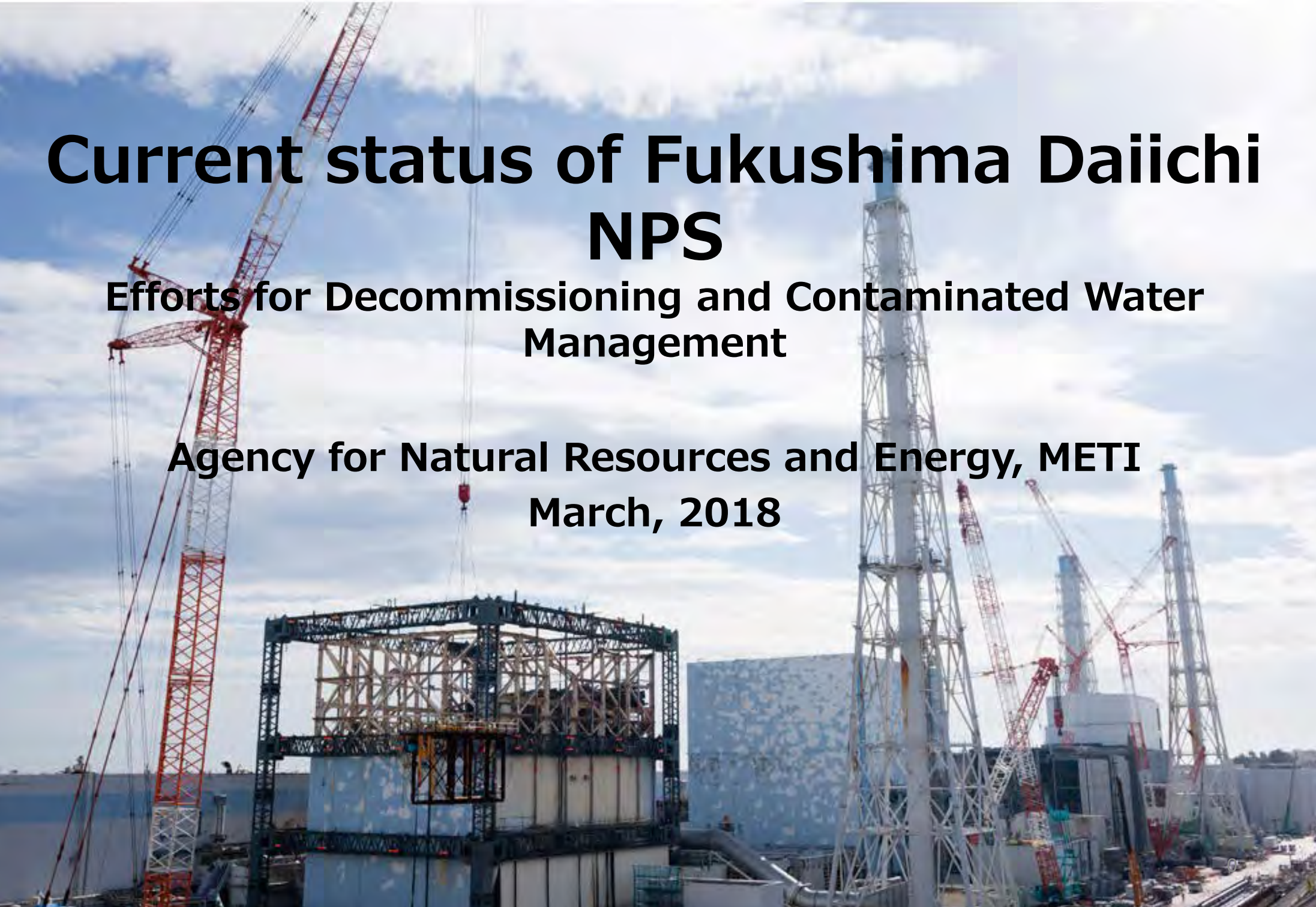


Current status of Fukushima Daiichi NPS

Efforts for Decommissioning and Contaminated Water Management

Agency for Natural Resources and Energy, METI

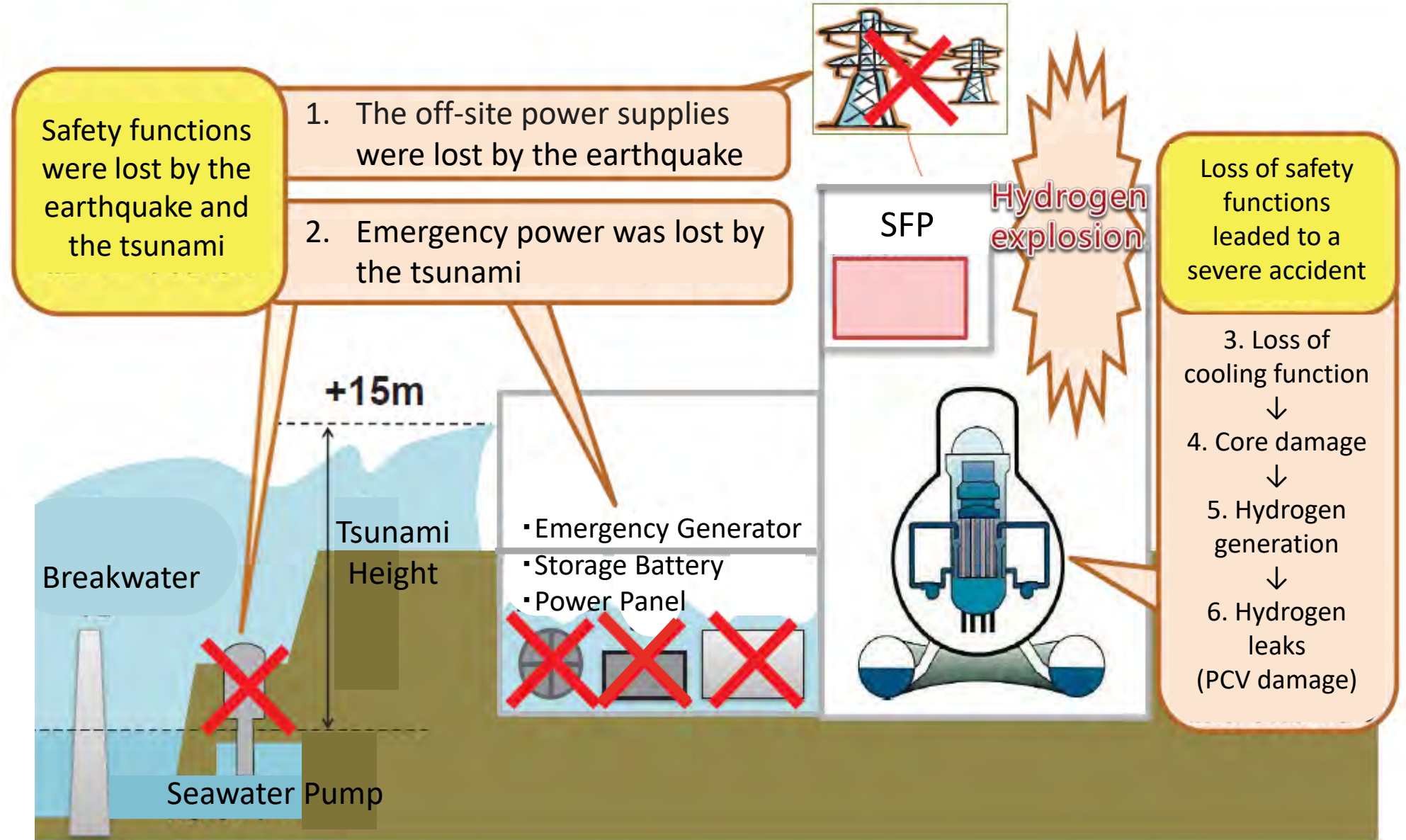
March, 2018

Outline

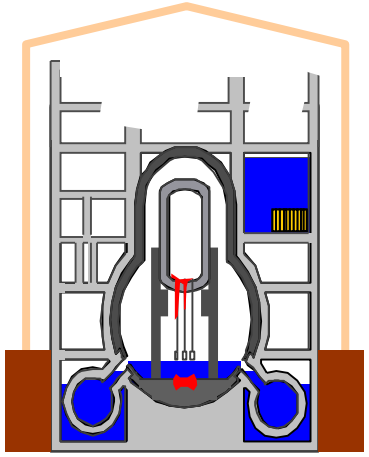
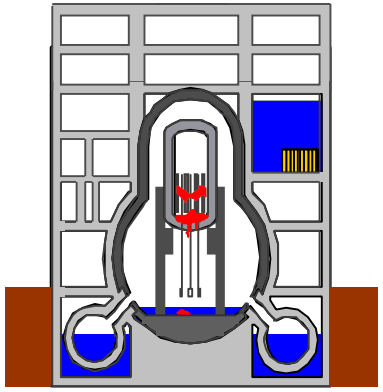
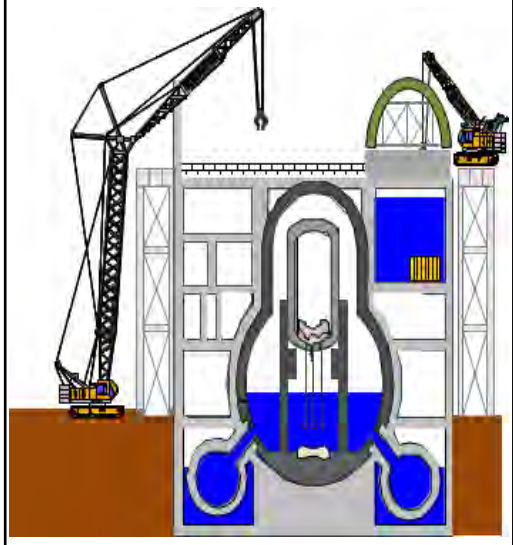
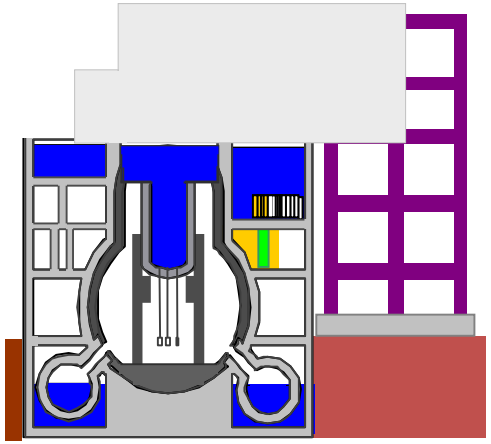
1. Summary of Fukushima Daiichi NPS Accident
2. Overview and Main Progress in Decommissioning Work
3. Overview and Main progress in Contaminated Water Management
4. Improvement of working conditions
5. Revising Mid-and Long-term Roadmap
6. Communication with the public
7. Cooperation with International Communities

Summary of Fukushima Daiichi NPS Accident - The Cause of Severe Accident

- At the Fukushima Daiichi NPS, the safety functions were lost due to the earthquake and the tsunami.
- Thus, the following severe accident could not be prevented.



Summary of Fukushima Daiichi NPS Accident - The Damage of each Unit

	Unit 1	Unit 2	Unit 3	Unit 4
				
Status at the accident	In Operation	In Operation	In Operation	Not in Operation (Under planned outages)
Fuels in SFP	392	615	566	1533*
Core melt	☑	☑	☑	
Hydrogen explosion	☑		☑	☑

* Excluding 2 new fuels taken before 2012

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The Current Status of each Unit

Unit 1

✓ Hydrogen explosion
✓ Core melt

<At the Time of the Accident>

<Now>

・Installation of windbreak fences to further reduce dust scattering during rubble removal from the operating floor was completed in December 2017. And the removal of the rubble on the operating floor started from January 2018

Unit 3

✓ Hydrogen explosion
✓ Core melt

<At the Time of the Accident>

<Now>

- An equipment to cover the upper part of the building as well as a crane has been installed since August 2017 to start removing spent fuel from the pool in the middle of the 2018 fiscal year.

Unit 2

➢ No hydrogen explosion
✓ Core melt

<At the Time of the Accident>

<Now>

- Currently, TEPCO is proceeding with preparation work, such as removal of rubble around the reactor building and building scaffolding.

Unit 4

✓ Hydrogen explosion
➢ No core melt

<At the Time of the Accident>

<Now>

- On December 22, 2014, all (**1533**) fuel removal from Unit 4 SFP was completed.

