prepared based on the website, "Environmental Remediation," of the Ministry of the Environment"

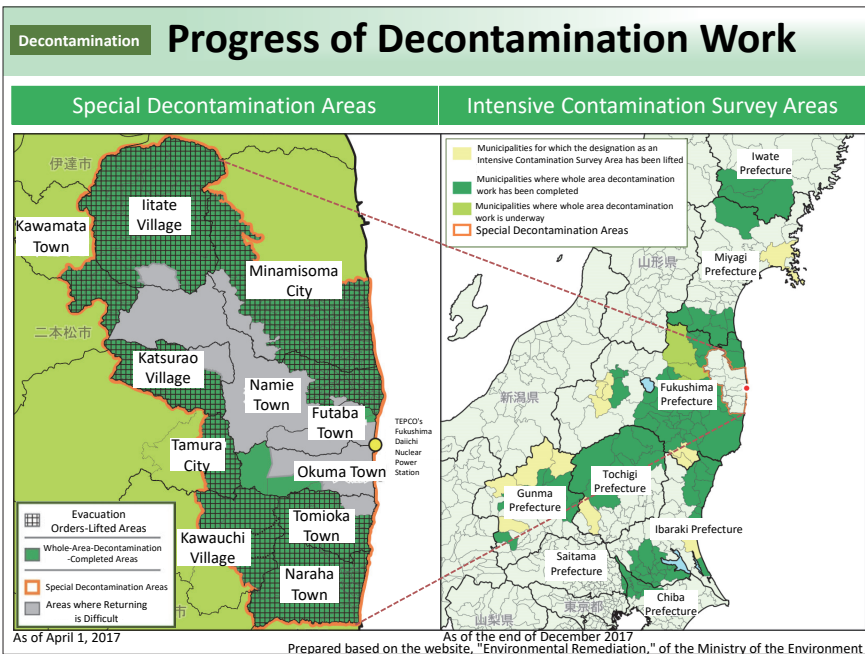
After the accident at Tokyo Electric Power Company (TEPCO)'s Fukushima Daiichi NPS, the Diet enacted the Act on Special Measures Concerning the Handling of Environment Pollution by Radioactive Materials in August 2011.

Special Decontamination Areas and Intensive Contamination Survey Areas were designated as areas where decontamination is to be conducted under this Act on Special Measures. The decontamination has been conducted in these areas in line with the Act and the Basic Policy based thereon. Areas especially necessary from the perspective of protecting human health were prioritized. Soil, etc. removed through decontamination work is collected, transported to Temporary Storage Sites, and disposed of safely.

Special Decontamination Areas are areas where the national government directly conducts decontamination work. 11 municipalities in Fukushima Prefecture which were once designated as a Restricted Area or a Deliberate Evacuation Area are designated. In these areas, a decontamination plan is to be formulated for each area, while taking into account respective municipalities' needs, and decontamination is conducted in line with the plan.

Intensive Contamination Survey Areas are areas where municipalities take the initiative in decontamination work. 92 municipalities in 8 prefectures are designated (as of the end of December 2017) from among municipalities including areas where measured ambient dose rates were 0.23  $\mu\text{Sv/h}$  or higher. In these areas, each municipality carries out monitoring, formulates a decontamination plan based on the results thereof, and conducts decontamination in line with the plan. The national government takes financial measures and technical measures to assist these municipalities.

Included in this reference material on March 31, 2013  
Updated on February 28, 2018



In the 11 municipalities in Fukushima Prefecture designated as Special Decontamination Areas, the Ministry of the Environment conducted decontamination and whole area decontamination work was completed in all designated municipalities by the end of March 2017 (excluding Areas where Returning is Difficult). Decontamination was completed for approx. 22,000 housing sites, approx. 8,400 ha of farmland, approx. 5,800 ha of forests and approx. 1,400 ha of roads.

In municipalities where whole area decontamination work was completed, radiation monitoring after decontamination has been carried out for such purposes as confirming the maintenance of the effects of decontamination. As a result of such measures, evacuation orders were all lifted by April 1, 2017, for Habitation Restricted Areas and Preparation Areas for Lift of Evacuation Order except for Futaba and Okuma.

Each municipality in Intensive Contamination Survey Areas formulated a decontamination plan in light of the circumstances of the respective areas, priorities and feasibility, and has conducted decontamination work based thereon. As of the end of December 2017, decontamination work was underway in three cities in Fukushima Prefecture.

Additionally, it was confirmed that radiation doses decreased to below 0.23  $\mu\text{Sv/h}$  in 12 municipalities by the end of March 2017, and the designation as Intensive Contamination Survey Areas was removed for these 12 municipalities. Accordingly, the number of municipalities designated as Intensive Contamination Survey Areas decreased from 104 to 92.

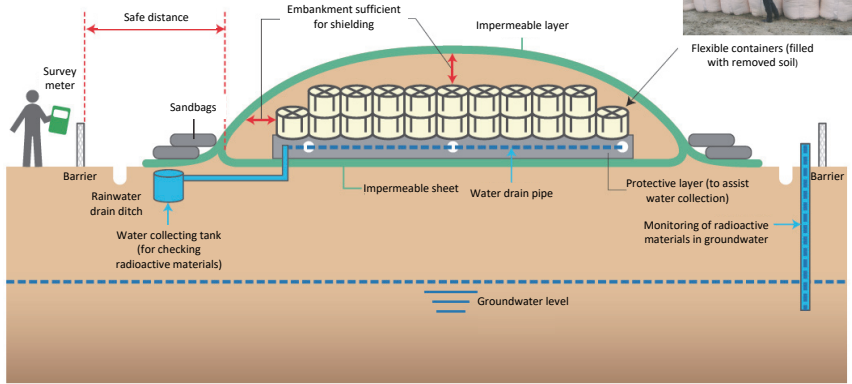
Included in this reference material on February 28, 2018

Storage of  
Removed Soil, etc.

## Storage in Temporary Storage Sites (When Storing Removed Soil above Ground)

Soil removed through decontamination work is stored safely on site or at Temporary Storage Sites for a certain period of time.

In case of storing removed soil above ground  
(in such cases as where the groundwater level is high)



Prepared based on the website, "Environmental Remediation," of the Ministry of the Environment

Soil, etc. removed through decontamination work is stored and managed temporarily on site or at Temporary Storage Sites.

Specifically, removed soil is put in a container (flexible container, etc.) and placed on an impermeable layer (impermeable sheet, etc.), and is shielded sufficiently by such methods as placing sandbags filled with uncontaminated soil around the site to reduce ambient dose rates at the boundary to the same level as that in the surrounding areas.

Additionally, the site is covered with an impermeable sheet, etc., thereby preventing scattering and leakage of removed soil and further preventing infiltration of rainwater and resulting contamination of groundwater, etc.

Radiation doses at the site and radioactivity concentrations in groundwater are measured regularly.

