Japan’s Decontamination Efforts and its Effects

Jan. 8, 2015

Ministry of the Environment
Outline

1. Policy Framework
2. Progress in Special Decontamination Area
3. Progress in Intensive Contamination Survey Area
4. After Decontamination
5. Interim Storage Facility
6. Public Communication
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1-1 Radioactive Pollution Caused by the Accident at TEPCO’s Fukushima Dai-ichi NPP

Legend
Air dose rate at 1m height above the ground(μSv/h)
(as of Sep. 18, 2011)

Fukushima city
Tokyo
Yokohama

Legend
- 190 ≤ 95 - 190
- 95 - 95
- 95 - 38
- 38 - 10
- 10 - 1.9
- 1.9 - 0.5
- 0.5 - 0.23
- 0.23 - 0.5
- < 0.23
- No data
1-2 Decontamination based on the “Act on Special Measures”

1) Special Decontamination Area

- Designation of SDA by the Minister of the Environment
- Development of decontamination implementation plans 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
- Survey measurement by the mayors of municipalities
- Development of decontamination implementation plans by the mayors of municipalities
- Implementation of decontamination by the mayors of municipalities, etc.

Decontamination of soil and disposal of generated soil at NPP

Implemented by the nuclear power plant operating company in charge (TEPCO)
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Prior to the decontamination in the Special Decontamination Area, the decontamination plans were elaborated taking into account the progress of rearrangement of the Restricted Area and the Deliberate Evacuation Area. The rearrangement was completed on Aug. 7, 2013.

3 categories after the rearrangement:

**Area 1: < 20 mSv/yr**
Evacuation orders are ready to be lifted:

**Area 2: 20 – 50 mSv/yr**
Residents are not permitted to live:

**Area 3: > 50 mSv/yr**
Residents will have difficulties in returning for a long time:
Decontamination should be implemented taking into account the level of air dose rate:

- **Area where additional exposure rate is higher than 50 mSv/year:** MOE conducts demonstration model projects and studies future demonstration policies based on the lessons learned from the projects.
- **Area where additional exposure rate is between 20-50 mSv/year:** Decontamination is implemented, aiming to reduce exposure dose in residential areas and farmlands to less than 20 mSv/year.
- **Area where additional exposure rate is lower than 20 mSv/year:** Decontamination is implemented for the area as well.

- MOE reviewed the progress of decontamination in the SDA and announced on September 10, 2013 that it will revise the previous policy that aimed to complete decontamination and transfer generated materials to temporary storage sites in two years (by the end of March 2014) for all municipalities and will promote decontamination in accordance with reconstruction activities depending on the situation of each municipality.
- MOE announced on December 26, 2013 that it will revise the decontamination plans for Minami-Soma, Iitate, Kawamata, Katsurao, Namie and Tomioka and set realistic schedules in accordance with the situation of each municipality, in consultation with them.
2-3 Progress in the Special Decontamination Area (as of Nov., 2014)

**Completed decontamination**

<table>
<thead>
<tr>
<th>Area</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tamura</td>
<td>Whole area decontamination was completed in June, 2013. Evacuation order was lifted on April 1, 2014.</td>
</tr>
<tr>
<td>Kawauchi Naraha Okuma</td>
<td>Whole area decontamination was completed in March, 2014. ※ As for Kawauchi, a part of the evacuation order was lifted on October 1, 2014.</td>
</tr>
<tr>
<td>Katsurao</td>
<td>Decontamination of residential area was completed in July, 2014.</td>
</tr>
<tr>
<td>Joban Expressway</td>
<td>Decontamination was completed ※ Reopened between Hirono and Joban-Tomioka.</td>
</tr>
</tbody>
</table>

**Schedules of decontamination ahead**

<table>
<thead>
<tr>
<th>Area</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kawamata</td>
<td>Aiming at the completion of decontamination of remaining areas within 2015.</td>
</tr>
<tr>
<td>Katsurao</td>
<td>Aiming at the completion of decontamination of residential area within 2014 and the completion of decontamination of remaining area within 2016.</td>
</tr>
<tr>
<td>Iitate</td>
<td>Aiming at the completion of decontamination within 2015.</td>
</tr>
<tr>
<td>Minamisoma Namie</td>
<td>Aiming at the completion of decontamination of residential area within FY 2015 and the completion of decontamination of remaining area within FY 2016.</td>
</tr>
<tr>
<td>Tomioka Futaba</td>
<td>Aiming at the completion of decontamination within FY 2015.</td>
</tr>
</tbody>
</table>