Measures to Deal with the Aftermath of the Accident at Fukushima Daiichi Nuclear Power Station (Measures for decommissioning)

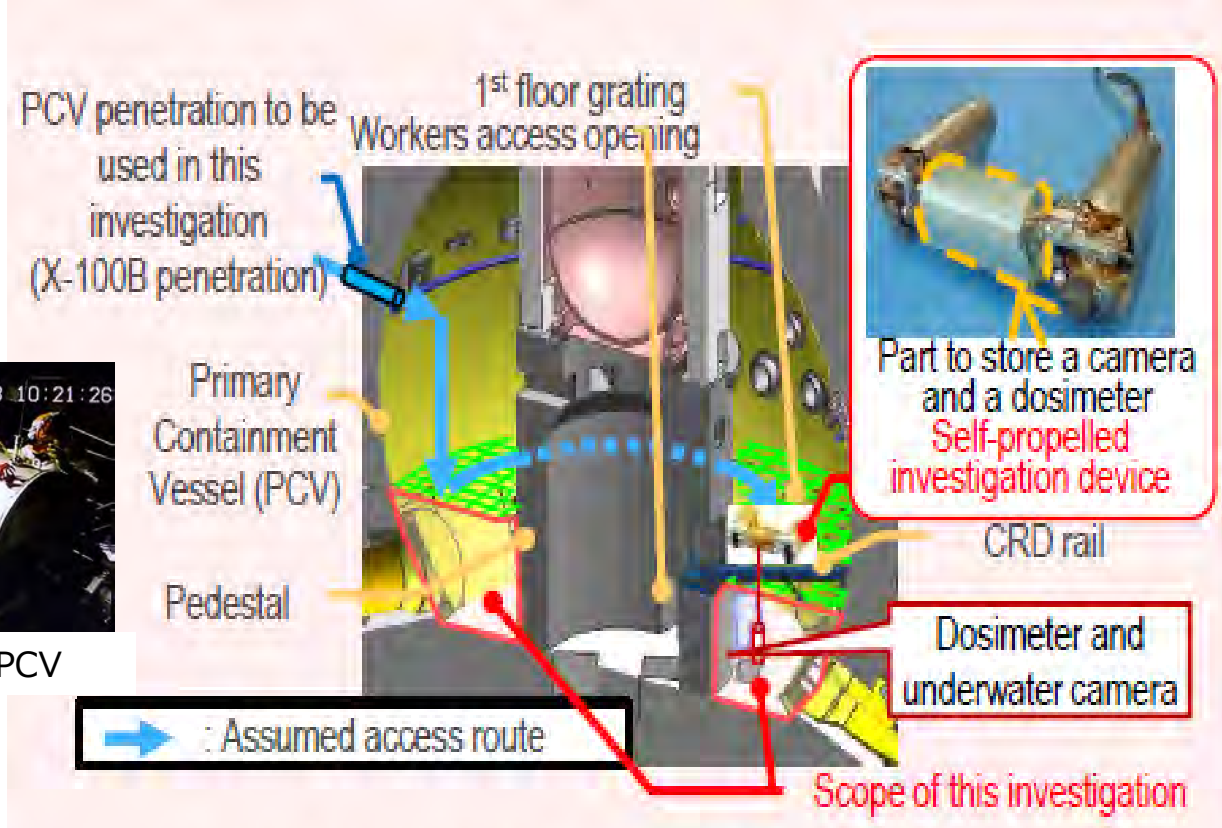
- Concerning measures for decommissioning, **progress was made in activities such as the removal of fuels from the spent fuel pools and the retrieval of fuel debris** based on the Mid-and-Long-Term Roadmap

Measures		FY2015	2016	2017	2018	2019	2020	2021	2022	2023
Fuel removal	Unit 1	Started removal of the covers of the reactor building after implementation of measures to prevent scattering of dust【All roof panels were removed by October 2015.】	Completed removal of the covers of the building【November 2016】		<Image of the building at the time of the start of removal (FY2023)>					
		Dismantling of the building covers → Removal of rubble, decontamination, etc. → Installation of covers used for removal of fuels								Removal of fuels (FY2023)
	Unit 2	Decided which portions of the upper part of the Unit 2 building should be dismantled before the selection of removal plans【November 2015】	Started installation of a platform for access to the operating floor【September 2016】		<Image of the removal plans (decided in FY2017)>					
		Preliminary construction			Dismantling of the upper part of the building, etc.					Removal of fuels (FY2023)
	Unit 3	(Reference) The condition of the operating floor immediately after the accident	Completed removal of the largest piece of rubble (appox. 25 tons) in the spent fuel pool【August 2015】	Started installation of removal equipment【January 2017】	<Image of the building at the time of start of removal (around the middle of FY2018)>					
				Completed decontamination of the operating floor【June 2016】 Completed installation of shields【December 2016】						
		Removal of rubble and decontamination → Installation of shields → Installation of covers used for removal of fuels, etc.								Removal of fuels (around the middle of FY2018)
Fuel debris retrieval	Unit 1	Examination of the inside using cosmic ray muon【May 2015】 Examination of the inside using a snake-shaped robot【April 2015】	Started full-fledged operation of Naraha Remote Technology Development Center【April 2016】	Implemented detailed examination of the inside based on the result of the previous examination【March 2017】	Decide the policy for debris retrieval (Sep. 2017)	Finally decide the method of debris retrieval (FY2019)	Continue to conduct R&D based on knowledge and wisdom collected from within and outside Japan			
	Unit 2			Examination of the inside using cosmic ray muon【July 2016】 Examination of the inside using a scorpion-shaped robot【February 2017】						
	Unit 3	Conducted a preliminary survey in preparation for examination of the inside using robots【October 2015】 Internal situation		Examination of the inside using cosmic ray muon【May to Sept. 2017】 Examination of the inside using a submersible robot【July 2017】						
		Grasp of the situation in the nuclear reactor container and consideration of the method of debris retrieval			Engineering work, etc.		Preparation for debris retrieval			Start of debris retrieval for the first unit

Investigation inside the Unit1 PCV (March 2017)

- In order to grasp the internal conditions of the PCV, from March 18th to 22nd 2017, a robot equipped with a dosimeter and underwater camera was remotely inserted into the PCV and a investigation was conducted.
- According to the analysis so far, it is estimated that fuel debris was distributed to the outside of the pedestal in the basement floor. In this investigation, the dosimeter and the underwater camera were suspended from the first floor, and information inside the PCV was gathered.

Outside the PCV



<Image of investigation inside the PCV>

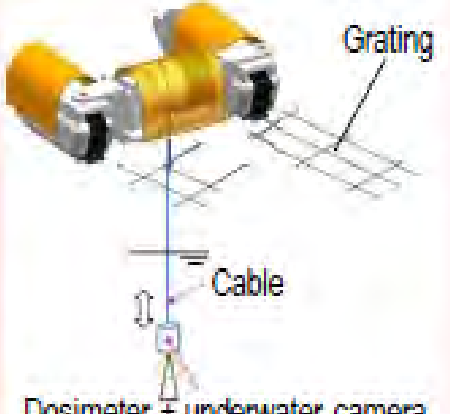


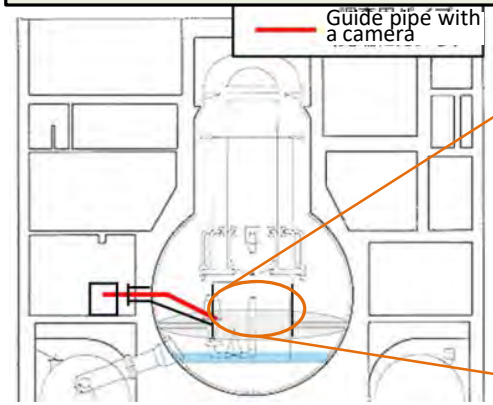
Image of hanging of dosimeter and camera

Image near the bottom

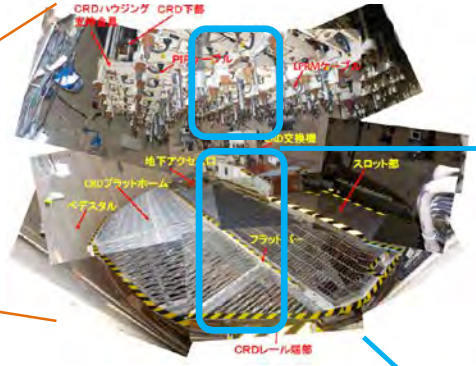
The progress of the investigation inside the Unit 2 PCV (Jan. – Feb. 2017)

- To determine the status inside the Unit 2 PCV, a camera and a robot were inserted close to the RPV by remote control from 26th January to 16th February.
- From the results of this investigation, the fallen scaffold below the RPV and the status of deposits were identified directly for the first time. In the PCV, many images were taken. Also, actual measurement of radiation and temperature were implemented. Effort toward the decommissioning of Unit 2 is progressing steadily.
- Through this investigation, there was and will be no effect by the radioactive material to the outside the PCV.

Camera investigation(26th Jan. and 30th Jan. 2017)



※Before the accident

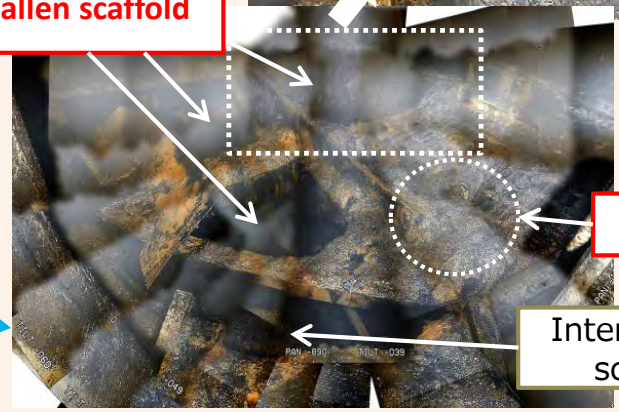


The status below RPV were identified for the first time

No massive damage of facilities below PRV

extended figure

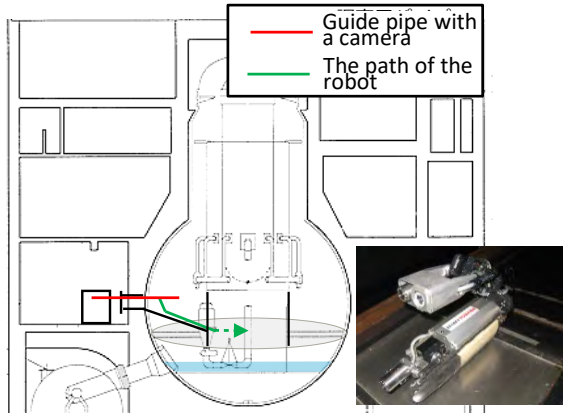
Fallen scaffold



Deposits

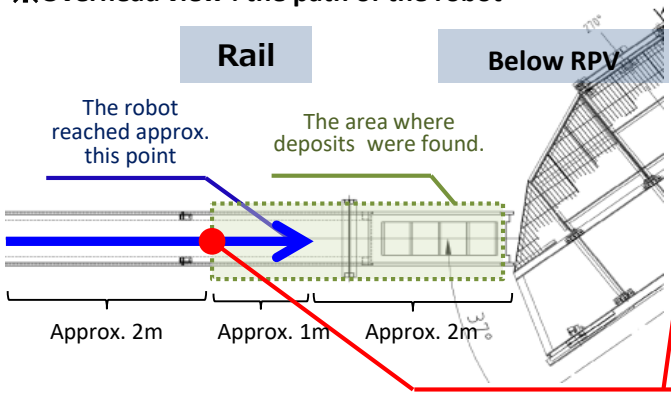
Interspace of scaffold

Robot investigation(16th Feb. 2017)



The investigation robot

※Overhead view : the path of the robot

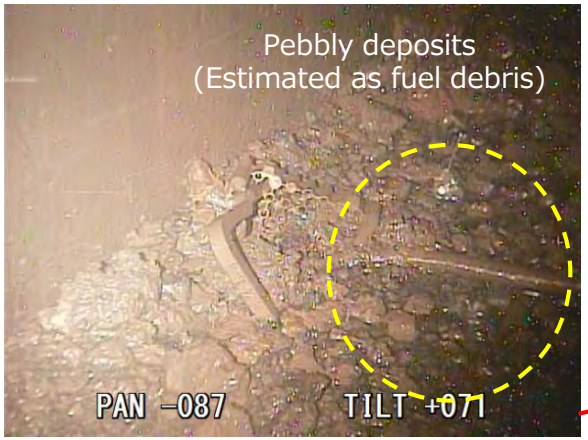


Success of the actual measurement

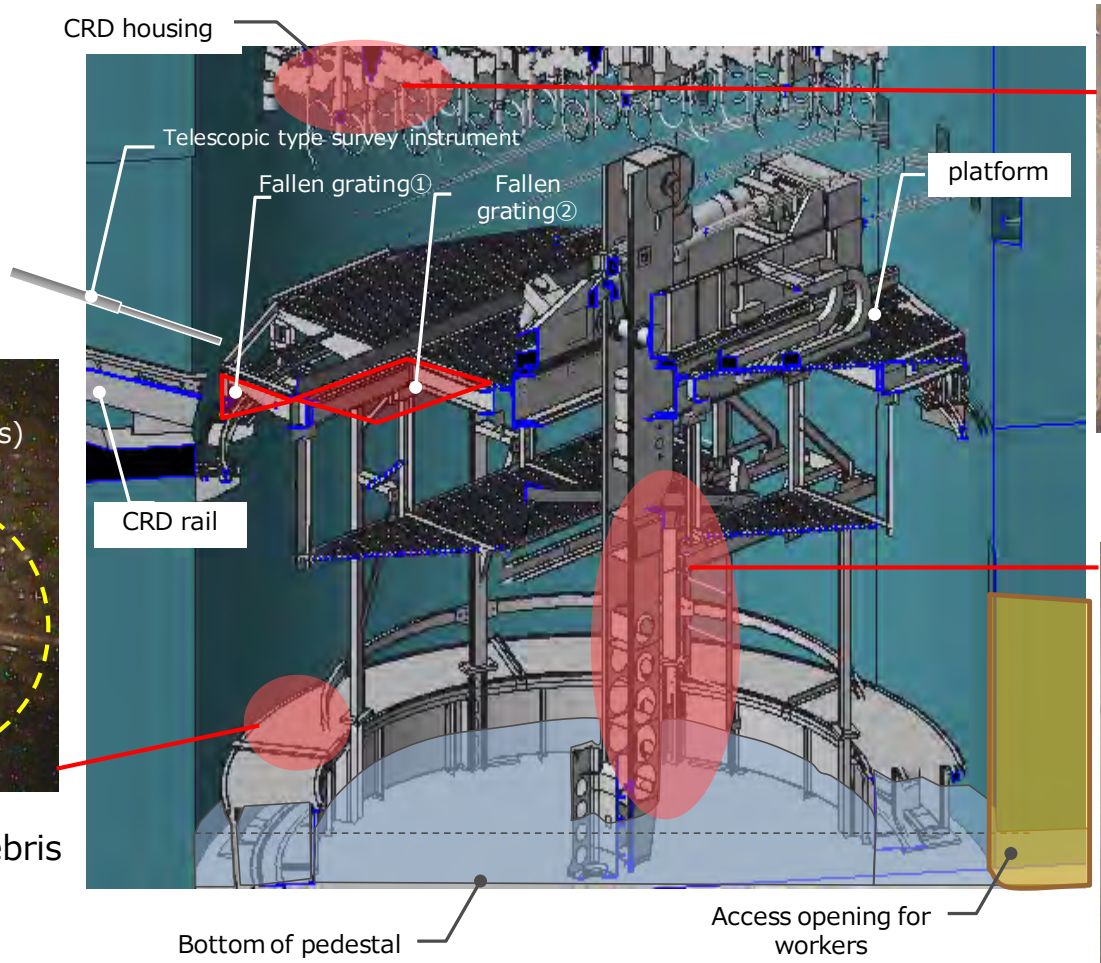
Radiation dose：Approx. 70 Sievert per hour*
*This radiation dose is inside of the PCV shielded by the thick steel vessel, and concrete. The radiation dose outside of the PCV is approx. 5 to 6 mSv/h. There was and will be no effect of the radioactive material outside the PCV.
Temperature ：Approx. 16.5 degrees**
It is almost the same temperature as that measured by the constantly monitoring thermometer (18.7 degrees). **There is no abnormality in the cold shutdown condition.