Furthermore, from the perspective of keeping the site away from the public (securing distance), public access to the site is prohibited, and shortening of working hours and other measures are also considered from the perspective of reducing workers' exposure to radiation (p.168 of Vol. 1, "Three Principles of Reduction of External Exposure").

Included in this reference material on March 31, 2013

Updated on February 28, 2018

## Comprehensive Efforts toward Regeneration of Forests and Forestry in Fukushima

**Others**

○ In order to ensure safe and secure lives of the residents and regenerate forests and forestry in Fukushima, relevant ministries and agencies carry out the following measures comprehensively in collaboration with the prefecture and municipalities, while obtaining the understanding of the people in Fukushima.

**I. Efforts toward regeneration of forests and forestry**

**1. Efforts for ensuring safe and secure living environment**

- Steadily continue decontamination work for forests near people's houses, etc.
- For residential areas surrounded by forests on three sides, taking measures as necessary, such as decontaminating forests 20m or further from the border or installing barriers to prevent soil runoff

**3. Efforts for regenerating forestry in mountainous areas, etc.**

- Promote a project to conduct tree thinning or other forest maintenance work together with measures concerning radioactive materials, and a demonstration project aiming for regeneration of forestry
- Newly prepare a guidebook on radiation safety that is easy to understand for workers

**II. Future-oriented efforts for research and studies**

- Continuously engage in research and studies for monitoring radiation doses in the forest, understanding behavior of radioactive materials and reducing radiation doses; Continue efforts for regeneration of forests and forestry into the future while utilizing the outcomes of such research and studies in formulating further measure

**III. Information provision and communication**

- Meticulously provide the latest information regarding knowledge on radioactive materials in forests and the national government's efforts toward regeneration of forests and forestry, using such media as relevant ministries' websites and PR magazines
- Continue efforts for ensuring safe and secure lives of the people in Fukushima through maintaining good communication, including dispatching experts

**Picture of Satoyama Forest Restoration Model Project**

Prepared by the Ministry of the Environment

In addition to decontamination work, comprehensive efforts for regenerating forestry and ensuring safe and secure lives of the residents are indispensable for the regeneration of forests and forestry in Fukushima Prefecture. Based on the guideline, "Comprehensive Efforts toward Regeneration of Forests and Forestry in Fukushima," relevant ministries and agencies have been carrying out measures comprehensively in collaboration with the prefecture and municipalities, while obtaining the understanding of the people in Fukushima.

According to the knowledge obtained at the Environment Restoration Panel established in the Ministry of the Environment, it is found that removal of sedimentary organic materials at locations 20m or further from the edge of the forest has little effect in reducing ambient dose rates at the forest edge. Removal of sedimentary organic materials broadly in forests may even make things worse, in ways such as increasing bad effects on trees due to causing erosion of dirt, etc. containing radioactive cesium or impoverishing the soil. Accordingly, under the basic policy to prioritize areas especially necessary from the perspective of protecting human health, decontamination of forests has been conducted within approx. 20m from the edges of the forests adjacent to houses or farmland, etc.

Additionally, it was determined to implement a model project to comprehensively facilitate efforts for restoring *Satoyama* forests including decontamination work. In September and December 2016, the Reconstruction Agency, the Ministry of Agriculture, Forestry and Fisheries, and the Ministry of the Environment jointly selected a total of 10 municipalities as model districts (Kawamata Town, Hirono Town, Kawauchi Village, Katsurao Village, Soma City, Nihonmatsu City, Date City, Tomioka Town, Namie Town and Iitate Village).

Included in this reference material on March 31, 2017  
 Updated on February 28, 2018

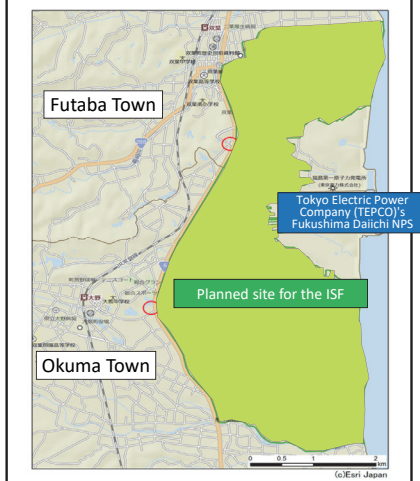
## Outline of the Interim Storage Facility

- In Fukushima Prefecture, large quantities of contaminated soil and waste have been generated from decontamination works.
- \* Estimated to be approx. 16 million to 22 million m<sup>3</sup> (equivalent to approx. 13 to 18 times the volume of the Tokyo Dome)
- Currently, it is difficult to clarify methods of final disposal of the soil and waste.
- **It is necessary to establish an Interim Storage Facility (ISF) in order to manage and store the soil and waste safely and intensively until final disposal.**

(Site Area: approx. 16 km<sup>2</sup>)

- Removed soil and waste generated from decontamination works in Fukushima Prefecture and incineration ash with radioactivity concentrations exceeding 100,000 Bq/kg are stored.
- The national government has legally specified its intention to take measures necessary for completing final disposal outside Fukushima Prefecture within 30 years after the commencement of interim storage (the Amended JESCO (Japan Environmental Storage & Safety Corporation) Act was promulgated in November 2014).

## &lt; Planned site for the Interim Storage Facility &gt;



Prepared by the Ministry of the Environment

In Fukushima Prefecture, large quantities of contaminated soil and waste have been generated from decontamination works. The volume even after incineration of combustibles is estimated to be approx. 16 million to 22 million m<sup>3</sup>, which is equivalent to approx. 13 to 18 times the volume of the Tokyo Dome.

Currently, it is difficult to clarify methods of final disposal of the soil and waste, and it is indispensable to establish an ISF as a facility to manage and store the soil and waste safely and intensively until final disposal.

At the ISF, the following are to be stored:

- (i) Removed soil and waste (e.g. fallen leaves and branches, etc.) generated from decontamination works which is currently stored in Temporary Storage Sites;
- (ii) Incineration ash with radioactivity concentrations exceeding 100,000 Bq/kg.

Consent to accept the construction of the ISF was obtained from Fukushima Prefecture in September 2014 and from Okuma Town and Futaba Town in January 2015. The total area of the planned site is approx. 16 km<sup>2</sup>, almost the same area as Shibuya Ward in Tokyo.

Included in this reference material on January 18, 2016

Updated on February 28, 2018



# Construction of Interim Storage Facility

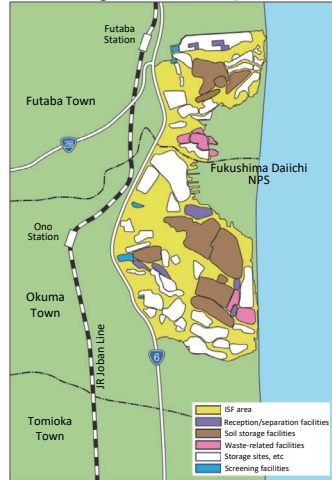
Reception/Separation Facilities



Soil Storage Facilities



<Perspective drawing of the facilities (November 2017)>



\* The figure above shows the envisaged area for each facility as of November 2017, within which facility construction is to be conducted concentrated in a certain location in light of the landform and progress of land acquisition. The plan can be changed in accordance with the progress of land acquisition and facility construction.

