



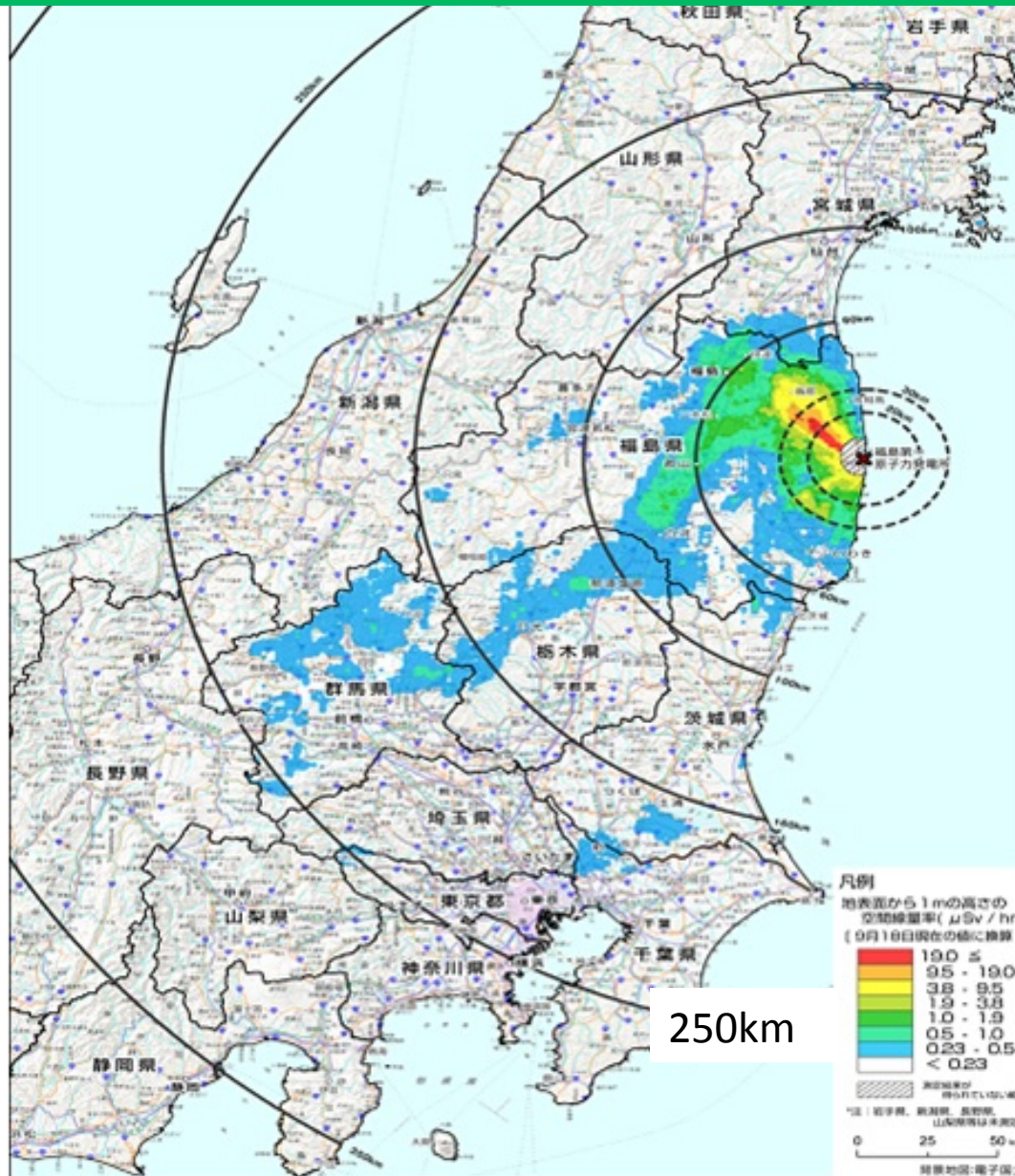
Progress on Offsite Cleanup Efforts in Japan

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**The Fukushima Ministerial Conference on Nuclear Safety, Dec.16, 2012
Side Event organized by Government of Japan**

Radioactive Pollution caused by the accident at TEPCO's Fukushima Dai-ichi NPS



Progress off-site Decontamination of Radioactive Materials

Framework of Decontamination

New 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 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 NPP, or annual cumulative dose is >20mSv)
- ◆ Decontamination is implemented by the national government

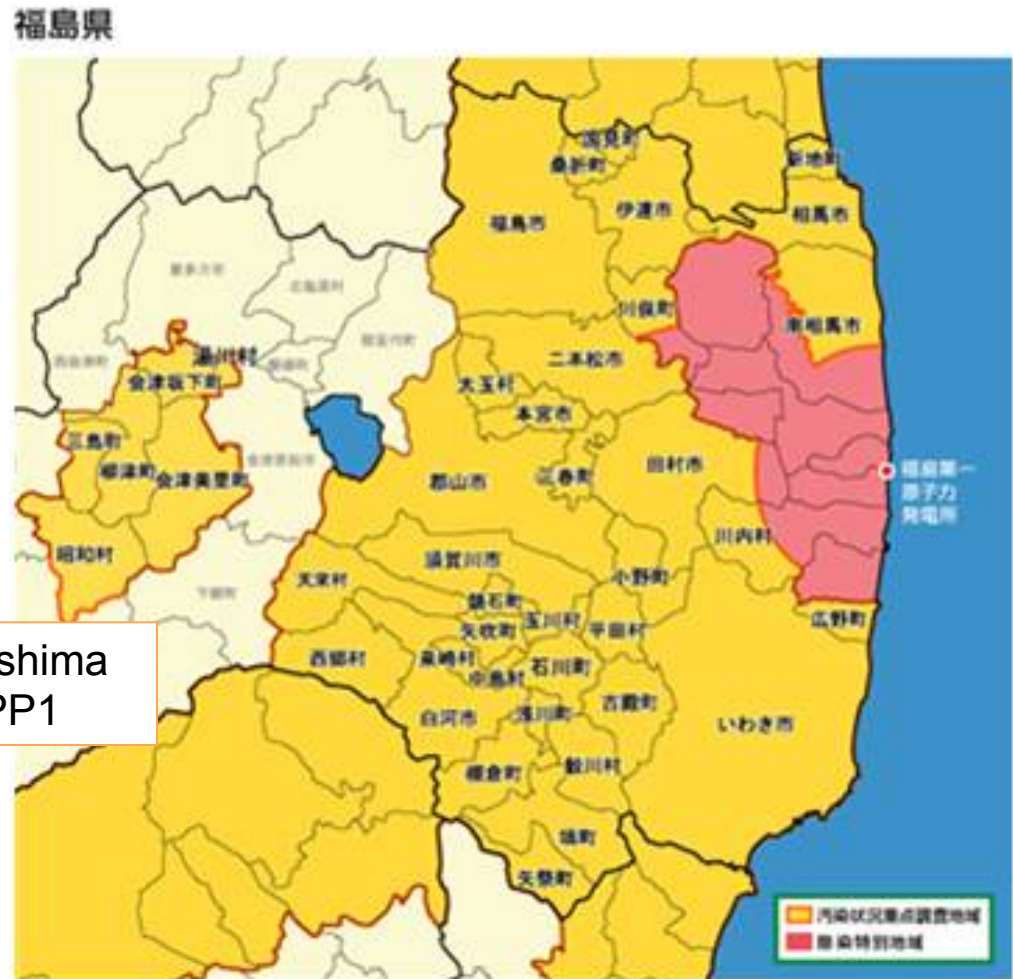
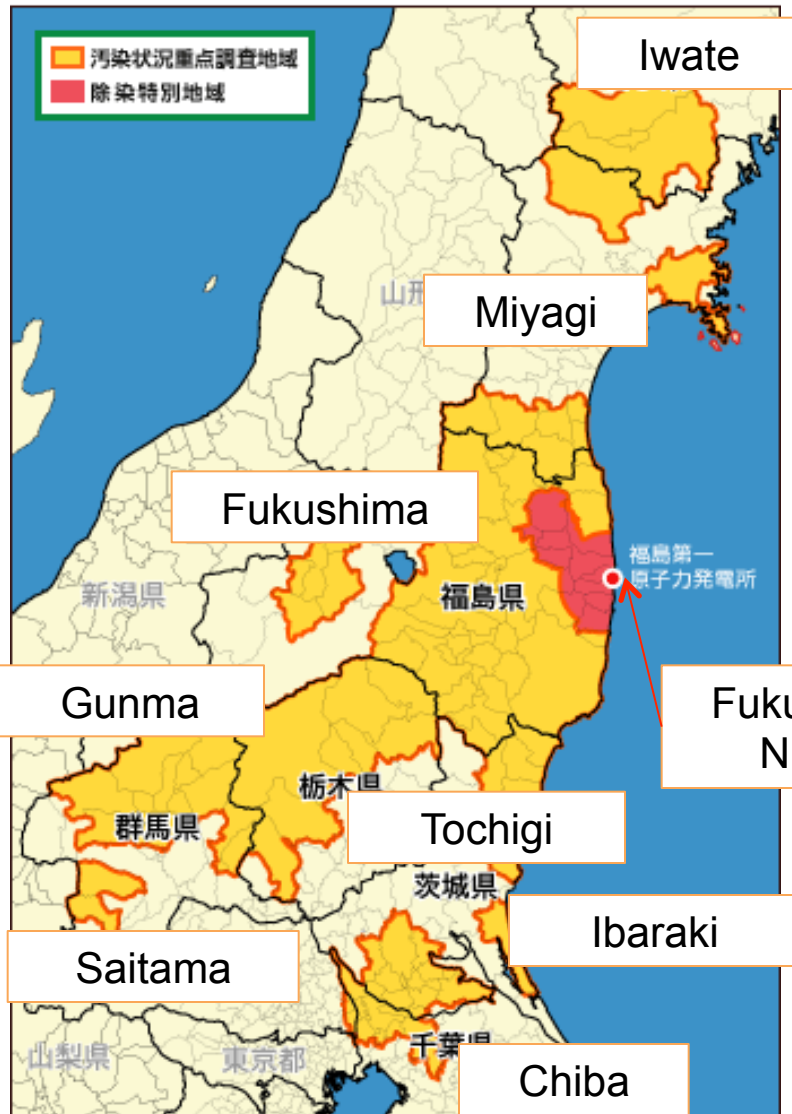
(*) Entire area of Naraha, Tomioka, Okuma, Futaba, Namie, Katsurao, and Iitate.
Some area of Tamura, Minami Soma, Kawamata, and Kawachi.

