The Current Situation of Off-site Clean-up in Japan

May 23, 2016

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Ministry of the Environment, Japan
1. Current Situation of Off-site Decontamination

2. Interim Storage Facility
Decontamination based on the “Act on Special Measures”

1) Special Decontamination Area
   - Designation of SDA by the Minister of the Environment
   - Development of the decontamination implementation plan in the SDA by the Minister of the Environment
   - Implementation of decontamination by the national government

2) Intensive Contamination Survey Area
   - Designation of ICSA by the Minister of the Environment (Areas where air dose rate is 0.23μSv/h or more)
     ※0.23μSv/h is a criterion for designation of ICSA and not a decontamination target
   - Survey measurement by the mayors of the municipalities
   - Development of the decontamination implementation plan by the mayors of the municipalities
   - Implementation of decontamination by the municipalities, etc. (The national government allocates budgets.)

Note: The air dose rate 0.23μSv/h corresponds to a cautiously estimated individual exposure dose of 1mSv/y assuming that people spend
① 8 hours outside ② 16 hours in a wooden house with a low shielding rate in a day

Decontamination and disposal of soil at NPS
   Implemented by the nuclear power station operating company in charge (TEPCO)
### Progress in the Special Decontamination Area

**② (As of the end of March, 2016)**

**<Municipalities in which evacuation order were lifted>**

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Evacuation order was lifted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tamura city</td>
<td>April 1, 2014</td>
</tr>
<tr>
<td>A part of Kawauchi village</td>
<td>October 1, 2014</td>
</tr>
<tr>
<td>(former “areas to which evacuation orders are ready to be lifted”)</td>
<td></td>
</tr>
<tr>
<td>Naraha town</td>
<td>September 5, 2015</td>
</tr>
</tbody>
</table>

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**Map Legend:**
- Evacuation order lifted
- Decontamination completed
- Residential areas completed
- Implementing
- Special Decontamination Area
- Areas where it is anticipated that residents will face difficulties in returning for a long time
### Progress in the Special Decontamination Area ③ (As of the end of March, 2016)

#### Main Topic
- Decontamination in progress with max. 11,700 labor per day (Feb. 16 – Mar. 31, 2016)
- Decontamination has completed in Minami-Soma and Tomioka (residential area), Futaba (whole area)

#### 1. Municipalities implementing whole area decontamination (aimed to complete all the decontamination by March 2017)

<table>
<thead>
<tr>
<th>Securement of TSS Note 1,3</th>
<th>Consent on decontamination Note 3</th>
<th>Execution rate (%)</th>
<th>Note 2,3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Residential area</td>
<td>Farmland</td>
<td>Forest</td>
</tr>
<tr>
<td>Iitate</td>
<td>Secured</td>
<td>almost completed</td>
<td>100</td>
</tr>
<tr>
<td>Minami-Soma</td>
<td>Mostly secured</td>
<td>approx. 90%</td>
<td>88</td>
</tr>
<tr>
<td>Namie</td>
<td>approx. 90%</td>
<td>almost completed</td>
<td>48 (44)</td>
</tr>
<tr>
<td>Tomioka</td>
<td>Secured</td>
<td>Completed</td>
<td>100 (93)</td>
</tr>
</tbody>
</table>

#### 2. Municipalities completed decontamination

<table>
<thead>
<tr>
<th>Time of Completion Note 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tamura</td>
</tr>
<tr>
<td>Naraha</td>
</tr>
<tr>
<td>Kawauchi</td>
</tr>
<tr>
<td>Okuma</td>
</tr>
<tr>
<td>Katsurao</td>
</tr>
<tr>
<td>Kawamata</td>
</tr>
<tr>
<td>Futaba</td>
</tr>
</tbody>
</table>

**Note 1:** The ratio shows: Contracted TSS area / Necessary TSS area. It might change because of increase and decrease of the necessary area depending on the progress of decontamination construction.

**Note 2:** Implementation ratio: Decontamination-completed area / Target decontamination area. They might be both revised with future investigation. “Areas where it is anticipated that residents will face difficulties in returning for a long time” are basically not included.

**Note 3:** Numbers in () are the numbers in a previous month. Numbers without () have not been changed from the previous month.

**Note 4:** Time of decontamination completion means the time which decontamination is completed in the area with resident’s consent. If the area is not decontaminated, it will be eventually decontaminated once the consent is obtained.