Prepared by the Ministry of the Environment

Source: Reference material for the 9th meeting of the Committee on Environmental Safety of the ISF (Ministry of the Environment)

The site necessary for the construction of the ISF is estimated to be approx. 1,600 ha and the number of relevant registered land owners is 2,360. By the end of December 2017, the contracts have been steadily increasing to approx. 801 ha (approx. 50.1% of the envisaged construction site) with 1,331 land owners (approx. 56.4% of the total). The national government considers it most important to obtain understanding on the construction of the ISF, not to mention building a relationship of trust with land owners, and is committed to continuing efforts while providing sufficient explanations to land owners.

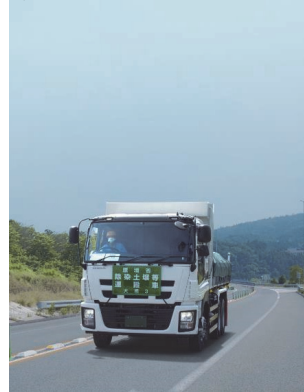
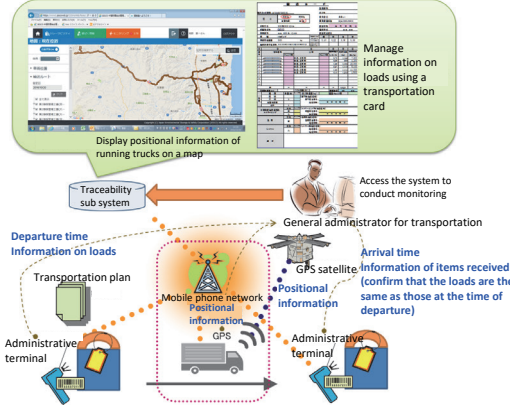
Construction of the Reception/Separation Facilities and Soil Storage Facilities started in November 2016. The Reception/Separation Facilities receive the removed soil and waste which is transported from the Temporary Storage Sites in Fukushima Prefecture to the ISF. The soil and waste is unloaded from trucks, taken out from container bags and separated into combustibles and incombustibles. The Soil Storage Facilities store the soil and waste treated at the Reception/Separation Facilities safely in accordance with the radioactivity concentrations and other properties. Reception and separation of the removed soil and waste started in June 2017 and storage of the treated soil and waste started in October 2017. Construction of the facilities will be continued in order to further promote treatment and storage of the removed soil and waste.

Included in this reference material on February 28, 2018

- An accumulative total of approx. 640,000 m3 of the removed soil and waste had been transported to the ISF by the end of January 2018.
- Approx. 1.8 million m3 of the removed soil and waste is planned to be transported in FY2018.
- Safe and secure transportation will be sequentially conducted through managing the whole numbers of transport objects and operation of trucks used for transport, and conducting environmental monitoring, etc.

< Outline of the truck management functions >

< Transportation of the soil and waste >



Prepared by the Ministry of the Environment

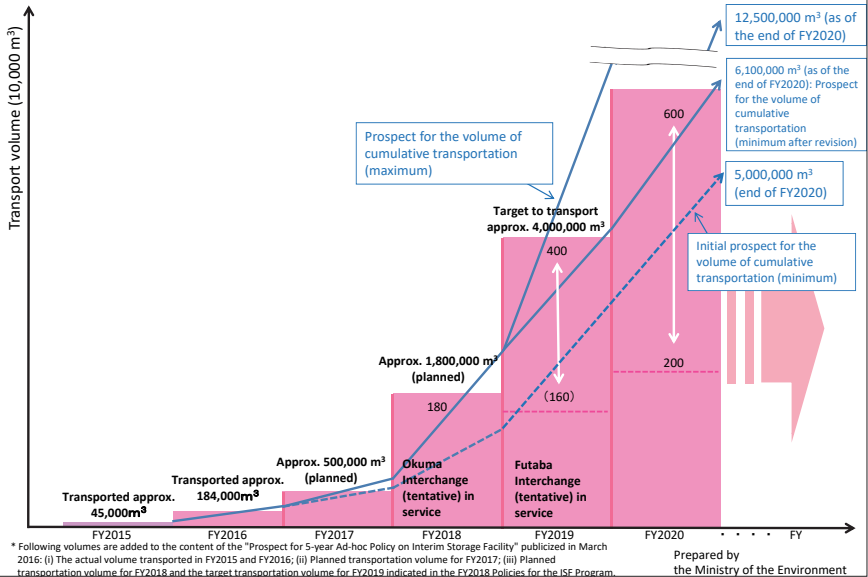
By the end of January 2018, an accumulative total of approx. 640,000 m3 of the removed soil and waste had been transported to the ISF. Approx. 1.8 million m3 of the removed soil and waste is planned to be transported in FY2018.

The operation of trucks used for transportation is managed on a real-time basis using GPS as follows.

(i) All loads are linked to respective trucks by the unit of container bags at the time of departure from loading sites and trucks are managed together with their loads.

(ii) Positional information of running trucks is ascertained using GPS devices loaded thereon and is recorded in the system. Recorded positional information is displayed on a map and the operation of trucks is monitored. Trucks are continuously monitored even after unloading the items at the ISF and returning back to loading sites with an empty load.

Included in this reference material on February 28, 2018



The Ministry of the Environment publicized the "Prospect for 5-year Ad-hoc Policy on Interim Storage Facility" on March 27, 2016.

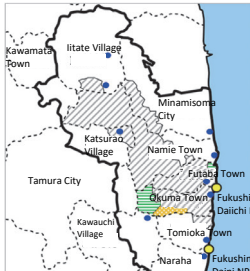
The amount equivalent to the total amount of the soil and waste currently being stored on sites, such as schools or individuals' houses, will be transported to the ISF. Utmost efforts should be made to acquire the land for construction of the related facilities and it is targeted to transport an amount of the removed soil and waste equivalent to that currently being placed along the major roads to the ISF. By FY2020, it is forecast that transportation of approx. 5 million to 12.5 million m<sup>3</sup> of removed soil and waste will be achieved. From which Temporary Storage Site to start transport is up to each municipality.

The above figure also includes the actual volume transported in FY2015 and FY2016 and planned transportation volume for FY2017, as well as planned transportation volume for FY2018 and the target transportation volume for FY2019 indicated in the FY2018 Policies for the ISF Program. This prospect can be revised as needed in light of the progress of the ISF Program.

