<Sixth Press Conference for Overseas Media>
Update on the Status of the Discharge of ALPS Treated Water into the Sea and Decommissioning Work at the Fukushima Daiichi Nuclear Power Station

TEPCO

May 20, 2024

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Today's agenda

- Status and future plans of decommissioning work
  - Overview of the decommissioning work
  - Unit 1 PCV Internal Investigation
  - Unit 2 PCV Internal Investigation/Preparation Status of Fuel Debris Trial Retrieval
- Status of the discharge of ALPS treated water
  - ALPS treated water discharge status update
  - Sea area monitoring status
  - Contaminated water and countermeasures
- Q&A session

Overview of the decommissioning work

May 20, 2024

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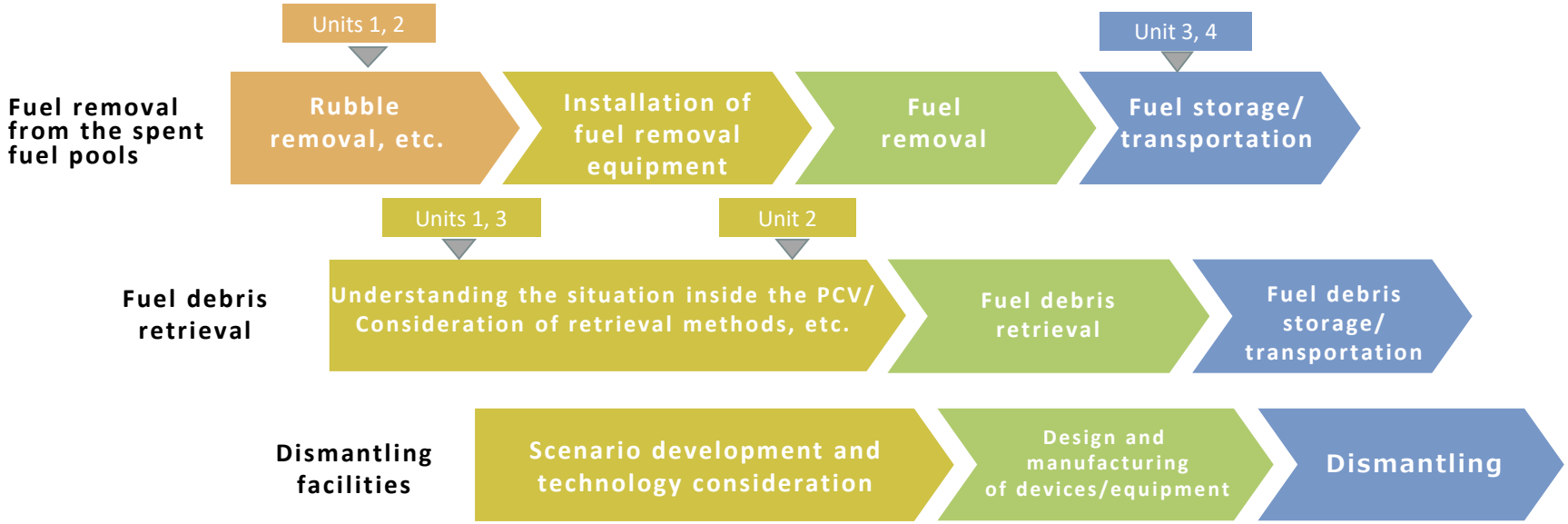
Primary decommissioning program and work steps

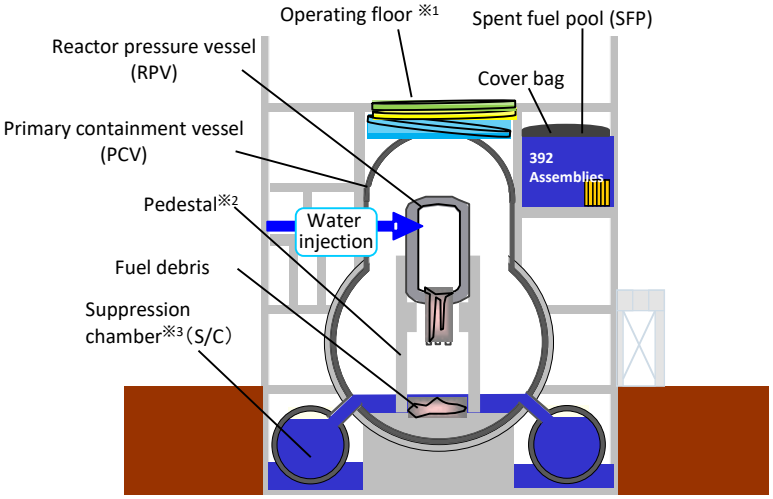
- At the Fukushima Daiichi Nuclear Power Station, decommissioning is underway in accordance with the Mid/Long-Term Roadmap created by the Inter-ministerial Council for Contaminated Water, Treated Water and Decommissioning Issues.
- Fuel removal from Unit 4 and Unit 3 spent fuel pools was completed on December 22, 2014 and February 28, 2021, respectively.
- Work is underway in preparations for spent fuel removal from Unit 1-2 and fuel debris (※) retrieval from Units 1-3