**Note 5:** A part of farmland struck by heavy rain disaster is not included.
Number of municipalities designated as the Intensive Contamination Survey Area:
104 (at the start) \(\rightarrow\) 97 (at present)
The designation was lifted in seven municipalities because of the radiation dose decrease, etc.

Municipalities that formulated decontamination implementation plans:
93 municipalities (all that had intended to do)

Municipalities that have completed or almost completed their plans (and continued monitoring of air dose rates).
49 municipalities

Municipalities in process of implementing decontamination based on the plans:
44 municipalities
In most of the decontamination plans, ending time period is set between FY2015- FY2016.

The progress of decontamination

In Fukushima Pref. (as of the end of March 2016):
Public facilities: approx. 90%
Residential houses: approx. 80%
Roads: approx. 50% Forests in living area: approx. 50%

Outside Fukushima Pref. (as of the end of Dec. 2015):
Schools & nurseries/ parks, sports facilities / residential houses: almost completed
Roads: approx. 90%
Farmland & meadows/ forests in living area: completed
### Progress in Intensive Contamination Survey Area ③

<table>
<thead>
<tr>
<th>Within Fukushima Prefecture (As of the end of March 2016)</th>
<th>Ordering Ratio (Number of ordering/Number of planning)</th>
<th>Executing Ratio (Number of actual achievement/Number of planning)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public facilities, etc.</td>
<td>mostly ordered</td>
<td>approx. 90%</td>
</tr>
<tr>
<td>Residential houses</td>
<td>approx. 90%</td>
<td>approx. 80%</td>
</tr>
<tr>
<td>Roads</td>
<td>approx. 70%</td>
<td>approx. 50%</td>
</tr>
<tr>
<td>Farmlands &amp; meadows</td>
<td>mostly ordered</td>
<td>approx. 90%</td>
</tr>
<tr>
<td>Forests(in living areas)</td>
<td>approx. 70%</td>
<td>approx. 50%</td>
</tr>
</tbody>
</table>

Note: The number of planning areas have been continuously revised, based on the investigation result made by Fukushima Prefecture.

<table>
<thead>
<tr>
<th>Outside Fukushima Pref. (As of the end of Dec. 2015)</th>
<th>Ordering Ratio (Number of Ordering/number of planning)</th>
<th>Executing Ratio (Number of actual achievement/number of planning)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schools and nurseries</td>
<td>mostly ordered</td>
<td>almost completed</td>
</tr>
<tr>
<td>Park, Sports facilities</td>
<td>mostly ordered</td>
<td>almost completed</td>
</tr>
<tr>
<td>Residential houses</td>
<td>mostly ordered</td>
<td>almost completed</td>
</tr>
<tr>
<td>Other facilities</td>
<td>approx. 90%</td>
<td>approx. 80%</td>
</tr>
<tr>
<td>Roads</td>
<td>mostly ordered</td>
<td>approx. 90%</td>
</tr>
<tr>
<td>Farmlands &amp; meadows</td>
<td>ordered</td>
<td>completed</td>
</tr>
<tr>
<td>Forests( in living areas)</td>
<td>ordered</td>
<td>completed</td>
</tr>
</tbody>
</table>

Note: The number of planning is the total number until the end of Dec. 2015, which might be increased in future depending on each municipality’s status.
Effects of Decontamination Work in Kawauchi

【Air dose rate at the height of 1m from the ground at entire Kawauchi village*】

Air dose rates at residential areas:
decreased approx. 45% comparing before decontamination to after decontamination
decreased approx. 63% comparing before decontamination to post-decontamination monitoring
and the effects of decontamination have been retained

*entire Kawauchi village: indicates both former “Areas in Which Residents are not Permitted to Live” and former “Areas to Which Evacuation Orders are Ready to be Lifted”

<table>
<thead>
<tr>
<th>Location</th>
<th>Before decontamination (μSv/h)</th>
<th>After decontamination (μSv/h)</th>
<th>Post-decontamination monitoring (μSv/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential areas</td>
<td>1.11</td>
<td>0.61</td>
<td>0.41</td>
</tr>
<tr>
<td>Farmland</td>
<td>0.99</td>
<td>0.57</td>
<td>0.45</td>
</tr>
<tr>
<td>Forest near residential area</td>
<td>1.24</td>
<td>0.99</td>
<td>0.70</td>
</tr>
<tr>
<td>Road</td>
<td>1.19</td>
<td>0.74</td>
<td>0.50</td>
</tr>
</tbody>
</table>

*(n=2,589) (n=1,933) (n=1,967) (n=6,944)*
1. Current Situation of Off-site Decontamination

2. Interim Storage Facility
What is an Interim Storage Facility (ISF)?

♦ In Fukushima Prefecture, large quantities of contaminated soil and waste have been generated from decontamination activities.
♦ Currently, it is difficult to clarify methods of final disposal of such soil and waste.
♦ Until final disposal becomes available, it is necessary to establish an Interim Storage Facility (ISF) in order to manage and store soil and waste safely.

