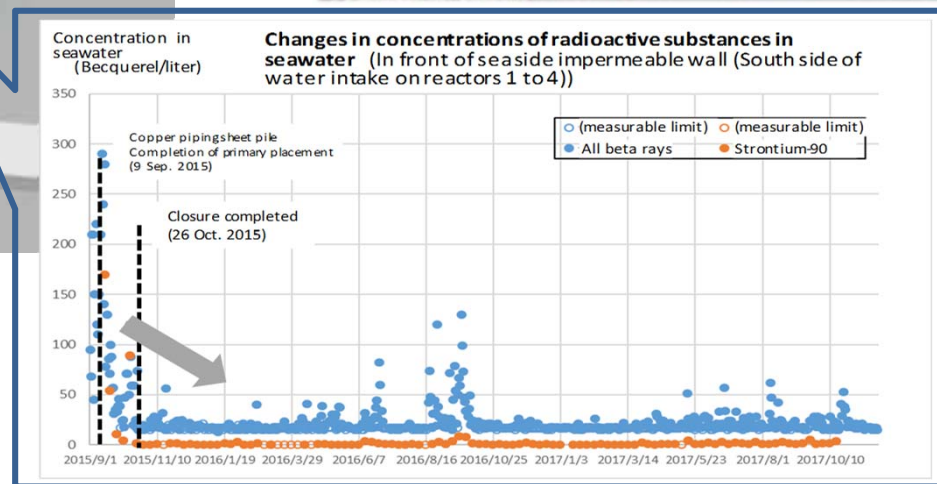
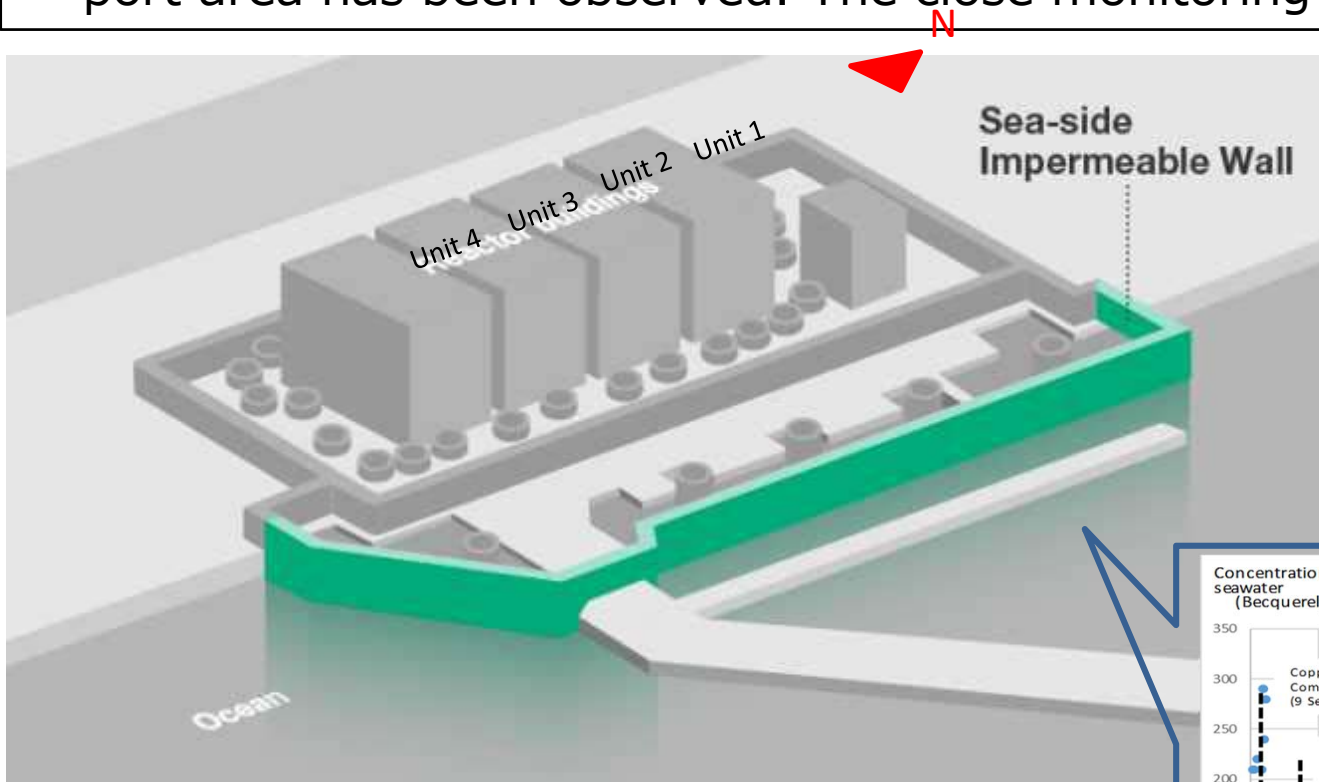


Sea-side Impermeable Wall [Preventing leakage]

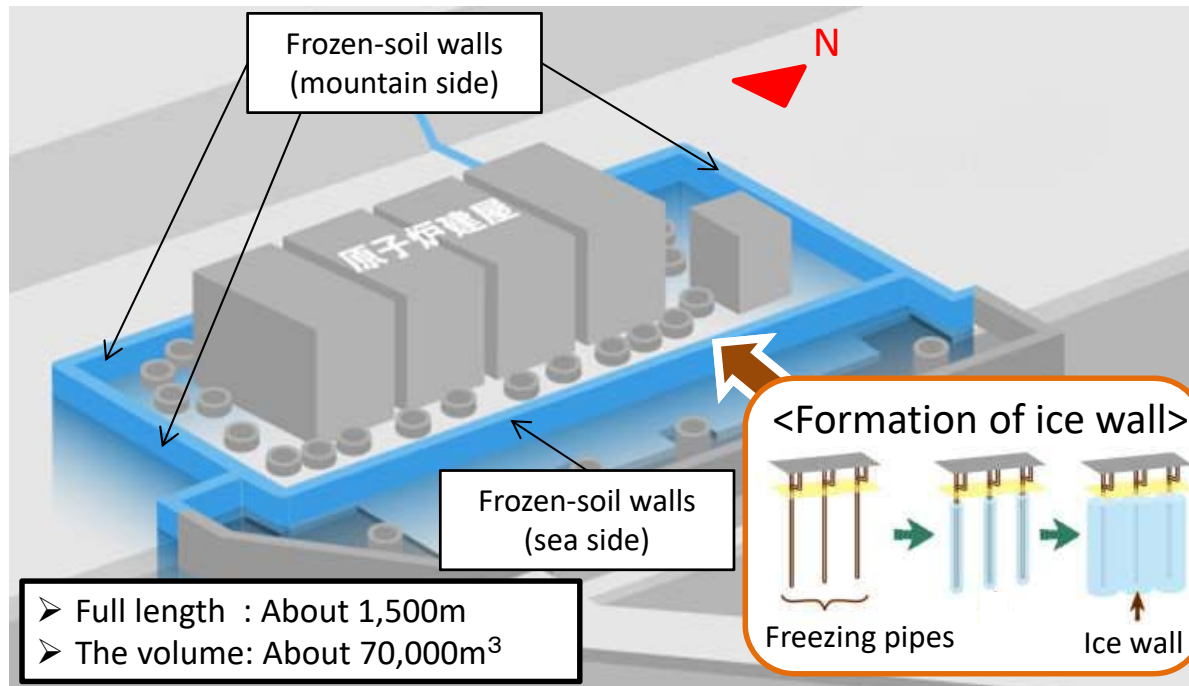
- To prevent groundwater outflow to the sea and improve its water quality, the seaside impermeable wall, a steel pipe and sheet pile wall (Depth: approx. 30m, Length: approx. 780m), was constructed on the east side of the buildings.
- The closure has completed on Oct 26, 2015, after operating Sub-drains and Groundwater-drains.
- After the closure, the decline in the concentration of radioactive materials inside the port area has been observed. The close monitoring is continued.