Included in this reference material on March 31, 2017

Updated on February 28, 2018

## Progress of Disposal of Disaster Waste Directly Governed by the National Government in Designated Areas in Fukushima Prefecture



**As of April 1, 2017**

- Contaminated Waste Management Areas
- Habitation Restricted Areas
- Temporary Incineration Facilities (including planned facilities and those already demolished, etc.)
- Preparation Areas for Lift of Evacuation Order
- Areas where Returning is Difficult

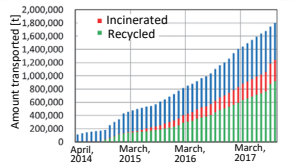


Temporary Incineration Facility in Okuma Town (December 2017)

**Disaster waste has been disposed of based on the Treatment Plan on Waste within the Management Areas (partial revision on December 26, 2013).**

**[Amount of Waste within the Management Areas having been transported to Temporary Storage Sites]**

**As of the end of November 2017, a total of approx. 1.80 million tons of waste had been transported to Temporary Storage Sites (of which, approx. 320,000 tons were incinerated and approx. 920,000 tons were recycled).**



Amount of Waste within the Management Areas having been transported from designated areas to Temporary Storage Sites

**[Removal of tsunami rubble]**

**OTsunami rubble in former Restricted Areas was all transported to Temporary Storage Sites in March 2016, except for such rubble left in Areas where Returning is Difficult.**

**[Installation of Temporary Incineration Facilities]**

|                                      |  |
|--------------------------------------|--|
| Now treating disaster waste, etc.    | Tomioka Town, Minamisoma City, Katsurao Village, Namie Town, Iitate Village (Warabidaira district), Naraha Town and Okuma Town |
| Preparing for placing orders         | Futaba Town  |
| Disposal of disaster waste completed | Kawauchi Village and Iitate Village (Komiya district)  |

\* Tamura City and Kawamata Town use existing waste disposal facilities for disposing of disaster waste.



Temporary Incineration Facility in Naraha Town (Oct. 2016)

Prepared by the Ministry of the Environment

Waste within the Management Areas in Fukushima Prefecture has been disposed of based on the Plan on Waste within the Management Areas, which was revised in December 2013.

Such waste, which includes tsunami rubble, debris of damaged houses, and waste from houses after cleaning-up, has been transported sequentially to Temporary Storage Sites. As of the end of November 2017, a total of approx. 1.8 million tons had already been transported. Transported waste is recycled as much as possible.

It was decided to incinerate inflammable waste to reduce volume at provisional incineration facilities to be constructed at ten locations in nine municipalities. As of January 2018, seven such facilities were in operation and waste is being steadily disposed of and treated.

Included in this reference material on February 28, 2018

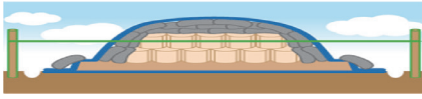
## Ensuring Safety for Temporary Storage of Designated Waste

### Temporary storage work (in the case of agricultural by-products)



### Structure of a Temporary Storage Site (in the case of agricultural by-products)

- Take measures to prevent scattering and runoff of waste
- Take required measures against radiation (isolation or shielding using sandbags, etc.)
- Take measures to prevent infiltration of rainwater using impermeable sheet, etc.



### Checking of storage status

The status of storage at Temporary Storage Sites is to be checked to ensure that designated waste is properly stored in compliance with the standards, etc. specified in the Act on Special Measures.



Staff of the Regional Environmental Office checking the storage status

Prepared based on the website, "Information on Disposal of Radioactive Waste," of the Ministry of the Environment

Designated waste includes ash left after incinerating waste contaminated with radioactive materials, sludge generated through sewage treatment, soil that remains at purification plants to supply tap water (p.31 of Vol. 2, "Waterworks System"), agricultural by-products such as rice straw and pasture grass, etc.

As of September 30, 2017, there was a total of over 200,000 tons of designated waste in 11 prefectures including Tokyo Metropolis. Such waste is temporarily being stored at incineration facilities, purification plants, sewage treatment facilities, farmland, etc., where it was generated, until the national government establishes a proper disposal system.

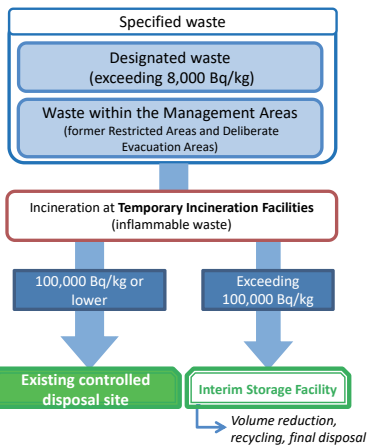
The waste is to be covered with impermeable sheets, etc. to prevent infiltration of rainwater and measures to prevent scattering and runoff of the waste are supposed to be taken voluntarily in line with the guidelines and the Act on Special Measures Concerning the Handling of Environment Pollution by Radioactive Materials. Officials of the Ministry of the Environment visit various locations and check the status of temporary storage periodically to ensure safe and proper storage of designated waste.

Included in this reference material on January 18, 2016

Updated on February 28, 2018

## Procedures for Disposal of Designated Waste in Fukushima Prefecture

The Ministry of the Environment has been carrying out a program to reduce volume and stabilize properties of designated waste through incineration and drying, etc. With regard to designated waste generated in Fukushima Prefecture, waste with radioactivity concentrations exceeding 8,000 Bq/kg but 100,000 Bq/kg or lower is to be transported to the existing controlled disposal site, while waste with radioactivity concentrations exceeding 100,000 Bq/kg is to be transported to the Interim Storage Facility.



### Volume reduction project

Sewage sludge

#### Terminal treatment plant in Horikawa Town, Fukushima City

Drying treatment of dehydrated sludge, etc. was completed at the end of October 2014 and the plant was demolished at the end of March 2016.



#### Samegawa Village

Incineration of agricultural waste was completed at the end of July 2015.

#### Switching stations (Tamura City and Kawauchi Village)

Volume reduction of agricultural waste generated in 24 municipalities in the central and southern parts of Fukushima Prefecture; Operation started in June 2017.



Agricultural waste, etc.

#### Fukushima Prefecture Central Purification Center (Koriyama City)

Incineration of dehydrated sludge, etc. was completed in March 2014, and Fukushima Prefecture took over the work and incinerated waste with radioactivity concentrations of 8,000 Bq/kg or lower and the incineration work was completed at the end of May 2016.



#### Warabidaira District, Iitate Village

Volume reduction of contaminated waste generated in Iitate Village and surrounding five municipalities; A Temporary Incineration Facility started operation in January 2016 and a facility to make recycled materials constructed on the same site also started operation in April 2016.

#### Adachi District (Nihonmatsu City)

Volume reduction of agricultural waste and inflammable waste generated from decontamination activities in three municipalities in the Adachi District (Nihonmatsu City, Motomiya City and Otama Village); Preparation for the construction work is underway.

Prepared by the Ministry of the Environment

With regard to disposal of designated waste, the national government is committed to securing long-term management facilities required for the prefectures where a large amount of designated waste has been generated and storage facilities are in urgent need, while considering the utilization of existing waste disposal facilities.

In Fukushima Prefecture, waste with radioactivity concentrations exceeding 8,000 Bq/kg but 100,000 Bq/kg or lower is to be transported to the existing controlled disposal site, while waste with radioactivity concentrations exceeding 100,000 Bq/kg is to be transported to the Interim Storage Facility.