(※) Fuel that melted and fell during the accident

＜ Mid/Long-Term Roadmap Milestones ＞

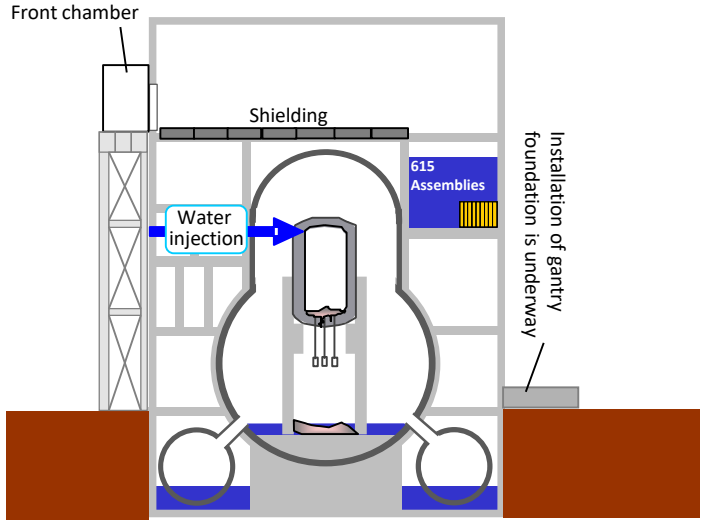


Current conditions at Units 1 and 2



Unit 1

In preparation for the removal of fuel from the spent fuel pool, dismantling of the building cover (remaining portion) has been completed, and construction of a large cover began in September 2021. Internal investigations of the primary containment vessel are being conducted in preparation for fuel debris retrieval.



Unit 2

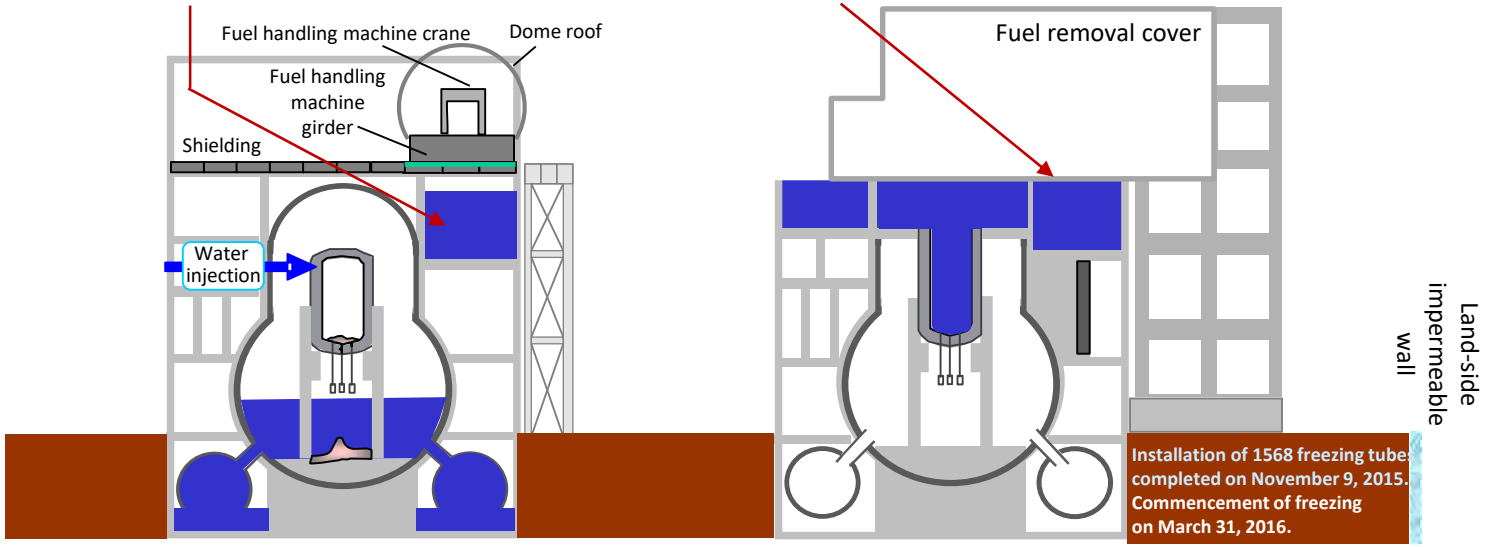
A fuel removal gantry/front chamber is being constructed on the south side of the reactor building in preparation for the removal of fuel from the spent fuel pool. Fuel debris retrieval preparations are also underway since this will be the first unit from which fuel debris will be retrieved.

※1 Uppermost floor of the reactor building
※2 The foundation that supports the reactor. It is a steel plated cylindrical shell that has been filled with concrete.
※3 A part of the primary containment vessel that holds water.

Current conditions at Units 3 and 4

Fuel removal completed: February 28, 2021 (566 assemblies)

Fuel removal completed: December 22, 2014 (1,535 assemblies)



Unit 3

Unit 4

Removal of the fuel from the spent fuel pool (566 assemblies) was completed on February 28, 2021. The need for additional internal investigations of the primary containment vessel in preparation for the retrieval of fuel debris is being deliberated.

The removal of fuel from the spent fuel pool (1535 assemblies) was completed on December 22, 2014 thereby eliminating risks associated with fuel.

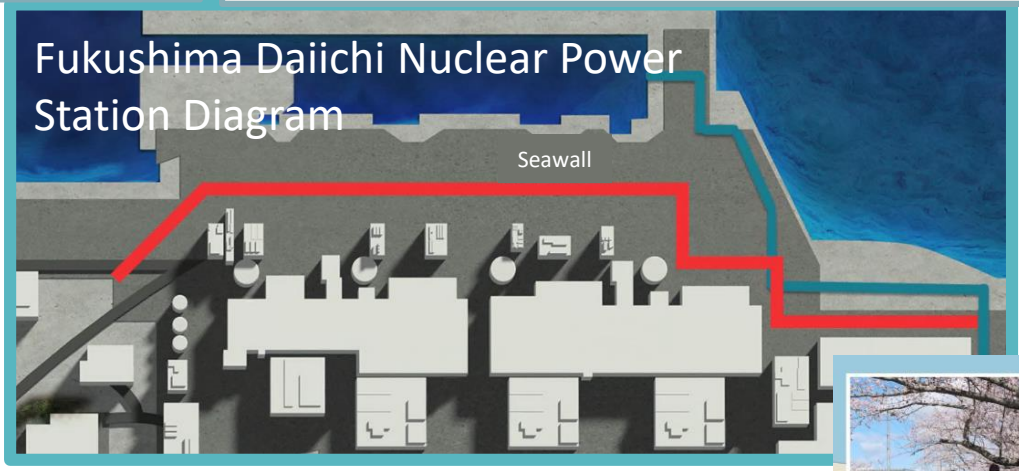
Current conditions at the Fukushima Daiichi Nuclear Power Station