Intensive Contamination Survey Area

- ◆ 104 municipalities in 8 prefectures (*), in which over 0.23 μ Sv/hour of air dose rate (equivalent to over 1 mSv/Year) is observed, were designated.
- ◆ Decontamination is 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



Basic Principles under the Act

Targets of the Decontamination

Additional * exposures over 20mSv/y

- Aim at stepwise and rapid reduction of those areas based on the ICRP Recommendation (2007).
 - * 'additional' means beyond natural background and medical exposure

Additional exposures < 20mSv/y

- As a long term goal, aim at reducing to 1 mSv/y or less

General Public

- Reduce estimated annual exposure of the general public by 50 % in 2 years (by Aug 2013)

by radioactive decay, decay by natural factors and by decontamination

Children

- Reduce estimated annual exposure of children by 60 % in 2 years (by Aug 2013) by thorough decontamination of their living environment.

by radioactive decay, decay by natural factors and by decontamination

- The goals will be reviewed periodically

- **Waste-related guidelines:** storage, maintenance and management standards and disposal standards
- **Decontamination-related guidelines:** methods for the investigation and measurement of the status of pollution, decontamination and other measures, collection, transfer and storage of the removed soil
- **Guidelines for decontamination workers:** exposure dose management methods, preventive measures against internal exposure, safety and health management systems



Progress in Special Decontamination Area

Decontamination Policy for Special Decontamination Area

Policy in FY 2012 and 2013

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

- ◆ **Area less than 20mSv/year:** Aiming for reducing additional exposure dose less than 1mSv/year as long-term goal.
- ◆ **Area from 20~50mSv/year:** Aiming for reducing exposure dose in residential and farmland area less than 20mSv/year by the end of FY 2013.
- ◆ **Area more than 50mSv/year:** Demonstration projects will be implemented. Lessons learnt will be reflected into future decontamination policy.

Policy After FY 2014

- ◆ Aiming for reducing additional exposure dose less than 1mSv/Y as long-term goal
- ◆ Check and evaluate two-year decontamination results, consider proper actions, and revise implementation plans as needed.

Progress of work in the Special Decontamination Area

	Advance Decontamination (base facilities, etc.)	Identification of owners of houses, etc.	Decontamination plan	Full scale Decontamination Works	Securing temporary storage sites
Tamura city	✓	✓	✓ (Apr 13)	in operation (July 25)	✓
Naraha town	✓	✓	✓ (Apr 13)	in operation (Sept. 6)	✓
Kawauchi village	✓	✓	✓ (Apr 13)	in operation (Sept. 4)	✓
Iitate village	✓	✓	✓ (May 24)	in operation (Sept. 25)	✓
Minami-Soma city	✓	✓	✓ (Apr 18)		local coordination process
Katsurao village	✓	✓	✓ (Sep 28)	in preparation (Oct. 12)	✓ (partly secured)
Kawamata town	✓	✓	✓ (Aug 10)	In preparation (Nov. 1)	✓ (partly secured)
Namie town	✓	✓	✓ (Nov 21)		local coordination process
Okuma town	✓	✓	local coordination process		local coordination process
Tomioka town	✓	✓	local coordination process		local coordination process
Futaba town					

*Decontamination works in a municipality are to be implemented on the premises of formulation of ,
the decontamination implementation plan and securing of temporary storage sites.

Restricted Areas and Areas to which Evacuation Orders have been issued (as of Nov 30, 2012)

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.