**Areas where it is anticipated that residents will face difficulties in returning for a long time.**
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3-1 Progress in Intensive Contamination Survey Area

As of December, 2014

Completed based on the plan
Already planned (Areas where the decontamination plan was formulated based on the Act)
Other Intensive Contamination Survey Area

Inside the orange frame is the Special Decontamination Area

< In Fukushima prefecture >

◊ Number of municipalities designated as the Intensive Contamination Survey Area:
   41 (at the start) → 39 (at present)
   When the situation becomes different from the required condition of designation, the designation can be lifted. The designation was lifted in two municipalities up to now because of the radiation dose decrease, etc.

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

◊ Municipalities in process of implementing decontamination based on the plans:
   36 municipalities

◊ The progress of decontamination (as of the end of October 2014)
  Public facilities: approx. 80%
  Residential houses: approx. 60%
  Roads: approx. 30%

◊ The end of most of the decontamination plans is set between FY2015- FY2016.
3-2 Progress in Intensive Contamination Survey Area

As of December, 2014

- Completed based on the plan
- Already planned (Areas where the decontamination plan was formulated based on the Act)
- Other Intensive Contamination Survey Area

< Outside Fukushima prefecture >

- Number of municipalities designated as the Intensive Contamination Survey Area:
  63 (at the start) → 60 (at present)
  When the situation becomes different from the required condition of designation, the designation can be lifted. The designation was lifted in two municipalities up to now because of the radiation dose decrease, etc.

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

- 17 out of 58 municipalities have completed their plans (and continued monitoring of air dose rates).

- 26 out of 58 municipalities have almost completed.

- The progress of decontamination (as of the end of September 2014)
  Schools & nurseries: almost completed
  Residential houses: approx. 90%
  Roads: approx. 90%
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Decontamination work has reduced air dose rates.
e.g. by approx. 36% for residential houses.
The data from the post-decontamination monitoring confirm that the effects of whole area decontamination have been maintained and show that air dose rates have been continuously decreasing.

4-1 Effects of Decontamination Work
(in Tamura in the Special Decontamination Area)

- Decontamination work has reduced air dose rates.
  e.g. by approx. 36% for residential houses.
- The data from the post-decontamination monitoring confirm that the effects of whole area decontamination have been maintained and show that air dose rates have been continuously decreasing.

<table>
<thead>
<tr>
<th>Area</th>
<th>Before → After Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential houses (n=4,130)</td>
<td>Before → After 36% reduced</td>
</tr>
<tr>
<td>Farmlands (n=3,774)</td>
<td>Before → After 25% reduced</td>
</tr>
<tr>
<td>Forests close to residential areas (n=3,359)</td>
<td>Before → After 21% reduced</td>
</tr>
<tr>
<td>Roads (n=2,250)</td>
<td>Before → After 25% reduced</td>
</tr>
</tbody>
</table>

*conducted between Sep. - Oct., 2013*
4-2 Overview of Follow-Up after Decontamination

Decontamination based on the Act on Special Measures

Decontamination based on the plans

Follow-up of decontamination

1. Confirming of retained effects / Follow-up decontamination
   - Post-decontamination monitoring in detail
   - Confirming of retained effects of decontamination
   - Follow-up decontamination
   - Measurement after the decontamination

Select 1-3 as needed

2. Continuous monitoring
   ※Designed according to radiation doses

3. Finely tuned service to communities
   ◇Verifying of sites
   ◇Monitoring
   ◇Risk communication
   ◇Actions on site

Other measures※
<Examples>
※MOE cooperates with the relevant ministries and municipalities

Health management and risk communication
◇Measurement and management of individual doses
◇Health activity and advice

Other measures for radiation protection
◇Monitoring
◇Daily maintenance and cleaning of houses and gardens
◇Advice on daily activities
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5-1 What is an Interim Storage Facility (ISF)?

- In Fukushima prefecture, large quantities of contaminated soil and waste have been generated from decontamination activities.
- It is difficult to clarify methods of final disposal of such soil and waste at the current stage.
- 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 and intensively.

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.

2. Incineration ash with radioactive concentration more than 100,000 Bq/kg.
   * In principle, combustible materials will be incinerated, and incinerated ash will be stored.