- On the sea-side of the station, where there was much damage, rubble has been removed.
- As a result of countermeasures, such as paving ground surfaces, etc., general work uniforms can be worn in 96% of the site.
- Seawall which serves as a tsunami countermeasure was constructed.

Sea-side area following the accident

Kuril Trench tsunami countermeasure seawall completed in September 2020

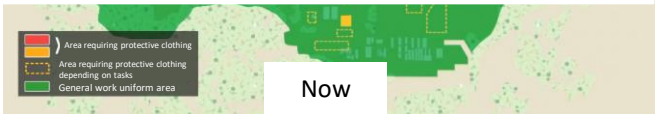
Construction of the Japan Trench tsunami countermeasure seawall completed on March 2024



Unit 3 building cover

Paving of site surfaces

General work uniforms can be worn in 96% of the site



Completion of Japan Trench tsunami countermeasure seawall (March 15, 2024)

- Built as a countermeasure to the imminent threat of Japan Trench tsunami.
- Aimed to suppress inundation by tsunami, prevent an increase of contaminated water due to building inundation, and reduce risks to essential decommissioning facilities, as well as risk of delays in decommissioning work.

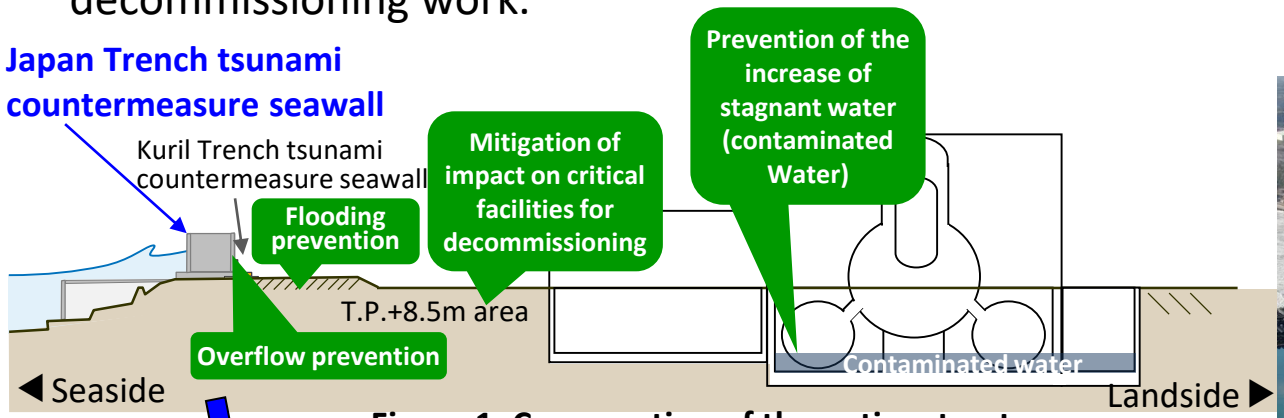


Figure 1. Cross section of the entire structure

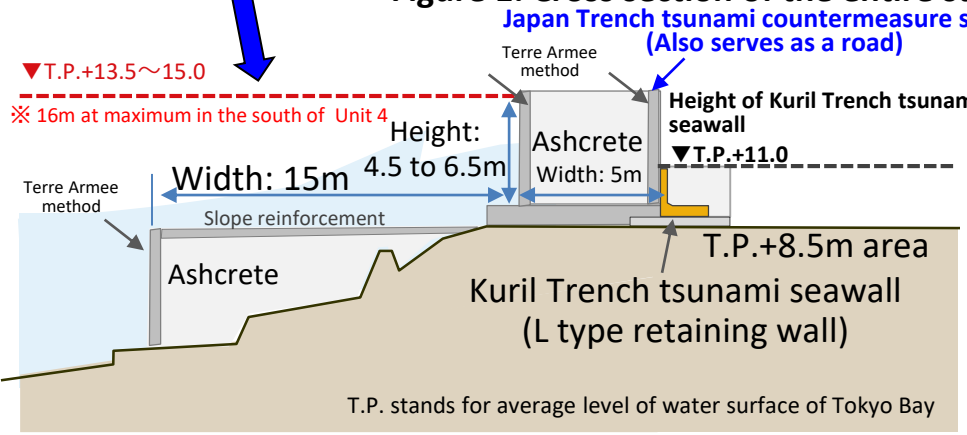
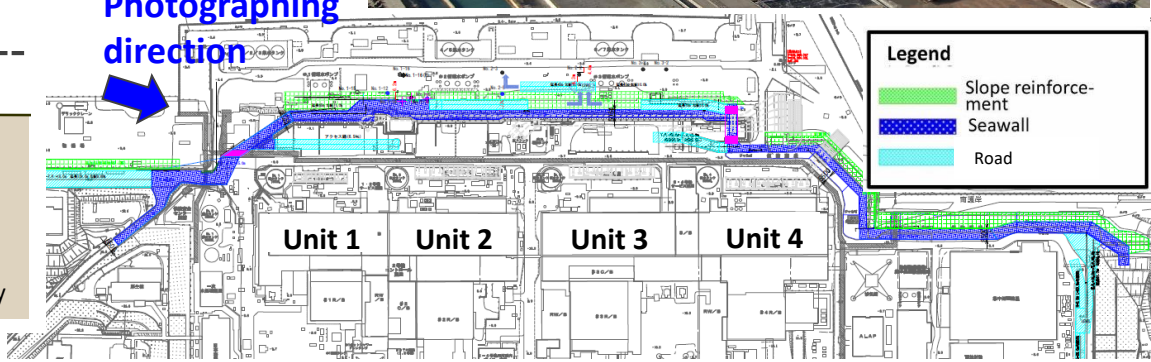
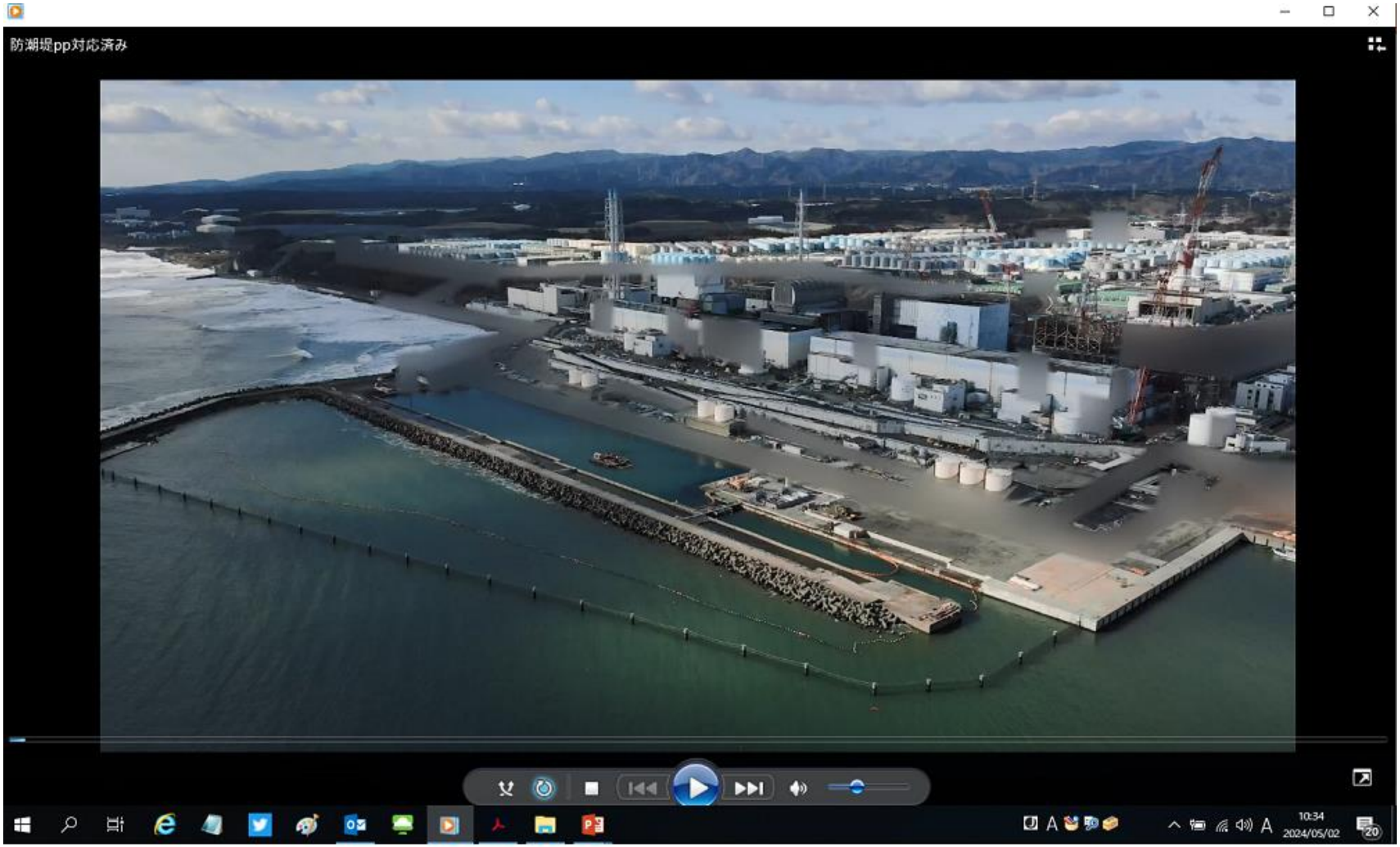


Figure 2. Cross section of the seawall



Japan Trench tsunami countermeasure seawall



Filmed on March 2, 2024

Unit 1 PCV Internal Investigation
(Non-submerged area on the first floor)

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Key findings from the Unit 1 PCV internal investigation (submerged area on the subfloors) in March 2023

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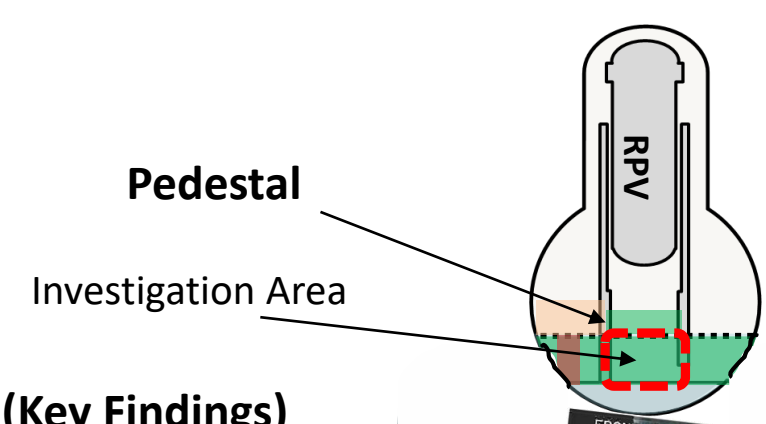
- The footage shows that concrete of the inner pedestal foundation is degraded, while the exposed inner skirt and steel have remained intact.