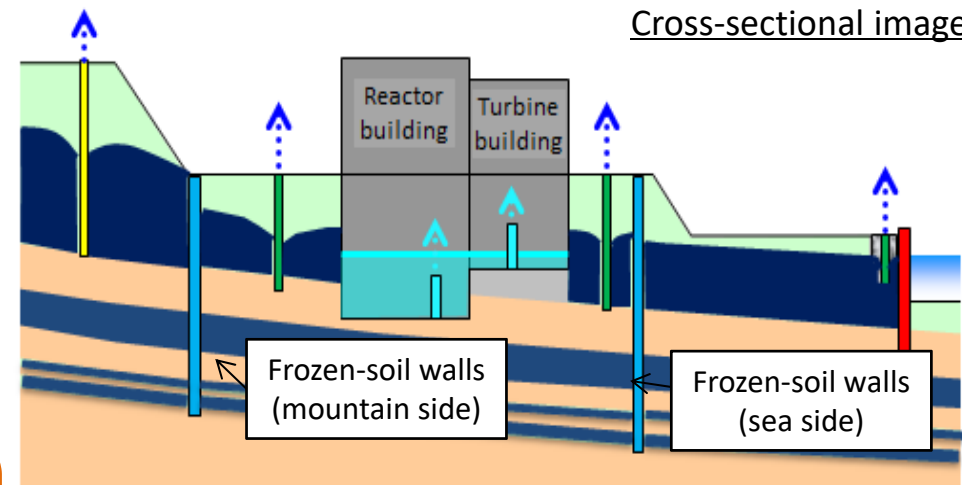
Frozen-soil Impermeable Walls [Isolating]

- To suppress the generation of contaminated water by blocking groundwater inflow into the buildings, impermeable walls, made of frozen-soil, have been constructed to surround the buildings.
- All the freezing pipes had been installed (Mountain-side: September, 2015; Sea-side: February, 2016)
- On the sea side, freezing started in March 2016 and completed in October 2016. The pumped up groundwater has declined. That is, the effect of the impermeable walls has been seen.

