



Progress on Off-site Cleanup Efforts in Japan

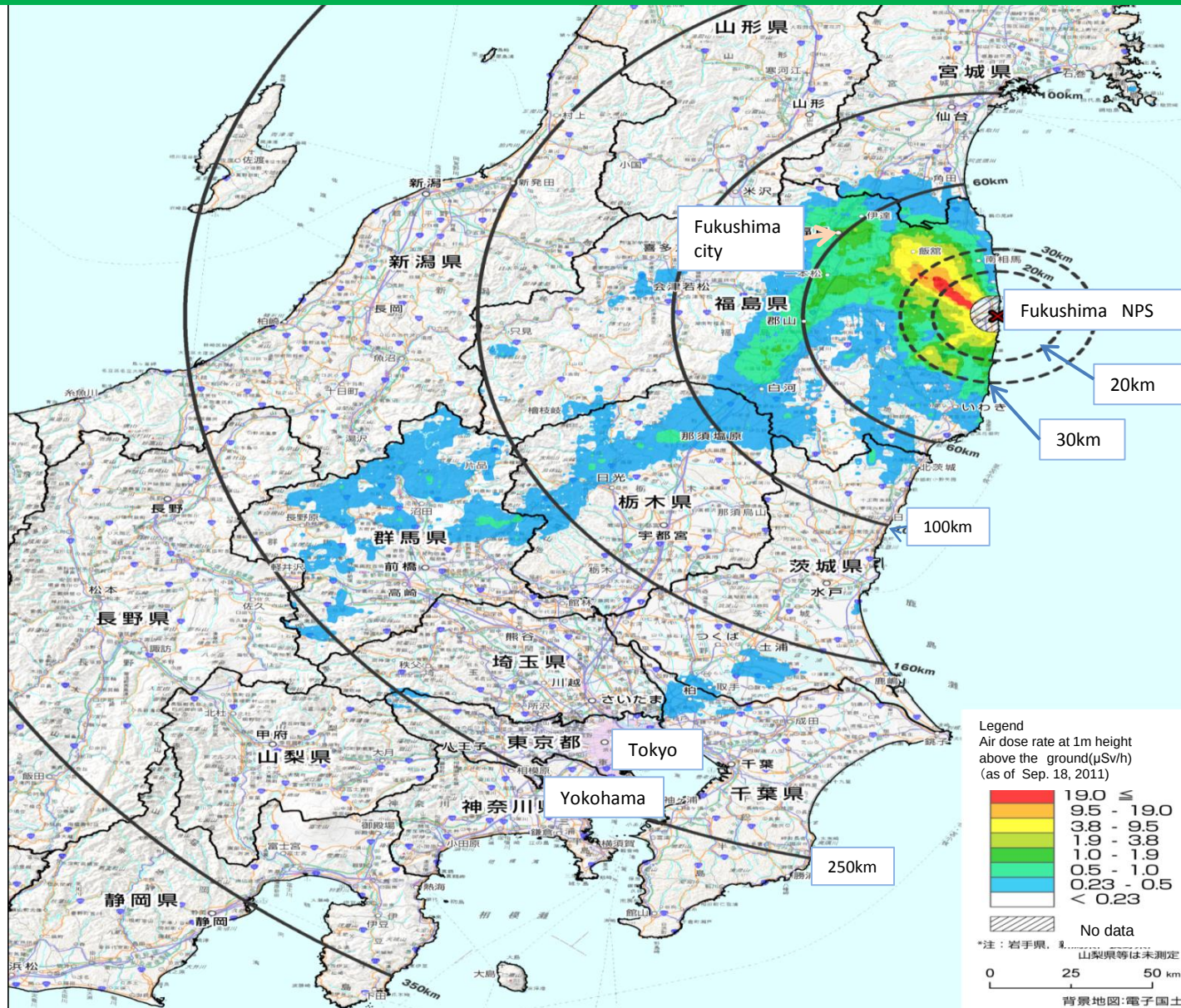
Sep 16th, 2013

Ministry of the Environment, Japan

Outline

- **Policy Framework**
- Progress in Special Decontamination Area
- Progress in Intensive Contamination Survey Area
- New policies announced in Sep 2013
- Efforts to secure Interim Storage Facility

Radioactive Pollution Caused by the Accident at TEPCO's Fukushima Dai-ichi NPS



Framework of Decontamination

Legislation for Promoting Decontamination

- ◆ The Act on Special Measures Concerning the Handling of Radioactive Pollution came into force on January 1, 2012.
- ◆ Based on this Act the followings are carried being out:
 - Planning and implementation of decontamination work
 - Collection, transfer, temporary storage, and final disposal

Special Decontamination Area

- ◆ 11 municipalities in (former) restricted zone or planned evacuation zone (<20km from the NPS, or annual cumulative dose is >20mSv)
- ◆ Decontamination is being implemented by the national government

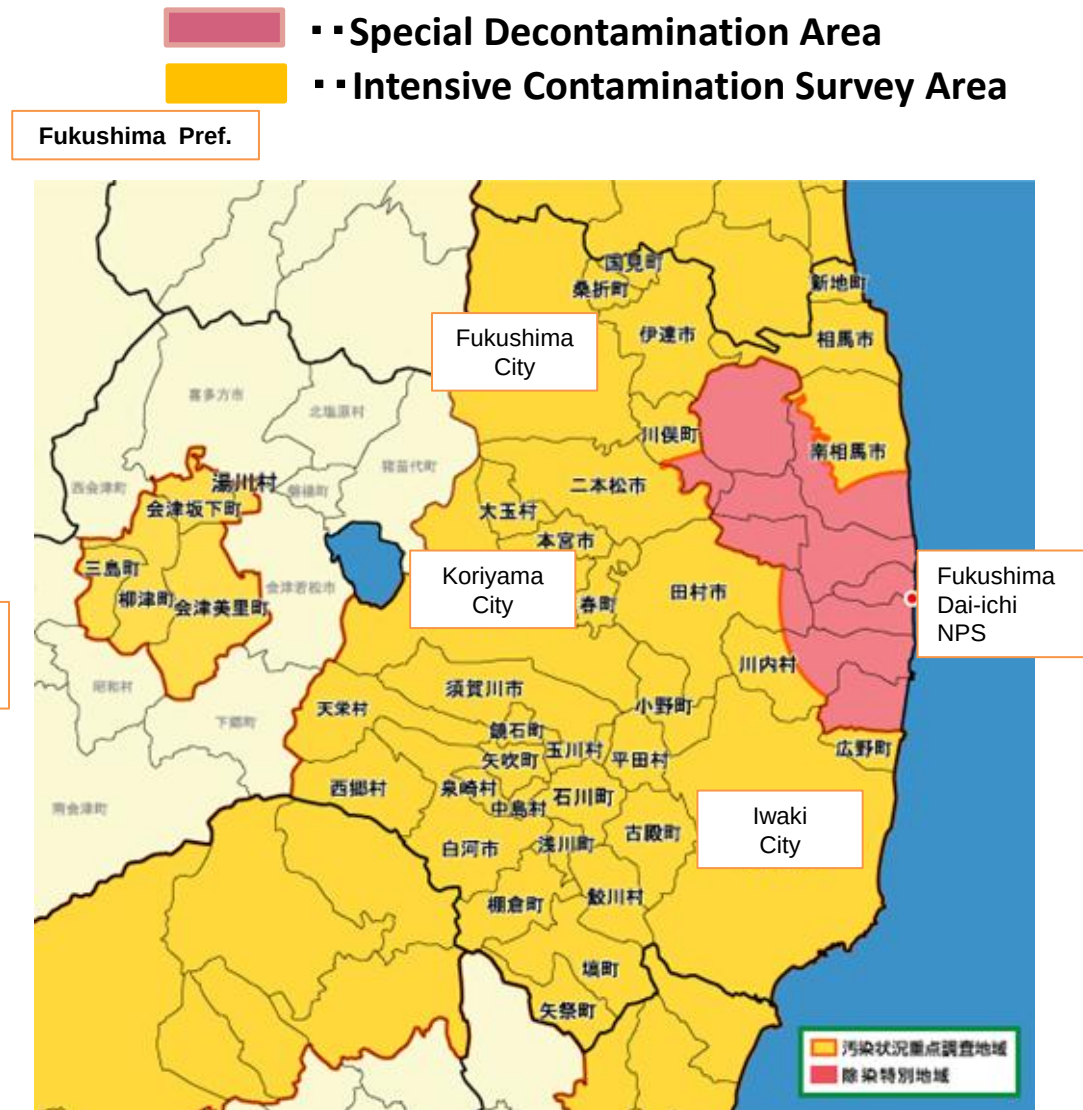
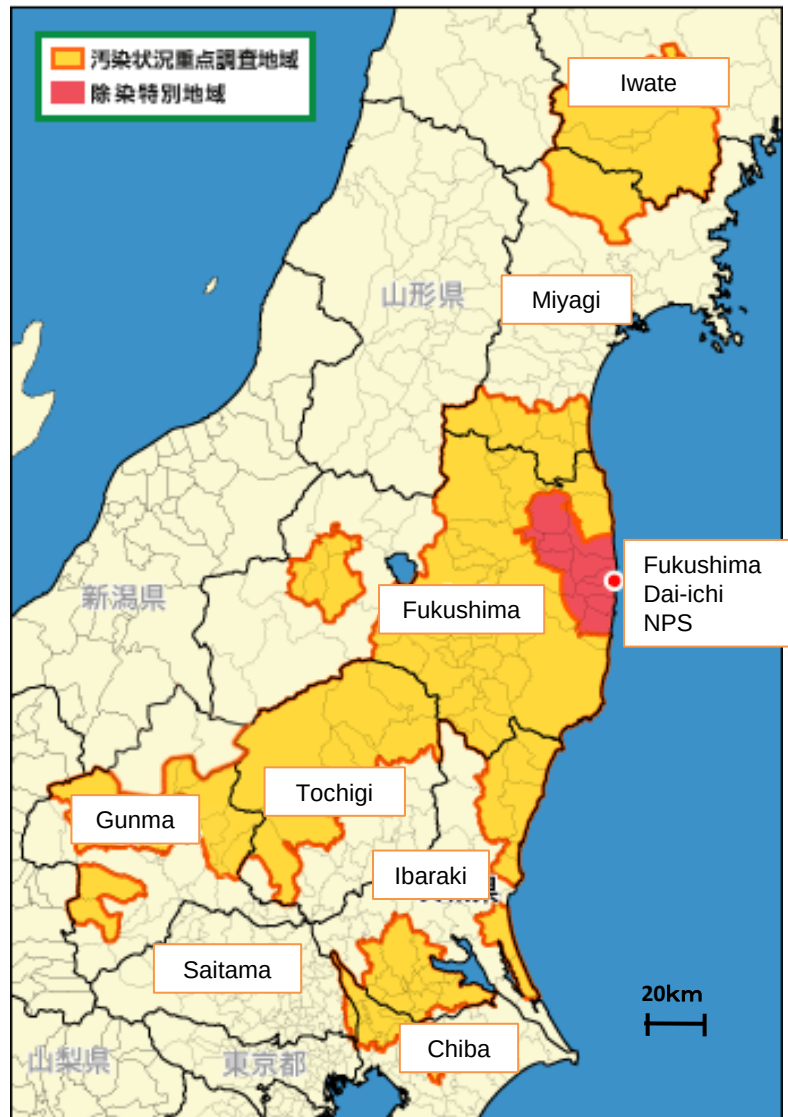
(*) Entire area of Naraha, Tomioka, Okuma, Futaba, Namie, Katsurao, and Iitate.
Some area of Tamura, Minami Soma, Kawamata, and Kawauchi.