Area 1: <20mSv/yr

Evacuation orders are ready to be lifted 

Area 2: 20 – 50 mSv/yr

Areas in which residents are not permitted to live 

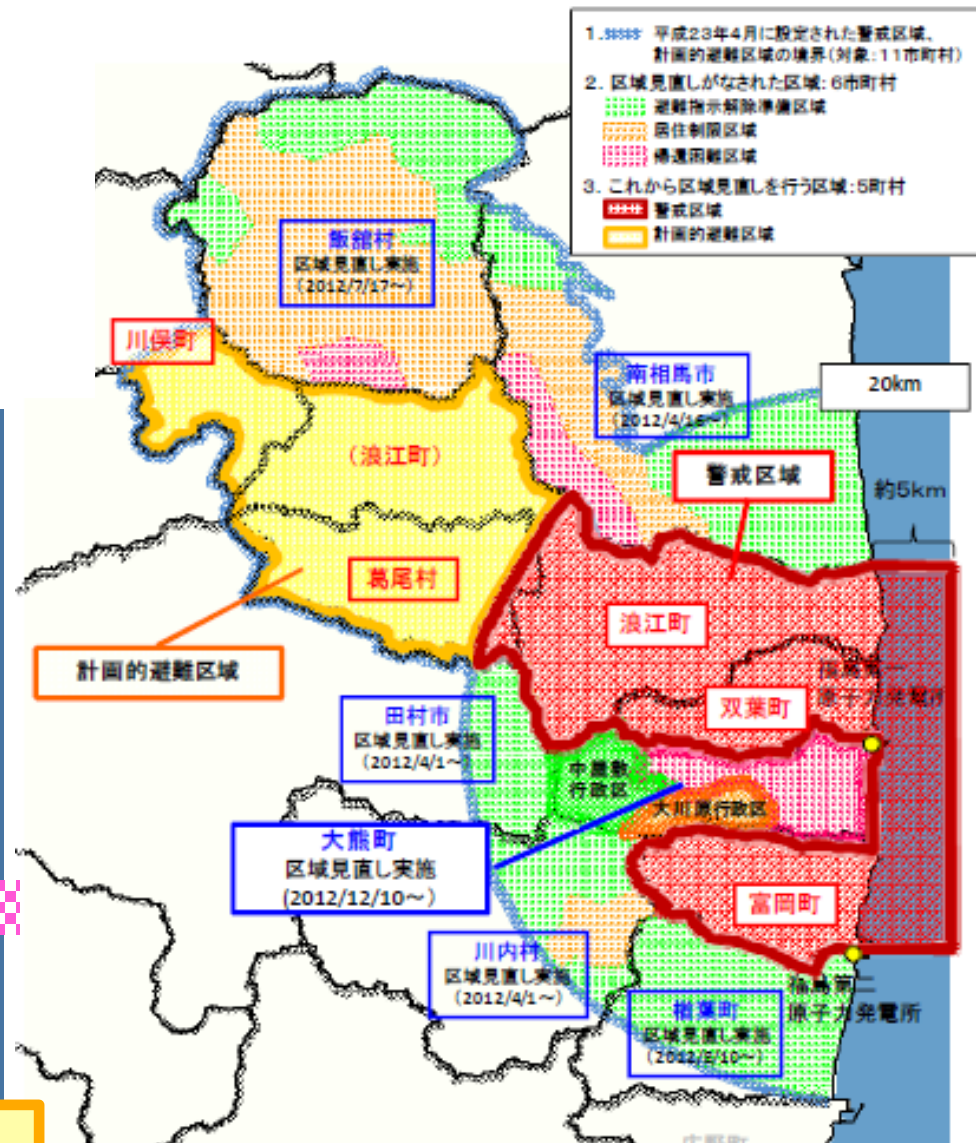
Area 3: >50 mSv/yr

Residents will face difficulties in returning for a long time 

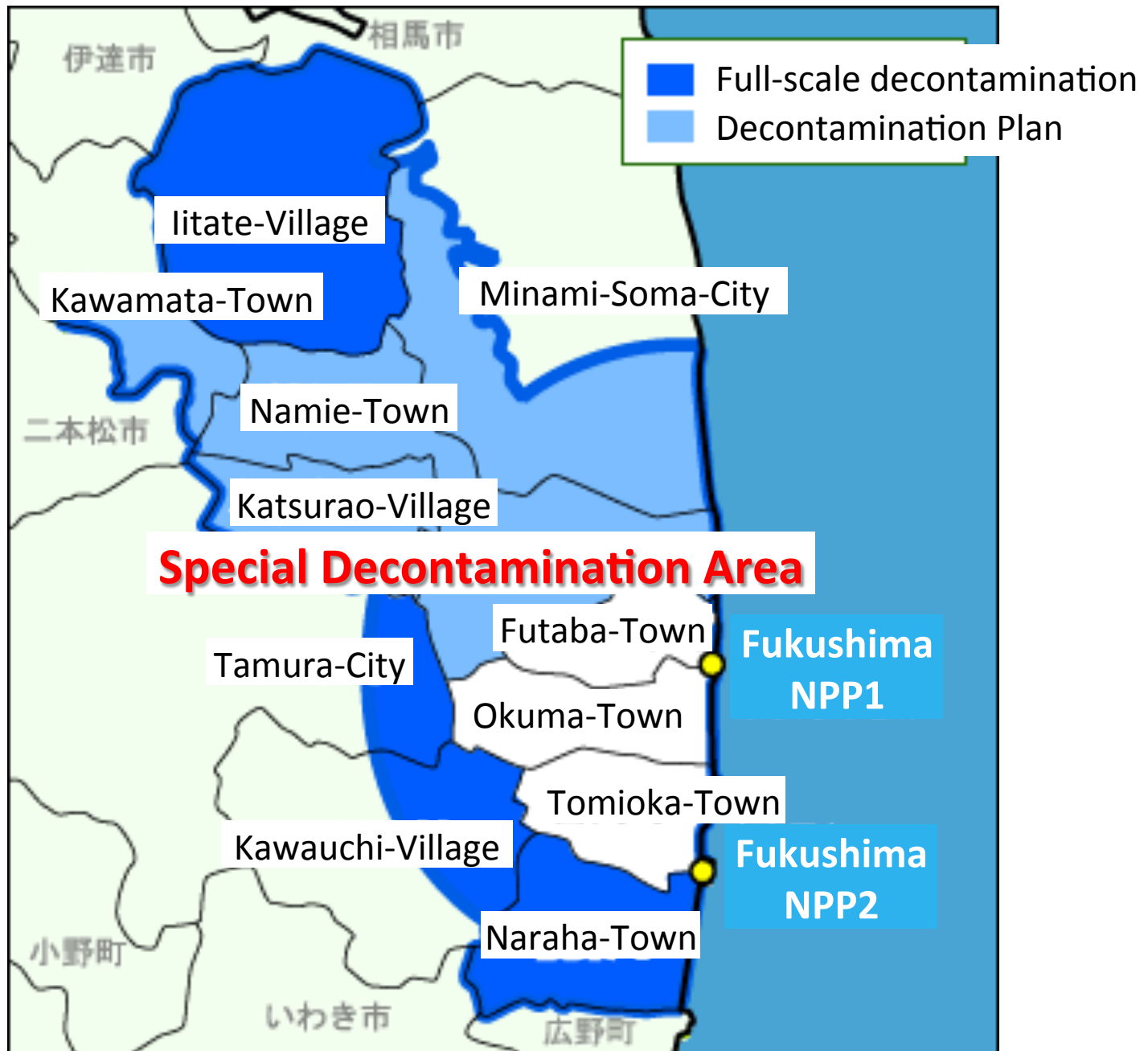
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Restricted Area: 

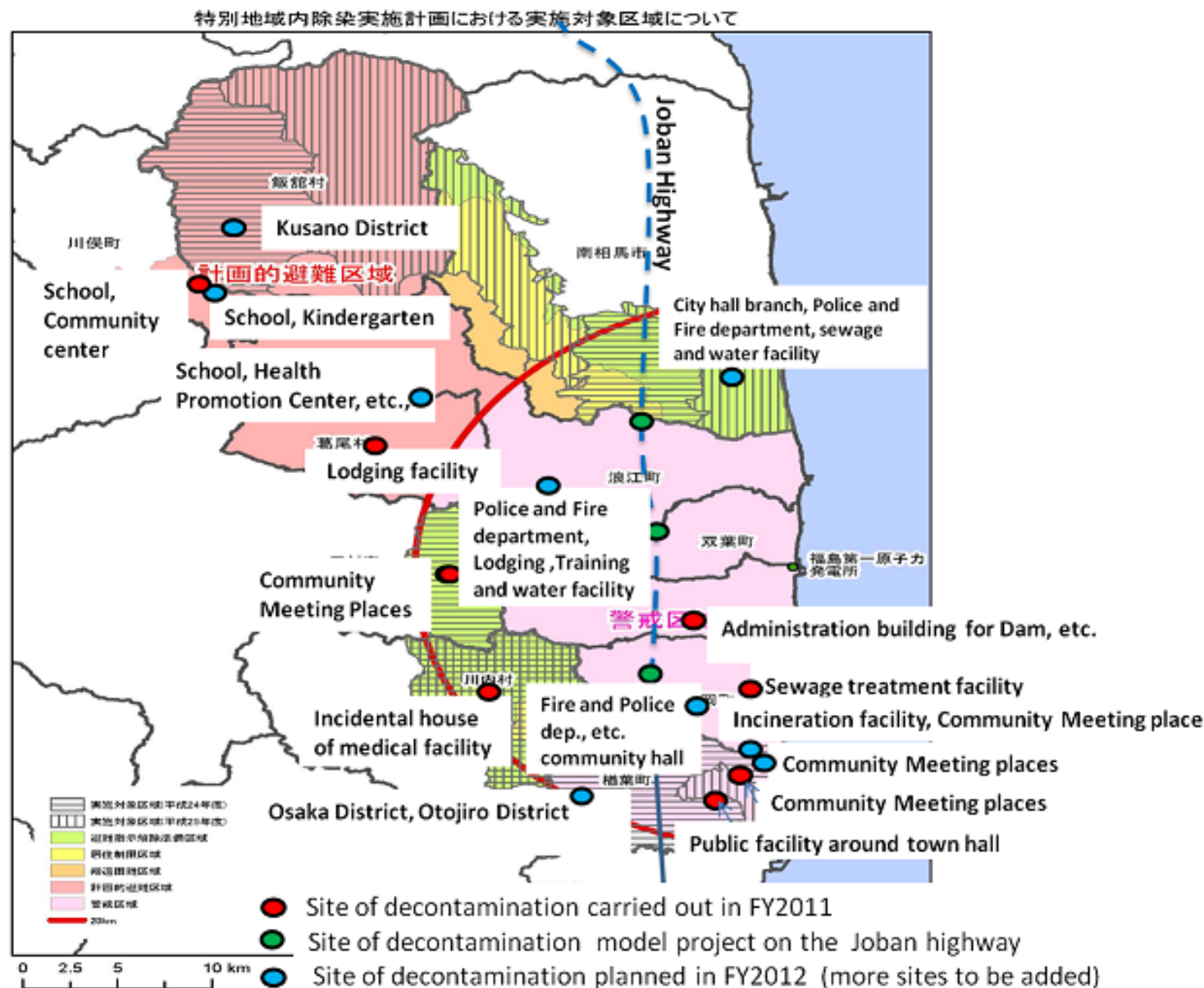
Deliberate Evacuation Area: 