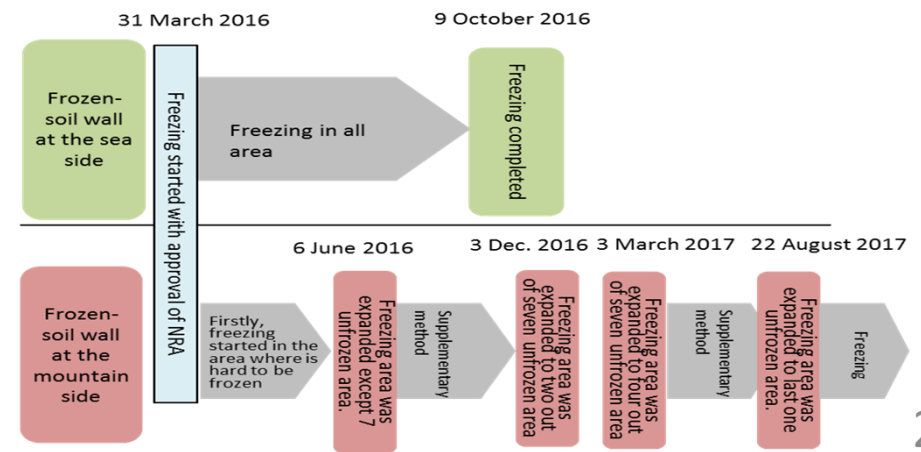
Panorama image of the walls



Cross-sectional image

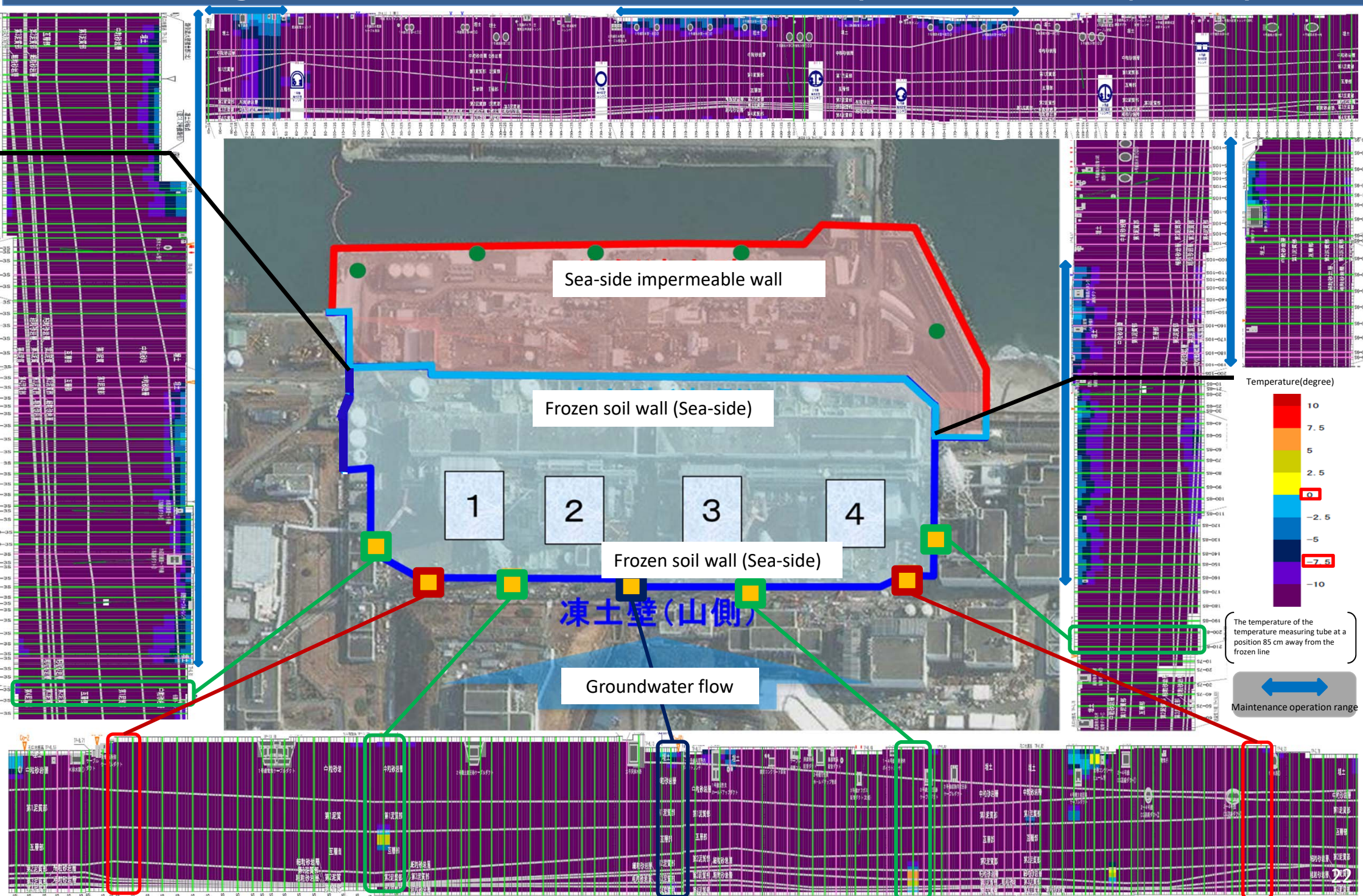


Progress of the freezing



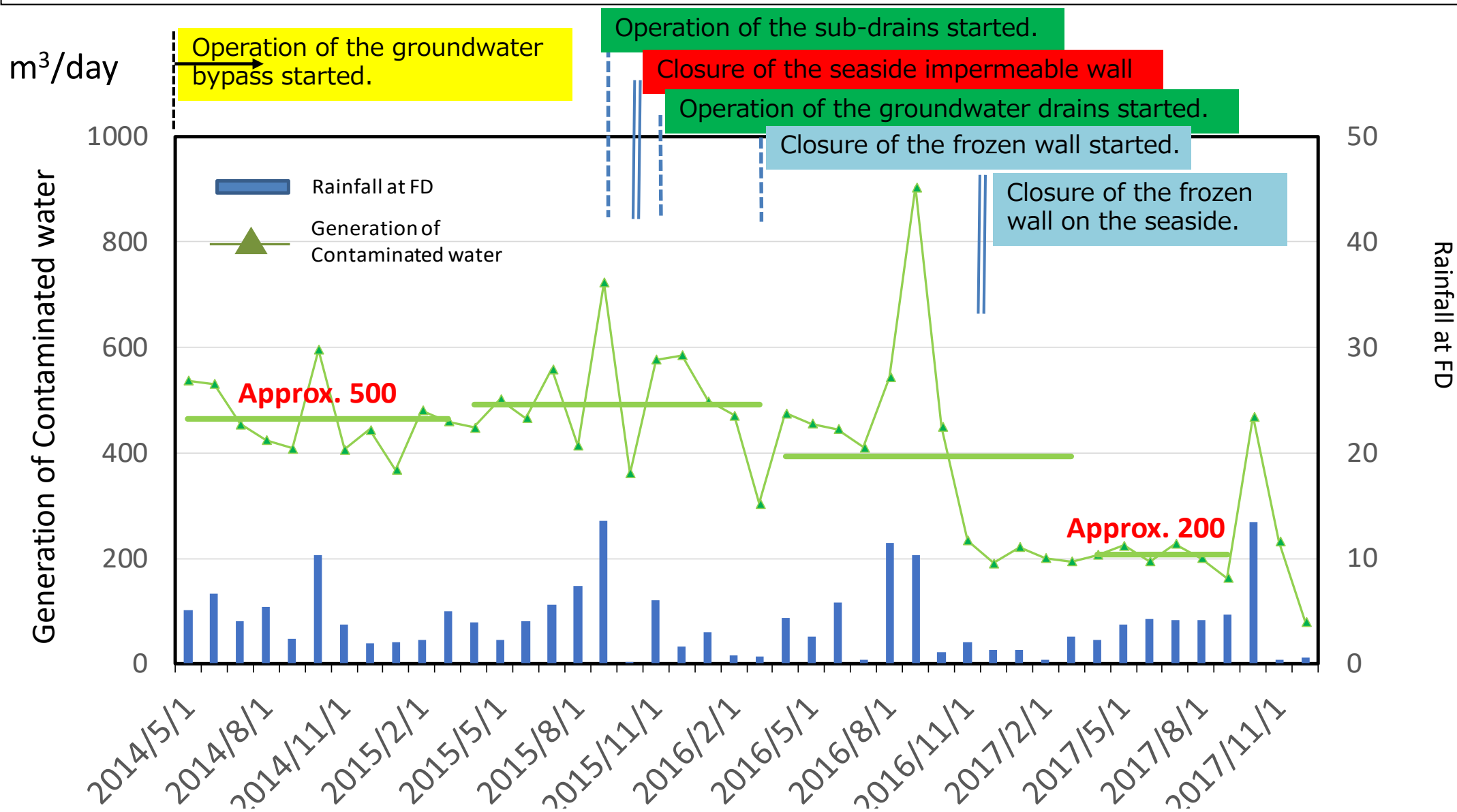
On 28 June, NRA has approved in principle that one last unfrozen area are frozen.

Freezing condition of the entire frozen wall (as of 9 February 2018)



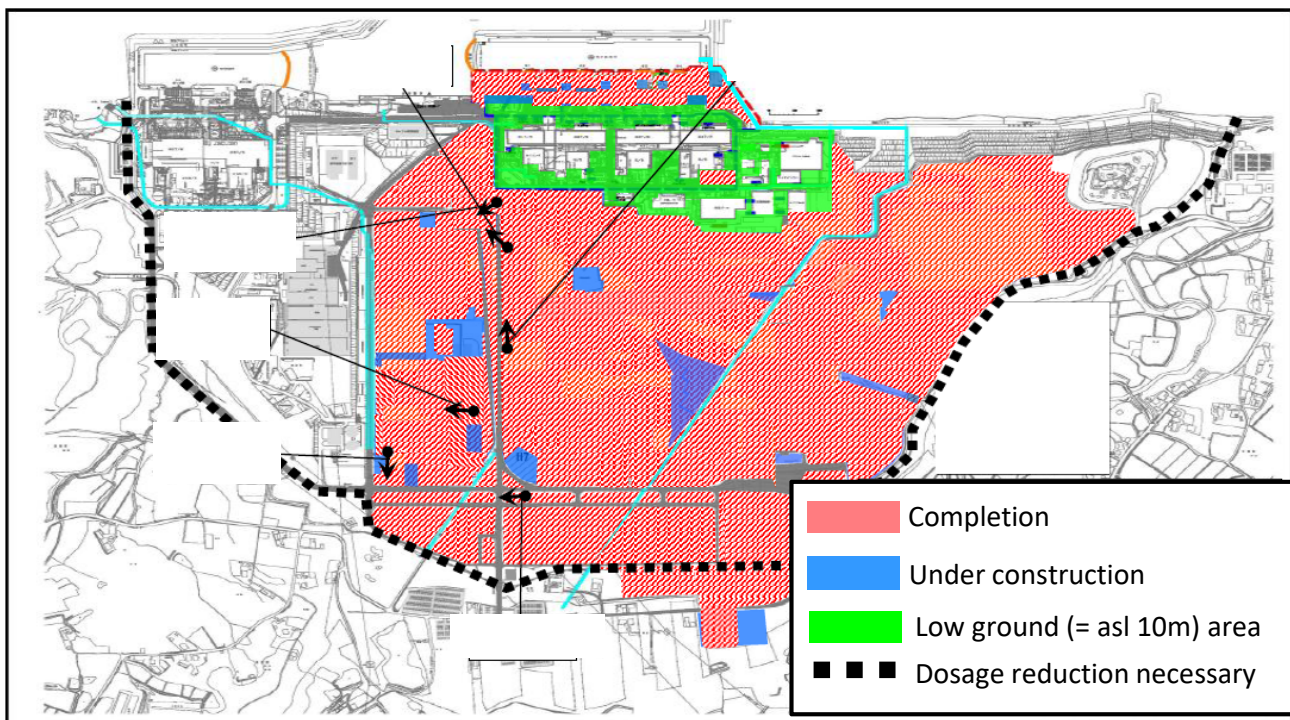
Status of generation of contaminated water

- As a result of the measure “Isolating groundwater from the contamination source” such as the groundwater bypass, the sub-drains, the seaside impermeable wall, Waterproof Pavement, the frozen walls, generation of contaminated water has been reduced comparing before the measure.



Waterproof Pavement to Prevent Rainwater Seeping

- As a result of groundwater flow simulations etc., it was determined that the source of almost all the groundwater coming into the buildings is the rainfall at/around the site.
- In order to reduce the amount of groundwater, and to control the amount of the water inflow to the buildings, a large area of the site is being paved. 90% was completed in FY 2015, leaving high dose areas and work assessment areas
- Up until July 2017, approx. 93% of the entire site area has been paved.