The results of the investigation inside the Unit 2 PCV (January 2018)

◇On January 19, the inside of the Unit 2 PCV was investigated. As a result of it, recording the images were succeeded.
◇Through the image of the camera, the lower part of the lattice-like scaffold just below the pressure vessel was seen. It was confirmed that part of the fuel assembly dropped to the bottom of the containment vessel, and deposits considered to be fuel debris in the RPV. In addition, the dose tended to be lower inside the pedestal than outside the pedestal.
◇from now on, detailed analysis and evaluation of data acquired images and dose will be advanced.



Deposits estimated to be fuel debris

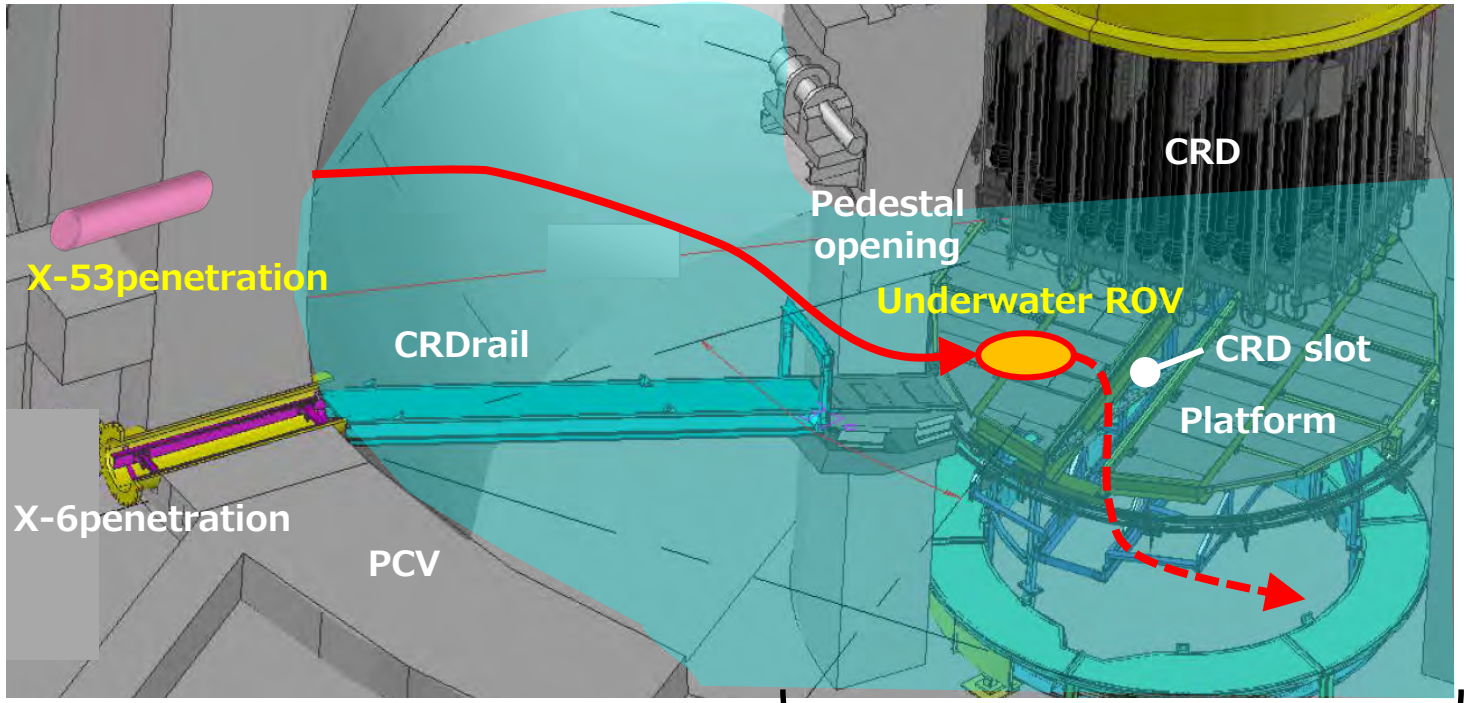


CRD housing support

Direction: the access opening for workers

Investigation inside the Unit 3 PCV (July 2017)

- In July 2017, the interior of the PCV was investigated using the underwater ROV (remotely operated underwater vehicle) to inspect the inside of the pedestal.
- The investigation identified several fallen obstacles and deposits, such as seemingly solidified molten materials and grating, inside the pedestal.



Underwater ROV

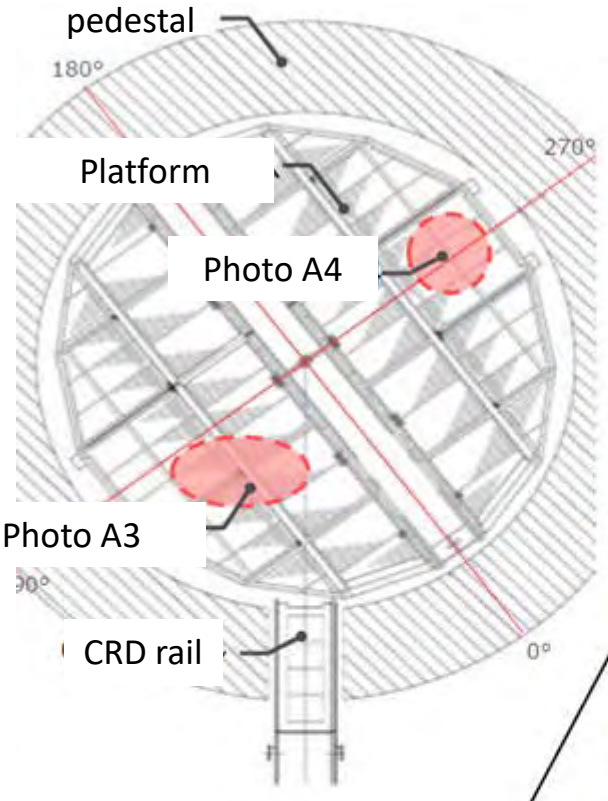
Lower center in Pedestal

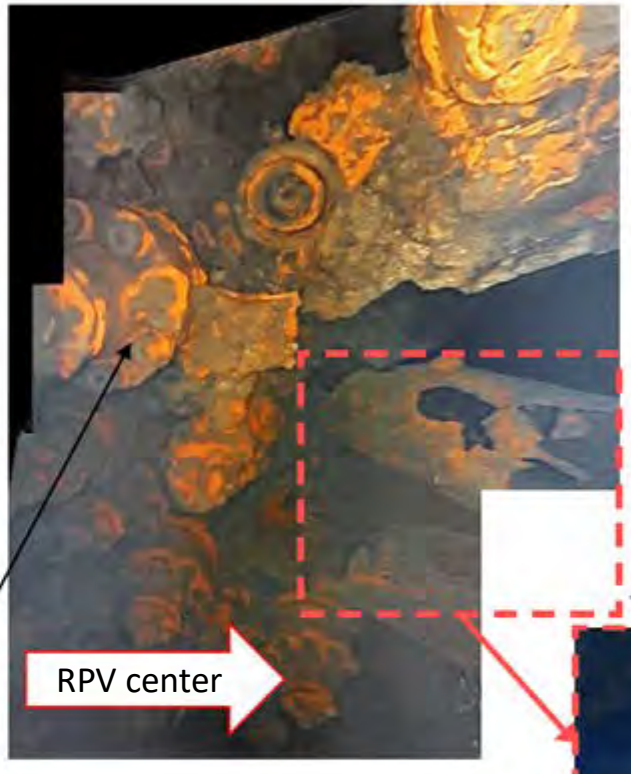
Inside Pedestal

Close to the wall in Pedestal

The results of the investigation inside the Unit 3 PCV (November 2017)

○"CR guide pipe" that should be at the lower part of the RPV was at the bottom of the PCV.
○Therefore, there is a possibility that holes of several tens of centimeters in diameter are opened at the bottom of the RPV.





CRD housing flange

Waste management（Storage）

◇TEPCO HD were published Solid Waste Storage Management Plan in Mar. 2016.
◇Solid waste storage volume will reach about 750,000 m³ on Mar. 2029 from 350,000 m³ on Mar. 2017. Volume reducing treatment facility, incinerator and waste storage building will developing, and temporary outdoor storage areas will released in FY 2028.
◇Large-scale waste storage building will be developing, and secondary waste from water treatment will be stored in the building.

Present condition

Storage volume is about 350,000 m³on 2017

Storing status of rubble, etc.

Rubble (flammable)
Felled tree
Used protective clothing

Outdoor storage

Rubble (metal, concrete etc.)

over 1mSv/h

Soil covered temporary storage facility

Solid waste storage

0.005 – 1 mSv/h

Outdoor seat covered storage

under 0.005mSv/h

Contaminated soils

Storing status of Secondary waste from water treatment

Used vessels

AREVA sludge

Stored in sludge storage facility

Concentrated waste liquid

D area tank

H2 blue tank

Storage volume will reach about 750,000 m³ on 2029

Plan of waste management (～ FY2028)

Incineration treatment

1 Expansion of Incinerator
2 Pretreatment of Incineration facility

Storage volume will reach about 230,000 m³ on 2029 after volume reduction treatment

Volume reduction treatment

3 Volume reducing treatment facility

Reuse and reduce is future task

Process method is future task

(A)

: planned construction

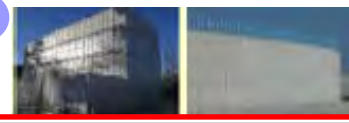
Storage management

Solid waste storage building (Storage capacity is about 190000 m³)

Established solid waste storage building(Units 1 to 8) (about 50000 m³)

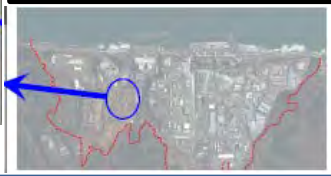
Expansion solid waste storage building (about 140000 m³) 4

Temporary storage building of Contaminated soils 6



Temporary storage building of used vessels of water treatment

Large-scale storage building of used vessels of water treatment 5



By TEPCO

Waste management（Characterization）

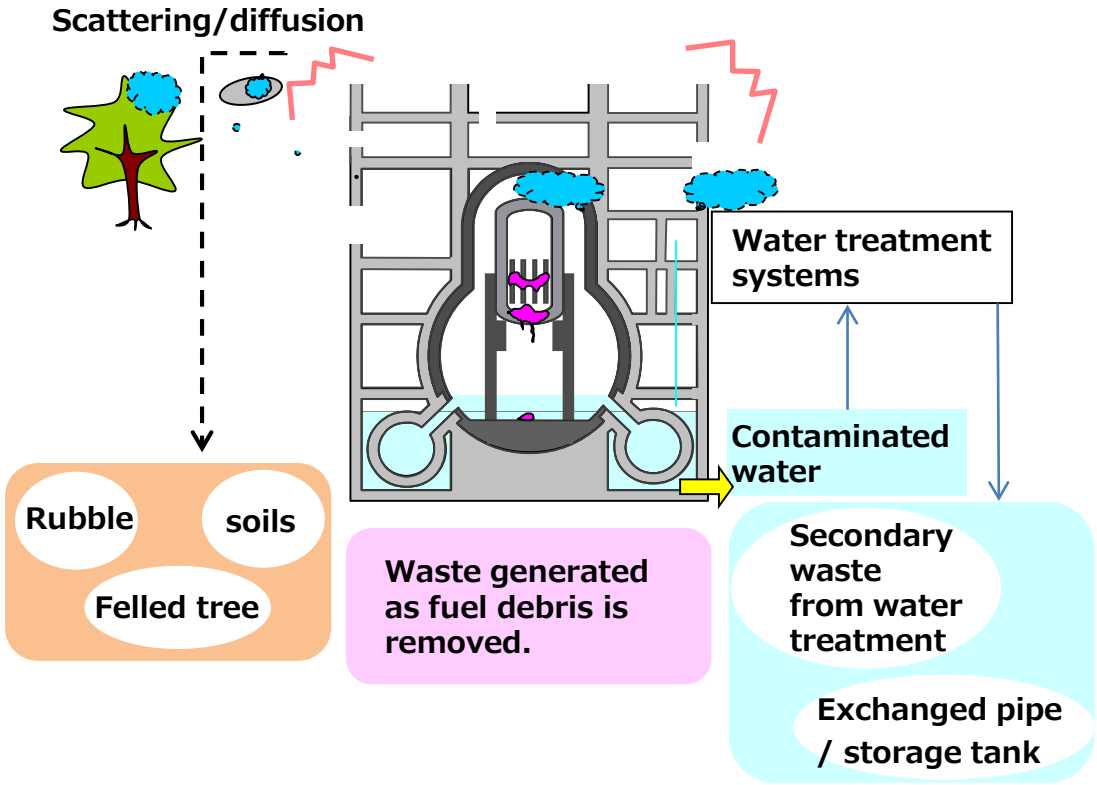
◇ Nuclide composition and concentration of waste are presumed to be diverse.