Intensive Contamination Survey Area

- ◆ 100 municipalities in 8 prefectures (*), in which over 0.23 $\mu\text{Sv}/\text{hour}$ of air dose rate (equivalent to over 1 mSv/Year) is observed, were designated.
- ◆ Decontamination is being implemented by each municipality. The national government will take financial and technical measures.

(*) Iwate, Miyagi, Fukushima, Ibaraki, Tochigi, Gunma, Saitama, and Chiba

Special Decontamination Area and Intensive Contamination Survey Area



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Decontamination Policy for Special Decontamination Area

Policy in FY2012 and 2013

Decontamination should be implemented taking into account the level of air dose rate.

- ◆ **Area less than 20mSv/year**: Aiming to reduce additional exposure dose to less than 1mSv/year as long-term goal.
- ◆ **Area from 20~50mSv/year**: Aiming to reduce exposure dose in residential and farmland area to less than 20mSv/year.
 - > Decontamination work in all municipalities in the Area has been uniformly scheduled to be completed within 2 years, assuming the securing of temporary storage sites and consent of landowners, etc.
 - > In the case of areas more than 50mSv/year, demonstration projects will be implemented. Lessons learned will be taken into consideration in future decontamination policy.

Policy Review at Sep. 2013

Decontamination work will be implemented in cooperation with reconstruction measures depending on the situation of each municipality. Additional measures for further progress will be conducted. (Refer to the following slide.)

Progress in the Special Decontamination Area

- Progress (implementation ratio) of the decontamination work planned in 2012 and 2013 are as follows:
- Difference is observed among municipalities depending on circumstances regarding preparation as well as operation of decontamination work.



As of Jul. 2013	Tamura	Naraha	Kawauchi	Iitate	Kawamata	Katsurao	Okuma
Living area	100%	51%	100%	3%	0%	2%	3%
Farmland	100%	68%	1%	1%	3%	0.1%	11%
Forest	100%	65%	69%	2%	6%	25%	6%
Road	100%	25%	100%	0.3%	0%	1%	6%

Note 1: Implementation ratio is calculated in a area basis: Areas completed / Areas planned in 2012 and 2013.

Note 2: Figures in tables are not finalized yet.

Result of the review on decontamination at Sep. 2013

Current Status

Difference has been observed on the progress between municipalities in the Special Decontamination Area reflecting each municipality's circumstances as below.

In the case of excessive time consumed for arrangements with stakeholders BEFORE decontamination is begun.

○Time consumed for:

- rearrangement of Restricted Areas and Deliberate Evacuation Area
- establishment of decontamination plans
- Securing temporary storage sites
- Obtaining consent for decontamination etc.

In the case of excessive time consumed WHILE decontamination is already in progress in venues.

○Time consumed for

- Negative effect of the elements such as snow
- Additional compensation work etc.

Challenges based on past experience

- Securing working staff (ie. labor-intensive work)
- Enhancement of safety measures
- Handling of heavy traffic volume for the transportation of workers and removed soils, etc., and that of waste generated from workers' daily life

Cooperation with reconstruction-related measures

- facilitation of the cooperation above (ex. Construction of infrastructures and core facilities for reconstruction, and Land use change)
- Proper schedule, taking into account the expected timing of evacuees' return

Future Direction

- Decontamination work will be implemented in cooperation with reconstruction measures depending on the situation of each municipality, by revising the current plan which has been uniformly scheduled to be completed within 2years.
- Additional measures will be introduced for speed-up and facilitation.
- Decontamination plans of 6 municipalities (Minamisoma, Iitate, Kawamata, Katsurao, Namie and Tomioka) will be amended by the end of this year while 3 municipalities (Naraha, Kawauchi and Okuma) are on schedule to finish within FY 2013. As for Futaba, coordination towards the formation of a plan will be continued. In Tamura, decontamination work has already been completed.

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- **Progress in Intensive Contamination Survey Area**
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Progress in Intensive Contamination Survey Area ①

100 municipalities, designated as Intensive Contamination Survey Area, shall implement monitoring surveys and formulate the decontamination implementation plan (the plan) which stipulates area, method and contractors to implement decontamination work.



○As of the end of March 2013, the plans have been formulated in 94 municipalities.

○As the decontamination target covers large areas including public facilities, residential houses, roads, farmland and forest, municipalities shall clarify the objects and priorities, with consideration to the protection of public health.

⇒Decontamination work is being implemented based on decontamination plans developed by each municipality. In regard with the work schedule of the plans, 5 years is set in many municipalities mainly in Fukushima prefecture, and 2-3 years is defined in municipalities in other prefectures.

Progress in Intensive Contamination Survey Area ②

Decontamination work have been progressed according to decontamination plans of each municipality. Especially at spaces related to children and public facilities, it is getting close to the end; however, it might take period of years to be completed in whole.

Outside Fukushima pref. (As of the end of Jun., 2013)	Ordering Ratio (Number of Order/number of planning)	Implementation Ratio (Number of actual achievement/number of planning)
Schools and nurseries	almost on order	almost completed
Park, Sports facilities	approx. 80%	approx. 80%
Residential houses	approx. 60%	approx. 30%
Other facilities	approx. 30%	approx. 30%
Roads	approx. 30%	approx. 30%
Farmlands & meadows	approx. 80%	approx. 60%
Forests(in living areas)	Partially on order	Partially implemented

Note: The number of planning is the number which is planed as of the end of Jun, 2013, so it might increase in future.