Progress of Special Decontamination Area



Decontamination situation in the Special Decontamination area



■ In addition the Government commissioned Decontamination Model Projects to JAEA in FY 2011.

Decontamination Activities in Tamura City



Removal of branches and fallen leaves in a Shrine



Weeding and removal of leaves in a grave site

Decontamination Activities in Kawauchi Village



Forests (within 20m from living areas):
removal of fallen leaves and topsoil



House garden: removal of topsoil



ground : Removal of deposited materials



House wall: wiping

Decontamination Model Work in the Joban Expressway

■ Objective

To test and evaluate various decontamination methods taking into account different road paving conditions and air dose rates.

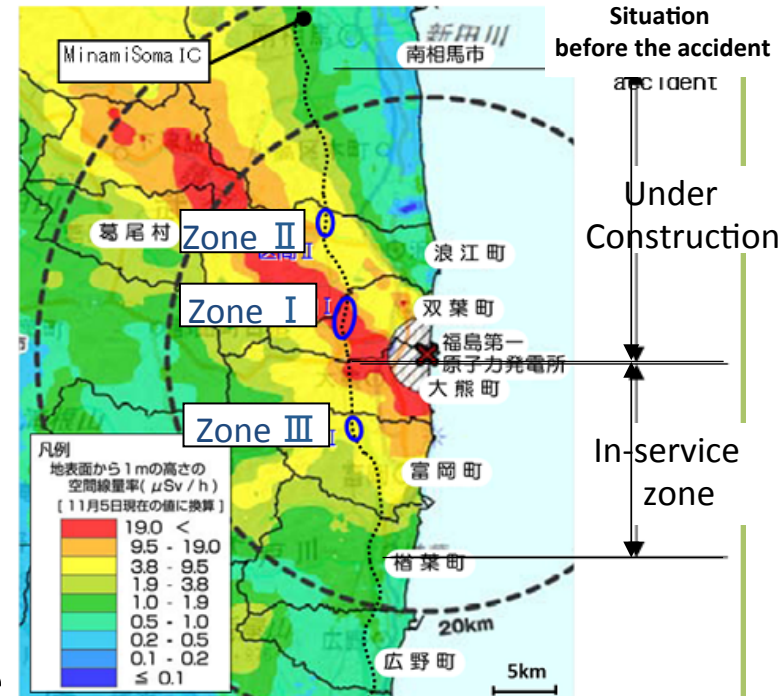
■ Outline

Period: March -July, 2012

Results:

In Zone I (most highly contaminated zone) it is confirmed that air dose rate could be reduced to less than $9.5 \mu\text{Sv/h}$, or equiv. to 50 mSv/y .

In zone II and III, it is confirmed that air dose rate could be reduced to approximate $3.8\mu\text{Sv/h}$, or equiv. to 20 mSv/y .



Decontami- nation Zone	Air dose rate	Situation before the accident	Road shape	Air dose rate at the center of expressway (μSv/h)				
				Before	→	After	Decreasing rate	
Zone I	More than 9.5 μ Sv/h (equivalent to more than 50mSv/y)	Under Construction	Cutting interval	43.1	→	8.3	▲81%	
			Landfill interval	11.6	→	4.2	▲64%	
			Bridge interval	10.3	→	5.9	▲43%	
Zone II	3.8~9.5 μ Sv/h (Annually equivalent to 20~50mSv)		Cutting interval	5.8	→	2.3	▲60%	
			Landfill interval	5.4	→	2.5	▲54%	
Zone III		Opened	Cutting interval	5.1	→	4.1	▲20%	

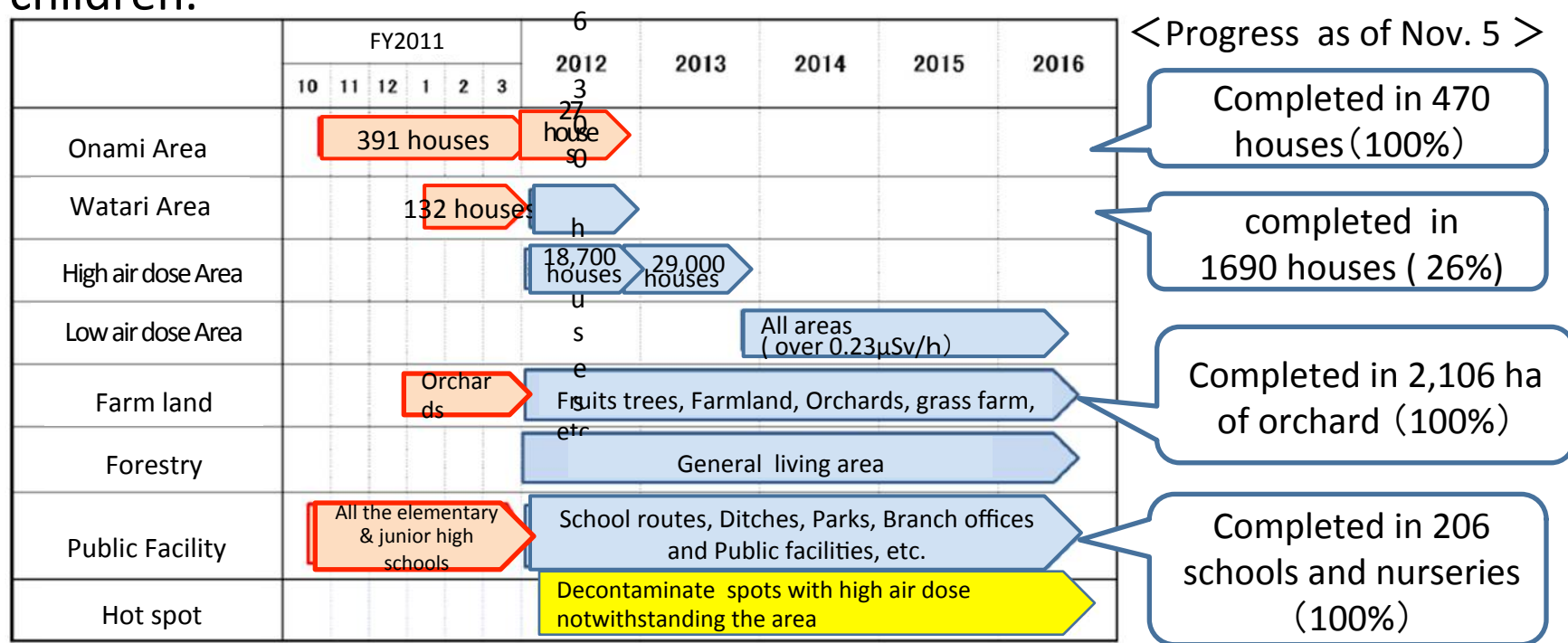
Progress in Intensive Contamination Survey Area

Decontamination Progress in Intensive Contamination Survey Area

- ◆ 90 out of 104 municipalities finalized their decontamination implementation plans under the Act (as of Nov 28, 2012)

<Example of Fukushima City>

- ◆ Planning term : 5 years until Sep. 2016 (2 years as an intensive term)
- ◆ Priority: Houses in high air dose areas, public facilities, especially for children.