For safe processing and disposal, it is necessary to understand characterization and plan research and development the different from conventional.

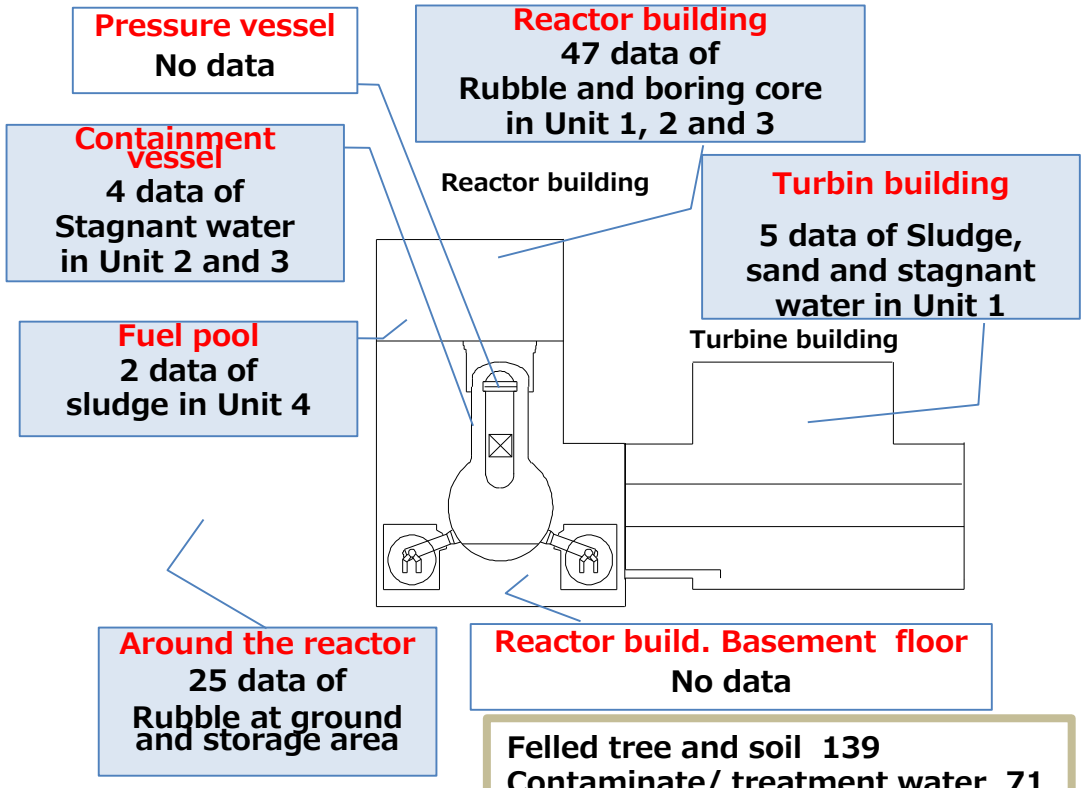
◇ In order to proceed with consideration of treatment and disposal, it is necessary to understand the properties(nuclide composition, radioactivity concentration) and generation amount of waste.

However, analytical data are **not** sufficient (about 300 samples at present).

◇ The construction of a method to understanding the characterization will be needed to proceed by combining analytical data and model based methods, because data will be clarified after debris removal progress and plan clarification.



Outline of waste pollution sources and routes



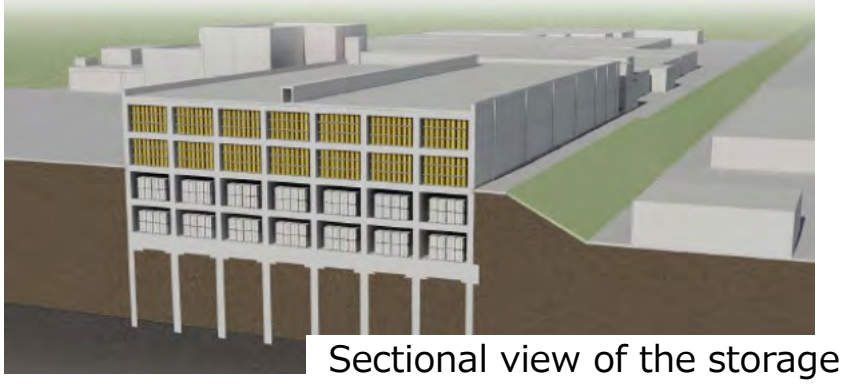
Sampling and analysis situation for characterization

The ninth solid waste storage building

◇The purpose of setting the ninth tower of solid waste storage is to store debris generated in the decommissioning work and radioactive solid waste stored from before the accident, like the first to eighth buildings installed in the premises.

◇From February 2018, operation of the ninth tower of solid waste building began.

Exterior of the storage building



Sectional view of the storage building

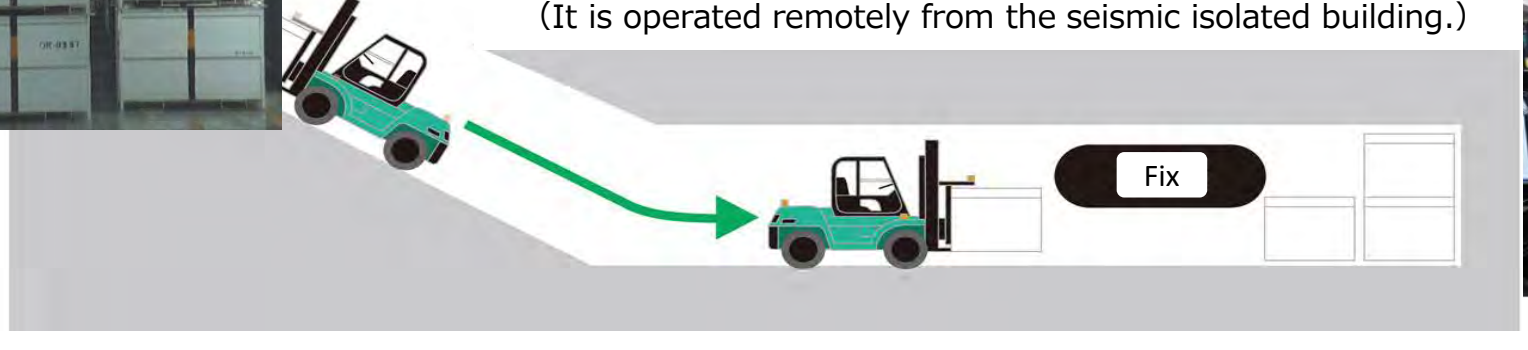
The storage capacity: approx. 61,200m^3 (corresponding to 200 ℓ × 110,000 cans)

Cf: Total amount of the first to the eighth storage capacities are corresponding to 200 ℓ × 284,500 cans

Rectangular containers

● Unattended remote forklift

(It is operated remotely from the seismic isolated building.)



Seismic Isolated Building

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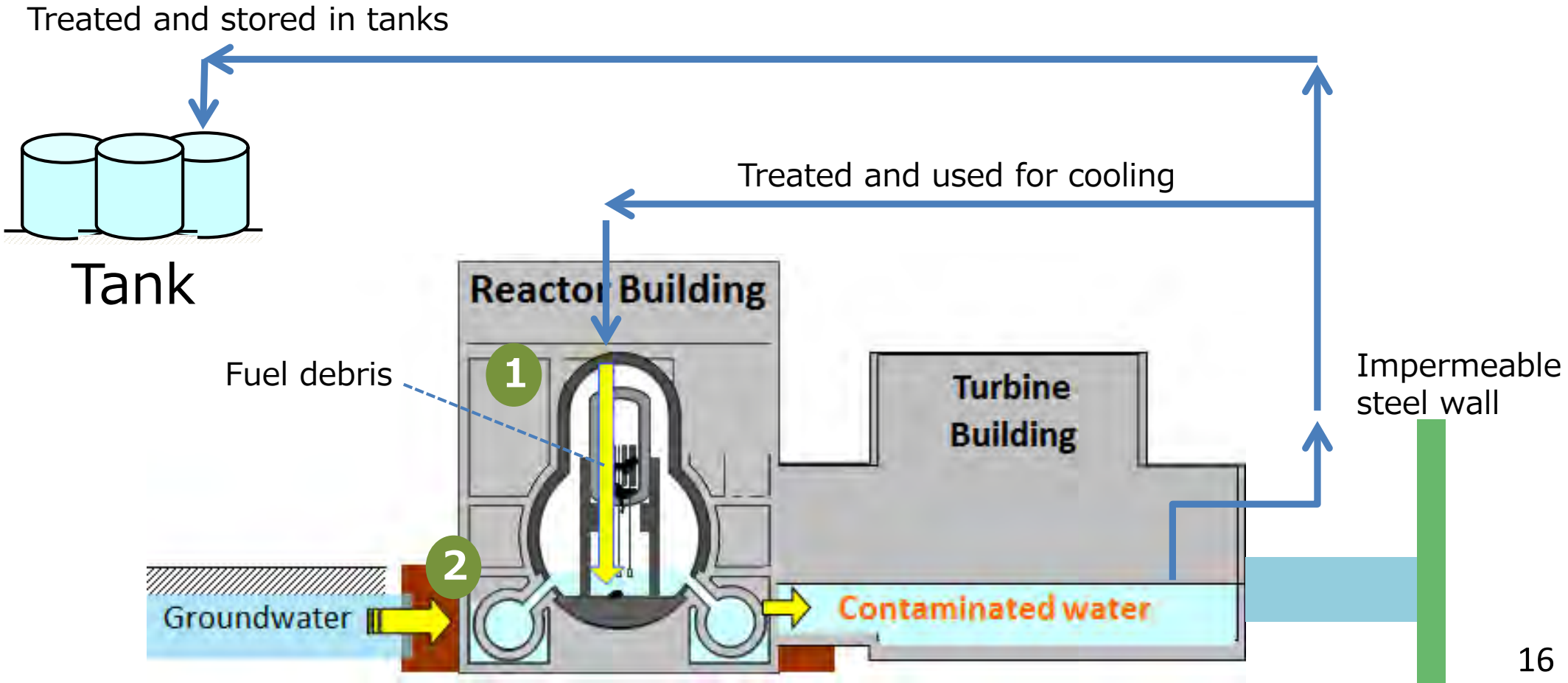
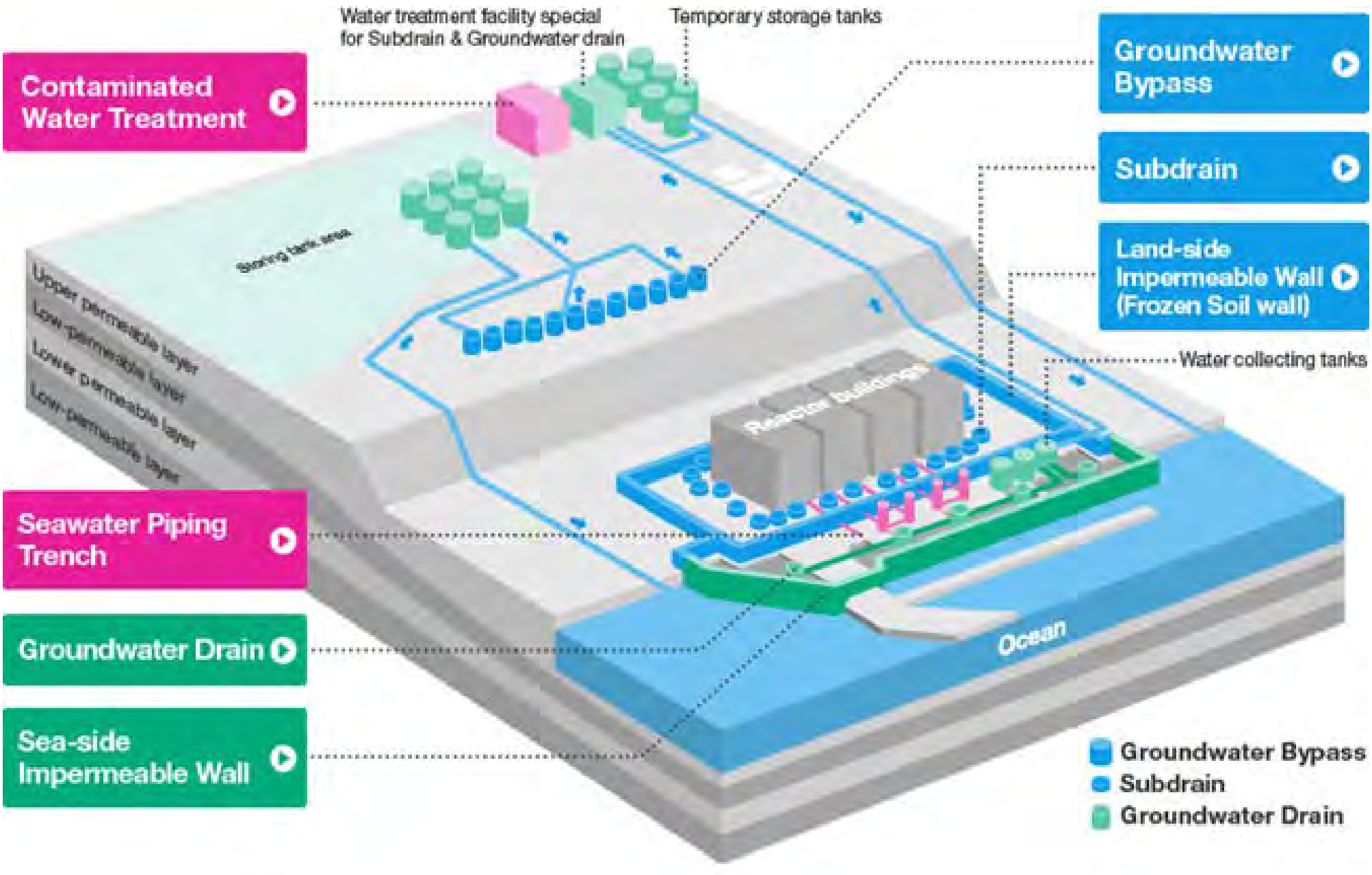
Mechanism by which of contaminated water is created