Within Fukushima pref.※ (As of the end of Jun., 2013)	Ordering Ratio (Number of order/number of planning)	Implementation Ratio (Number of actual achievement/Number of planning)
Public facilities, etc.	approx. 80%	approx. 60%
Residential houses	approx. 50%	approx. 20%
Roads	approx. 40%	approx. 20%
Farmlands & meadows	approx. 90%	approx. 80%
Forests(in living areas)	approx. 30%	approx. 10%

Note:
The number of planning is the number planed by the end of FY2013. On the other hand, whole number including that of after FY 2013 is yet fixed in many municipalities.

※The table “Within Fukushima pref. ” is based on the investigation result conducted by Fukushima prefecture.

Result of the review on decontamination at Sep. 2013

Checkup the status of municipalities tackling leading decontamination and completing decontamination work based on on-going decontamination plan. Effective information shall be shared widely among municipalities in consideration of municipalities' status.

- The municipalities, implementing leading decontamination work, have been accumulating various original and innovative measures and know-hows, from the view point of the promotion of effective and efficient decontamination work and mutual understanding between local residents.

Example: Excerpted from “ Good Practice Collection”(compiled by Fukushima Office for Environmental Restoration, MOE)

▪ Volume reduction of the waste(twigs, etc.) discharged from decontamination work (in Date city)

▪ Cooperation with local residents, delivery of Q & A materials for smooth operation for explanatory meetings (in Fukushima city)

Chipping operation in decontamination site



Committee for countermeasures for decontamination area



Questionnaire booth



- There are municipalities of which decontamination work have completed according to the plan as of Jun., 2013



With accelerating and streamlining of decontamination work in consideration of each municipality's status, information shall be shared by updating Good Practice Collection and by guidelines, and also exchanging opinions among municipalities.

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New Policies announced in Sep 2013

MOE has announced new policies for two items below in September 2013.

1. Follow-up policy after decontamination work is completed

Follow-up policy has newly been established by MOE, according to the completion of decontamination work based on the decontamination plans in several municipalities.

2. Decontamination policy in forest areas

Decontamination in forest area has been limited to within 20 m from the residential area under the current policy.

Taking into account voices from Fukushima that hope to widen decontamination target area, decontamination policy for forest areas is also renewed based on relevant results of research.

1. Follow up measures after completion of decontamination work based on a plan

(Confirmation of maintenance of decontamination effects)

- Conduct relevant monitoring so as to confirm whether air dose reduction by decontamination would be maintained.

(Follow-up decontamination work)

- Implement decontamination work in the case of that newly-found contaminated areas(*) or areas in which un-decontaminated points are found, while considering radiation level there.

(*) Supposing such area whose air dose rate is higher than that of surrounding area because contaminated soil, etc. is re-accumulated there associated with fallen leaves or rain water and, as a result, air dose rate goes up significantly after the decontamination.

- Require a careful judgment to decide the follow-up decontamination implementation, considering various circumstances of each case. MOE will publish guidance for it by analyzing actual cases.

(Others)

- Take relevant measures including risk communication matters based on the ongoing discussion at the Nuclear Emergency Response Headquarters on radiation protection measures.
- In regard with measures on rivers and lakes, monitoring will have been conducted.

2. Measures on forest areas

A. Around residential areas

- Make an additional measure possible to remove organic residuals 5m in width from the edge in the case the effects of prior decontamination (by removing organic deposits such as fallen leaves 20m in width) is found to be limited.
- Make an exceptional measure possible to widen the area of decontamination to over 20m in case relatively high air dose rate is monitored around the house even though prior decontamination has been done, supposing such a house located in a valley, etc.

B. Cultivating farm for mushroom

- Make the implementation of standard decontamination method possible, which have been approved around residential areas (20m wide), in a case where cultivating business is expected to be sustained.

C. Forest in whole

- Collaborative measures will be conducted by Ministry of the Environment and Forestry Agency.

MOE: measures regarding monitoring on runoff and/or diffusion of contaminated soil as well as countermeasures against them

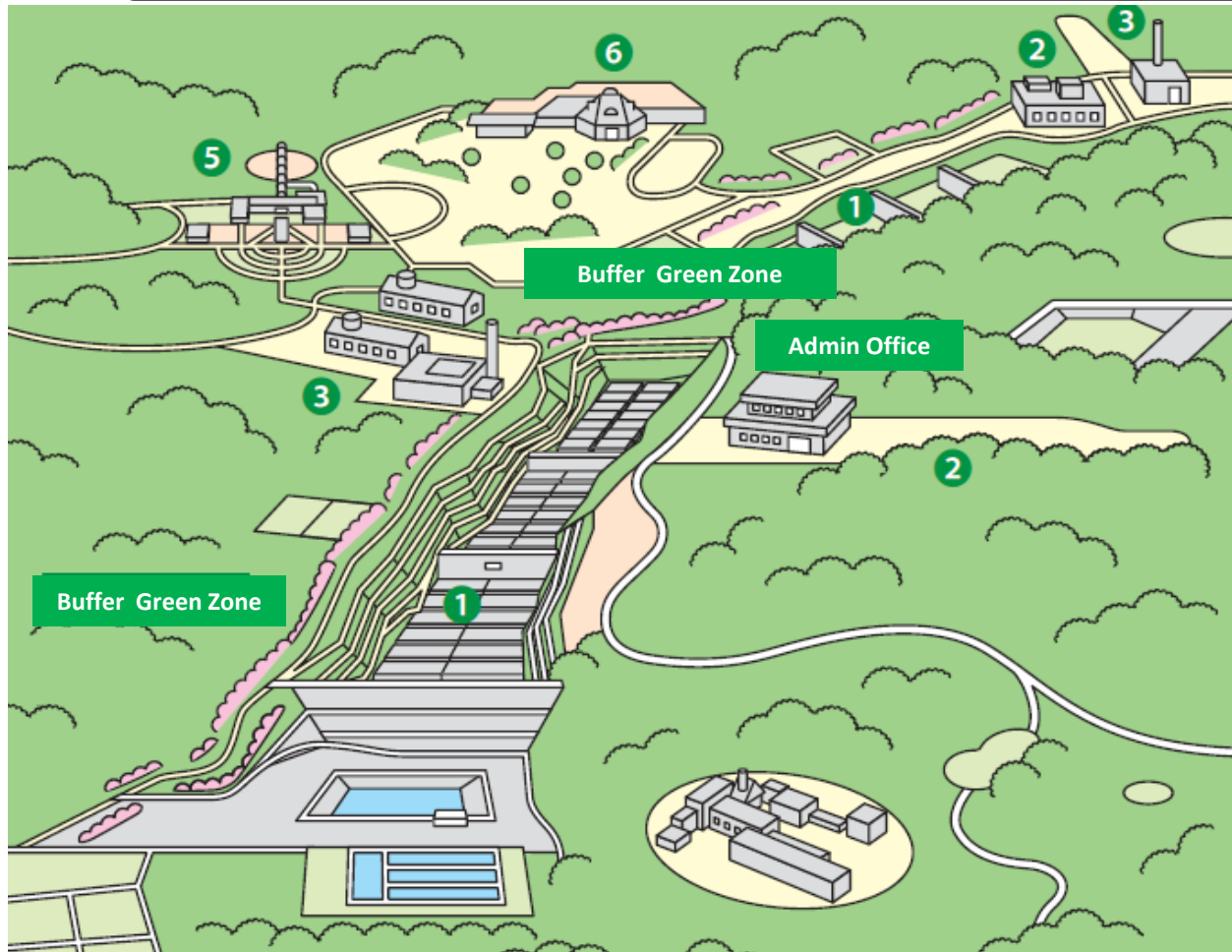
Forestry Agency: measures to take proper forestry management

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Interim Storage Facility: Bird's-Eye View