The following materials generated in Fukushima Prefecture will be stored in the ISF.
1. Soil and waste (such as fallen leaves and branches) generated from decontamination activities, which have been stored at the Temporary Storage Sites.

* In principle, combustible materials will be incinerated, and incinerated ash will be stored.

2. Incineration ash with radioactive concentration more than 100,000 Bq/kg.
<table>
<thead>
<tr>
<th>TIME</th>
<th>CONTENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 2013-</td>
<td>MOE started the field survey including boring survey, obtaining the consent from the local communities.</td>
</tr>
<tr>
<td>Dec. 2013</td>
<td>MOE requested that Fukushima Prefecture and the 3 towns (Futaba, Okuma and Naraha) accept the establishment of the ISF.</td>
</tr>
<tr>
<td>Feb. 2014</td>
<td>The Governor of Fukushima requested the national government to consolidate the ISF in Okuma and Futaba.</td>
</tr>
<tr>
<td>May-June, 2014</td>
<td>The Government held <em>explanatory meetings for residents</em>. <em>(16 times in total: 10 times in Fukushima, 6 times outside Fukushima)</em></td>
</tr>
<tr>
<td>Sep. 1, 2014</td>
<td>The Governor of Fukushima accepted the construction of the ISF, and both mayors of Okuma and Futaba agreed that the government would explain to the landowners. At the same time, the Governor asked confirmation of the five conditions of the national government before its acceptance of transportation of soil.</td>
</tr>
<tr>
<td>Sep. 2014 -</td>
<td>MOE held <em>explanatory meetings for landowners</em> <em>(12 times in total: 9 times in Fukushima and 3 times outside Fukushima)</em></td>
</tr>
<tr>
<td>Oct. - Nov. 2014</td>
<td>The amendment bill for the Japan Environmental Safety Corporation (JESCO) Law in order to legislate the final disposal of contaminated soil and waste outside Fukushima Prefecture was approved by the Cabinet and submitted to the Diet in Oct. The law was enacted in Nov. and put into effect in Dec.</td>
</tr>
<tr>
<td>Dec.2014-Jan.2015</td>
<td>Both Okuma and Futaba accepted the construction of the ISF.</td>
</tr>
<tr>
<td>Feb. 3, 2015</td>
<td>The construction of stock yards in the ISF started.</td>
</tr>
<tr>
<td>Feb. 8, 2015</td>
<td>The Minister of the Environment and the Minister for Reconstruction explained to the Governor of Fukushima the progress related to the five conditions which should be confirmed before the transportation of soil to the ISF.</td>
</tr>
<tr>
<td>Feb. 25, 2015</td>
<td>The Governor of Fukushima and both mayors of Okuma and Futaba conveyed the acceptance to the Minister of the Environment and the Minister for Reconstruction.</td>
</tr>
<tr>
<td>March, 2015 -</td>
<td>Transportation of soil from temporary storage sites to the stock yards started in Okuma on March 13, in Futaba on March 25, and sequentially in other municipalities.</td>
</tr>
</tbody>
</table>
Planned Site for the Interim Storage Facility
Estimated Storage Volume in the Interim Storage Facility

Estimated volume of removed soil and waste being generated (in the case of 22 million m³)

- Approx. 10.06 mil. m³
- Approx. 10.35 mil. m³
- Approx. 1.55 mil. m³
- Approx. 10,000 m³
- Approx. 20,000 m³

The amount of soil and waste is estimated to be approx. 16 to 22 mil. m³ after volume reduction (incineration)

(*1) Soil and waste
(*2) Wastes from the countermeasure area
The Interim Storage Facility consists of several facilities with various functions.

- **Temporary Storage Sites, etc.**
- **Acceptance & Separation Facility**
  - To classify the soil and waste transported by measuring the weight and radiation dose.
- **Soil Storage Facility**
  - To store soils after classification by radioactive cesium concentrations and other features.
- **Volume Reduction Facility**
  - To reduce the volume of stockpile by incinerating the combustibles (branches and plants, etc.).
- **Waste Storage Facility**
  - To store waste (incineration ash, etc.) measuring more than 100,000 Bq/kg.