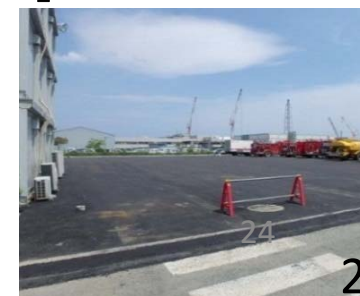
【Between Unit 3 and Unit 4】



【Tank Area】

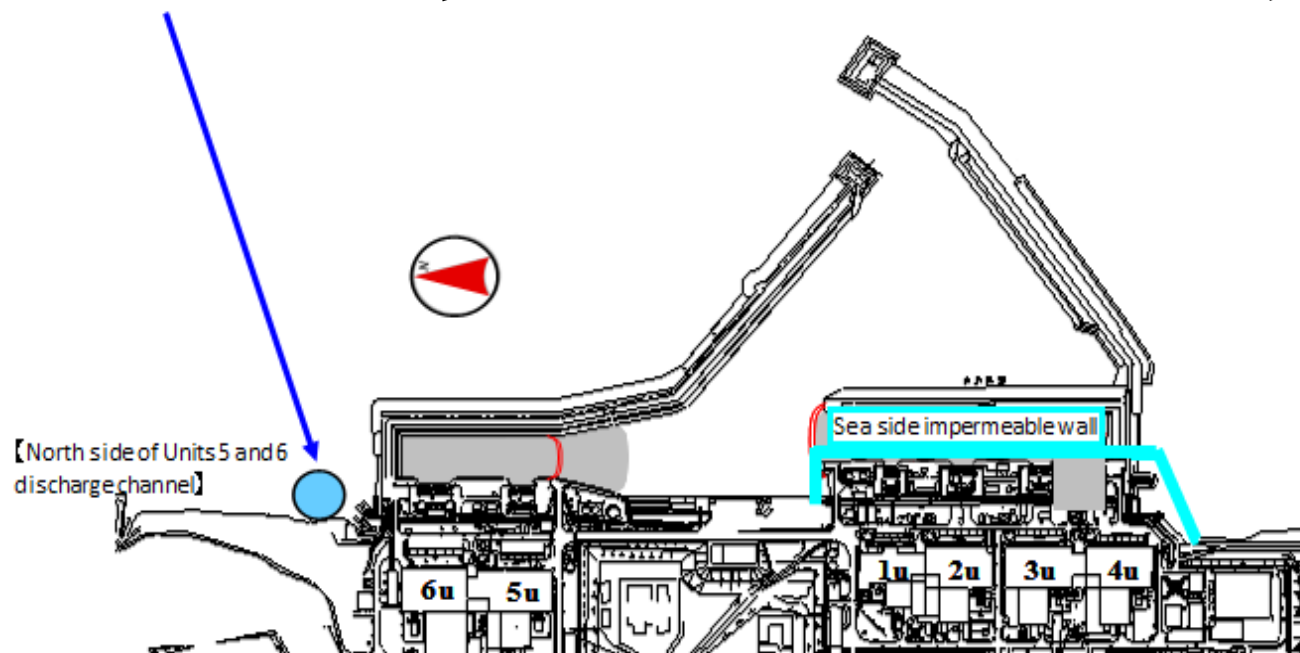
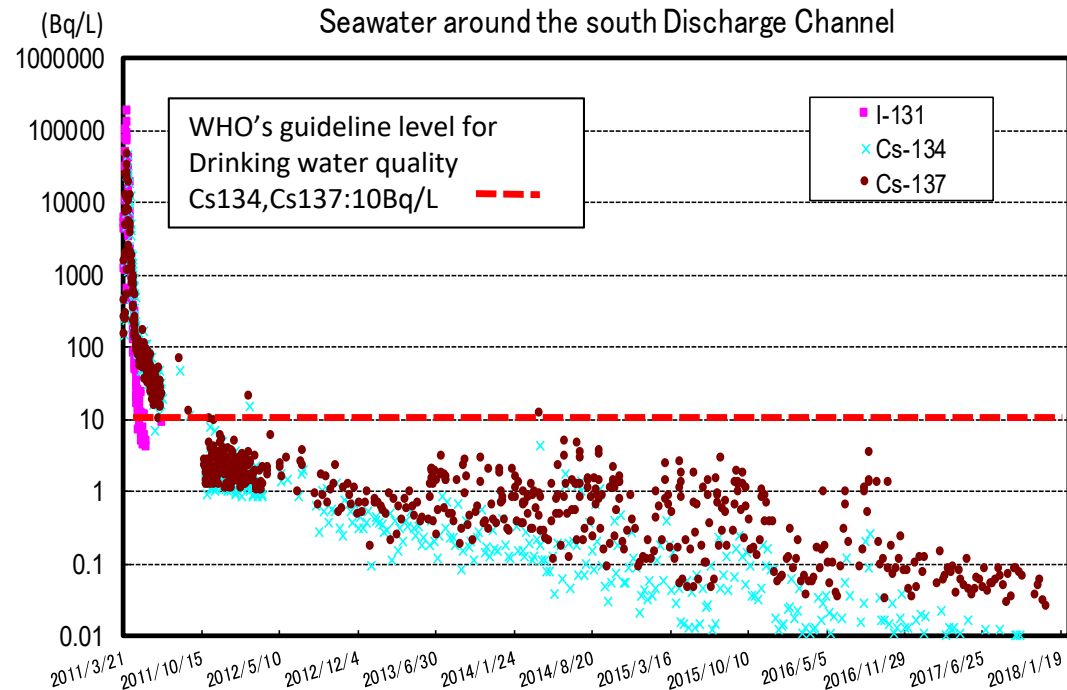
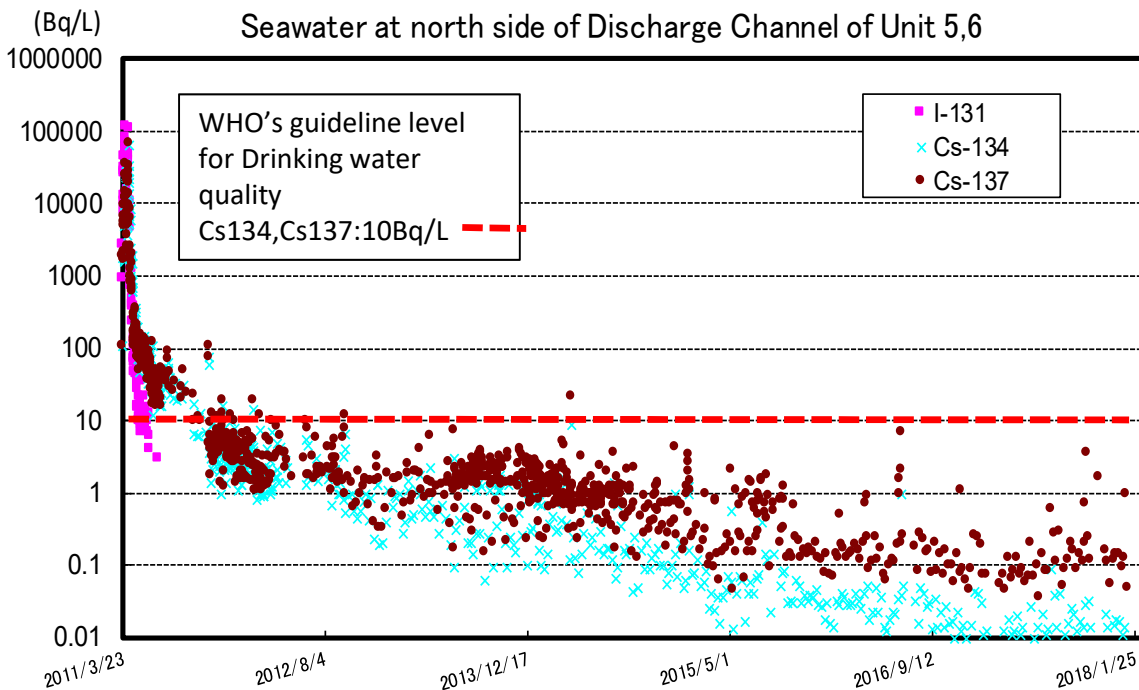


【Parking Lot】



Status of seawater monitoring around outside of the port

<Changes of the seawater monitoring point near the FDNPP>



Concentration of radioactive materials in the surrounding sea area

About 10,000 Bq/L (March 2011 near the south outlet)

▶ Not Detectable (Under 0.7Bq/L) (March 2016 near the south outlet)