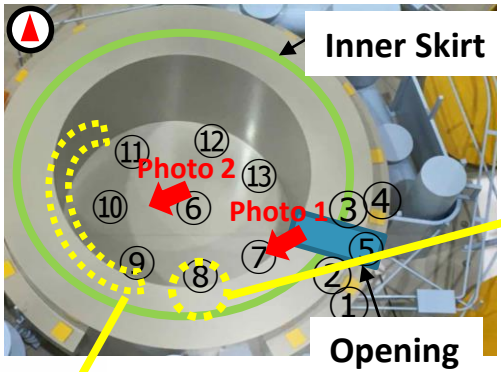


Photo 1: Point ⑧at inner pedestal base

(Key Findings)

-Concrete of the inner pedestal foundation has been degraded around almost its entire circumference.
-The degraded sections are all approximately the same height.

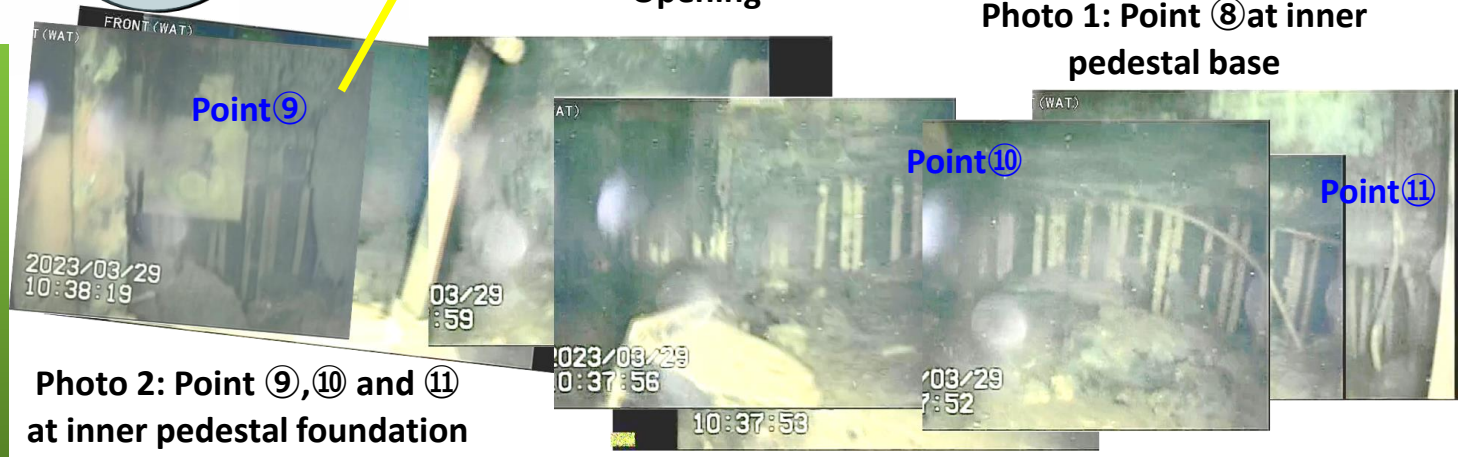
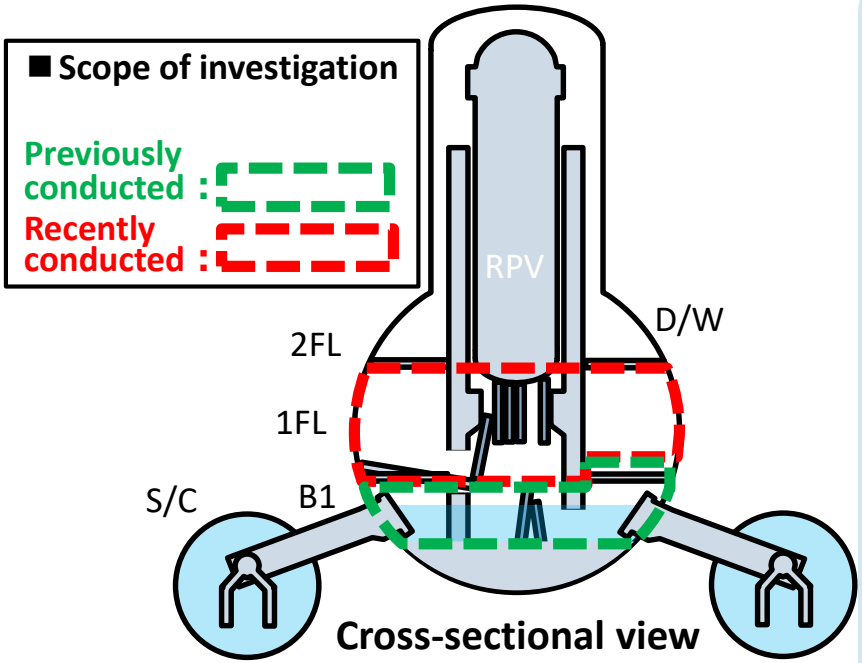


Photo 2: Point ⑨,⑩ and ⑪ at inner pedestal foundation

Overview of Unit 1 PCV internal investigation (non-submerged area on the first floor)

- To gain a comprehensive understanding of the interior of Unit 1 PCV in preparation for the fuel debris retrieval, an investigation of the first floor was conducted, following the one on the subfloors.