ISF will be consisted of facilities with various functions

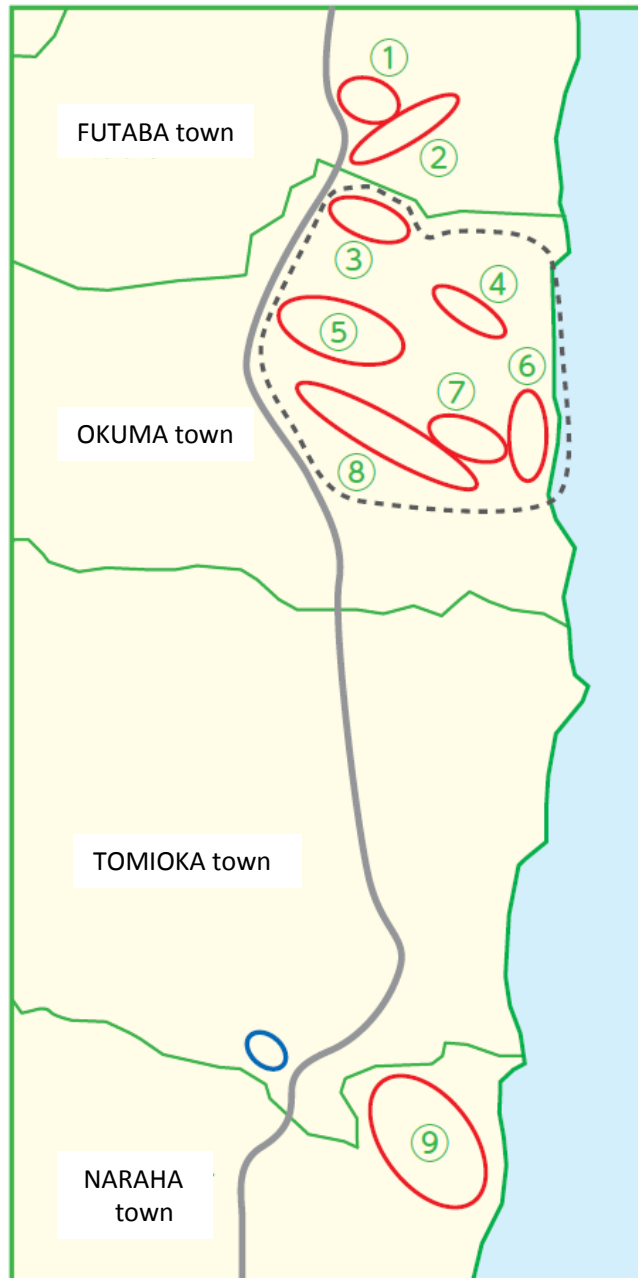


- ① Storage Facility
- ② Emplacement & Segregation Facility
- ③ Volume Reduction Facility
- ④ 24-hour monitoring Equipment(placed in several points, not specifically indicated)
- ⑤ R & D Facility
- ⑥ Public information Center

Scale of the whole facility (estimation)

Total storage volume ranges between 15-28 million m^3 , which is 12-23 times big as a baseball stadium(approx. 1.24million m^3)

Outlook for Selecting Potential Survey Sites for ISF



Potential sites will be selected from 3 towns (Futaba, Okuma and Naraha).

Survey sites are selected in consideration with existing data and following conditions:

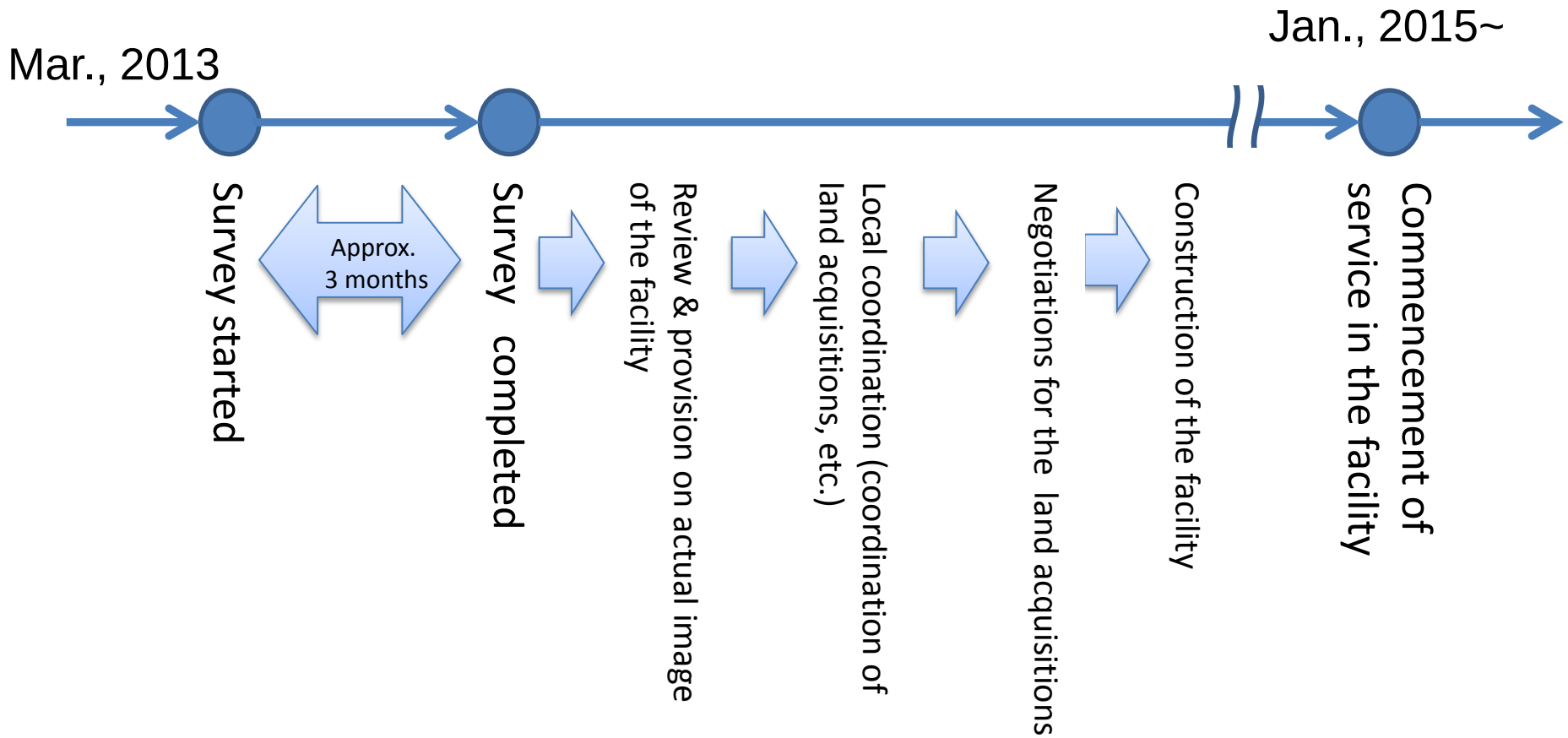
- Effective utilization of existing geological formation, e.g. plateaus and hills
- Utilization of existing facility
- Utilization of sites contributed to disaster prevention

○ Potential sites for preliminary survey

○ Existing controlled landfill site

※ Indicated potential survey sites are only rough outline envisaged to carry out the preliminary survey as of this moment.

Future Plan



Tackling the Challenges

1. Seeking for more efficient / effective technology for decontamination from the perspective of cost, time, etc. through demonstration model project and R&D (incl. soil/waste minimization and volume reduction)
2. Promotion of Public communication for securing temporary storage sites, interim storage facilities, etc. for removed soils as well as risk communication with citizens before/after decontamination.
3. Research on the behavior and environmental fate of cesium, including the development of transport models

Thank you for your attention



Ministry of the Environment,
Government of Japan

Reference data

Current Status of the Areas to Which Evacuation Order have been Issued (as of End of Aug, 2013)

Ahead of the decontamination in the Special Decontamination Area, Decontamination Plans are to be elaborated taking into account the progress of rearrangement of the Restricted Areas and Deliberate Evacuation Area. The rearrangement has been completed on Aug 7 2013.