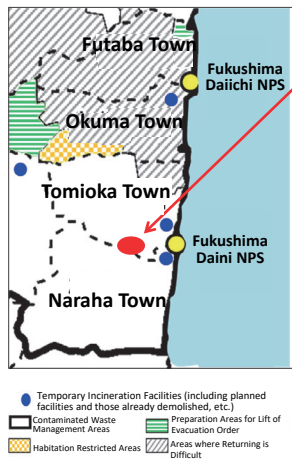
Additionally, designated waste is incinerated, dried or otherwise handled to reduce volume and stabilize their properties in Fukushima Prefecture.

Included in this reference material on January 18, 2016

Updated on February 28, 2018

## Landfill Disposal Plan of Specified Waste Utilizing the Controlled Disposal Site

In order for reconstruction of eight municipalities in Futaba County and ultimately the entirety of Fukushima Prefecture, the issue of waste contaminated with radioactive materials needs to be solved as early as possible. It is planned to safely and promptly bury waste with radioactivity concentrations not exceeding 100,000 Bq/kg at the existing controlled disposal site, former Fukushima Ecotec Clean Center. Transport of specified waste was commenced in November 2017.



Prepared by the Ministry of the Environment

### Specified Waste Landfill Disposal Facility (Former Fukushima Ecotec Clean Center)

[Outline of the facility]

- Location: In Tomioka Town (transport via Naraha Town)
- Area: approx. 9.4 ha
- Capacity: approx. 960,000 m<sup>3</sup> (Possible landfill capacity: approx. 650,000 m<sup>3</sup>)

### Outline of the landfill disposal program

#### ○ Waste to be buried

- Household refuse of returned residents in eight municipalities in Futaba County < approx. 27,000 m<sup>3</sup> >
- Waste within the Management Areas < approx. 445,000 m<sup>3</sup> >
- Designated waste in Fukushima Prefecture < approx. 182,000 m<sup>3</sup> >

#### ○ Period

- Household refuse from eight municipalities in Futaba County: for approx. 10 years
- Waste within the Management Areas and designated waste: for approx. 6 years

#### ○ Landfill disposal, radiation monitoring, etc.

- Multiple safety measures should be taken to prevent leakage of radioactive materials such as curbing elution of radioactive cesium or infiltration of rainwater.
- The status of seepage control and leachate treatment facility, etc. is to be periodically checked and ambient dose rates and radioactivity concentrations of groundwater, etc. should be monitored.

#### ○ Responsibility of the Ministry of the Environment and its management system

- Based on the Act on Special Measures, the Ministry of the Environment will serve as the responsible entity and initially nationalize the disposal site and responsibly conduct landfill disposal of specified waste.
- The Ministry of the Environment constantly stations a supervisor at a newly established local office, thereby ensuring a system to properly manage landfill disposal and related facilities.

Waste with radioactivity concentrations not exceeding 100,000 Bq/kg generated in Fukushima Prefecture is to be buried promptly at the existing controlled disposal site.

In order to implement this program, the national government first asked local communities for consent to accept the construction of an Interim Storage Facility in December 2013, and then provided explanations to the authorities, assemblies and residents of Tomioka Town and Naraha Town.

In December 2015, consent was obtained from Fukushima Prefecture, Tomioka Town and Naraha Town for the implementation of this program. The national government nationalized the existing controlled disposal site in April 2016 and concluded a safety agreement with Fukushima Prefecture and the two municipalities in June 2016. Preparatory work was conducted thereafter and the transport of waste to the facility was commenced in November 2017.

In order to steadily facilitate disposal of waste contaminated with radioactive materials, utmost efforts will be continued to properly carry out this program with safety as the top priority and to build a stronger relationship of trust with local residents.

Included in this reference material on January 18, 2016

Updated on February 28, 2018



## Status of the Five Prefectures concerning Designated Waste

| < Miyagi Prefecture ><br>• Municipal mayors' conference (14 meetings) [Oct. 2012 to July 2017]  | < Tochigi Prefecture ><br>• Municipal mayors' conference (8 meetings) [April 2013 to Oct. 2016]   | < Chiba Prefecture ><br>• Municipal mayors' conference (4 meetings) [April 2013 to April 2014]  | < Ibaraki Prefecture ><br>• Municipal mayors' conference (4 meetings) [April 2013 to Jan. 2015]  | < Gunma Prefecture ><br>• Municipal mayors' conference (3 meetings) [April 2013 to Dec. 2016]                   |
|---|---|---|--|---|
| <p><b>2014</b><br/>Jan.: 3 candidate sites for detailed survey were presented (Fukayamadake, Kurihara City; Shimohara, Taiwa-cho; Tashirodake, Kami Town).<br/>Aug.: The prefectural governor announced the acceptance of a detailed survey as a consensus of all municipal mayors.<br/>Aug.: A detailed survey was commenced. An on-site survey was not possible due to protests by local residents.</p> <p><b>2016</b><br/>March: Results of the remeasurement for designated waste were released.<br/>Nov.: Results of the remeasurement for other types of designated waste were released.</p> <p><b>2017</b><br/>June: The prefecture presented draft disposal policies such as to require each area to independently incinerate contaminated waste generated therein, and each municipality would carry out further municipality-level discussions on the draft.<br/>July: The draft disposal policies were agreed as they are.</p> | <p><b>2014</b><br/>July: One candidate site for detailed survey was presented (Terashimairi, Shiyoa Town).<br/><b>2016</b><br/>Oct.: Results of the remeasurement for designated waste were released and future directions were presented.<br/><b>2017</b><br/>July: Meeting of mayors of municipalities concerning measures to ease burdens of farm households storing waste by themselves<br/>→ Draft of Policy for measures to ease burdens of farm households storing waste by themselves were presented.</p> | <p><b>2015</b><br/>April: 1 candidate site for detailed survey was presented. (Part of the premises of Tokyo Electric Power Company (TEPCO)'s Chiba Thermal Power Station (Chuo Ward, Chiba City))<br/><b>2016</b><br/>July: Designation was removed for designated waste whose radioactivity concentrations had become lower than 8,000 Bq/kg.</p> | <p><b>2015</b><br/>April: Meeting of mayors of municipalities where waste is temporarily stored<br/><b>2016</b><br/>Feb.: 2nd meeting of mayors of municipalities where waste is temporarily stored<br/>→ The policy to continue on-site storage and promote staged disposal was determined.<br/><b>2017</b><br/>March: Results of the remeasurement for designated waste, etc. in the prefecture were released.</p> | <p><b>2016</b><br/>Dec.: The policy to continue on-site storage and promote staged disposal was determined.</p> |
| <b>(Reference) Expert meeting of the Ministry of the Environment</b>  |   |   |  |   |
| <b>The Ministry of the Environment had meetings (nine times) to discuss the safety of long-term management facilities and process of selecting candidate sites from a scientific and technological point of view, in tandem with the municipal mayors' conferences held by these prefectures. [March 2013 to March 2016]</b>  |   |   |  |   |
| <small>Prepared based on reference material for the Third Panel on Safety Measures against Radioactive Materials (Nov. 2015), Ministry of the Environment</small>   |   |   |  |   |

Prefectures other than Fukushima Prefecture which are in urgent need to secure Temporary Storage Sites for designated waste (Miyagi Prefecture, Tochigi Prefecture, Chiba Prefecture, Ibaraki Prefecture and Gunma Prefecture) are taking measures in accordance with the circumstances of respective prefectures. They ascertain the current status through the measurement of radioactivity concentrations, based on discussions at municipal mayors' conferences.