- In the PCVs, cooling is continued by spraying water on the molten and solidified fuel.(①)
- In order to prevent the stagnant water in the buildings from flowing to outside, the water level is pumped so that it stays lower than the groundwater level outside the building. This is known as water sealing.
- As a result, the groundwater flows into the buildings and mixes with the stagnant water, and new contaminated water is created in the buildings.(②)



Overview of Water Management



Overview of Water Management

Three Basic Principles for Water Management

1. “Isolating” groundwater from the contamination source

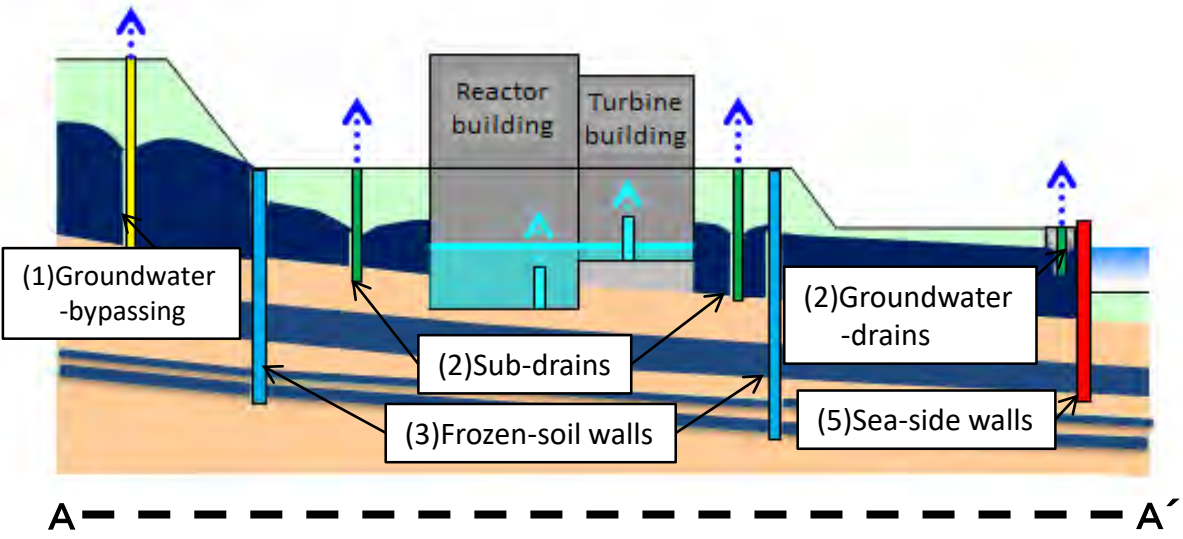
Measures are taken to reduce the generation of contaminated water. ((1)(2)(3)(4) of the right figure)

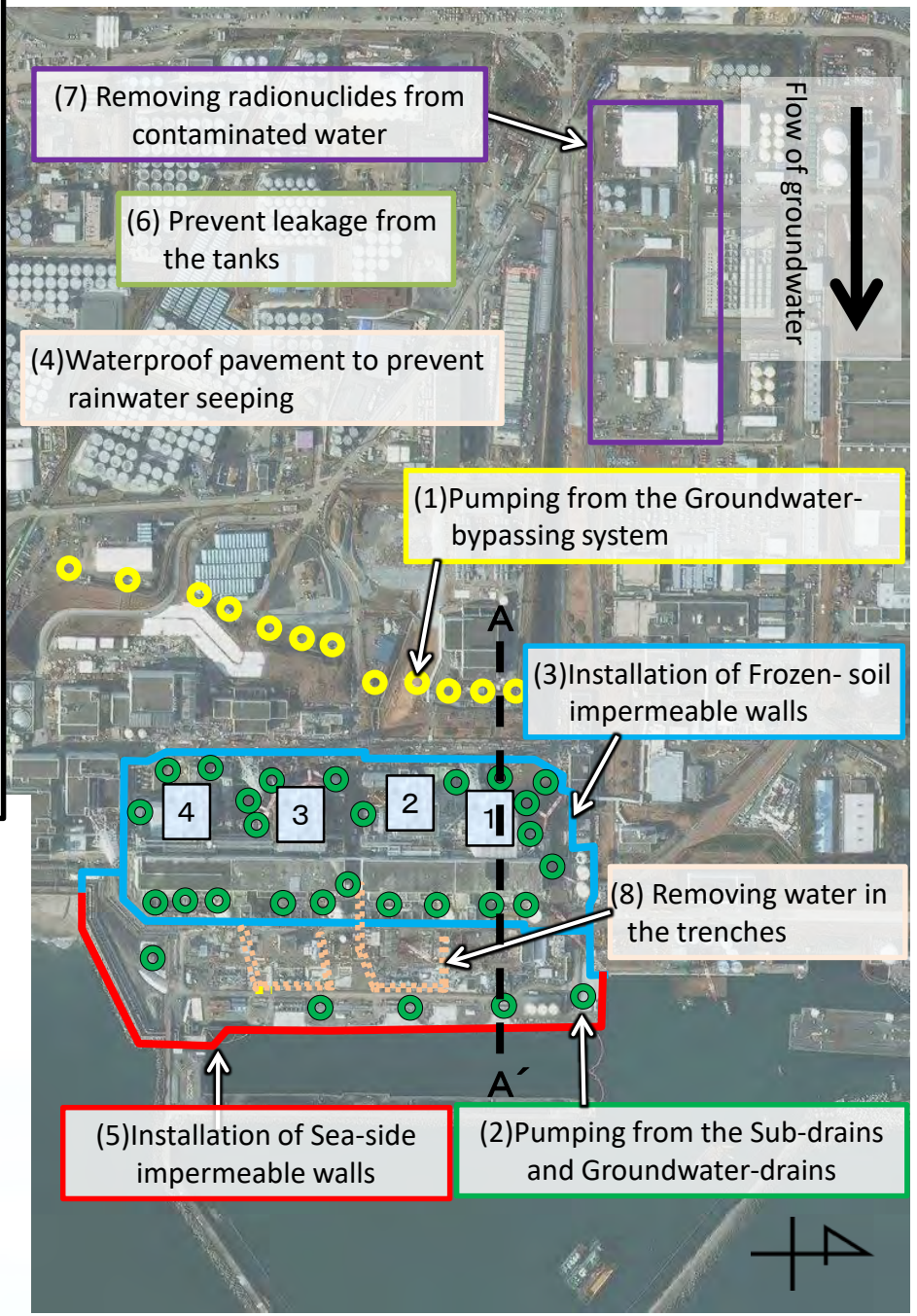
2. “Preventing leakage” of contaminated water

Measures are taken for preventing leakage of contaminated water to the sea. ((5)(6) of the right figure)

3. ”Removing” the contamination source

Measures are taken for removing the radioactive nuclides from the contaminated water in the tanks and in the trenches. ((7)(8), etc.)





Concept of Cyclic Cooling in Reactor Building

◆ To stably cool down the fuel debris, circulated cooling water is continuously injected into primary containment vessel .

Spent fuel pool

Reactor Building

Primary containment vessel

Reactor pressure vessel

Turbine Building

Groundwater inflow (A) *

70~80m³/day (average in December)

Groundwater

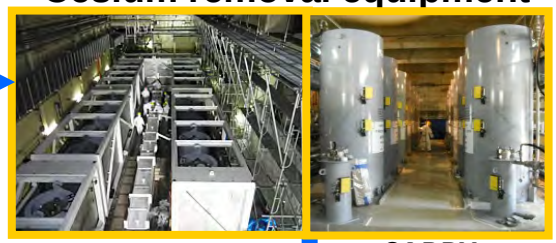
Contaminated water

Pumping water around the bank area (B)*

40~50 m³/day (average in December)

Added Sr removal function

Cesium removal equipment



KURION

SARRY

500~550 m³/day

Reactor cooling water

200~220m³/day

Cyclic cooling

Pump

Tank

(Gross β: a few hundred Bq/L)

(Gross β: a few million Bq/L)

(Gross β: a few hundred million Bq/L)

Desalination device (RO)

300~330m³/day

(A)+(B) equivalent

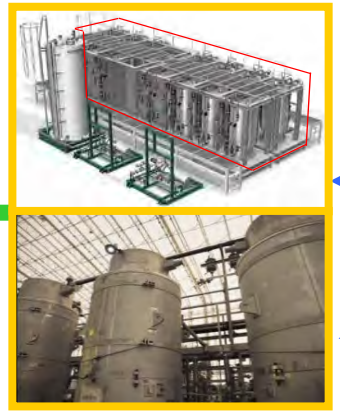
ALPS treated water

About 850,000m³

(As of January, 2018)

Storage tanks

Removing 62 types of nuclides except Tritium



Multi-nuclide removal equipment (ALPS)

Sr treated water

About 180,000m³

(As of January, 2018)

Storage tanks

Completed reduction of Sr concentration

RO concentrated saline water

0m³

(Completed on May 27, 2015)

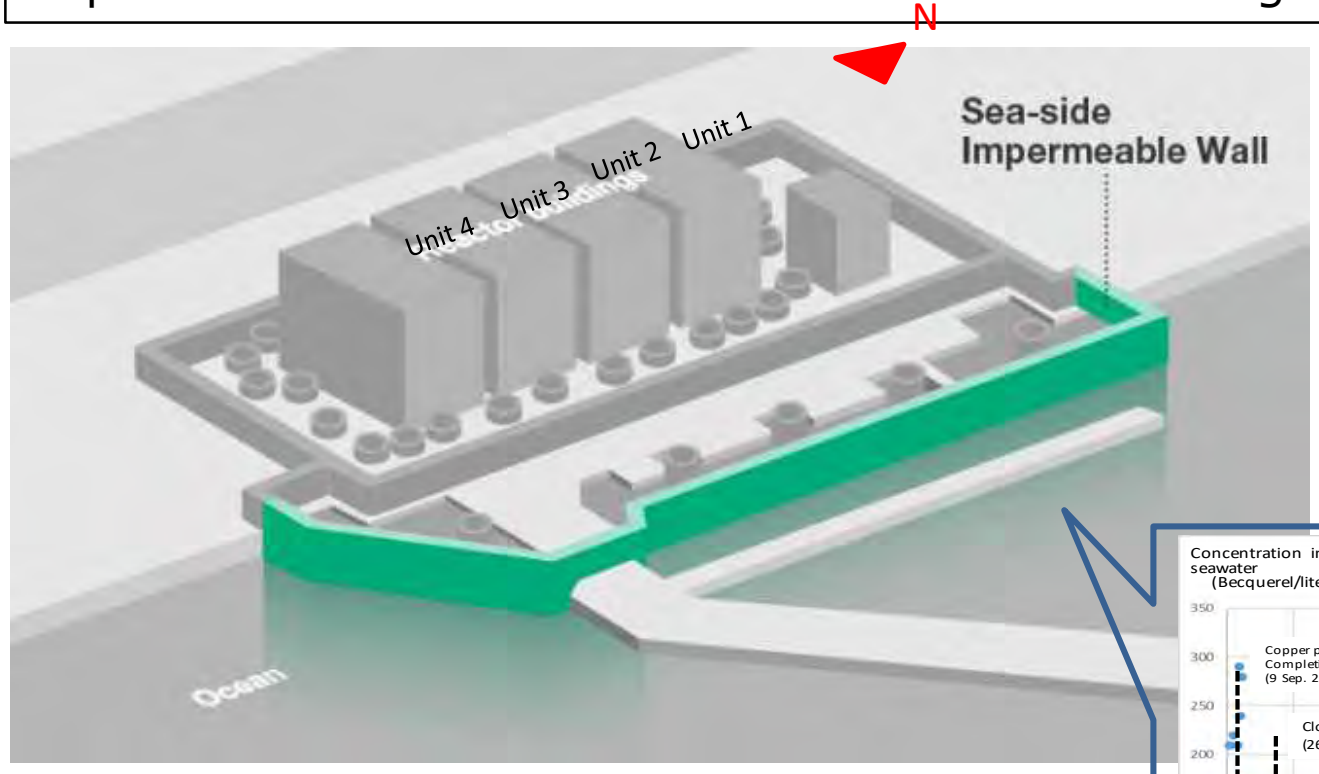
Storage tanks

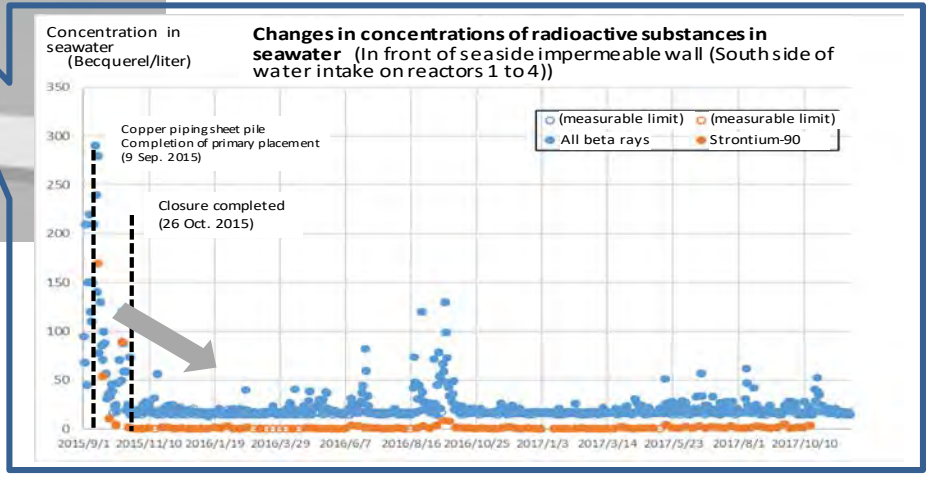
※Residual water: about 700m³

* (A) and (B) vary depend on the measures and the precipitation.