3 categories after the rearrangement:

Area 1: <20mSv/yr

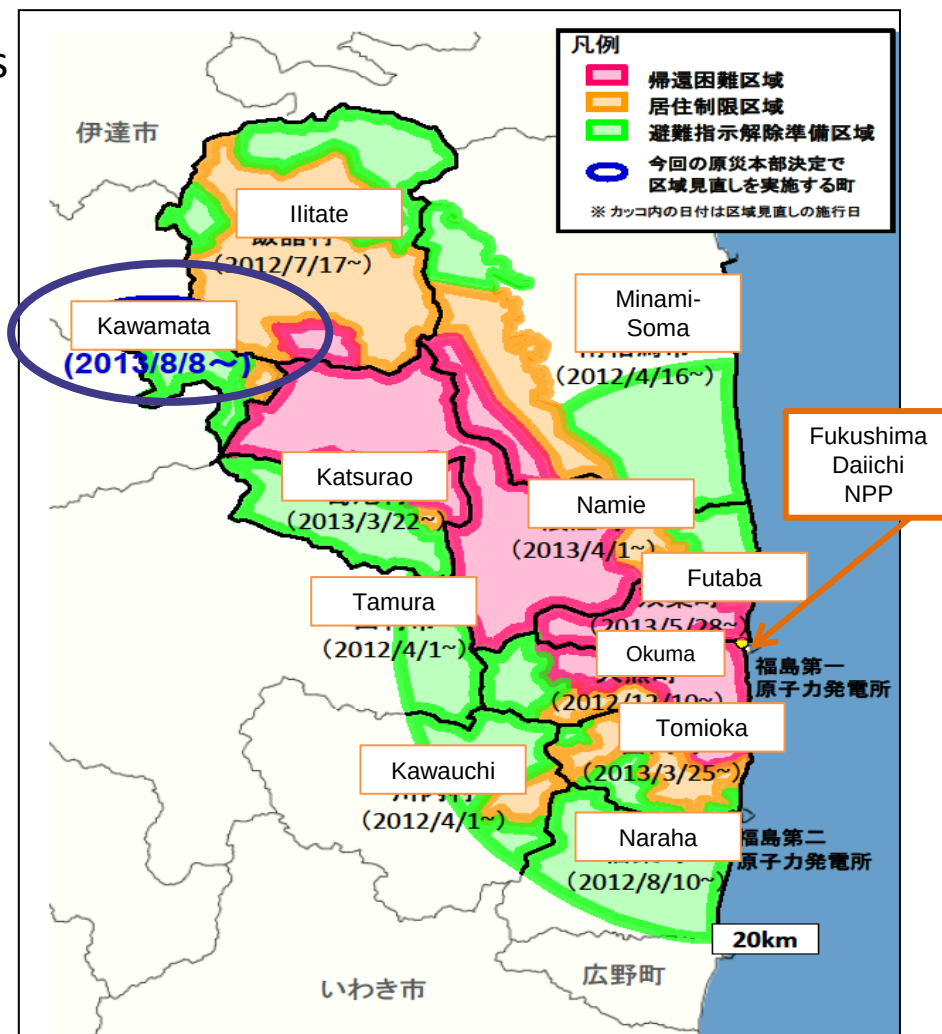
Evacuation orders are ready to be lifted: 

Area 2: 20 – 50 mSv/yr

Residents are not permitted to live: 

Area3: >50 mSv/yr

Residents will have difficulties in returning for a long time: 



Progress in the Special Decontamination Area

Decontamination work are begun from areas in which preparation is completed. As of Sep 2013, Decontamination Plan has been established in 10 municipalities out of 11 target municipalities. Decontamination work has been in operation or in preparation in 9 municipalities and has been completed in 1 city according to its plan.

Progress Status	Population in Decontamination Target Area (approx. Figure)	Decontamination Target Area (ha) (approx. figure)	Rearrangemen t of the Restricted areas, etc.	Progress of the Decontamination Work				
				Decontamination Plan	Temporary Storage Site (as of the end of Aug, '13)	Content of landowners, etc. (As of the end of Jul., '13)	Decontamination activities (As od Aug., 30, '13)	
On full scale decontamination work / On preparation	TAMURA	400	500	Apr. 2012	Apr. 2012	Secured	Competed	Completed in June. 2013
	NARAHA	7,700	2,000	Aug. 2012	Apr. 2012	Secured	Almost completed	In progress
	KAWAUCHI	400	500	Apr. 2012	Apr. 2012	Secured	Completed	In progress (houses and roads completed)
	MINAMI-SOMA	13,300	6,100	Apr. 2012	Apr. 2012	approx. 20% secured	approx. 30%	In progress
	IITATE	6,000	5,100	Oct. 2012	May 2012	approx. 20% secured	approx. 30%	In progress
	KAWAMATA	1,200	1,300	Aug. 2013	Aug. 2012	approx. 80% secured	approx. 90%	In progress
	KATSURAO	1,400	1,700	Mar. 2013	Sept. 2012	approx. 20% secured	Almost completed	In progress
	NAMIE	18,800	3,200	Apr. 2013	Nov. 2012	approx. 10% secured	approx. 10%	Under bidding procedure
	OKUMA	400	400	Nov. 2012	Dec. 2012	approx. 70% secured	approx. 60%	In progress
	TOMIOKA	11,300	2,800	Mar. 2013	Jun. 2013	approx. 50% secured	In preparation	Contractor decided In preparation of work
	Plans not yet formulated	FUTABA	300	200	May. 2013	Under coordination	Under coordination	Under coordination
Note: Decontamination work in a municipality are to be implemented based on the premises of formulation of the decontamination plan, consent of land owners and securing of temporary storage sites.								

Note: Decontamination work in a municipality are to be implemented based on the premises of formulation of the decontamination plan, consent of land owners and securing of temporary storage sites.

Plans not yet formulated

Summary on Decontamination Effect (tentative)

Monitoring data of before/ after decontamination in early decontamination stage (mainly in 2012), e.g. model project and preliminary decontamination work implemented in Fukushima were collected and analyzed. As a result, reduction rate of surface concentration of contamination(cpm) were;

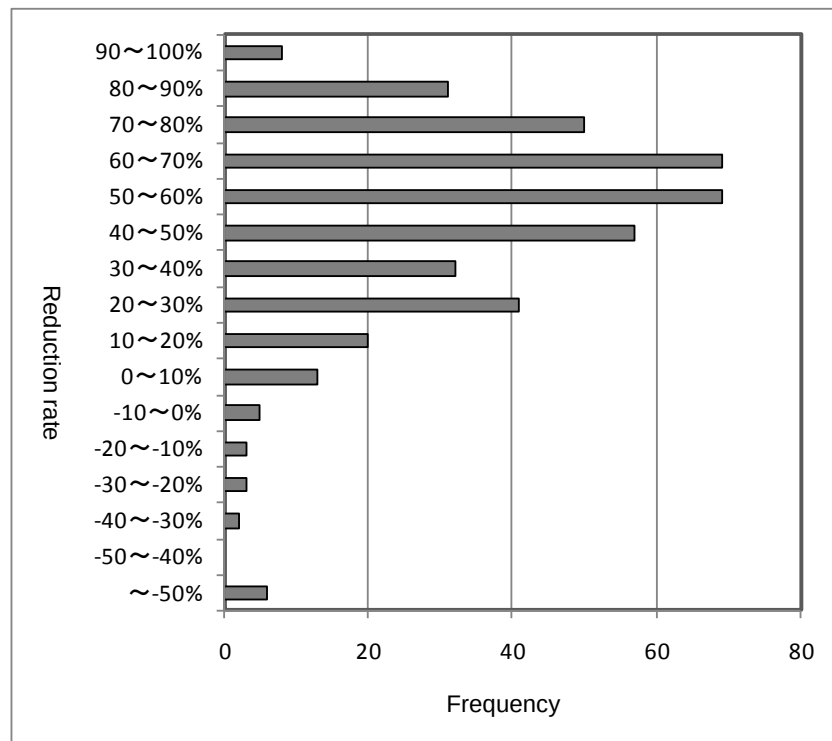
- 50-70% reduction by washing,
- 30-70% reduction by high-pressure washing,
- 70-90% reduction by scraping on surface decontamination of asphalt-paved roads, and

as for decontamination work of playground, 80-90% reduction by top soil removal, which are acknowledged as a certain effectiveness.