**Other Facilities**
- Screening
- Water treatment
- Stock yard
- Admin. Office
- R&D
In order to confirm safe and secure delivery towards the transportation of a large amount of decontamination soil, MOE implemented pilot transportation approx. 1,000 m³ each from 43 municipalities in Fukushima Prefecture from 2015-2016.


<Actual achievement of the pilot transportation>

♦ Stored volume: 45,382 m³ in total

Stock Yards in Okuma: 23,266 m³
Stock Yards in Futaba: 22,116 m³
(Incombustibles: 40,034 m³, Combustibles: 5,348 m³)
* Calculated on the assumption that the volume of a large bag is 1 m³

♦ Total number of trucks used: 7,529 in total

Stock yards in Okuma: 3,868 trucks
Stockyards in Futaba: 3,661 trucks

♦ Results of truck screening
Surface doses of all the trucks from the Stock yards have been screened and proved to be below the standard of 13,000 cpm.
Measures towards the Final Disposal of Decontamination Soil outside Fukushima Pref.

8 steps towards the final disposal and technological review

◆ Measures will be processed according to 8 steps towards the final disposal
◆ MOE established a meeting with experts reviewing development and concept of volume reduction and recycling technologies, and sequentially proceed them from the possible field
⇒ MOE shall plan final disposal volume, radioactive concentration, structure and dimension of the site based on technological review and measures, then discuss investigation and adjustment of the final disposal site

Strategy for volume reduction & recycling technology development and the roadmap

In April 2016, MOE summarized “Strategy for volume reduction & recycling technology development” and “Roadmap” as a mid-and long term policy concerning recycling promotion of technology development and decontamination soil after volume reduction treatment towards final disposal outside Fukushima based on the discussion among experts meeting

<Major contents>
◆ Volume of the final disposal shall be reduced while increasing the target purified materials as much as possible, and treat decontamination soil by using volume reduction technology
◆ Basic technology development will be completed within a decade in order to implement volume reduction & recycling
◆ To realize the recycling of purified materials, MOE shall foster the national public for safety and securement, and shall make efforts concerning recycling business operators and social acceptance, cooperating with relevant ministries
Public Communication

Provision of basic and comprehensive information
- Call centers in Fukushima and in Tokyo

Decontamination Information Plaza (Information hub run by MOE and Fukushima Pref.)
- Providing interactive communications with people and municipalities
  - Interactive exhibition and workshops
  - Dispatch of experts to municipalities, communities, schools, etc.

Pamphlets, comic books, and videos
- Providing easy-to-understand information with detailed data on decontamination and radiation
  - Distributed at meetings, workshops, city offices, banks, and supermarkets in Fukushima, and also available on the Web

Collaboration with news organizations
- Providing information that helps people understand remediation and the state of the region after remediation, in collaboration with media organizations in Fukushima (Media is the largest information source for Fukushima people)
  - Newspaper ads and TV/radio programs
  - “Thanks Helmet”, a campaign to motivate the decontamination workers and improve relationships between the residents and the workers

Development of national public understanding
- Widely disseminate information of remediation and the state of the region after remediation to the public so that they can correctly understand the current status of Fukushima and its products
  - PR of rice harvested from decontaminated paddy fields
  - Exhibition at Tokyo about “Steps for Restoration of Fukushima”
MOE has exchanged information among policy makers and experts, concerning decontamination policy, methods, and research for the environmental behavior of radioactive materials and utilized shared knowledge and information to review and implement its decontamination activities.

**Nov. 3-4, 2015**

**Nov. 10-11, 2015**
The 4th Japan-UK Nuclear Dialogue (@London)

**Nov. 24-25, 2015**
The 5th meeting of the Japan-France Nuclear Cooperation Committee (@Tokyo)

**Nov. 26, 2015**
The 3rd Meeting of Japan-Ukraine Joint Committee for the cooperation to advance aftermath response to accident at nuclear power stations

**Nov. 27, 2015**
The 3rd Meeting of Japan-Belarus Joint Committee for the cooperation to advance aftermath response to accident at nuclear power stations

**Feb. 4-5, 2016**
The 1st IAEA-MOE Experts Meeting on Environment Remediation of Off-Site areas after the Fukushima Dai-ichi Nuclear Power Station Accident (@Tokyo)