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.

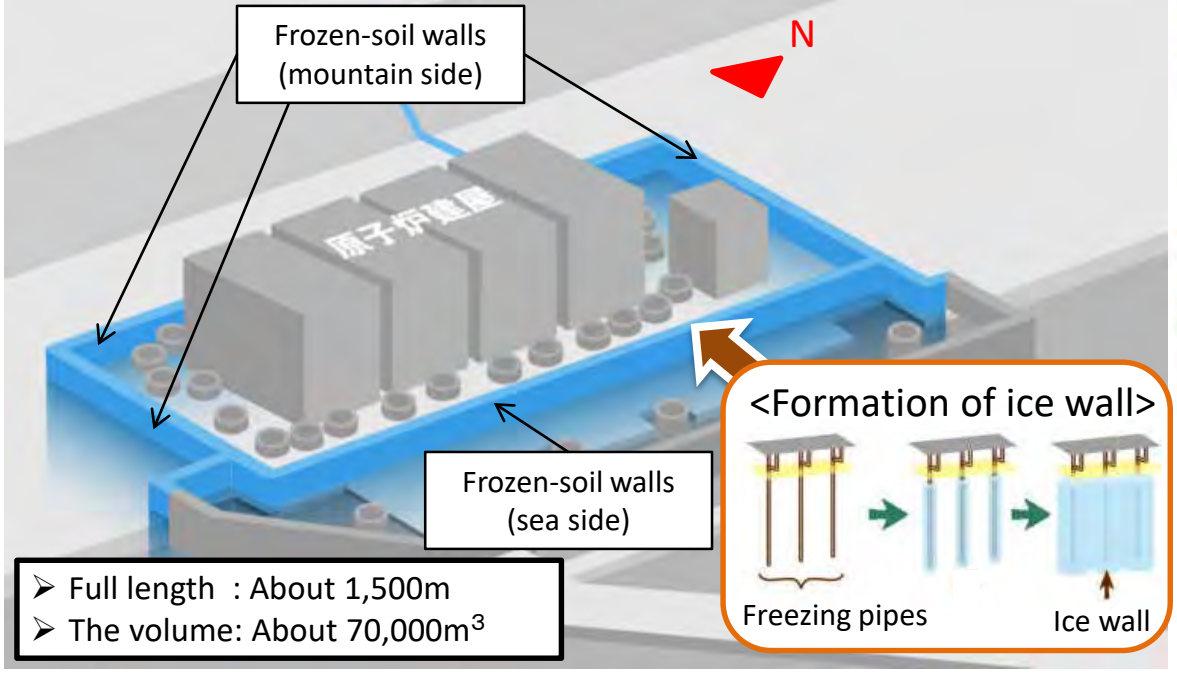




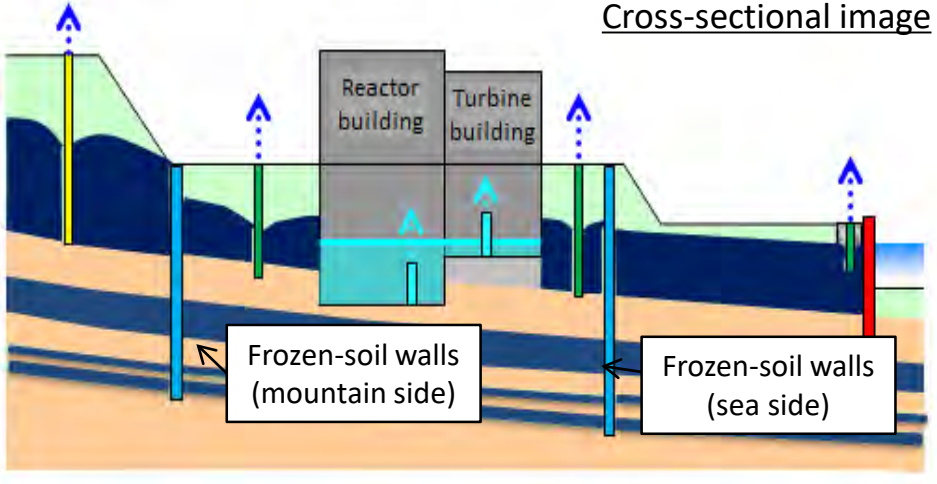
Frozen-soil Impermeable Walls [Isolating]

- 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.

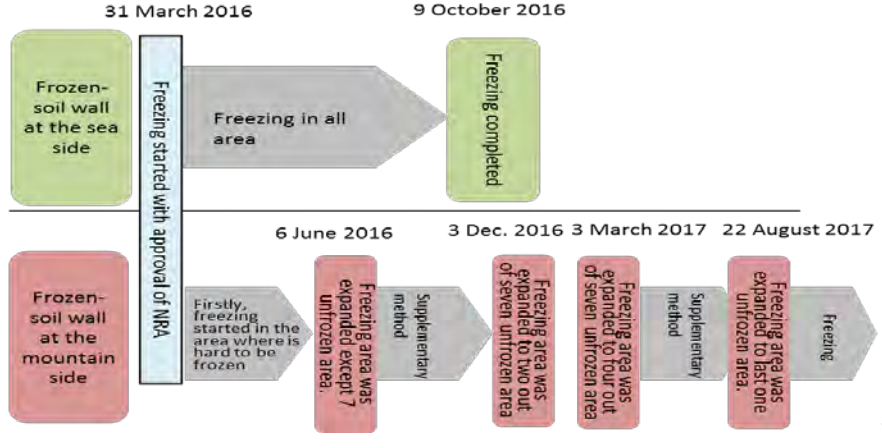
Panorama image of the walls



Cross-sectional image

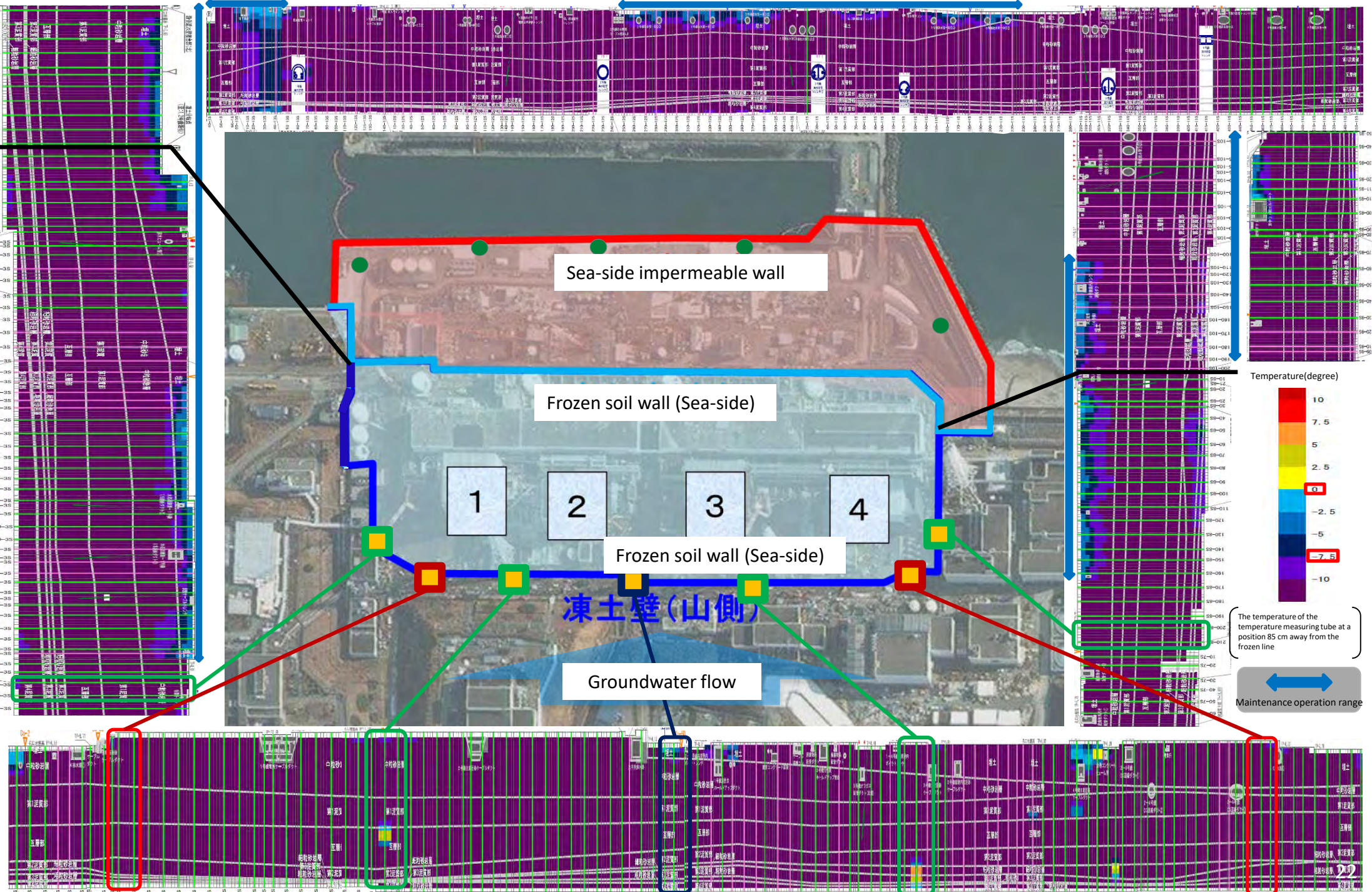


Progress of the freezing



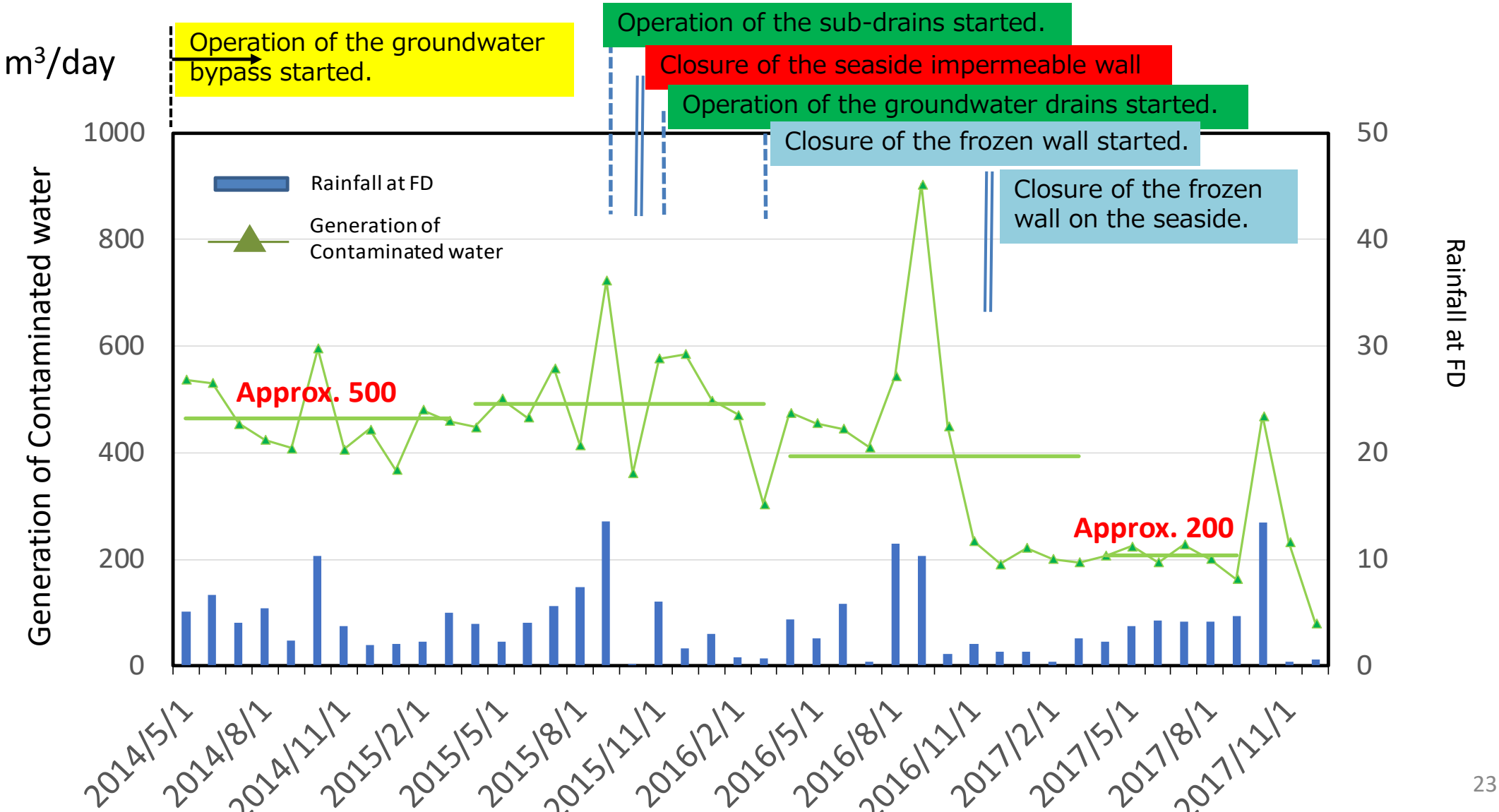
On 28 June, NRA has approved in principle that one last unfrozen area are frozen.