Small drone

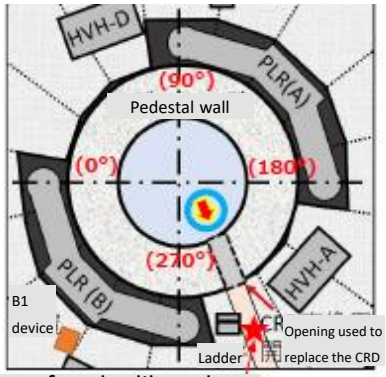
Use：Photography
Scale：191×179×54[mm]
Weight：185[g](including a battery)
Flight duration：Approx. 8 min
(Investigation will consist of four 5-min flights)
Installed devices：-Lights (90lm(45lm×2)),
-Ultrahigh-sensitivity camera (front only)

Wireless communications relay snake-like robot

Use：Transportation of wireless relay device & dose measurement
Scale：2,900×180×165[mm]
Weight：about 25[kg]
Installed devices：
-Wireless relay device for drones
-CMOS camera×2
-dosimeter

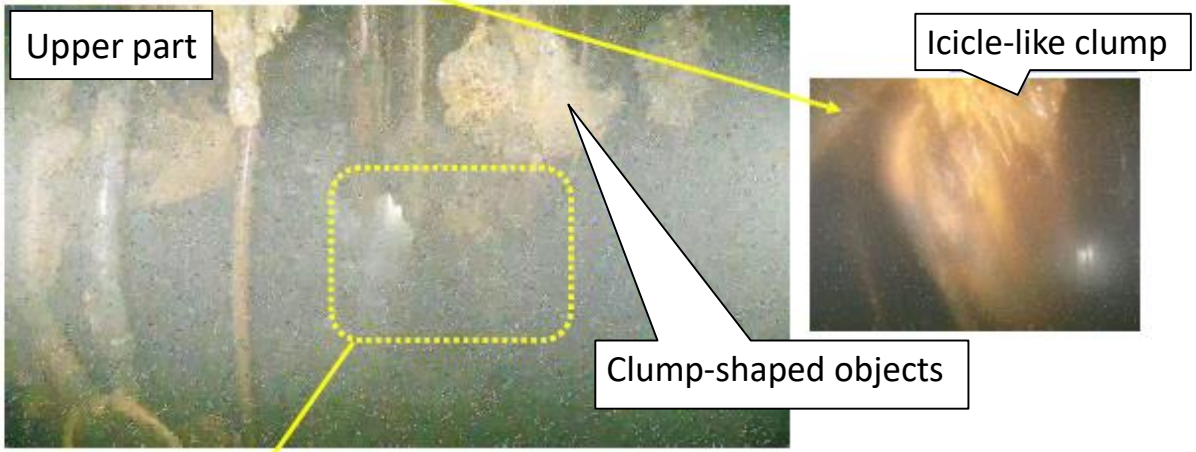
Investigation devices for Unit 1 PCV internal investigation of non-submerged area

Result of Unit 1 internal investigation of non-submerged area on the first floor



Standby position of snake-like robot

Rough sketch of the 1st floor inside pedestal



Video of Unit 1 internal investigation (non-submerged area on the first floor)

Video URL: https://www4.tepco.co.jp/en/news/library/archive-e.html?video_uuid=15205&catid=61785
https://www4.tepco.co.jp/en/news/library/archive-e.html?video_uuid=15217&catid=61785

Unit 2 PCV Internal Investigation/ Preparation Status of Fuel Debris Trial Retrieval

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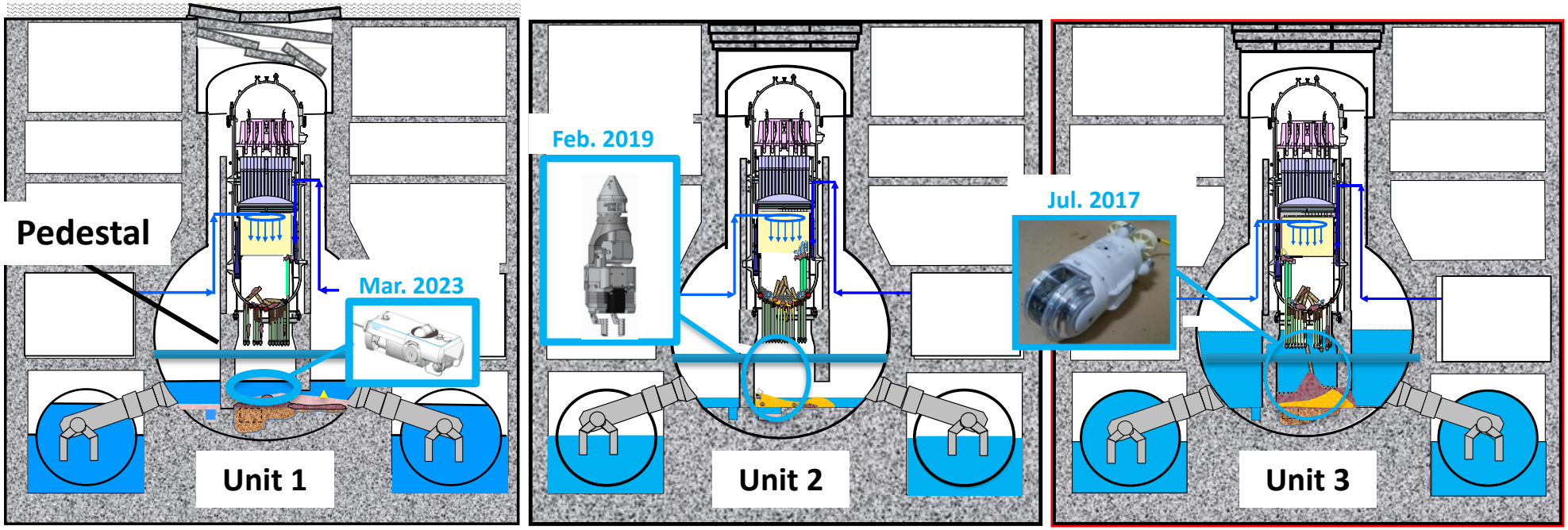
Assumed distribution of fuel debris