Less than 1/10,000

※Concentration of Cs137

Around south discharge channel

Progress and Future Prospect of Contaminated Water Management

Measures and the results (until March 2017)					Future outlook
Isolating	Volume of inflow of groundwater into the buildings	<u>Operation of the groundwater bypass</u> 【From May 2014】 Discharged approx. 270,000 tons of water by Mar. 2017	<u>Operation of the sub-drains</u> 【From Sept. 2015】 Discharged approx. 300,000 tons of water by Mar. 2017	<u>Completion of paving of 92% of the ground of the site</u> 【As of Feb. 2017】	<u>Closure of Frozen soil wall (landside impermeable wall)</u> 【Mar. 2016 Start of freezing】 【Oct. 2016 Completion of freezing on the sea side】 【August. 2017 Freezing process continuing (freezing area was expanded to last one unfrozen area on August 22.) Volume of water pumped through the bank area: reduced from around 400 m3/day (before measures were implemented) to the latest average of around 120 m3/day in March 2017
	Approx. 400 m3/day (From June 2011 to May 2014)	Approx. 300 m3/day (From May 2014 to Sept. 2015)	Approx. 120m3/day (The target (100 m3/day) was almost achieved) (Mar. 2017)	<u>Enhancement of the sub-drain</u> 【From Oct. 2016】 Expansion of purification facility to two systems, restoration and enhancement of pumping wells and an increase in the number of tanks	
Preventing leakage	Concentration of radioactive materials in the surrounding sea area *The value of cesium 137 in waters around the south discharge channel	<u>Ground improvement using water glass</u> 【Mar. 2014】	<u>Closure of the seaside impermeable wall</u> 【Oct. 2015】 Start of pumping of water through the groundwater drains following the closure 【Nov. 2015】	<u>Installation of more welded tanks</u> 【As of Jan. 2017】 Welded tanks with combined capacity of approx. 850,000 tons (around 90% of the total capacity of approx. 980,000 tons)	<u>Plan for installation of more tanks</u> The total installed capacity of welded tanks will increase to approx. 1.37 million tons by 2020 through such measures as installation of new tanks and replacement of flange-type tanks.
	Approx. 10,000 Bq / L (Mar. 2011) (Monthly average)	Lower than the detection limit value (0.7 Bq/L) (Mar. 2017)			<u>Treatment of flange-type tanks</u> Various measures will be taken to continue the use of flange-type tanks until 2018, including leak prevention measures such as installation of double dykes, preemptive security measures such as waterproof sealing of side flanges, and four-times-a-day patrol.
Removing	Additional effective doses at the site boundary	<u>Treatment of contaminated water in the tanks almost completed</u> 【May 2015】 → Cumulative total of approx. 760,000 m3 Treatment by ALPS will be continued to further reduce the risk.	<u>Treatment of contaminated water in the trenches wholly completed</u> 【Dec. 2015】 → Cumulative total of approx. 10,000 m3		<u>Consideration of long-term handling of contaminated water treated by ALPS</u> 【Sept. 2016 Establishment of a subcommittee concerning contaminated water treated by Advanced Liquid Processing System (ALPS)】
	Approx. 11 mSv/year (Mar. 2012)	Less than 1 m Sv/year (Achieved in March 2016)			
Treatment of stagnant water in the buildings		Separation of the Unit 1 turbine building from the circulation water injection line 【Mar. 2016】	Exposure of the floor in the Unit 1 turbine building 【Mar. 2017】		Completion of treatment of stagnant water in the building 【within 2020】
		Treatment of high concentration contaminated water in the condenser Start of removal for Unit 1 【Oct. 2016】	Halving of radioactive materials in stagnant water in the building compared with level at the end of FY2014 【Jan. 2017】		

<Others>

○Completed the reconfiguring of “Drainage K” path [2016.3]

○The area where workers can work with general working clothes was expanded [2016.3]

○A certificate of gratitude was awarded to the work teams involved in decommissioning and contaminated water management [2016.4]

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6. Communication with the public
7. Cooperation with International Communities

Improvement of the Environment inside various Areas of Fukushima Daiichi Nuclear Power Station

- Site tour can be conducted in ordinary clothes if visiting by bus (no drop-off). Radiation exposure dose at time of a site tour is 0.02 mSv if on a general course, which is approximately double the exposure of a set of dental X-rays.
- Radiation dose has been reduced through decontamination and paving of the site. The working environment has been improved. The area where a full face mask is unnecessary and ordinary clothing can be worn has been expanded to approx. **95%** of the site as of March 2017.

<Large rest house>



- A cafeteria and a convenience store opened. Shower rooms were installed.

<Changes in rest areas>



Just after the accident



Large rest area , since May 2015

<Areas where ordinary clothing can be worn>

- Areas where Protective clothing are required
- Areas where ordinary clothing can be worn



Protective clothing



Ordinary clothing



Clothing for exclusive use on the premise



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The results of the PCVs internal investigation

- To date, toward the fuel debris retrieval, investigations of the internal situation of the PCVs have been sequentially implemented, and useful data such as the dose-profile was collected.
- At the same time, NDF evaluated the feasibility of the retrieval methods of fuel debris and made recommendations toward deciding fuel debris retrieval policies.

Unit 1

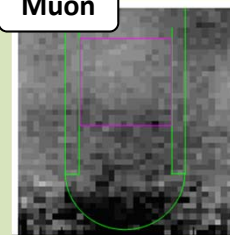
Muon



- ✓ There is no fuel in the core of the RPV (estimated)

Unit 2

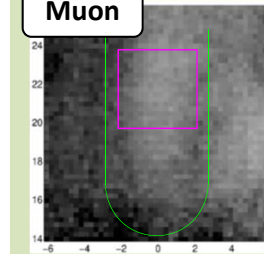
Muon



- ✓ There is fuel at the bottom of the RPV (estimated)

Unit 3

Muon



- ✓ High-density substances are not found inside the RPV (estimated, preliminary report information)

Robots, etc.



- ✓ No major damage to facilities and equipment has been confirmed

Robots, etc.



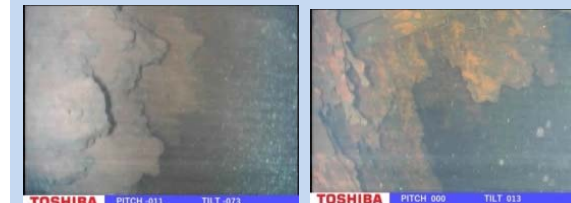
- ✓ Dose has been measured.
- ✓ Deposits and falling objects were found at the bottom.

Robots, etc.

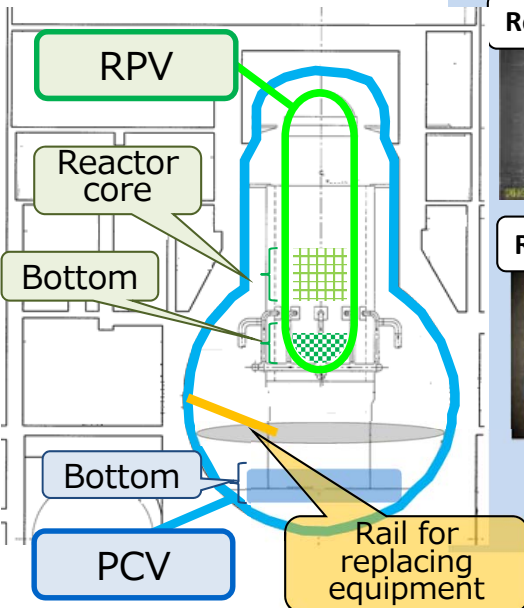


- ✓ A range of about 2/3 of the scaffold beneath the RPV was surveyed (partial dropout was found on the near side)
- ✓ Steam from the bottom was found (it was estimated that the steam of the fuel debris)

Robots, etc.



- ✓ Damage in the PCV was found.
- ✓ Melted materials which could be fuel debris were found.



The NDF's recommendation for deciding on the fuel debris retrieval policies

Premise

- ① It is important to reduce the potential risks related to fuel debris as soon as possible
- ② Information on fuel debris, development of extraction technology, etc. is still limited.
Many important uncertainties remain related to fuel debris retrieval at the present time.

1. Develop a comprehensive fuel debris retrieval plan aimed to optimize the entire retrieval process, from preparation work and transfer from the site to treatment, storage and cleanup, including coordination with other work implemented in the field.
2. Move forward in a flexible manner that takes into account information gained little by little via a **step by step approach** after determining which retrieval method should be focused on.
3. Assume that combining a variety of methods will be necessary to complete retrieval of the fuel debris.
4. Promote preliminary engineering and R&D focusing on partial submersion methods.
5. First, focus on retrieving the fuel debris located at the bottom of the PCV and keep reviewing the methods based on the new expertise and experience gained throughout the retrieval process.
6. Focus on the route from the side of the PCV (the side-access method) for the first access to the fuel debris located at the bottom of the PCV.