 : Decontamination completed

Dissemination of Information regarding Decontamination Progress in the website

In the case of Fukushima City:



環境省
Ministry of the Environment

住民の皆さまへ 安心できる毎日を。
除染情報サイト

Google™カスタム検索 検索

文字サイズの変更 小 **中** 大

 新着一覧

 政策資料・ガイドライン

 講演会・イベント

 お役立ちリンク集

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 印刷する

除染実施区域の概要・進捗

[岩手県](#)

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福島市 除染計画（第2次）承認済み

除染の進捗状況

除染実施計画 平成24年5月21日策定済

出典: 福島県除染対策課
平成24年9月末時点

公共施設 [施設数]

実績数 324

発注数 562

計画数 584

住宅 [戸]

実績数 1,723

発注数 18,913

計画数 23,576

道路 [km]

実績数 25.0

発注数 55.0

計画数 634.0

農地: 水田 [ha]

実績数 2,299

発注数 2,299

計画数 2,397

農地: 畑地 [ha]

実績数 167

発注数 1,189

計画数 1,189

農地: 樹園地 [ha]

実績数 2,106

発注数 2,106

計画数 2,358

Information Site on Decontamination
URL: <http://josen.env.go.jp/>

Efforts to secure Interim Storage Facility

Efforts to secure Interim Storage Facility

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

Main Contents

- The National Government shall secure, maintain and manage the facility
- The National Government shall make utmost efforts **to start operation of the facility by January 2015.** Location sites would be selected within FY 2012
- Target materials for storage is limited to soil and waste generated in Fukushima pref.
- **Final disposal will be carried out outside Fukushima Pref. within about 30 years** from the start of the interim storage.

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

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

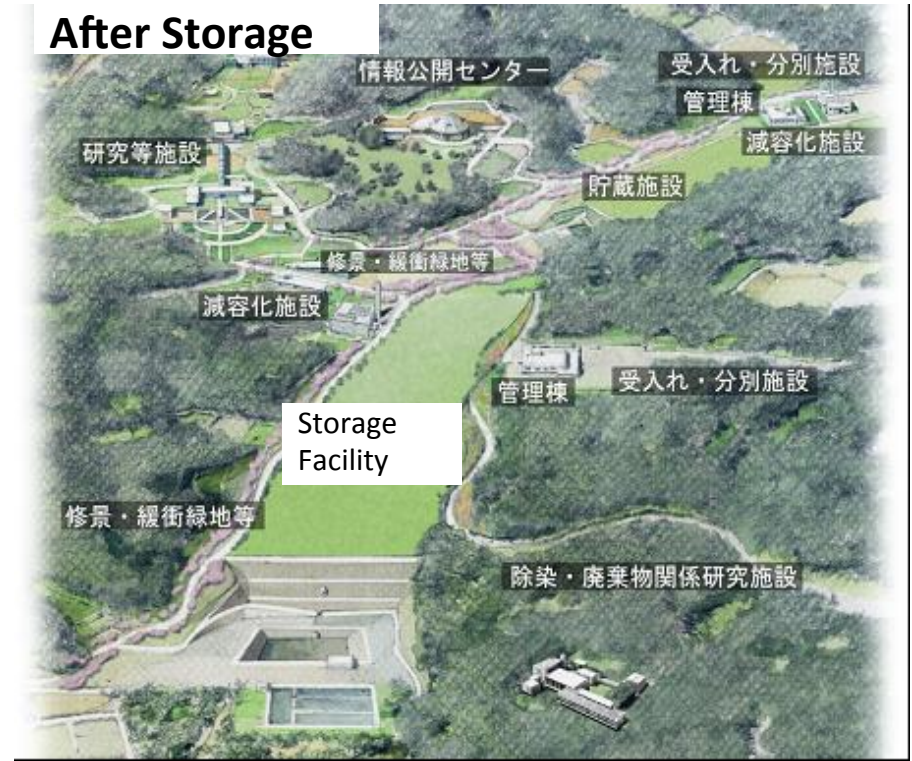
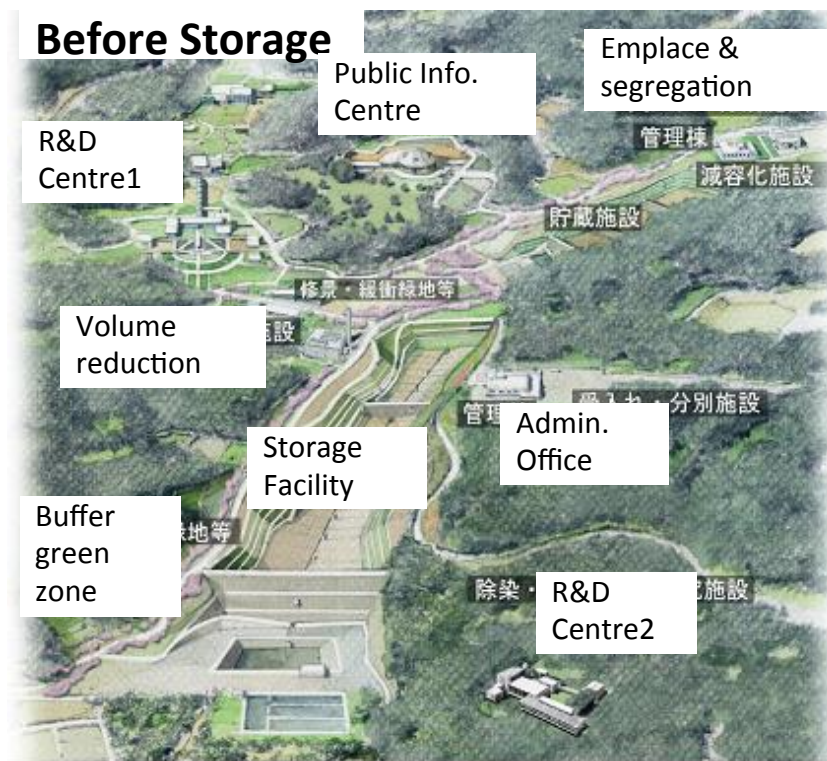
Aug., 2012 The Ministry proposed the sites for investigation to 8 towns and Fukushima Pref.

Aug. to Nov, 2012 The Ministry visited and explained to each of the 8 towns and Fukushima Pref. about the facility

Nov., 2012 The Governor of 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

ISF: Bird-view Image

- Total storage volume ranges 15-28 million_m³ according to the decontamination scope and methods
- Should contribute to municipal economy during construction and monitoring phases.