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



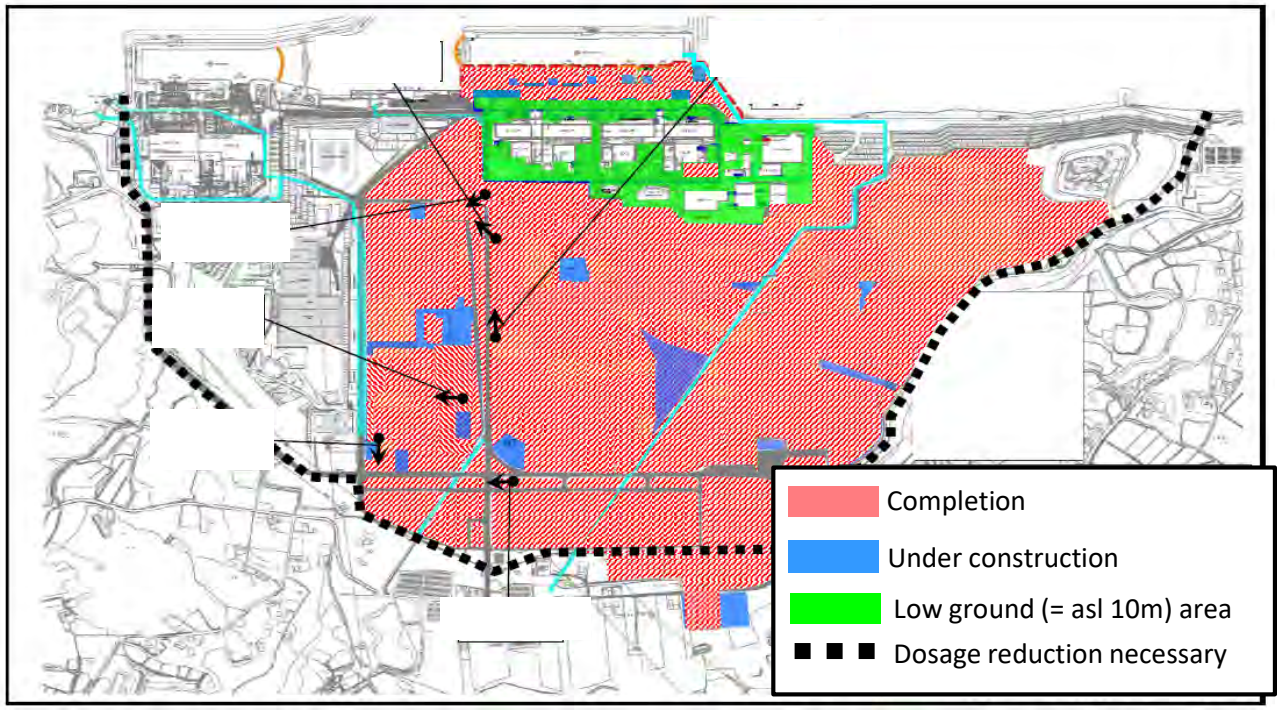
Status of generation of contaminated water

- 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.



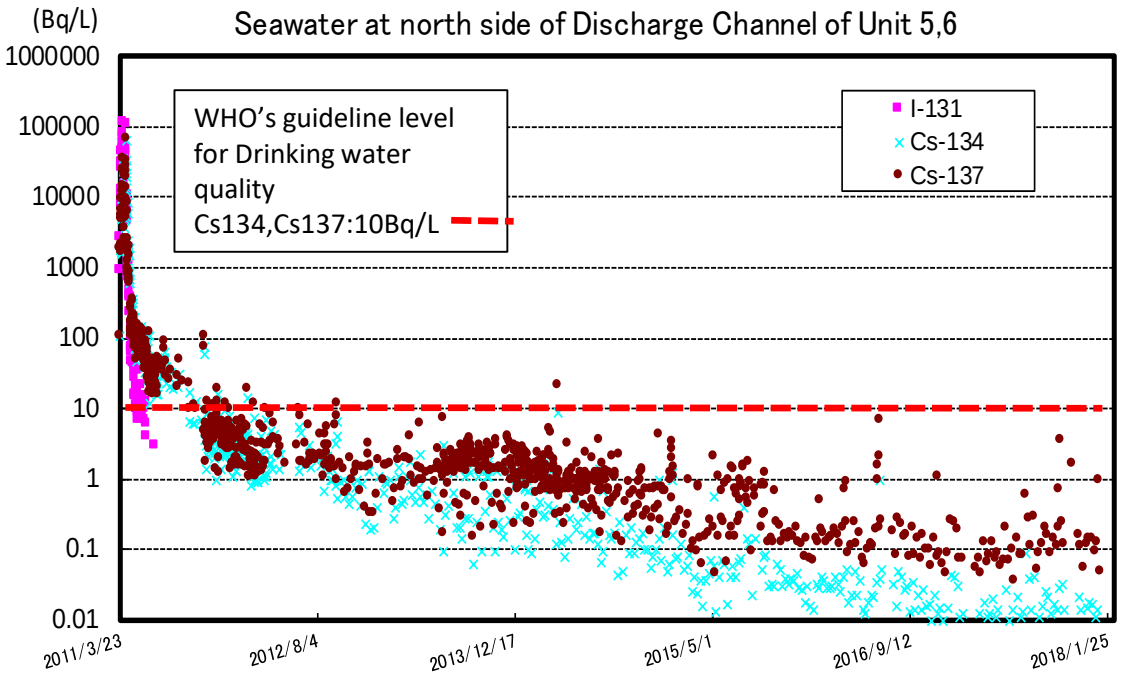
【Between Unit 3 and Unit 4】

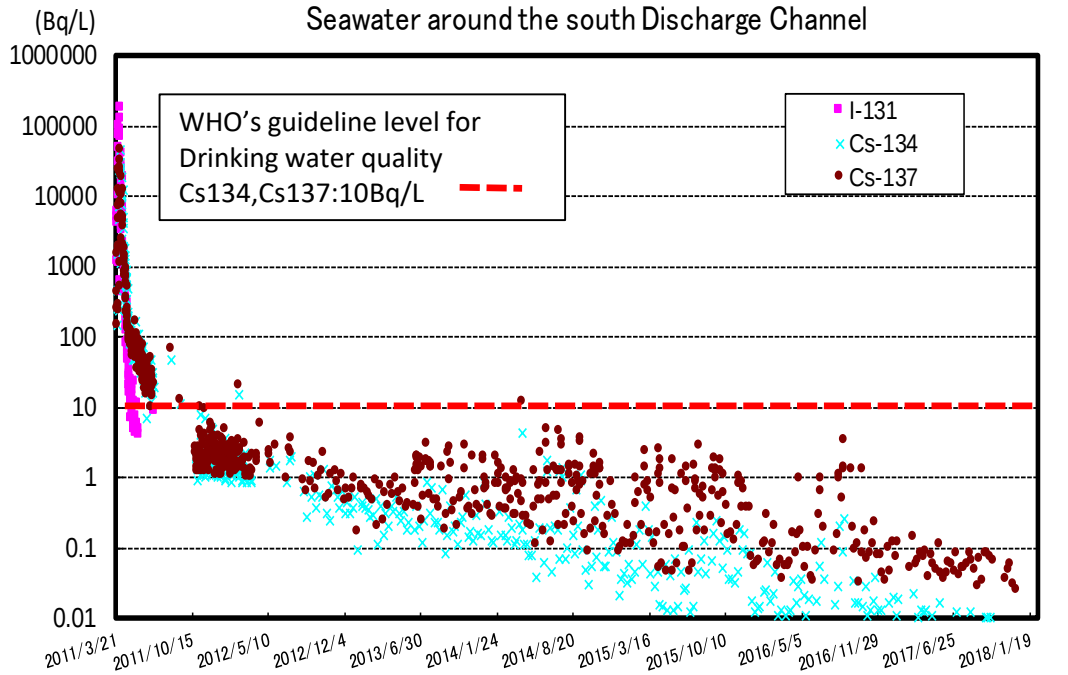
【Tank Area】

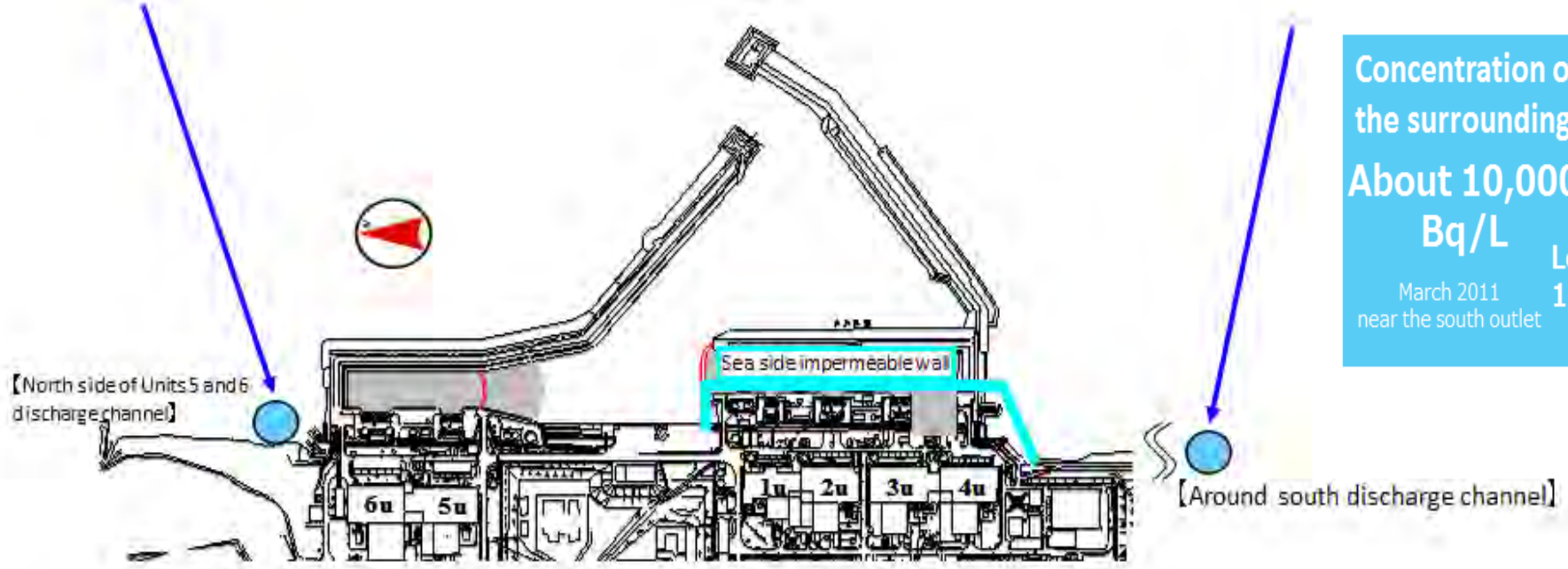
【Parking Lot】

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)

Less than 1/10,000

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

※Concentration of Cs137

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 **Approx. 400 m³/day (From June 2011 to May 2014)**	Operation of the groundwater bypass【From May 2014】 Discharged approx. 270,000 tons of water by Mar. 2017 Operation of the sub-drains【From Sept. 2015】 Discharged approx. 300,000 tons of water by Mar. 2017 Completion of paving of 92% of the ground of the site【As of Feb. 2017】 **Approx. 300 m³/day (From May 2014 to Sept. 2015)** **Approx. 120m³/day (The target (100 m³/day) was almost achieved) (Mar. 2017)**	Closure of Frozen soil wall (landside impermeable wall) 【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 Enhancement of the sub-drain【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 **Approx. 10,000 Bq /L (Mar. 2011)** (Monthly average)	Ground improvement using water glass【Mar. 2014】 Closure of the seaside impermeable wall【Oct. 2015】 Start of pumping of water through the groundwater drains following the closure【Nov. 2015】 Installation of more welded tanks【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) **Lower than the detection limit value (0.7 Bq／L) (Mar. 2017)**	Plan for installation of more tanks 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. Treatment of flange-type tanks 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 **Approx. 11 mSv/year (Mar. 2012)**	Treatment of contaminated water in the tanks almost completed【May 2015】 → Cumulative total of approx. 760,000 m³ Treatment by ALPS will be continued to further reduce the risk. Treatment of contaminated water in the trenches wholly completed【Dec. 2015】 → Cumulative total of approx. 10,000 m³ **Less than 1 m Sv/year (Achieved in March 2016)**	Consideration of long-term handling of contaminated water treated by ALPS【Sept. 2016 Establishment of a subcommittee concerning contaminated water treated by Advanced Liquid Processing System (ALPS)】
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】 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】	Completion of treatment of stagnant water in the building【within 2020】

<Others>

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

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

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

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1. Summary of Fukushima Daiichi NPS Accident
2. Overview and Main Progress in Decommissioning Work
3. Overview and Main progress in Contaminated Water Management
4. Improvement of working conditions
5. Revising Mid-and Long-term Roadmap
6. Communication with the public
7. Cooperation with International Communities