Basic policy on revision

- (1) Maintain that security is top priority and risk reduction is focused on.
- (2) Optimize all decommissioning work under the safe conditions, as the situation of the site has been clear.
- (3) Reinforce interactive communication in addition to release appropriate information in a timely manner.

(1) Fuel debris retrieval

- Step by step approach in a flexible manner according to the information gained little by little
- The most prevailing option of fuel debris retrieval will be “Partial Submersion - Side Access method”.
- Within 2019FY, the method of retrieval of fuel debris from the first reactor will be decided.

(2) Spent Fuel removal from pools

- Proceeding carefully with work, decontaminating, shielding against radiation and preventing radioactive dust from spreading.

(3) Contaminated water management

- Reduction of generation volume of contaminated water
- Maintain current policy below;
Regarding liquid waste,
“measures will be taken with the understanding of local stakeholders. Liquid waste will not be easily released to the ocean. Without the relevant ministries consent, its release to the ocean is not implemented.”

(4) Solid Waste management

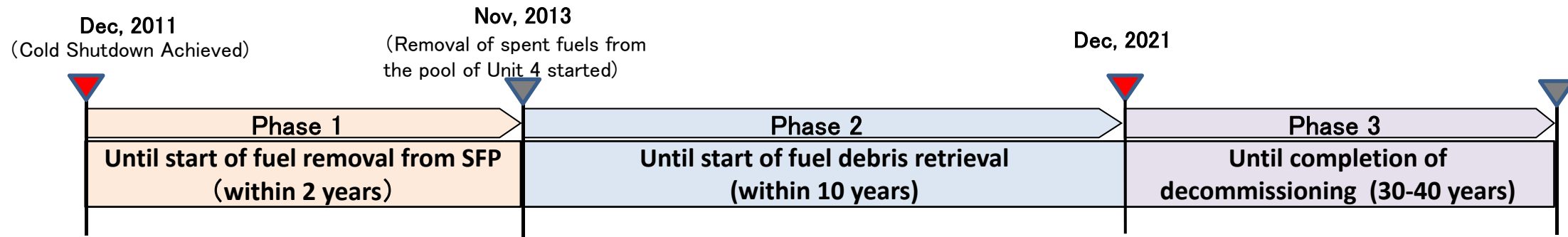
- Storage of radioactive solid waste under the safe conditions is continued until the characteristics of solid waste will be unveiled.

(5) Communication

- Reinforcement of interactive communication among the Japanese government, TEPCO and local communities in addition to releasing appropriate information based on accuracy and transparency in a timely manner

Mid- and Long- term Roadmap –Framework (provisional translation)-

The current framework of the entire process is maintained.



Major Milestones of the Mid- and Long-Term Roadmap

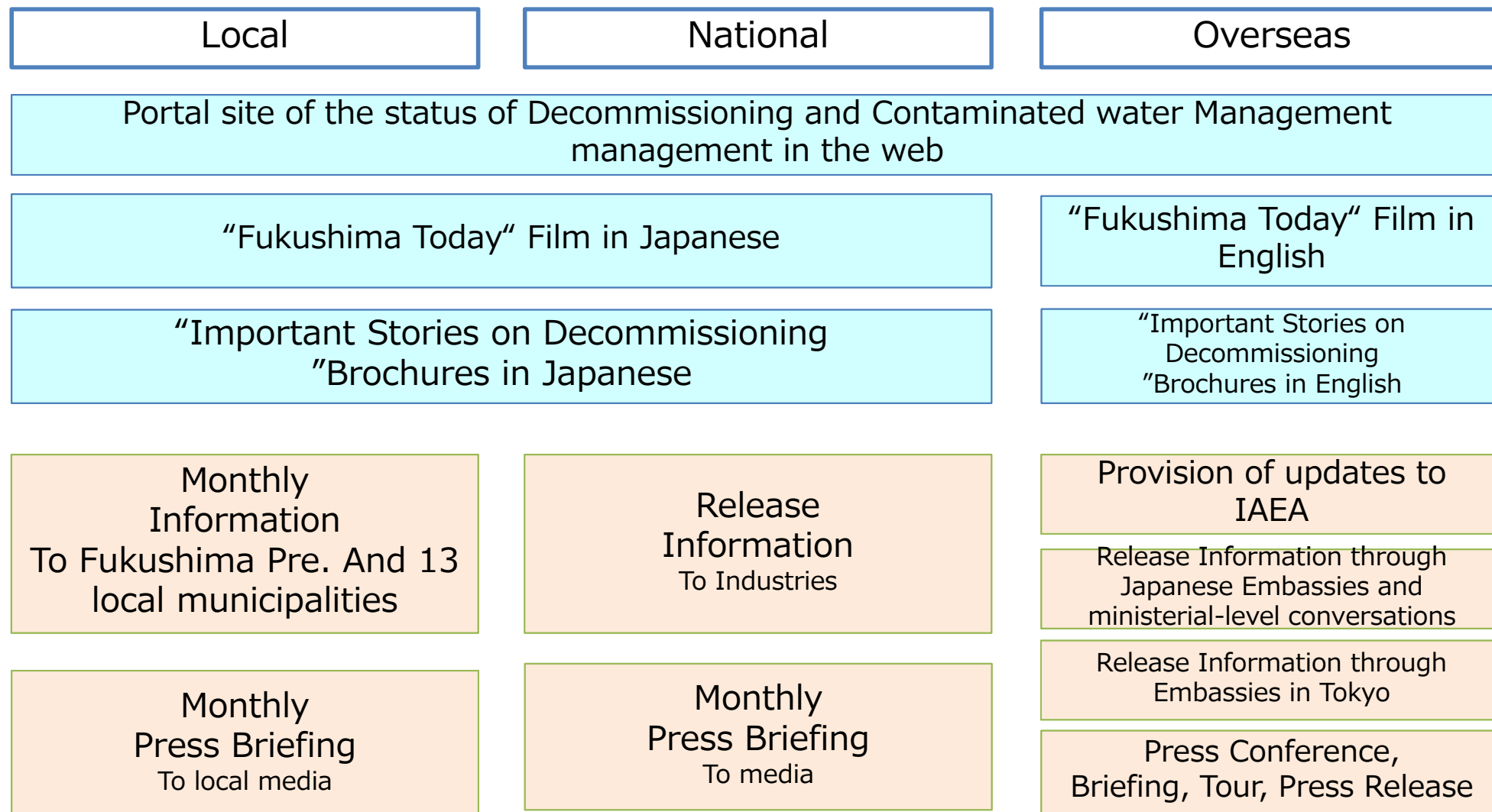
Contaminated water management	Suppress contaminated water generation to about 150 m ³ / day.	Within 2020
	Storage of all water generated by treatment of highly contaminated water in welded-joint tanks	FY 2018
	①Separation of connection between Units 1 and 2 and between Units 3 and 4	Within 2018
Stagnant water treatment	②Reduction of radioactive materials in stagnant water in the buildings by one-tenth of the 2014 year-end.	FY 2018
	③Completion of treatment of stagnant water in buildings	Within 2020
Removal of spent fuels	①Start of spent fuel removal at Unit 1	FY 2023 (an outlook)
	②Start of spent fuel removal at Unit 2	FY 2023 (an outlook)
	③Start of spent fuel removal at Unit 3	Mid FY2018
Retrieval of fuel debris	①Decision on the method for fuel debris retrieval from the 1st implementing Unit	FY 2019
	②Start of fuel debris retrieval from the 1 st implementing Unit	Within 2021
Solid Radioactive waste	Establishment of a technical perspective on measures of treatment / disposal and on safety.	Around FY2021

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Main work for releasing information

- ◇ Information release continuously through media, municipalities, international organizations etc.
- ◇ We are enriching contents that transmit directly to domestic and overseas, such as films and brochures.