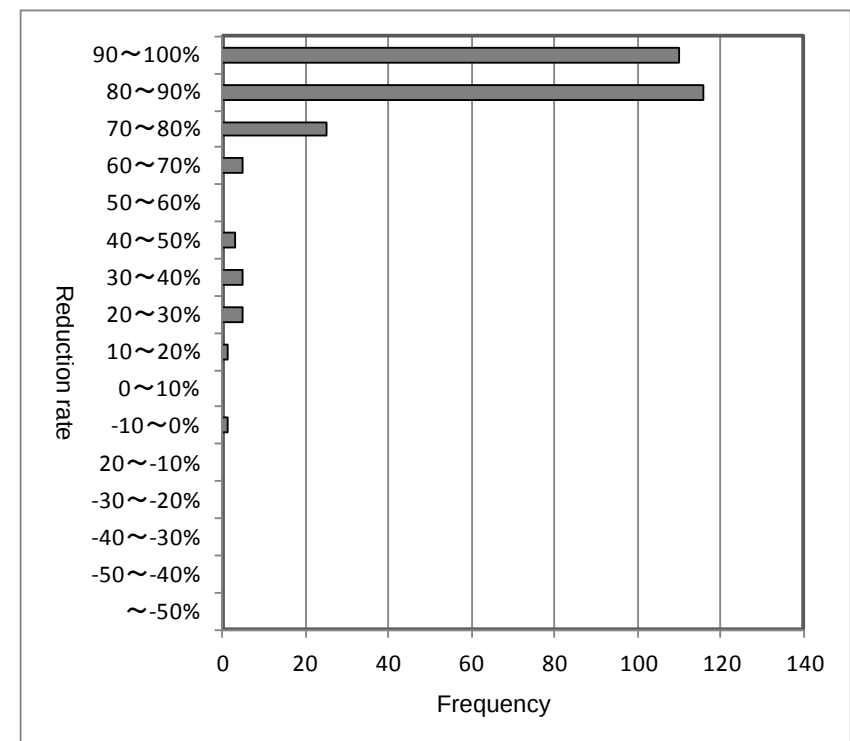
※the data is based on reduction rate of surface concentration of contamination on each decontamination method.

※The result of this analysis is tentative. The methods were not consolidated and not up-dated at that time.

Example) Decontamination work on asphalt-paved roads



Example) Decontamination Work on Playground

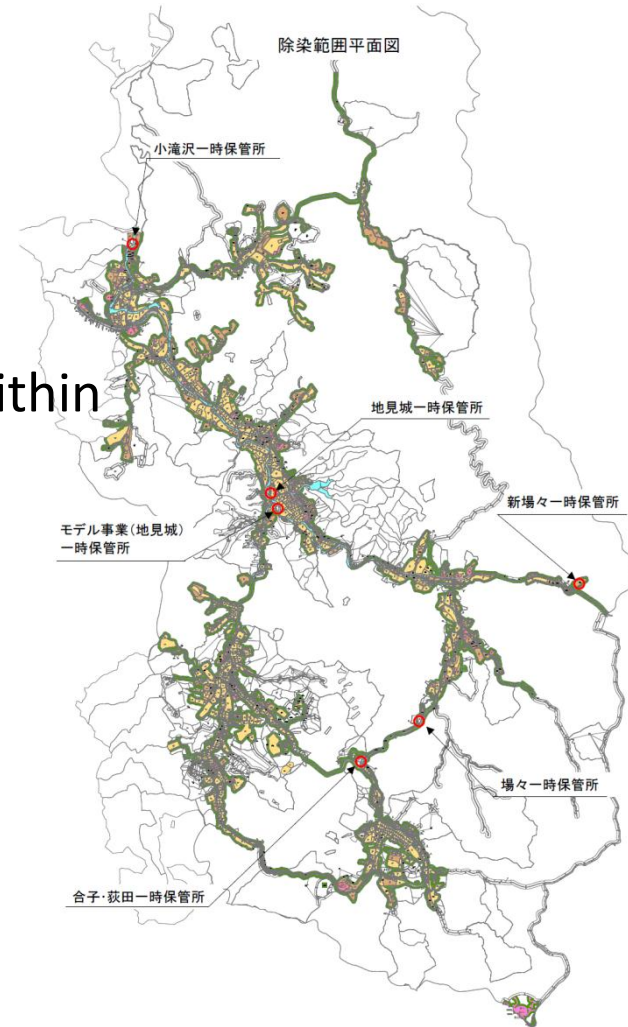


Reference : Announcement on “Effectiveness of decontamination work which is implemented by the national government and relevant municipalities in decontamination project” (Jan. 18, 2013)

Overview of the Decontamination Project in Tamura City

Decontamination work based on the Decontamination Implementation Plan has been finished in Tamura City.

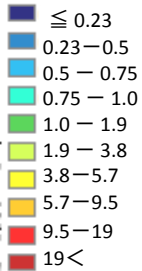
- Work Period: July 5, 2012 ~ June 28, 2013
- Number of Workers: Max. 1,300/day
(A total of 120,000 man day)
- Decontamination target area:
residential area and a part of forests (area within
20m from the edge) in Furumichi, Miyakoji
district
- Volumes of work
 - Buildings 228,249m²(121 family unit)
 - Roads 95.6km
 - Farmland 1,274,021m²
 - Forests 1,921,546m²



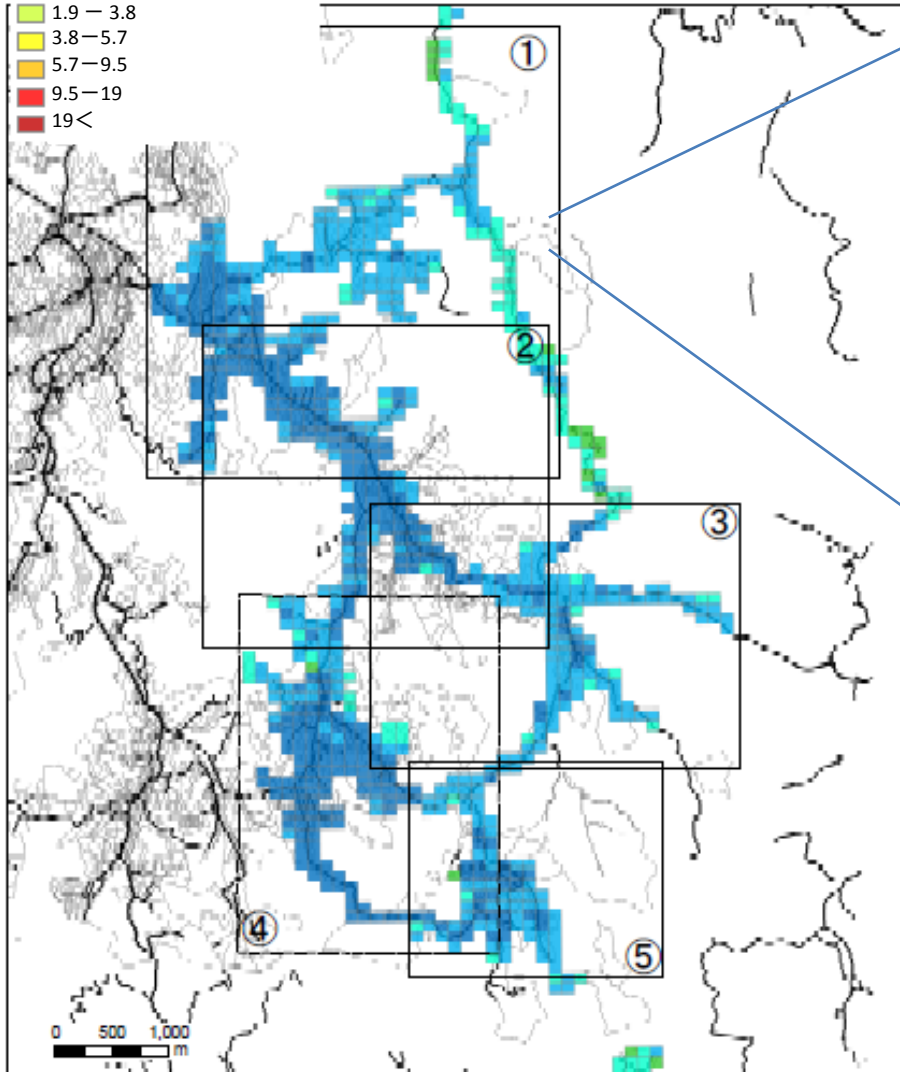
Effect of Radiation Dose Reduction by Decontamination Work in Tamura City