Robotic exploration | Analysis of accident transient | Muon Survey

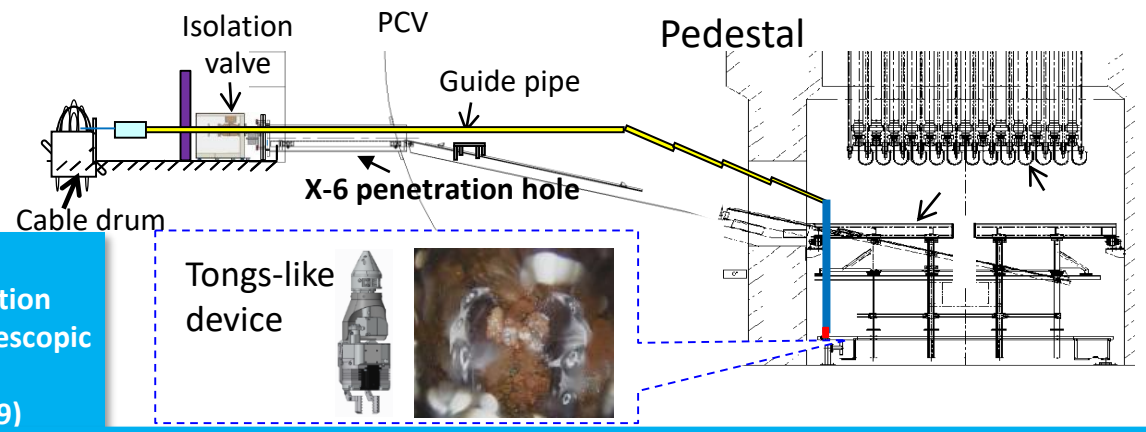


The first trial retrieval will be conducted at Unit 2

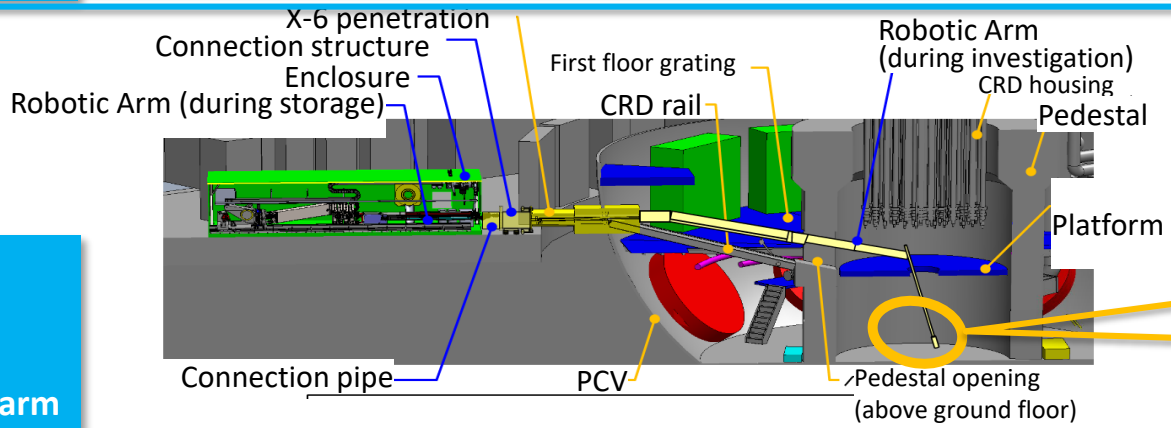
Trial retrieval plan at Unit 2

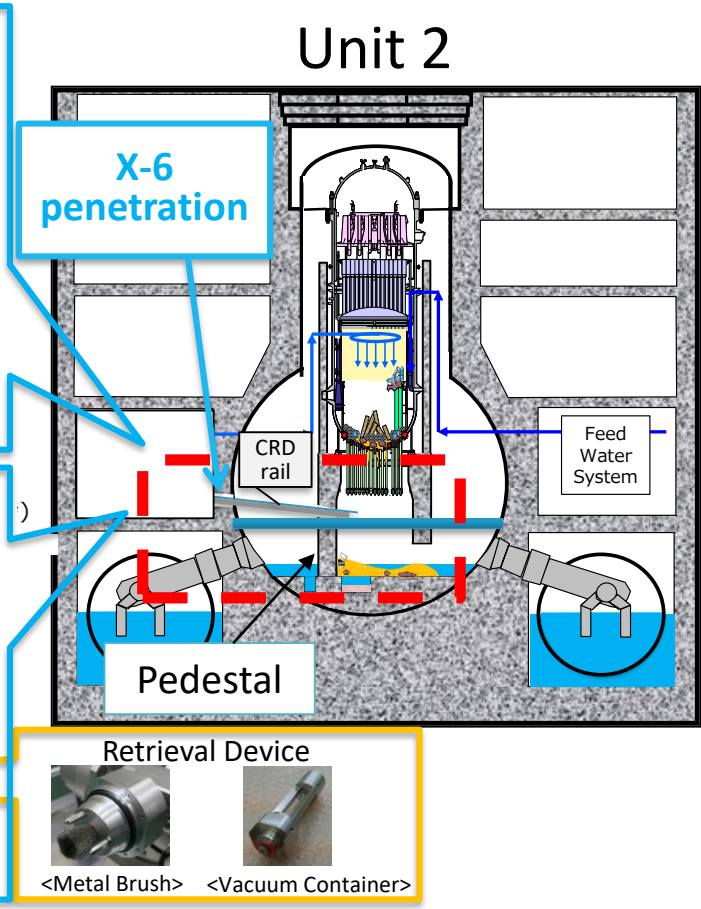
- We will insert an robotic arm device through the same access route as the investigation in 2019.
- A small amount of deposit that we observed in a touching investigation in 2019 will be collected by the device with metal brush and vacuum container attached.