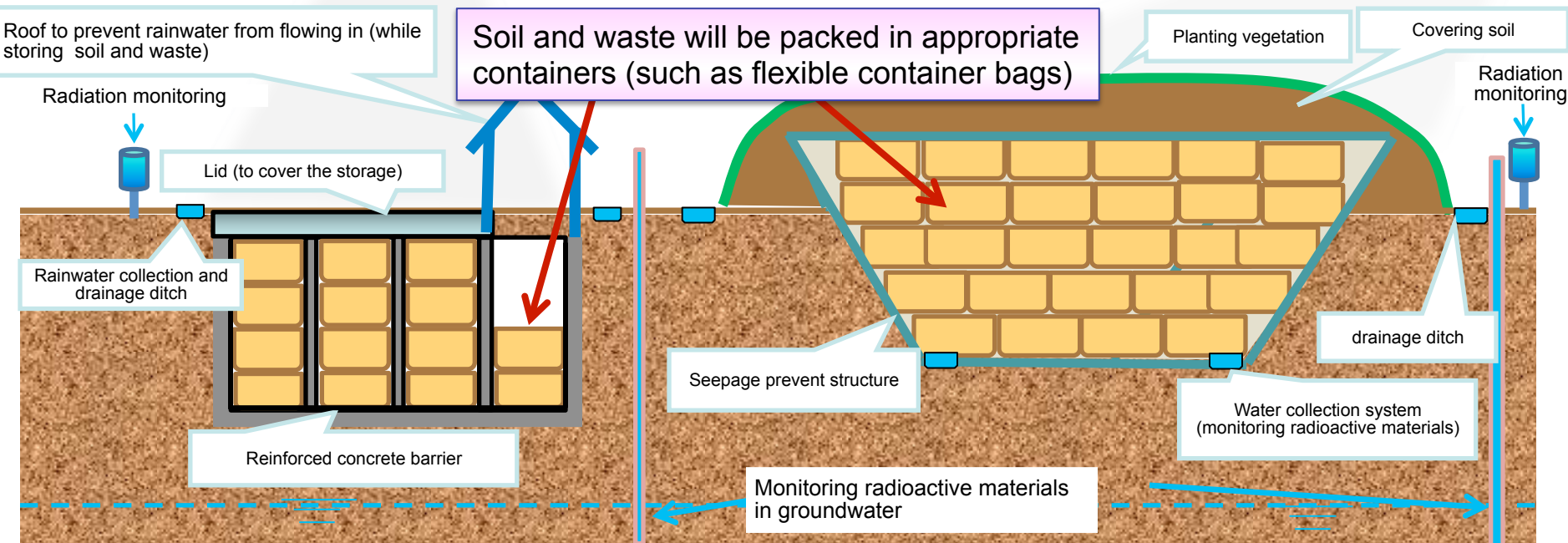
✂ The image is conceptual. Actual facilities and their layouts will be modified to the sites selected.

ISF: Storage Facility Image

- Several types of Storage Facilities may be installed according to the characteristics of stored soil and waste.
 - ✓ Level of contamination
 - ✓ Leachate traits under various environmental scenario.

Example of facilities for radioactive waste which can generate leachate

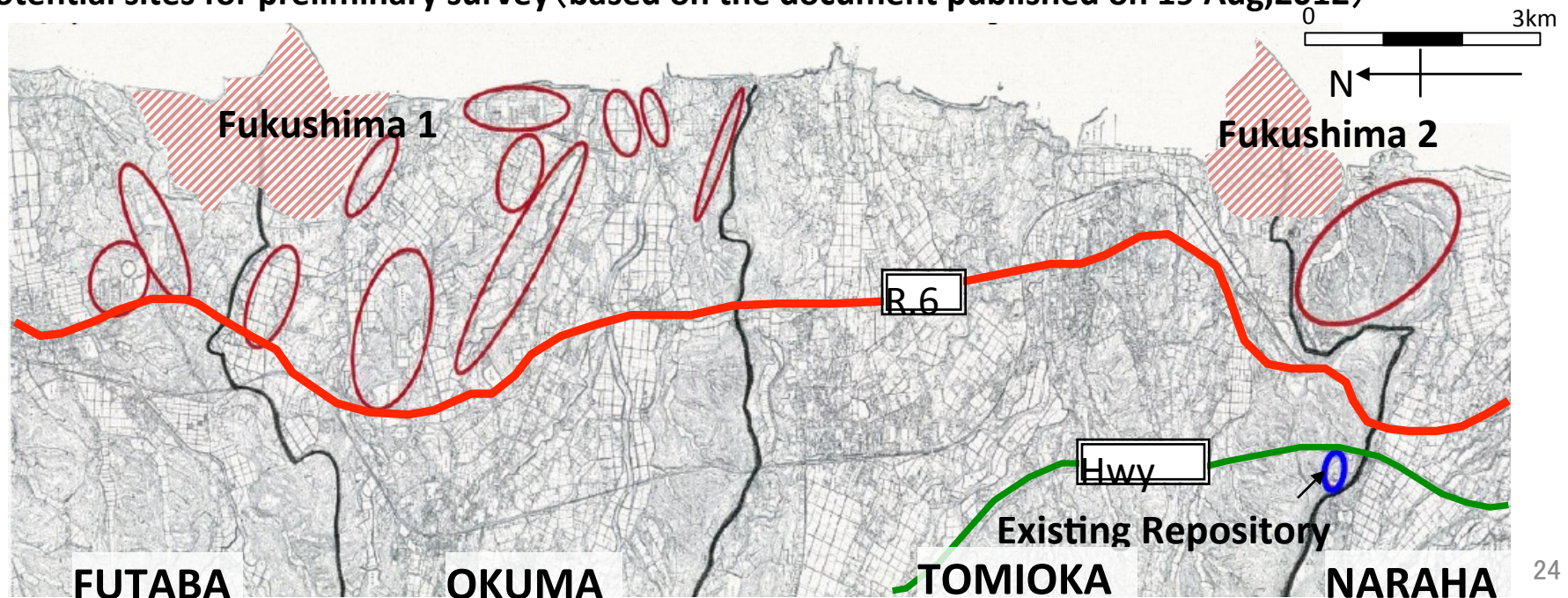
Example of facilities for radioactive waste which does not generate leachate



Potential Construction Sites

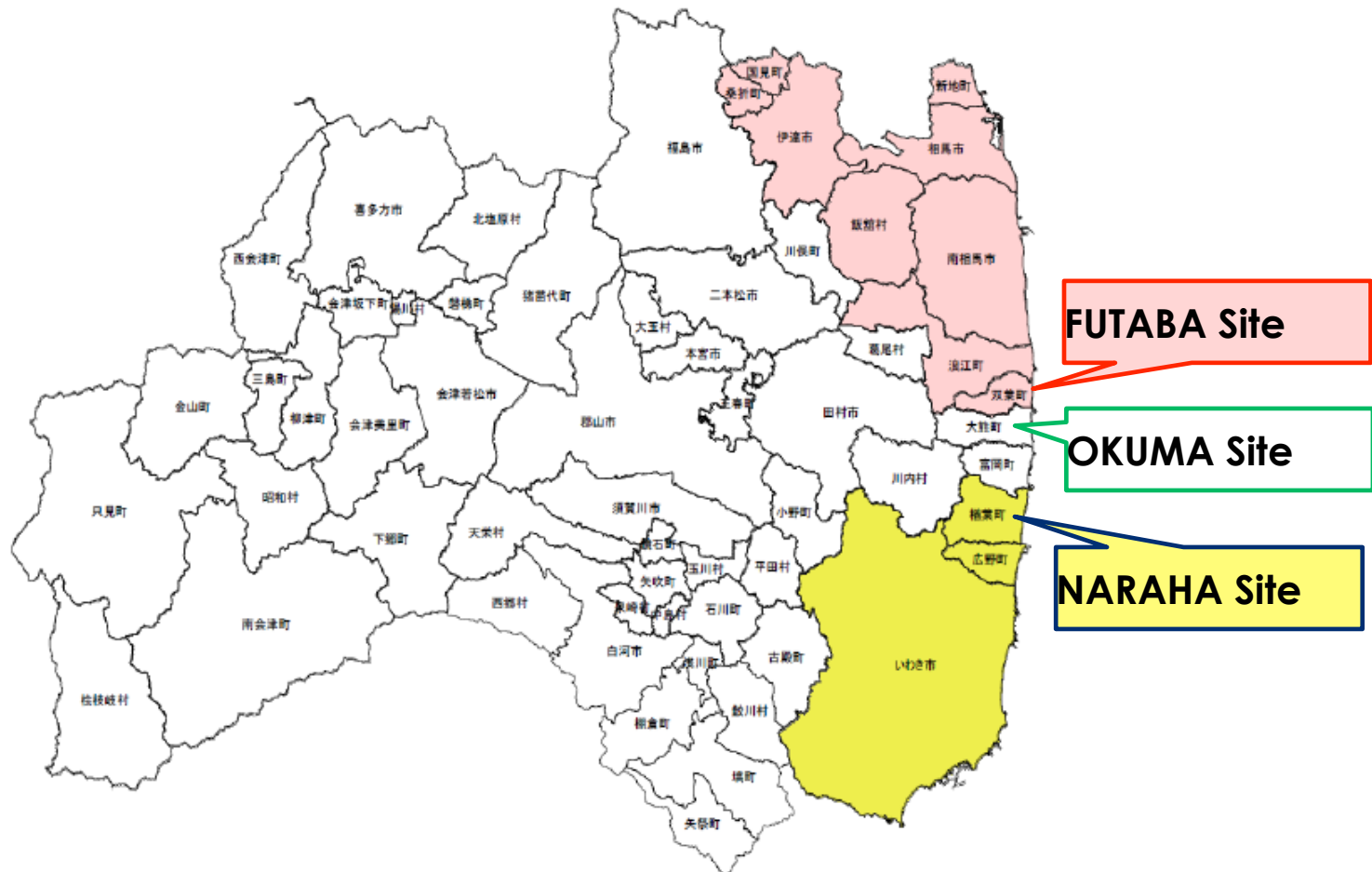
- 12 potential sites (for preliminary survey) around the Fukushima 1st and 2nd nuclear power plants
 - ✓ Vicinity to the highly contaminated (=high volume) area
 - ✓ Sufficient area for storage and related facilities
 - ✓ Transportation conditions (mitigation of congestion etc.)
 - ✓ Avoid of active fault and soft ground
 - ✓ Minimization of surface water diversion