Tamura City

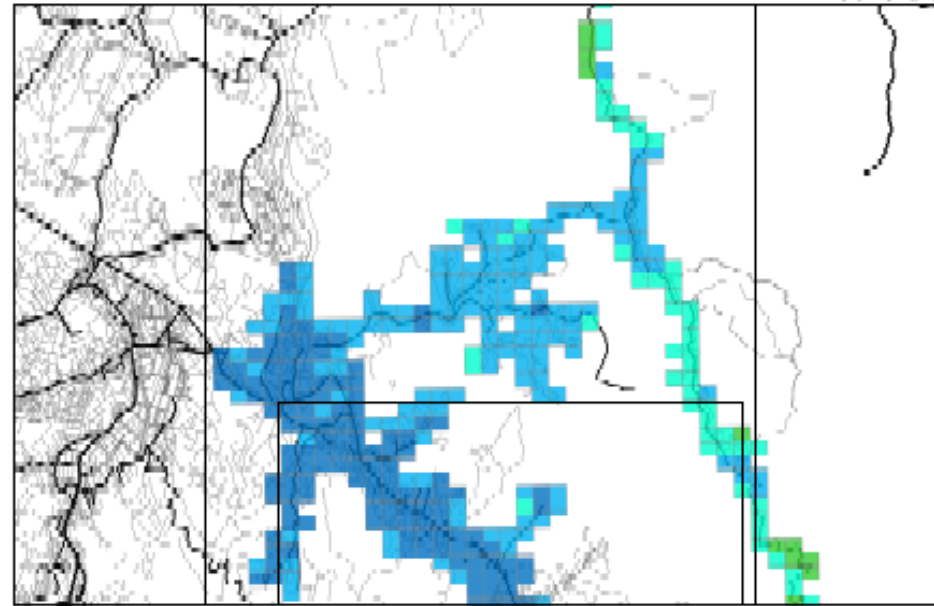
(Average of Air Dose Rate at the height of 1m above ground)



After

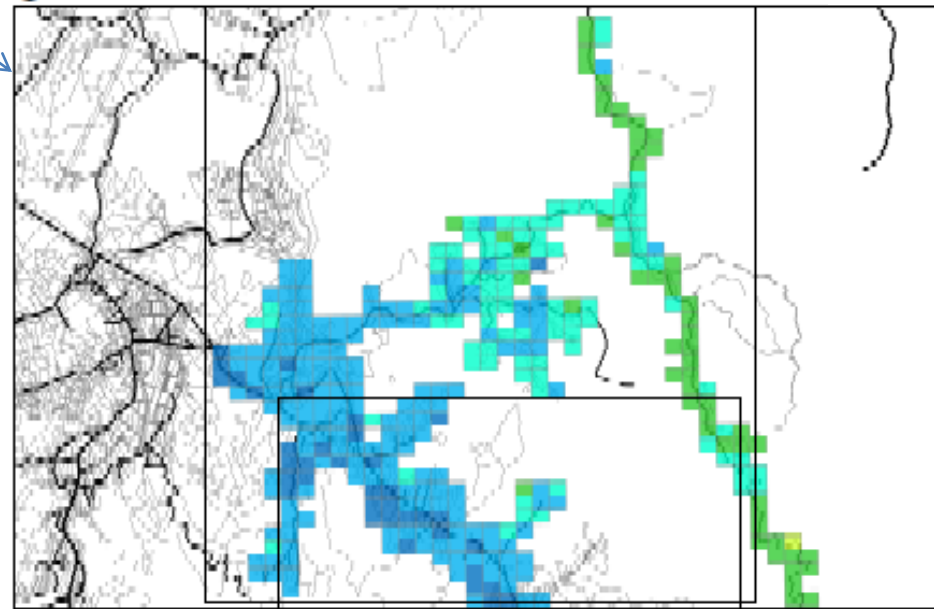


① Kotakizawa District



① Kotakizawa District

Before



Before & After the Decontamination Work



Decontamination Activities



Wiping off rooftop and walls



Wiping off a gutter



High pressure water cleaning of a drain pipe



High pressure water cleaning of paved road

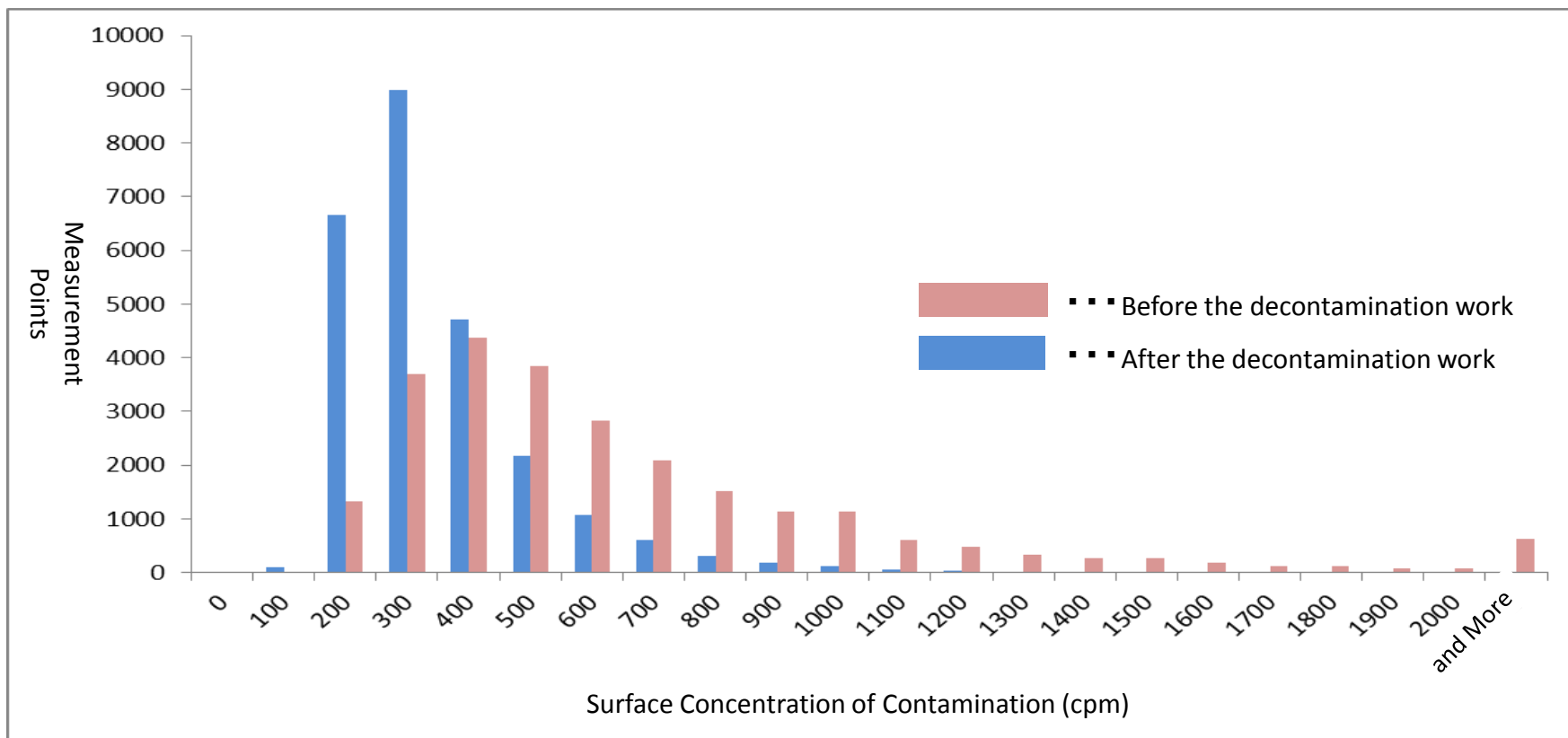


Mowing and removal of sludge



Removal of crushed stones and topsoil, and cover with clean soil

Effect of Reducing Radiation Dose by Decontamination Work (Surface Concentration of contamination*)