Note) MOE’s policy is that materials such as incinerated ash with radioactive concentration less than 100,000 Bq/kg will be finally disposed at a privately managed disposal site (named Fukushima Eco Tec Clean Center) in Tomioka.
5-2 Process regarding the Interim Storage Facility


※Main Contents
- The National Government will secure, maintain and manage the ISF
- The National Government will make utmost efforts to start operating of the ISF in about 3 years after start of full-scale collection of soil to the temporary storages sites
- Only soil and waste generated in Fukushima prefecture will be stored in the ISF
- The above materials will be finally treated outside Fukushima prefecture within 30 years after launch of interim storage

Mar., 2012  MOE explained the Fukushima prefecture and the 8 towns that the ISF may be located separately in 3 towns (Futaba, Okuma and Naraha).

Aug., 2012  MOE proposed an investigation regarding the ISF to Fukushima prefecture and the 8 towns in Futaba county.

Nov., 2012  The Governor of Fukushima announced the acceptance of the investigation proposed by MOE, subject to in-depth explanation to the local communities.

Apr., 2013  MOE started the field survey including boring survey, obtaining the consent from the local communities.

Jun.-Sep., 2013  Study groups on safety measures and environmental protection were held.

Dec., 2013  MOE requested the Fukushima prefecture and the 3 towns (Futaba, Okuma and Naraha) to accept the establishment of the ISF (and also requested Tomioka and Naraha at the same time to utilize the Eco Tec Clean Center.)

Feb.-Mar., 2014  The Governor of Fukushima requested MOE to consolidate the ISF in Okuma and Futaba. MOE accepted the request in March.
5-3 Process regarding the Interim Storage Facility

Apr.-May, 2014  The Government (MOE and the Reconstruction Agency) explained its policies on the ISF to Fukushima prefecture, Okuma and Futaba, and again asked them to let the Government hold explanatory meetings to local residents. Both towns accepted the request in May.

May.-Jun., 2014  The Government held the explanatory meetings for residents. (16 times in total: 10 times in Fukushima, 6 times outside Fukushima)

Jul.-Aug, 2014  The Government showed Fukushima prefecture, Okuma and Futaba a full picture of its policies including financial supports taken into considerations the opinions raised at the explanatory meetings.

Aug. 30, 2014  The Governor of Fukushima had a meeting with both mayors of Okuma and Futaba and other mayors in Futaba county and indicated acceptance of the establishment of the ISF.

Sep.1, 2014  The Minister the Environment and the Minister for Reconstruction met the Governor of Fukushima and the mayors of Okuma and Futaba. The Governor accepted the construction of the ISF, and both mayors conveyed that they took the Governor's acceptance seriously and agreed that the government would explain to the landowners. The Prime Minister Abe met the Governor of Fukushima and the mayors of Okuma and Futaba, and the Governor told the Prime Minister the acceptance as well.

Sep.- Oct., 2014  MOE held explanatory meetings for landowners. (12 times in total: 9 times in Fukushima and 3 times outside Fukushima)

Oct.- Nov., 2014  On October 3, 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. The amendment of JESCO Law was enacted on November 19.
It is estimated that stockpile of soil generated from decontamination will be approx. 16 ~22 mil. m³ after the volume reduction (incineration)

ref. : approximately 13~18 times as much as the volume of Tokyo Dome (1.24 mil. m³)

※ In discussing the plan for the Interim Storage Facility, possible increase in volume of soil due to additional decontamination that is difficult to estimate for now will be also considered.
The Interim Storage Facility will consist of several facilities with various functions.

- **Temporary Storage Sites, etc.**
- **Acceptance & Separation Facility**
  - To separate the soil and waste transported by measuring the weight and radiation dose.
- **Other Facilities**
  - Screening
  - Water treatment
  - Stockyard
  - Admi. Office
  - R&D
  - Information Center
- **Soil Storage Facility**
  - To store soils after separation in accordance with 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 the waste (incineration ash, etc.) of which radioactive cesium concentrations is more than 100,000 Bq/kg.
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6 Public Communication on Decontamination

**WEB**
- Comprehensive and instantaneous information
- Available on the Web

**Pamphlets and other materials**
- Easy-to-understand and detailed information
- Distributed at meetings, workshops, city offices, banks, convenience stores, etc.

**Newspaper ads and TV programs**
- Media is the largest information source for people in FP

**Decontamination Information Plaza**
- Information hub of decontamination run by MOE and FP (located near the Fukushima Station)
- Providing people inside and outside of FP and municipalities with comprehensive and latest information of decontamination and radiation
- Interactive exhibition, demonstration, and workshops
- Dispatch of experts to municipalities, communities, schools, etc.