Regarding candidate sites for detailed surveys, Miyagi, Tochigi and Chiba Prefectures followed selection methods determined through discussions at expert meetings and municipal mayors' conferences, and presented selected candidate sites in January 2014, July 2014 and April 2015, respectively. However, detailed surveys have not been conducted smoothly or not been conducted due to protests by local residents.

In the meantime, Miyagi Prefecture determined its policy in July 2017 to the first dispose of contaminated waste with radioactivity concentrations not exceeding 8,000 Bq/kg, excluding designated waste, at respective areas, and is now making adjustments for commencing test incineration.

In July 2017, the Ministry of the Environment presented a provisional policy for volume reduction and centralized collection of designated waste, targeting Tochigi Prefecture and municipalities storing waste, with the aim of easing burdens of farm households that have been storing waste by themselves, while maintaining the basic policy to ultimately develop long-term management facilities. Accordingly, Tochigi Prefecture is now making adjustments for commencing disposal based on the presented provisional policy.

Chiba Prefecture is also making efforts to obtain understanding of local residents for the implementation of a detailed survey concerning long-term management facilities.

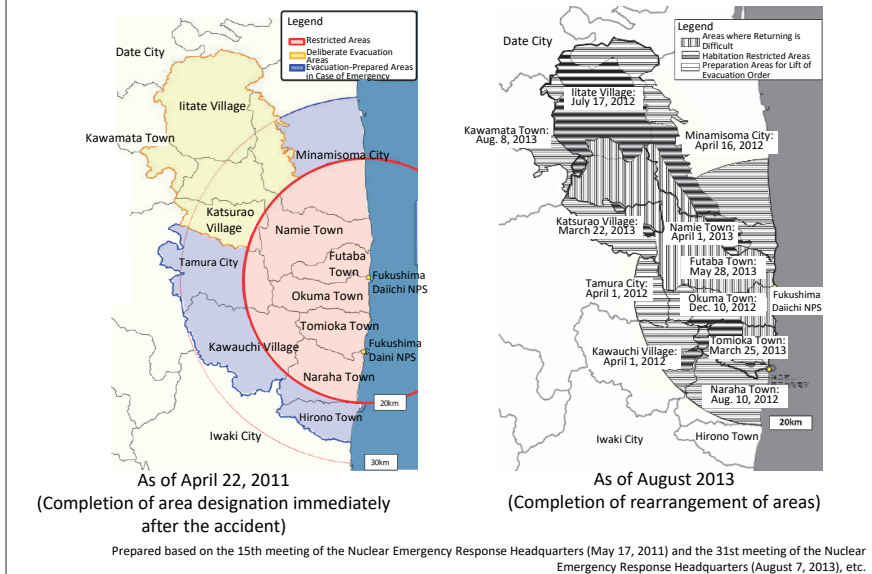
Ibaraki and Gunma Prefectures determined the policies to continue on-site storage and promote staged disposal respectively in February 2016 and December 2016. Based on the determined policies, both prefectures will repair or reinforce storage sites as necessary and will dispose of designated waste whose radioactivity concentrations have reduced to 8,000 Bq/kg or lower at existing disposal facilities in a staged manner.

Included in this reference material on March 31, 2016

Updated on February 28, 2018



## Designation of Areas under Evacuation Orders



Based on Article 15, paragraph (2) of the Act on Special Measures Concerning Nuclear Emergency Preparedness, a Declaration of a Nuclear Emergency Situation was issued at 19:03 on March 11, 2011. The Chief Cabinet Secretary announced the issuance of the declaration during the press conference at around 19:45 on the day. At 18:25 on the following day, evacuation orders were issued for the 20-km zone of Tokyo Electric Power Company (TEPCO)'s Fukushima Daiichi NPS.

As there were areas within the 20-km zone where annual cumulative doses would be highly likely to exceed 20 mSv after the accident, such areas were designated as Deliberate Evacuation Areas, taking into account the standard limits for radiological protection in emergency exposure situations. Considering future risks due to the accident, areas within 20 km from the NPS were designated as Restricted Areas and access was prohibited in principle, while areas within 20 km to 30 km were designated as Evacuation-Prepared Areas in Case of Emergency.

On June 5 onward, spots where decontamination work would not be easy and annual cumulative doses would be highly likely to exceed 20 mSv were designated as specific spots recommended for evacuation, based on the results of the environmental monitoring by the national government and Fukushima Prefecture.

On December 16, the reactors reached a state of cold shutdown and it was confirmed that the release of radioactive materials was under control. Accordingly, on December 26, the designation of Restricted Areas was removed and it was proposed to review Areas under Evacuation Orders and to newly designate Areas where Returning is Difficult, Habitation Restricted Areas and Preparation Areas for Lift of Evacuation Order. Upon reviewing Areas under Evacuation Orders, four problems common to all subjected areas were cited as problems to be addressed: (i) need to ensure safety and security of residents; (ii) need for decontamination and due consideration to children's radiation exposure; (iii) reconstruction of infrastructure and job creation; and (iv) compensation.

As indispensable requirements for lifting evaluation orders, the following were set: (i) it is certain that annual cumulative doses will become 20 mSv or lower after removal of the designation; (ii) infrastructure and living-related services necessary for daily lives have been almost restored and decontamination work has progressed sufficiently centered on children's living environments; and (iii) consultations have been held sufficiently among relevant local governments and residents.

Included in this reference material on February 28, 2018

| April 22, 2011, onward<br>Area designation immediately after accident  | April 2012, onward<br>After confirming cold shutdown of the reactors   |
|--|--|
| <b>Restricted Areas</b><br>Areas within 20 km in radius from the Nuclear Power Station (NPS); The relevant areas were designated as Areas under Evacuation Orders on March 12, 2011.   | <b>Preparation Areas for Lift of Evacuation Order</b><br>Areas where it is confirmed that annual cumulative doses will surely become 20 mSv or lower <sup>(*)</sup>  |
| <b>Deliberate Evacuation Areas</b><br>Areas 20 km or farther from the NPS where cumulative doses would be highly likely to exceed 20 mSv within one year after the accident  | <b>Habitation Restricted Areas</b><br>Areas where annual cumulative doses would be highly likely to exceed 20 mSv <sup>(*)</sup>   |
| <b>Evacuation-Prepared Areas in Case of Emergency</b><br>Areas within 20 km to 30 km in radius from the NPS other than Deliberate Evacuation Areas; The relevant areas were designated as In-house Evacuation Areas on March 12, 2011. | <b>Areas where Returning is Difficult</b><br>Areas where annual cumulative doses exceed 50 mSv <sup>(*)</sup> at present and would be highly likely to remain above 20 mSv <sup>(*)</sup> even after 6 years from the accident |

(\*) Based on the dose data obtained through the 4th airborne monitoring survey after correction as of March 31, 2012

**Areas under Evacuation Orders:**

Areas for which evacuation orders were issued based on Article 15, paragraph (3) of the Act on Special Measures Concerning Nuclear Emergency Preparedness; Areas under Evacuation Orders and the 20-km zone of the Nuclear Power Station were rearranged and were newly designated as Preparation Areas for Lift of Evacuation Order, Habitation Restricted Areas or Areas where Returning is Difficult.