Fukushima Advisory Board on Decommissioning and Contaminated Water Management

1. Purpose

- To respond quickly to local governments and local needs, it reinforces both providing information and maintaining communication with local stakeholders.
- To ask the local people about how to proceed with decommissioning and how to provide information and publication.
- To consider future decommissioning measures, etc. with the local stakeholders

2. Members

Chair : State Minister of Economy, Trade and Industry

Members :

- Deputy Governor of Fukushima Prefecture, Mayor of 13 local municipalities
- Chamber of commerce, Japan Agricultural Cooperative Fukushima Chuou-kai, Fukushima Prefectural Federation of Fisheries Co-operative Associations, NPO
- TEPCO, Nuclear Regulation Authority, METI, Secretariat of the Team for Countermeasures for Decommissioning and Contaminated Water Treatment

3. Topics for discussion * at the 12th Council in March 2017

- Efforts such as transmission of Information on decommissioning and contaminated water management
 - “Fukushima Today” films, “Important Stories on Decommissioning” Brochure
 - International Forum on the Decommissioning of the Fukushima Daiichi Nuclear Power Station

Films and Brochure

- The films and brochure were created to introduce the progress of the decommissioning work at Fukushima Daiichi NPS and the reconstruction situation of the surrounding area.

Fukushima Today -For a Bright Future- (English)



Release: Sep. 2016
Runtime: 5 min.
Subtitle: English,
Chinese, Korean



Fukushima Today 2017 Spring (Japanese)



Release: Mar. 2017
Runtime: 17 min.
*for the domestic audience

Friends of Japan – Fukushima –(English)



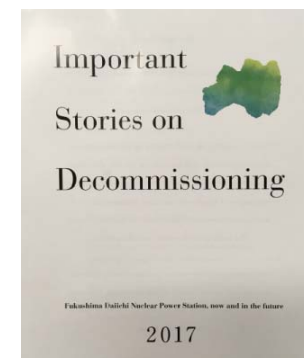
Release: Jun. 2017
Runtime: 13 min.
*Mainly off-site

Fukushima Today (English)



Release: Jan. 2017
Runtime: 90 sec.
*Aired on JAL, ANA
international flights, in
hotels, airports etc.

"Important Stories on Decommissioning" Brochure



International Forum on the Decommissioning of the Fukushima Daiichi Nuclear Power Station

- The First International Forum on the Decommissioning of the Fukushima Daiichi Nuclear power Station was held in Iwaki city in April 2016. The forum was attended by as many as 641 people from 15 countries. The main segments were “Communications with Local Communities” and “World-leading Technical Session regarding Decommissioning.”
- The 2nd Forum was held on July 2 and 3, 2017 in Hirono-town and Iwaki city respectively, attended by as many as 1055 people from 11 countries. The program was for local communities in Hirono-town and for technical experts in Iwaki-city.

The 1st Forum

DAY1 Communication Session

- Global efforts for decommissioning and communication with local communities.
- Efforts for decommissioning of Fukushima Daiichi and communication with local communities.

DAY2 Technical Session

- Risk Evaluation WS
- Fuel Debris Retrieval WS
- Radioactive waste management WS

Main Speakers



W. D. Magwood IV
Director General,
OECD/NEA



J. C. Lentijo
Deputy Director General,
IAEA



M. Weightman
Former Chief
Executive, ONR

The 2nd Forum

DAY1 Communication Session

- Lecture and Workshop on decommissioning of Fukushima Daiichi
- Research session in which NDF, Government, and Tepco answered questions from local communities.

DAY2 Technical Session

- Risk Evaluation WS
- Fuel Debris Retrieval WS
- Radioactive waste management WS

Facilitator / Main Speakers



H. Kainuma
Associate Professor, RITS Univ.



W. D. Magwood IV
Director General,
OECD/NEA



J. C. Lentijo
Deputy Director General,
IAEA

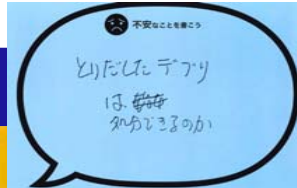
The scene of the 2nd Forum

Day 1 was dedicated to dialogue with local people in an accident-affected town

Lecture on “What is 1F D&D?” by facilitator



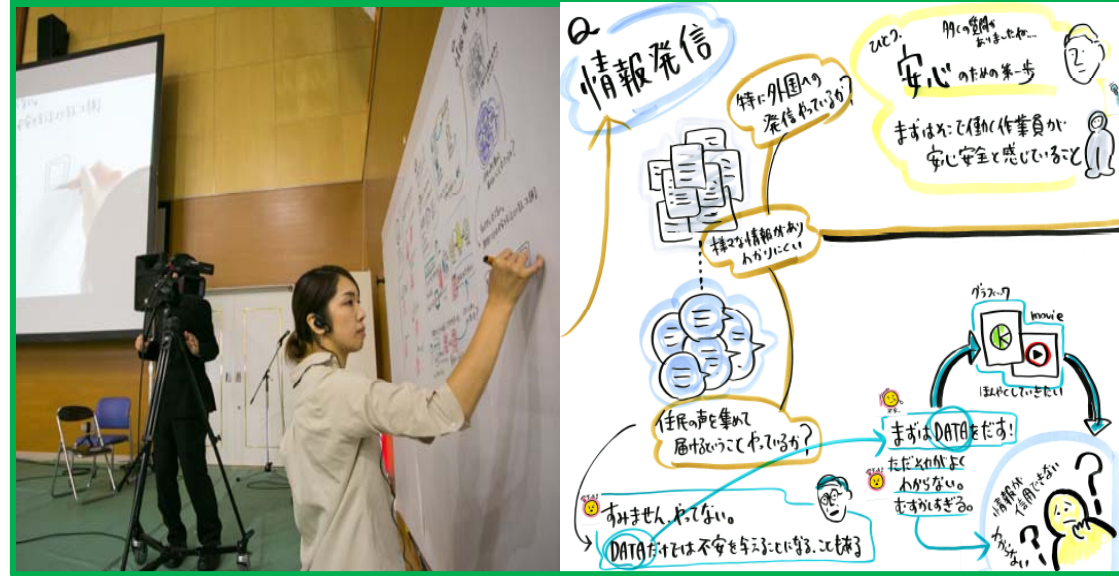
Mini workshop among participants



Dialogue between local representatives and METI, NDF, TEPCO, IAEA, OECD/NEA, etc.



Simultaneous graphic recording of the discussion



[TEPCO] Two-way Communications with Local Residents

Explanation at public meeting

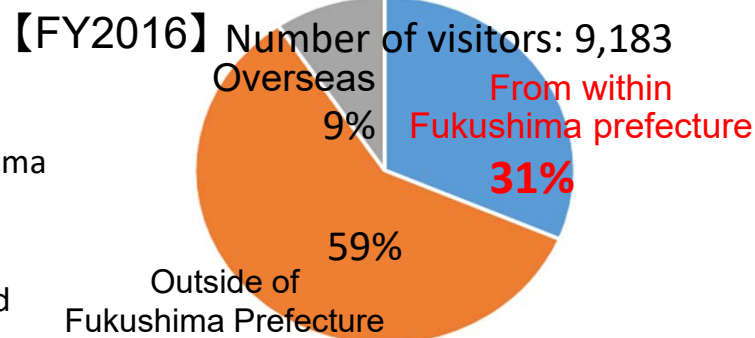
- Status Updates with regards to decommissioning are given to the public at the regular public meetings hosted by Fukushima Prefecture
- Opinions to TEPCO have been reflected to decommissioning measures



Left : Ishizaki, Former Representative of the Fukushima Revitalization Headquarters
Right : Masuda, Chief Decommissioning Officer, President of Fukushima Daiichi Decontamination and Decommissioning Engineering Company

Invitation to Site Visits

- Inviting the prefectural government and organizations
- Percentage of visitors from within the prefecture has increased to 31% (from 28% in FY2015)
- TEPCO aims to increase the number of site visitors to 20,000/y by Tokyo Olympics.
- Examples of comments received:
“Decommissioning is a big undertaking done with the cutting edge technology”
“Seeing is believing”
“Every time I visited Fukushima Daiichi, I was able to find some progress”



More than 28,000 visitors since the accident

Briefings

- Briefings are held on the issue of great concern to residents
- Explanation on :
 - The current state of dismantling Unit 1 building cover
 - Overview of the training yard facility in Hirono Town

【Briefing held in Hirono Town】
(December 2015)



Participants: 29

[Fukushima Prefecture] Communication tools

A publication relations magazine

- For the evacuees
- Circulation: 51,000 copies in FY2017
- Contents : Explanation of decommissioning and the safety confirmation measures, etc. in an easy-to-understand manner.
- Publication : Every quarter



Home Page

- For the public
- Contents : Based on “Monitoring of nuclear power plants”, “Measures for nuclear emergency”, “Publicity to local people”, “Monitoring of radiation dose”.