12 potential sites for preliminary survey (based on the document published on 19 Aug, 2012)



Transportation Plan

■ Divide into 3 areas corresponding to ISF locations (FUTABA, OKUMA and NARAHA).



Management of off-site Waste Contaminated with Radioactive Materials

Management of Waste contaminated with Radioactive Materials



**Designated Waste
(Contaminated Waste
above 8,000Bq/kg)**



House Demolition

Current status of Designated waste [as of November 2nd, 2012]

	Incineration ash (t)		Wasted sludge (t) (Domestic water)	Wasted sludge (t) (Industrial water)	Sewage sludge (t)	Agriculture and forestry Waste (t)	Other (t)	Total (t)
	Municipality solid waste	Industrial waste						
Iwate	181	0	0	0	0	0	176	358
Miyagi	0	0.2	1011	0	0	2238	0	3250
Yamagata	0	0	0	0	0	0	2.7	2.7
Fukushima	57,676	1,474	1,639	168	8,589	30	307	69,883
Gunma	0	0	451	127	171	0	0	749
Tochigi	1,034	0	585	0	2,200	3,535	0	7,354
Ibaraki	1,763	0	0	0	926	0	0	2,689
Chiba	1,592	0.6	0	0	0	0	0	1,592
Tokyo	981	1	0	0	0	0	0	982
Niigata	0	0	1,018	0	0	0	0	1,018
Shizuoka	0	0	0	0	0	0	8.6	8.6
Total	63,227	1,476	4,704	295	11,886	5,803	328	87,884

Designated waste : Contaminated Waste above certain level of radioactive Cesium

Outlines of the Act on Special Measures concerning the Handling of Radioactive Pollution

~Management of Contaminated Waste~

*The Act on Special Measures concerning the Handling of Environmental Pollution by Radioactive Materials Discharged by the Nuclear Power Station Accident Associated with the Tohoku District – Off the Pacific Ocean Earthquake that Occurred on March 11, 2011

Specified waste

(1) Waste within the management area

Contaminated waste management area
designated by the Minister of the Environment



A management plan for waste within the management area is formulated by the Minister of the Environment



Implementation by the national government pursuant to the treatment plan for waste

(2) Designated waste

Survey on sewerage sludge, incinerated ash, etc (obligatory)

Survey on waste other than that specified in the left box (voluntary basis)

Report to the Minister of the Environment



Application



Designation as “designated waste” by the Minister of the Environment
* Contaminated Waste above certain level



Implementation by the national government

Prohibition on unauthorized actions (ex. Unauthorized dumping)

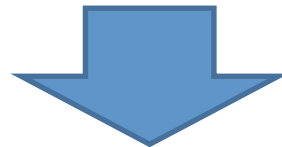
Low-level contaminated waste other than specified waste

To be treated / disposed in accordance with the Waste Management Act

Basic Approach of Waste Disposal Contaminated by Radioactive Materials

“Near –term policy to ensure the safety for treating and disposing contaminated waste around the site of Fukushima Dai-ichi Nuclear Power Station of Tokyo Electric Power Company” by Nuclear Safety Commission (June 3, 2011)

- Radiation expose of the residents living in the vicinity of the facilities during the treatment of contaminated materials : under 1mSv/y
- Radiation expose of the residents living in the vicinity of the facilities after termination of institutional control: under 10μSv/y



- Management of disaster waste contaminated by radioactive materials was designed to correspond with this near-term policy.

Landfill Disposal of Incinerated Ash According to the Act on Special Measures Concerning Management of Radioactive Contamination

	8,000 Bq/kg or under		8,000～100,000 Bq/kg	Exceeding 100,000 Bq/kg
	Other (Criteria of Waste Management Act)	Specified Domestic Waste & Specified Industrial Waste※2		
Structure of landfill site	Controlled type landfill site※1(Landfill site equipped seepage control work and drainage treatment)			Isolated type landfill site (Landfill site equipped outer intercept)
Preventive measures against leaching of radioactive material	None	-*Installing the soil layer *-Prevention of rainwater penetration into fly ash	*-Cement solidification *-Installing the soil layer *-Establishing the impermeable soil layer	None (No Leaching of Radioactive Material due to Water Blocking)
Monitoring of radioactive material	None	*Discharged water *Groundwater *Air dose rate in the vicinity		*(Non-existence of discharged water) *Groundwater *Air dose rate in the vicinity

^{※1} Isolated type of landfill site is possible to be used.

^{※2} Incinerated ash, sewerage sludge, etc, generated from areas with possible contamination with accident-origin radioactive materials near 8,000 Bq/kg .

Policy of disposal of designated waste (March 30, 2012), and Image of Landfill Disposal of Designated Waste

- National Government keeps effort to manage designated waste, which should be disposed of in each prefecture. If possible, the existing landfill site would be utilized for those waste.
- National Government determines sites from a few candidate sites.
- National Government lessens a burden of storage of agricultural by-products by intermediate treatment such as incineration, drying, and melting.