**Restricted Areas:**

Areas where access is restricted pursuant to the provisions of Article 63, paragraph (1) of the Disaster Countermeasures Basic Act as applied pursuant to Article 28, paragraph (2) of the Act on Special Measures Concerning Nuclear Emergency Preparedness, following the deemed replacement of terms

Prepared based on the "Basic Idea on Review of the Restricted Areas and Areas under Evacuation Orders in Response to the Completion of Step 2 and Matters to be Discussed" (December 26, 2011; Nuclear Emergency Response Headquarters)

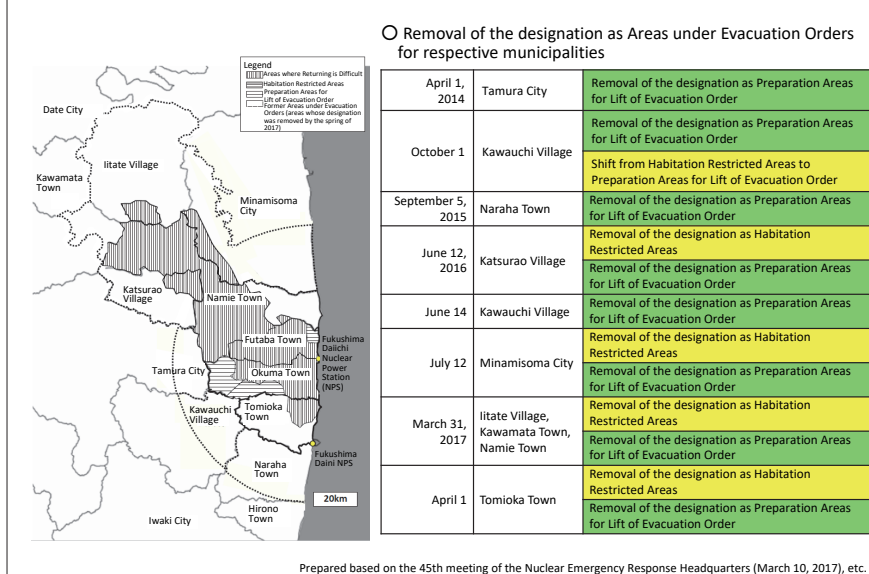
Immediately after the accident at Tokyo Electric Power Company (TEPCO)'s Fukushima Daiichi NPS on March 11, 2011, the Nuclear Emergency Response Headquarters issued evacuation orders in order to avoid risks to residents' lives and designated the areas within 20 km from the NPS as Areas under Evacuation Orders on March 12.

On April 22, for fear of any risks that residents might be exposed to a large amount of radiation at one time as a result of worsening of the situation, the Headquarters designated the relevant areas as Restricted Areas to prohibit access in principle, and also designated areas 20 km or farther from the NPS where cumulative doses would be highly likely to exceed 20 mSv within one year after the accident as Deliberate Evacuation Areas.

On December 16, the reactors reached a state of cold shutdown and the Nuclear Emergency Response Headquarters confirmed that the chaotic situation after the accident ended. Accordingly, on December 26, the basic idea on review of Restricted Areas and Areas under Evacuation Orders was presented. The Headquarters made preparations for the review while closely consulting with the prefecture, municipalities and residents and making adjustments, and at the same time endeavored to address problems common to all subjected areas.

On March 30, 2012, the Headquarters reviewed Restricted Areas and Areas under Evacuation Orders in accordance with radiation doses and problems unique to respective areas. By August 2013, the designation of Restricted Areas and Specific Spots Recommended for Evacuation was completely removed and Areas under Evacuation Orders were newly designated as Areas where Returning is Difficult, where physical protection measures such as installation of barricades were taken, Habitation Restricted Areas, where evacuation is required in principle, or Preparation Areas for Lift of Evacuation Order, where situations are considered to have reached existing exposure situations and support measures for reconstruction and recovery are to be promptly taken.

Included in this reference material on February 28, 2018



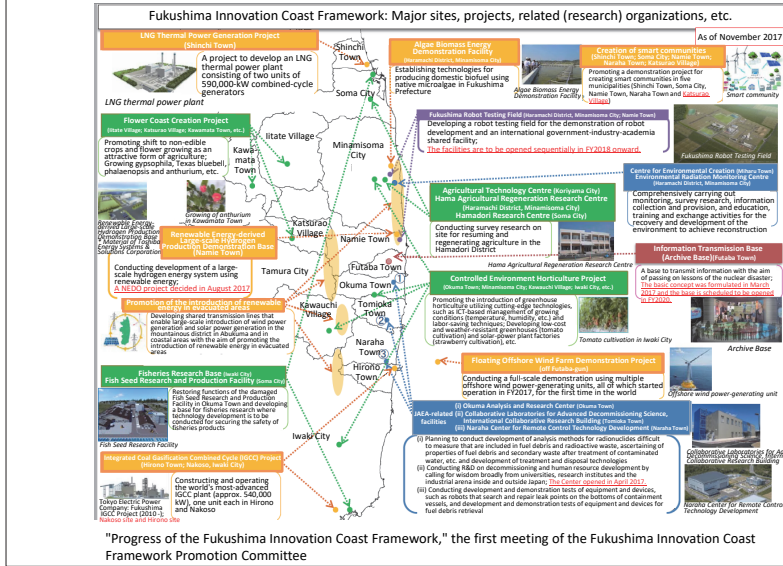
At the joint meeting of the Reconstruction Promotion Committee and the Nuclear Emergency Response Headquarters held on March 7, 2013, it was pointed out that "a certain view should be indicated within the year" regarding the lift of evacuation orders. Accordingly, procedures to be followed for lifting evacuation orders were presented based on the discussions over the Cabinet decision on December 20, 2013, "For Accelerating the Reconstruction of Fukushima from the Nuclear Disaster." In order to ease returning residents' anxiety over health effects of radiation, it was decided to take measures to reduce radiation exposure and eliminate health concerns (risk communication program). These measures include deployment of counselors, development of counselor support centers, ascertaining and management of personal doses, and radiation monitoring.