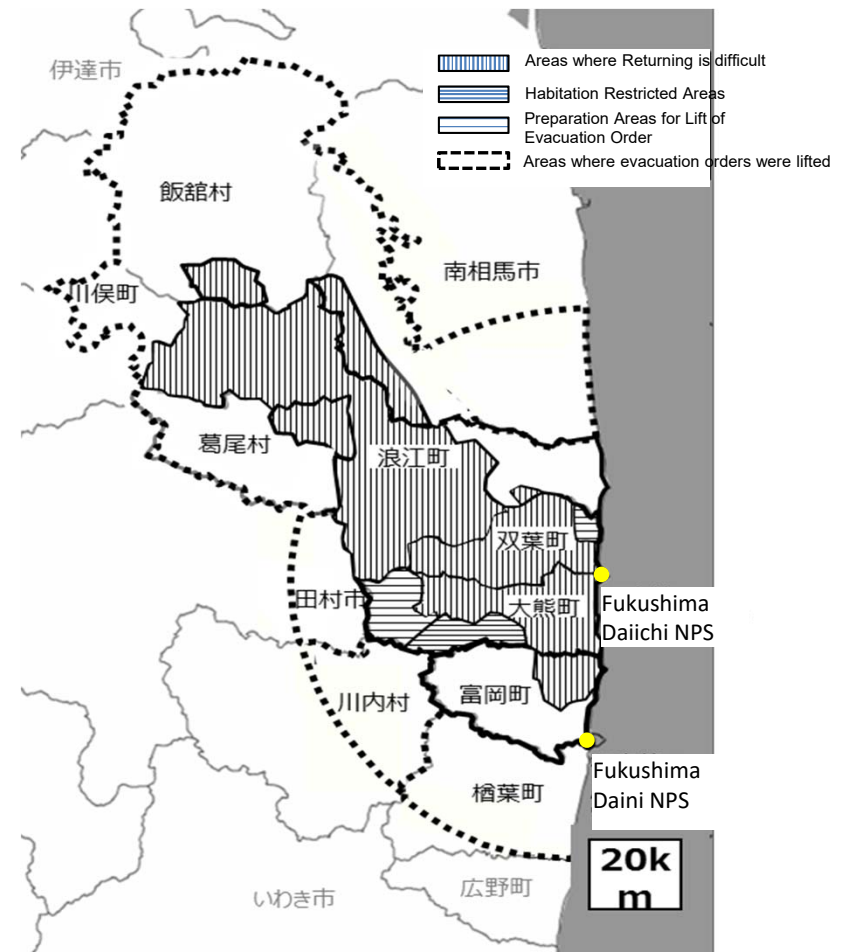
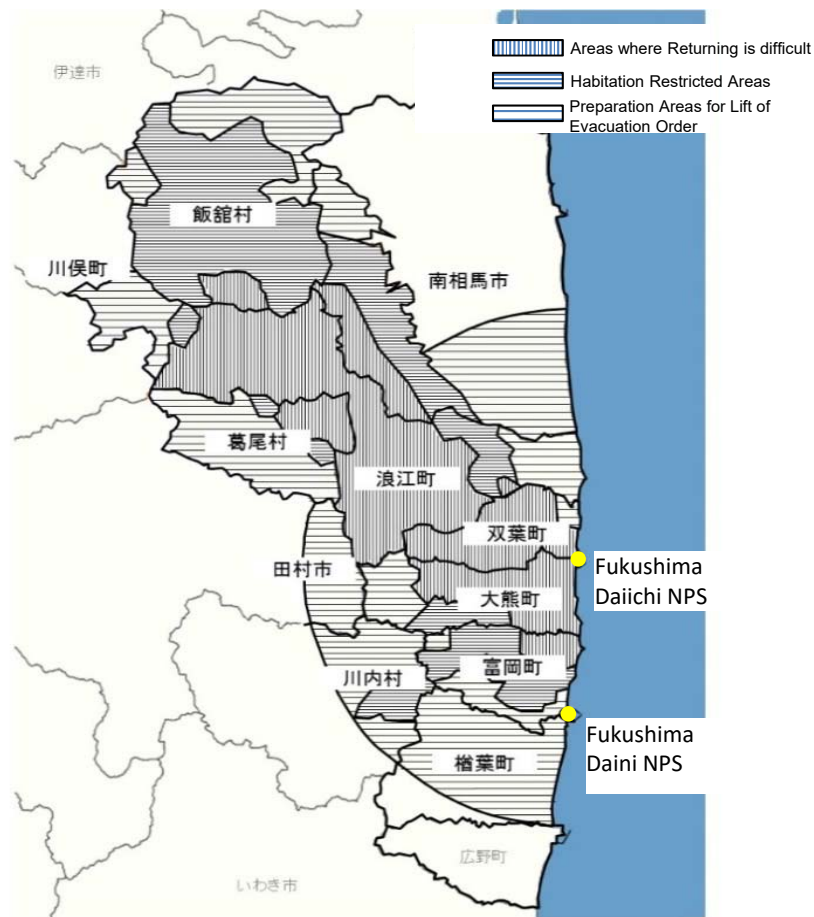
Films, Online bulletin board

- For the public
- Contents : Live conference, activities of residents on YouTube, documents about the countermeasures of decommissioning.



- Film : Activities of residents
- Online bulletin board

Status of the areas under evacuation orders



In Aug. 2013 at the time of the establishment of areas under evacuation orders.

As of Apr. 2017

The number of evacuees from the areas under evacuation orders	About 81,000	3 years and 8 month after the establishment of areas 	About 24,000
Dimension of under evacuation order	About 1,150km ²		About 370km ²

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Cooperation with International Communities

International Organizations



- Peer Review Missions (April, 2013 -)
- Expert Visits
- Expert Meetings
- Comprehensive information on the website (December, 2013 -)
- “The Fukushima Daiichi Accident” (September, 2015) (Reported by the Director General)
- Side Event in the General Conference since 2015



- BSAF Project
(Benchmark Study of the Accident at the Fukushima Daiichi NPS)
- PreADES
(Preparatory Study for Analysis of Fuel Debris)
- EGFWMD Meeting
(The Expert Group on Fukushima Waste Management and Decommissioning R&D)

Bilateral Frameworks

U.S.-Japan Bilateral Commission on Civil Nuclear Cooperation

- Decommissioning and Environmental Management Working Group
- Civil Nuclear Energy R&D Working Group



UK-Japan Nuclear Dialogue

- Decommissioning Working Group



Japan-France Nuclear Committee



Japan-Russia Nuclear Energy Working Group



◆ ANRE, METI

**Decommissioning and Contaminated Water Management
at TEPCO's Fukushima Daiichi NPS :**

<http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/index.html#links>



◆ The 2nd International Forum on the Decommissioning of the Fukushima Daiichi Nuclear Power Station

Dedicated website

http://ndf-forum.com/index_en.html



◆ Film (METI)

“Fukushima Today -For a bright future-”

<https://www.youtube.com/watch?v=ECIsNOp6pWg>



◆ TEPCO

Decommissioning Plan of Fukushima Daiichi Nuclear Power:

<http://www.tepco.co.jp/en/decommision/index-e.html>

TEPCO CUUSOO : <https://tepco.cuusoo.com>



◆ IRID (International Research Institute for Nuclear Decommissioning)

<http://irid.or.jp/en/>