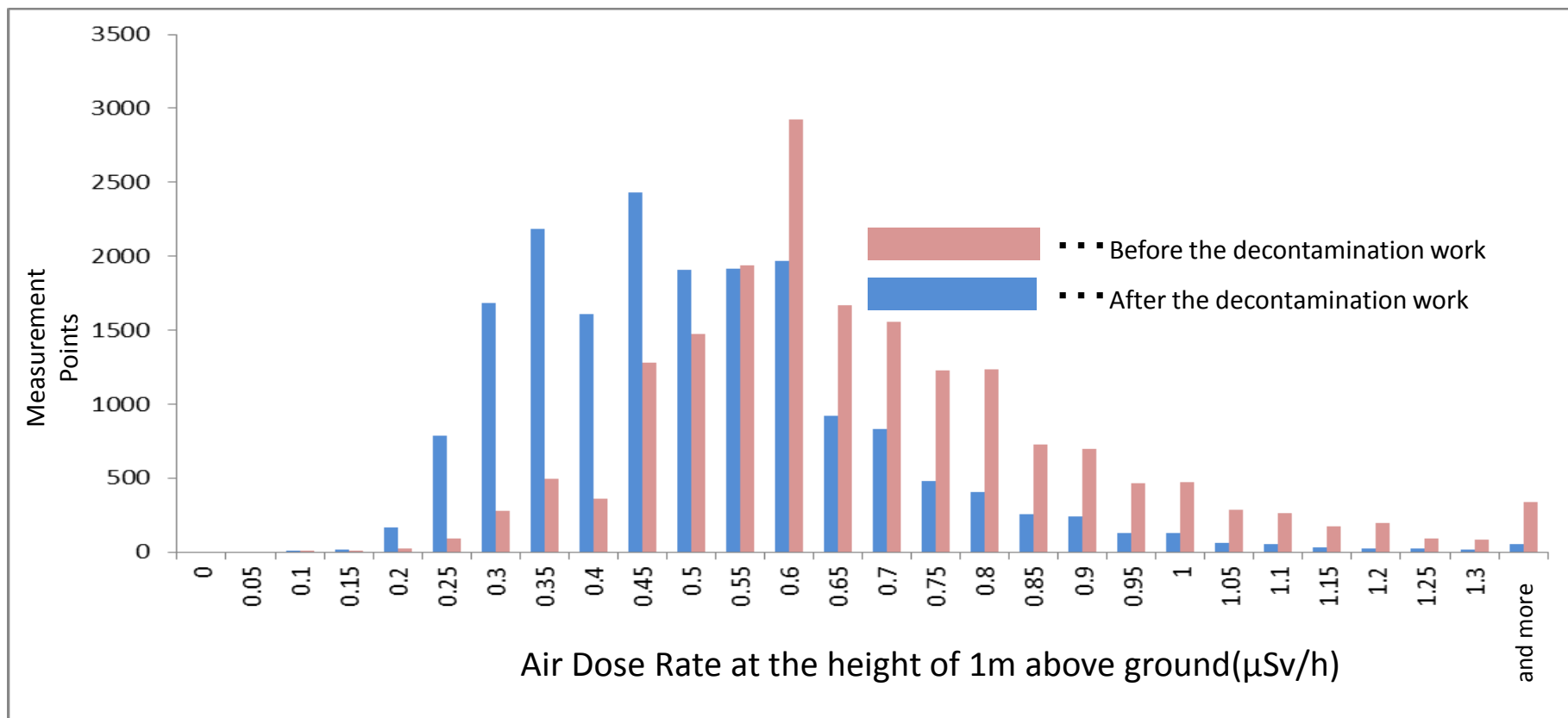


*Surface concentration of contamination is the number of radiation per minute counted by a detector . As it is detected at the level above 1cm from decontaminated surface, changes due to the figures can be clearly evaluated.

※The measurement was taken before and after the decontamination work so that natural attenuation effect after the work was not included.

- Measurement period before the decontamination work : July 25, 2012~May 23, 2013
- Measurement period after the decontamination work : August 7, 2012~May 30, 2013

Effect of Radiation Dose Reduction by Decontamination Work (Air Dose Rate at the height of 1m above ground)



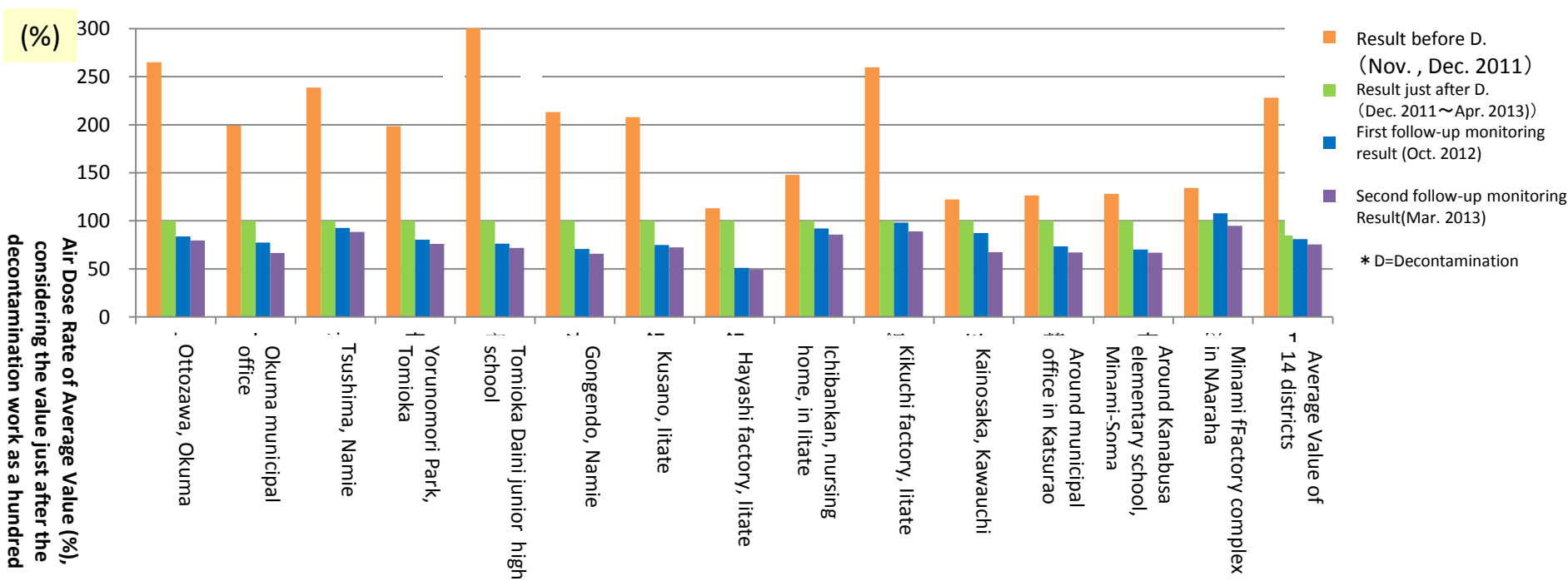
✂ The measurement was taken before and after the decontamination work so that natural attenuation effect after the work was not included.

- Measurement period before the decontamination work: July 25, 2012 ~ May 23, 2013
- Measurement period after the decontamination work: August 7, 2012 ~ May 30, 2013

Post-Decontamination Monitoring

- Average value of air dose rate has not been increased according to the investigation results up to now.
- Post-Decontamination Monitoring will be conducted in coming autumn at the same points of the previous monitoring in Tamura City.

Changes of Air Dose Rate after the Decontamination Model Project



Overview of Temporary Storage Site

- Removal soil and etc. has been collected and stored in temporary storage sites.
- Air dose rate at the entrance of the sites shows no difference after removed soil, tec. are stored.
- Radioactive materials has never been detected from leachate or groundwater under the sites.

District	Air Dose Rate just after Installation (1m)	Latest (5/27) Air dose Rate (1m)	Amount of Removed soil (m ³)	Measurement Result of Leachate	Measurement Result of Groundwater
Kotakizawa	0.36	0.36	4,242	ND	ND
Jikenjo	0.32	0.38	2,743	ND	ND
Jikenjo (Model Project)	0.38	0.34	2,626	ND	ND
Shin-Baba	0.60	0.56	7,985	ND	ND
Baba	0.40	0.45	1,974	ND	ND
Goshi, Ogita	0.39	0.43	12,149	ND	ND



Efforts to secure Interim Storage Facility

Oct., 2011 Ministry of the Environment announced the **Basic Principles for Interim Storage Facility (ISF) (the roadmap)**, and explained to the heads of relevant municipalities

Main Contents

- The National Government shall secure, maintain and manage ISF
- The National Government shall make utmost efforts **to start the operation of ISF within about 3 years(by January, 2015)**
- Materials to be stored are limited to soil and waste generated in Fukushima prefecture

Dec., 2011 The Ministry requested Fukushima Pref. and 8 towns in Futaba County to examine location sites within Futaba county

Mar., 2012 The Ministry explained the Fukushima Pref. and 8 towns that IFS may be located separately in 3 towns (Futaba, Okuma and Naraha)

Aug., 2012 The Ministry proposed the investigation for ISF to Fukushima Pref. and 8 towns

Nov., 2012 The Fukushima Pref. announced the acceptance of the investigation proposed by the Ministry at the consultation meeting with the mayors of Futaba County's towns and villages

Mar., 2013 The Ministry selected contractors, who will implement the investigations

Apr., 2013 On-site exploratory survey has started in Naraha and Okuma.