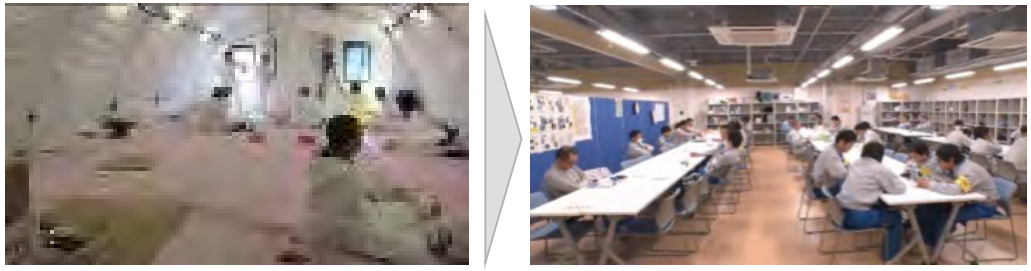
Improvement of the Environment inside various Areas of Fukushima Daiichi Nuclear Power Station

- 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>

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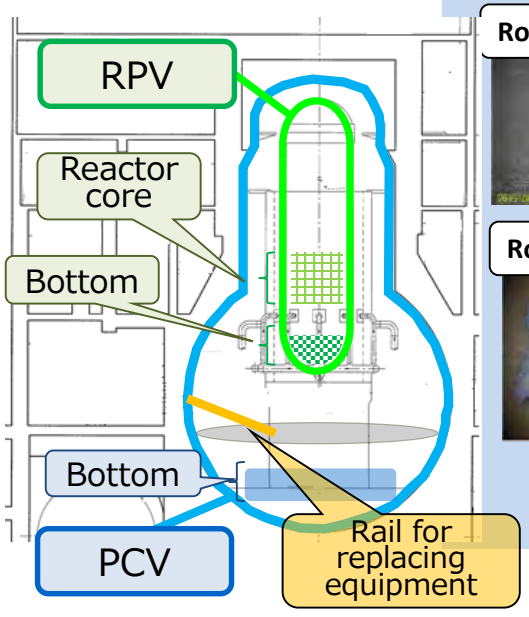
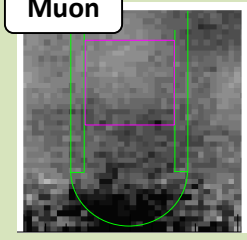
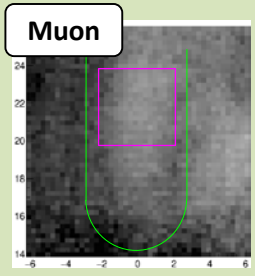
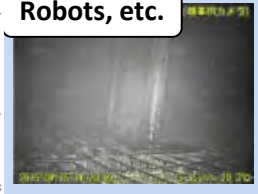
The results of the PCVs internal investigation

- 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	Unit 2	Unit 3
Muon	 ✓ There is no fuel in the core of the RPV (estimated)	 ✓ There is fuel at the bottom of the RPV (estimated)	 ✓ 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	 ✓ 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)	  ✓ Damage in the PCV was found. ✓ Melted materials which could be fuel debris were found.
Robots, etc.	 ✓ Dose has been measured. ✓ Deposits and falling objects were found at the bottom.		

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

Premise

①It is important to reduce the potential risks related to fuel debris as soon as possible

②Information 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.

Mid- and Long- term Roadmap -Key Points (provisional translation)-

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.

Mid- and Long- term Roadmap -Key Points (provisional translation)-

(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

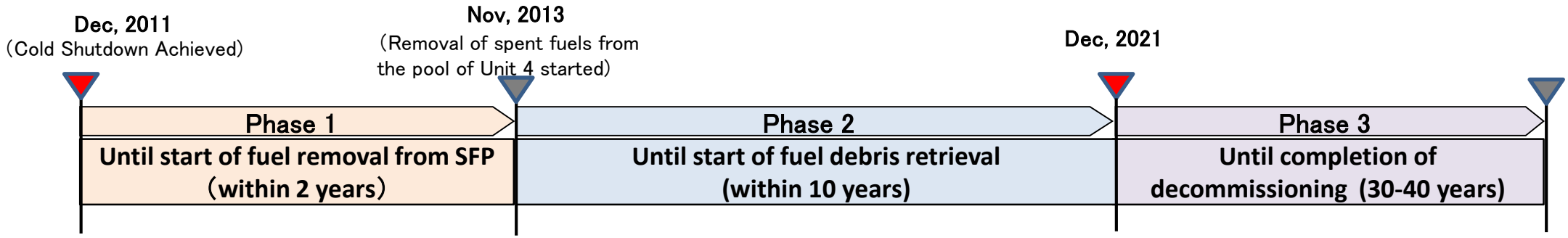
- Storage of radioactive solid waste under the safe conditions is continued until the characteristics of solid waste will be unveiled.

(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
Stagnant water treatment	①Separation of connection between Units 1 and 2 and between Units 3 and 4	Within 2018
	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 1st 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.

Local	National	Overseas
Portal site of the status of Decommissioning and Contaminated water Management management in the web		
“Fukushima Today“ Film in Japanese		“Fukushima Today“ Film in English
“Important Stories on Decommissioning ”Brochures in Japanese		“Important Stories on Decommissioning ”Brochures in English
Monthly Information To Fukushima Pre. And 13 local municipalities	Release Information To Industries	Provision of updates to IAEA
		Release Information through Japanese Embassies and ministerial-level conversations
Monthly Press Briefing To local media	Monthly Press Briefing To media	Release Information through Embassies in Tokyo
		Press Conference, Briefing, Tour, Press Release

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 (English)

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

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

"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

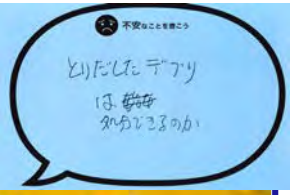
J. C. Lentijo
Deputy Director General,
IAEA

The scene of the 2nd Forum

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

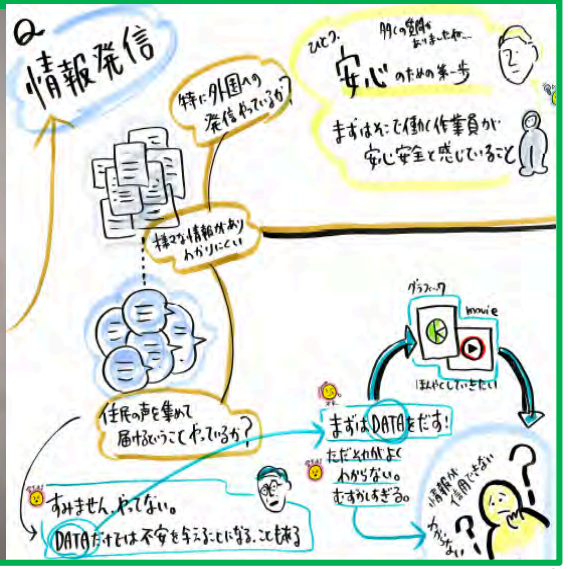
Lecture on "What is 1F D&D?" by facilitator

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

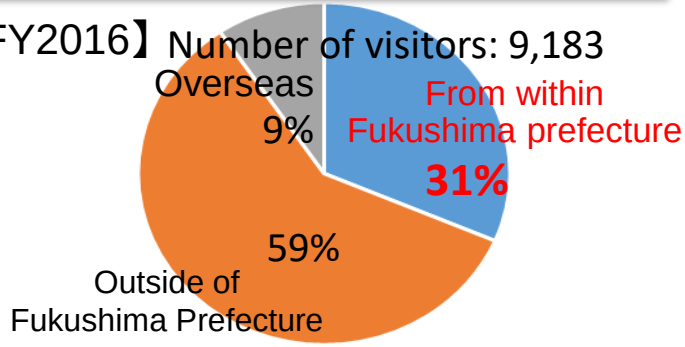
- Inviting the prefectural government and organizations
- Percentage of visitors from within the prefecture has increased to 31% (from 28% in FY2015)
- TEPCO aims to increase the number of site visitors to 20,000/y by Tokyo Olympics.
- Examples of comments received:

"Decommissioning is a big underta-king done with the cutting edge technology"

"Seeing is believing"

"Every time I visited Fukushima Daiichi, I was able to find some progress"

【FY2016】Number of visitors: 9,183



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 ”.

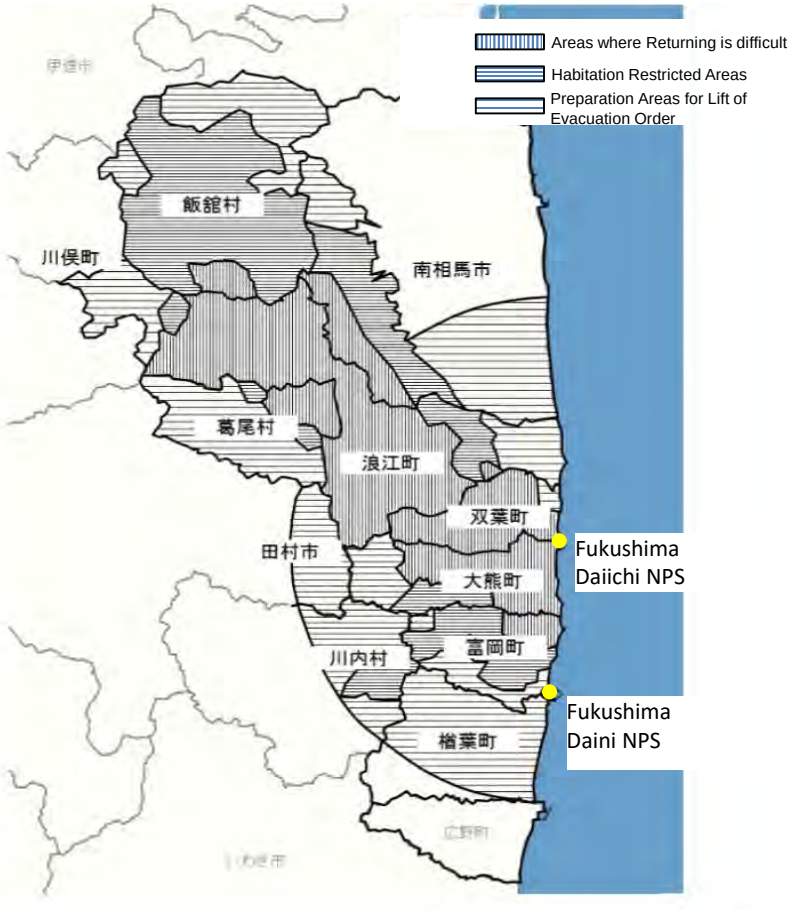
Films, Online bulletin board

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

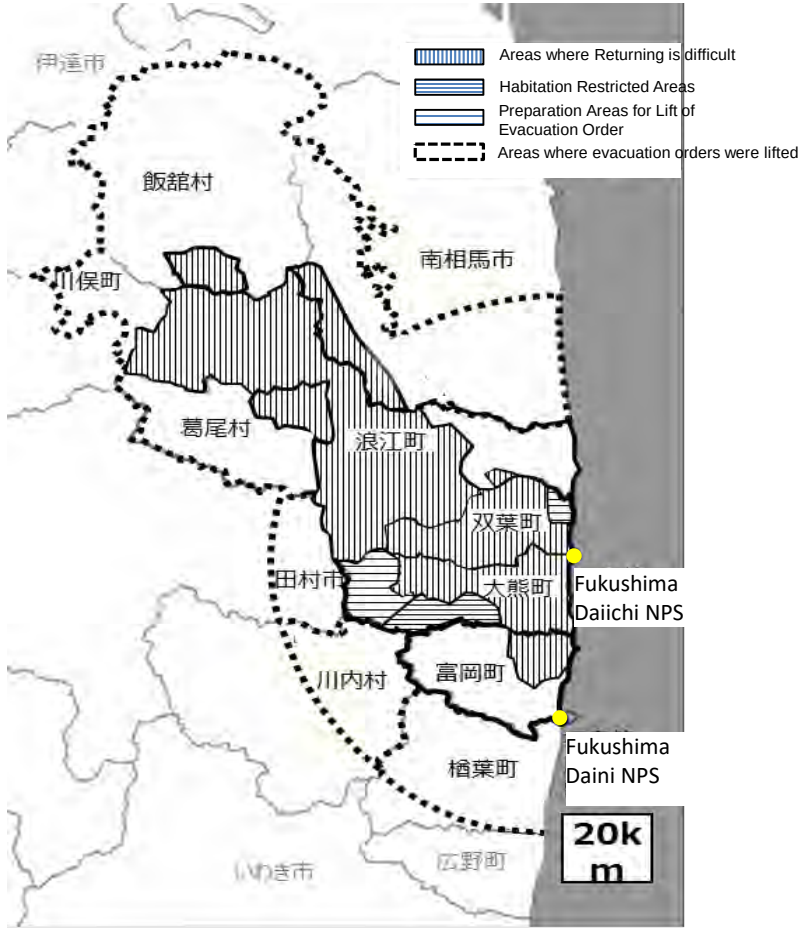
- Film : Activities of residents

- 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 1,150㎢		About 370㎢

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Cooperation with International Communities

International Organizations

IAEA International Atomic Energy Agency

- 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

OECD BETTER POLICIES FOR BETTER LIVES

NEA NUCLEAR ENERGY AGENCY

- 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

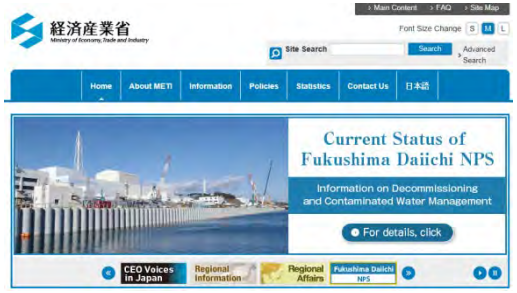
Japan-France Nuclear Committee

Japan-Russia Nuclear Energy Working Group

[Reference] Related Links

◆ 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/