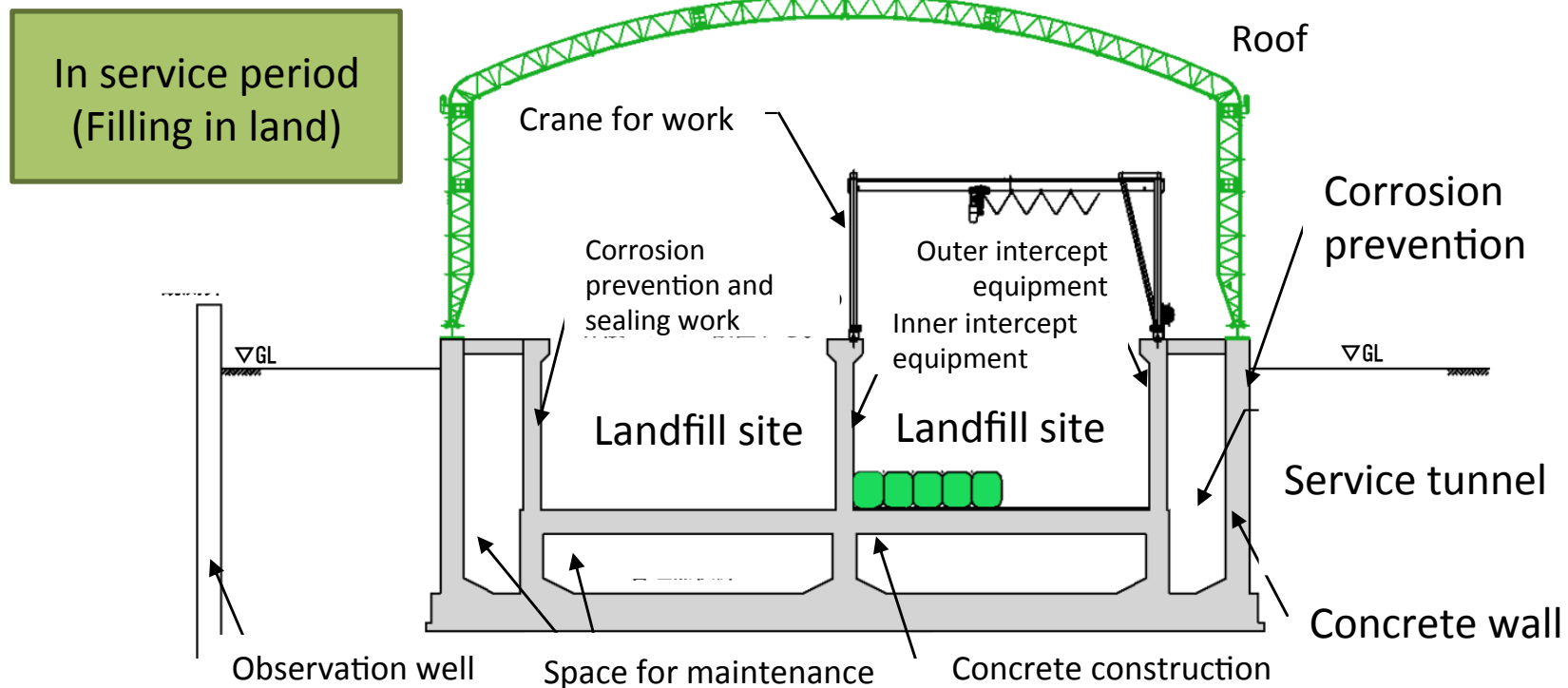
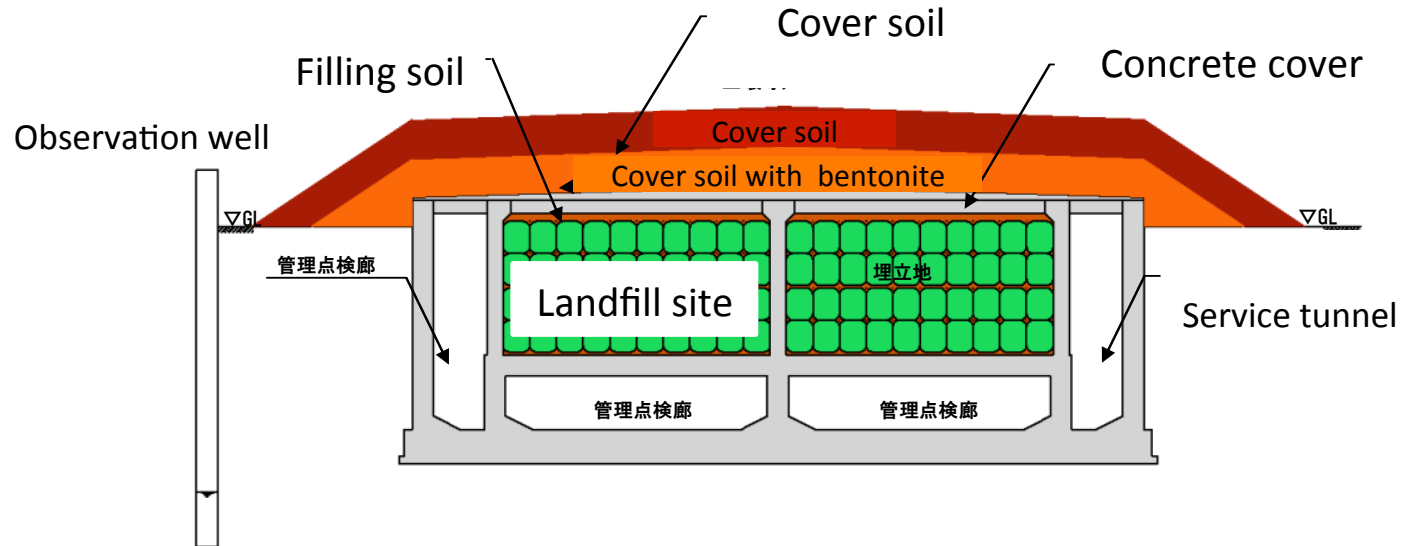
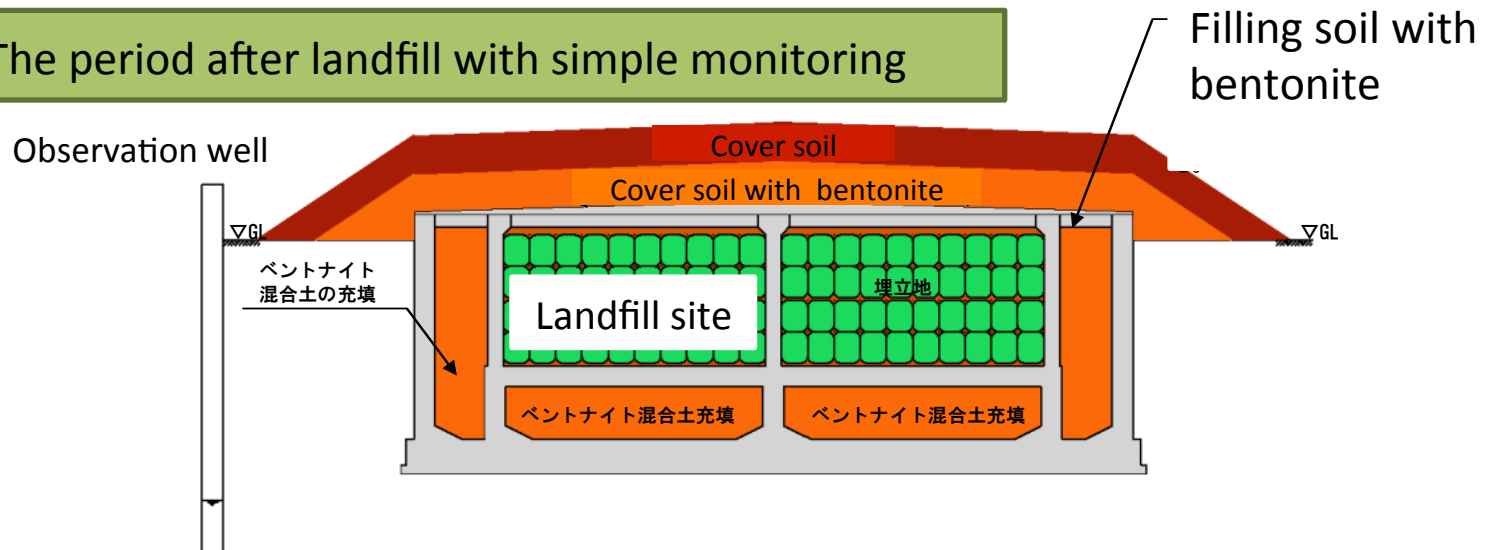


Image of Landfill Disposal of Designated Waste

The period after landfill with detail monitoring and maintenance



The period after landfill with simple monitoring



Tackling the Challenges

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