The revised "For Accelerating the Reconstruction of Fukushima from the Nuclear Disaster" (Cabinet decision on June 12, 2015) presents the policy to lift evacuation orders by March 2017 for all areas except for Areas where Returning is Difficult.

In the meantime, against a backdrop of decreasing radiation doses in Areas where Returning is Difficult and strong wishes of former residents eager to return home, the national government stepped forward to present its policy to develop the Specified Reconstruction and Revitalization Base in August 2016, based on requests of local residents and recommendations of the ruling parties. The development of the Specified Reconstruction and Revitalization Base, which aims to create new communities in tandem with the progress of reconstruction work, is to be carried out in response to the needs and requests of respective local governments, at the expense of the national government without seeking compensation from Tokyo Electric Power Company.

Prepared based on the following material:(i) Nuclear Emergency Response Headquarters' "For Accelerating the Reconstruction of Fukushima from the Nuclear Disaster" (December 20, 2013),(ii) revised version of Nuclear Emergency Response Headquarters' "For Accelerating the Reconstruction of Fukushima from the Nuclear Disaster" (June 12, 2015) (iii)Reconstruction Agency's "Draft of the Act Partially Amending the Act on Special Measures for Fukushima Reconstruction and Revitalization (Outline)" (February 2017)

Included in this reference material on February 28, 2018



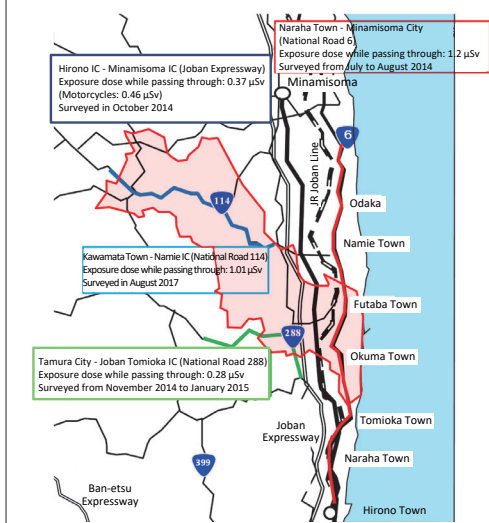
The Fukushima Innovation Coast Framework Workshop was first established in January 2014 with the aim of having people around the world witness the spectacular recovery of the Hamadori District at the time of the Tokyo Olympic and Paralympic Games in 2020. The Workshop compiled a report on the Fukushima Innovation Coast Framework in June 2014. The amended Act on Special Measures for Fukushima Reconstruction and Revitalization, which was promulgated in May 2017, provides for the promotion of the Framework and the relevant system was fundamentally strengthened with the creation of a ministerial-level council.

Fukushima Prefecture established a general incorporated foundation, "Fukushima Innovation Coast Framework Promotion Organization," in July 2017 with the aim of having it function as the central organization in promoting the Fukushima Innovation Coast Framework towards its realization.

Efforts are being made to materialize projects in the fields of decommissioning, robotics, energy and the agriculture, forestry and fisheries industry, etc. and to form industrial clusters, foster human resources, and increase the number of visitors, etc.

Included in this reference material on February 28, 2018

## Results of Radiation Dose Surveys along Major Roads in Areas where Returning is Difficult



Finally confirmed radiation doses measured before reopening of roads

### Joban Expressway

The entirety was restored with the reopening of the section between Namie IC and Joban Tomioka IC on March 1, 2015.

### JR Joban Line

The section between Tomioka Station and Namie Station is scheduled to be reopened at the end of FY2019.

### National roads and prefectural roads

Through operational change of the Special Transit Permission System, transit without carrying and presenting a pass came to be permitted for National Road 6 on September 15, 2014, for National Road 288 on February 28, 2015, and for National Road 114 on September 20, 2017.

### Exposure doses of drivers passing through, measured before reopening of roads

National Road 6 (special transit permission on September 15, 2014)

1.2  $\mu\text{Sv}$  (between Naraha Town and Minamisoma City)

\*Equivalent to one-167th of the exposure dose during a flight between Tokyo and New York (approx. 0.2 mSv)

Joban Expressway (reopened on March 1, 2015)

Four-wheeled vehicles: 0.37  $\mu\text{Sv}$ ; Motorcycles: 0.46  $\mu\text{Sv}$  (between Hirono IC and Minamisoma IC)

\*Equivalent to one-540th and one-430th, respectively, of the exposure dose during a flight between Tokyo and New York (approx. 0.2 mSv)

National Road 288 (special transit permission on March 1, 2015)

0.28  $\mu\text{Sv}$  (between Tamura City and Joban Tomioka IC)

National Road 114 (special transit permission on September 20, 2017)

1.01  $\mu\text{Sv}$  (between Kawamata Town and Namie IC)

In Areas where Returning is Difficult, transit had been restricted except for temporary entry of residents and transit based on the Special Transit Permission System.

As National Road 6 is a key major road for reconstruction and recovery of Fukushima Prefecture, after completion of decontamination and road repair work, special transit without carrying and presenting a pass came to be permitted for National Road 6 and Prefectural Road 36 on September 15, 2014, as a result of consultations with the relevant municipalities.

In conjunction with the reopening of the section between Joban Tomioka IC and Namie IC of the Joban Expressway on March 1, 2015, special transit without carrying and presenting a pass was made possible for National Road 288 and Prefectural Road 35 on February 28, 2015, and for National Road 114 and Prefectural Roads 34 and 49 at 6:00 on September 20, 2017.

- Results of Radiation Dose Surveys along National Road 6 and Prefectural Road 36 in Areas where Returning is Difficult (September 12, 2014)

[http://www.meti.go.jp/earthquake/nuclear/pdf/kokudou6gou\\_press.pdf](http://www.meti.go.jp/earthquake/nuclear/pdf/kokudou6gou_press.pdf) (in Japanese)

- Results of Radiation Dose Surveys along National Road 288 and Prefectural Road 35 Including Areas where Returning is Difficult (February 25, 2015)

[http://www.meti.go.jp/earthquake/nuclear/pdf/0225\\_001a.pdf](http://www.meti.go.jp/earthquake/nuclear/pdf/0225_001a.pdf) (in Japanese)

- Results of Radiation Dose Surveys along Joban Expressway (between Joban Tomioka IC and Namie IC) and at Naraha PA (February 27, 2015)

[http://www.meti.go.jp/earthquake/nuclear/pdf/0227\\_001a.pdf](http://www.meti.go.jp/earthquake/nuclear/pdf/0227_001a.pdf) (in Japanese)

- Results of Radiation Dose Surveys in Areas where Returning is Difficult along National Roads 114, 399 and 459 and Prefectural Roads 49 and 34 (September 15, 2017)

[http://www.meti.go.jp/earthquake/nuclear/kinkyu/hinanshiji/2017/pdf/0915\\_04.pdf](http://www.meti.go.jp/earthquake/nuclear/kinkyu/hinanshiji/2017/pdf/0915_04.pdf) (in Japanese)

Included in this reference material on February 28, 2018