Touching investigation using telescopic arm (Feb.2019)



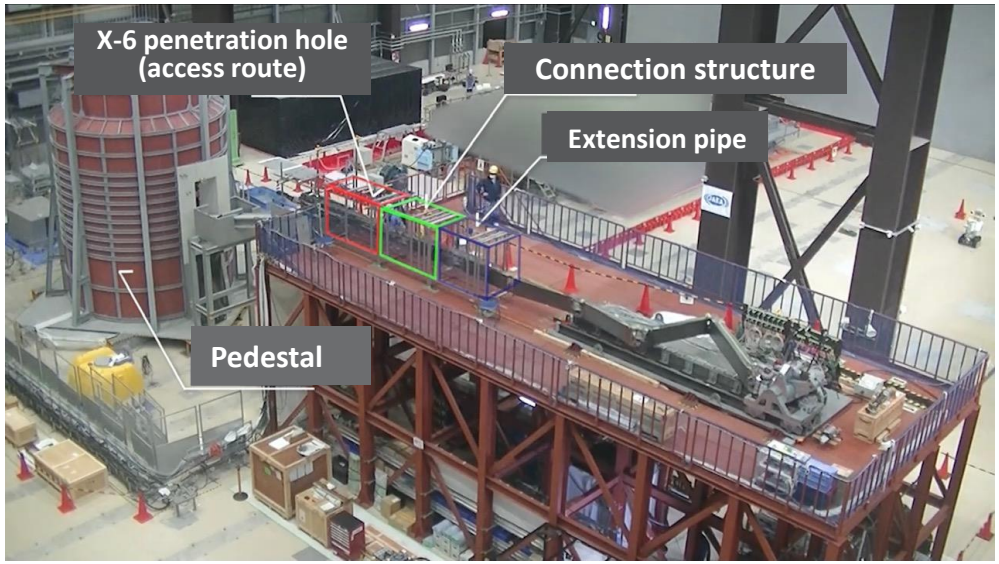
Planned retrieval using robotic arm



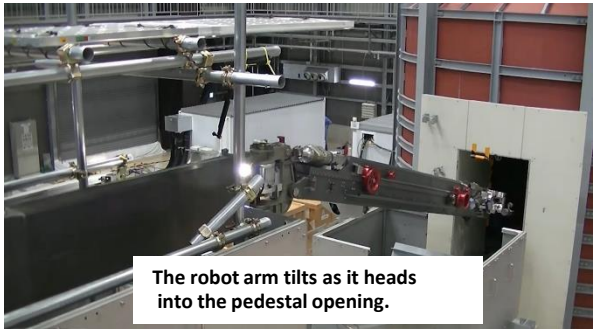


Mockup test of robotic arm for trial retrieval at Unit 2

- Tuning of systems and devices for the robotic arm, and training are being conducted.



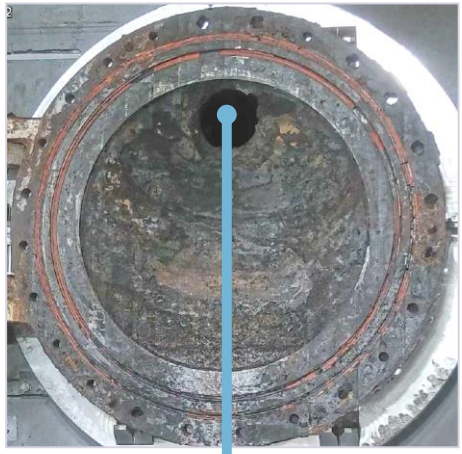
Credit: International Research Institute for Nuclear Decommissioning (IRID)



Status of X-6 penetration for inserting robotic arm

- When opening a hatch, we discovered the route is filled with deposits.
- We removed the deposits by utilizing a dozer rod, low and high pressure water, and abrasive water jet.

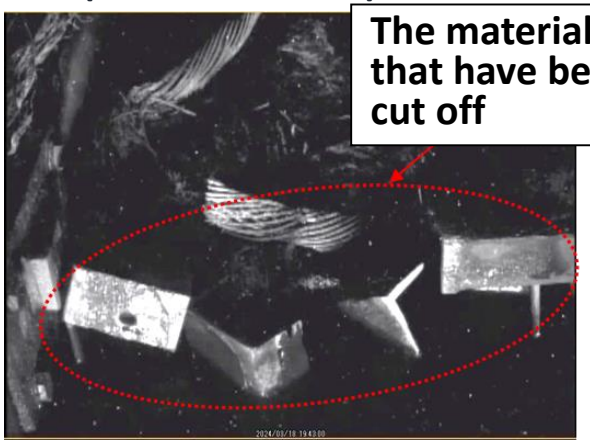
▼After opening a hatch of the X-6 penetration hole



The entrance for the past internal investigation

▼ After flushing low pressure water

▼ AWJ work is in progress (as of Mar. 2024)

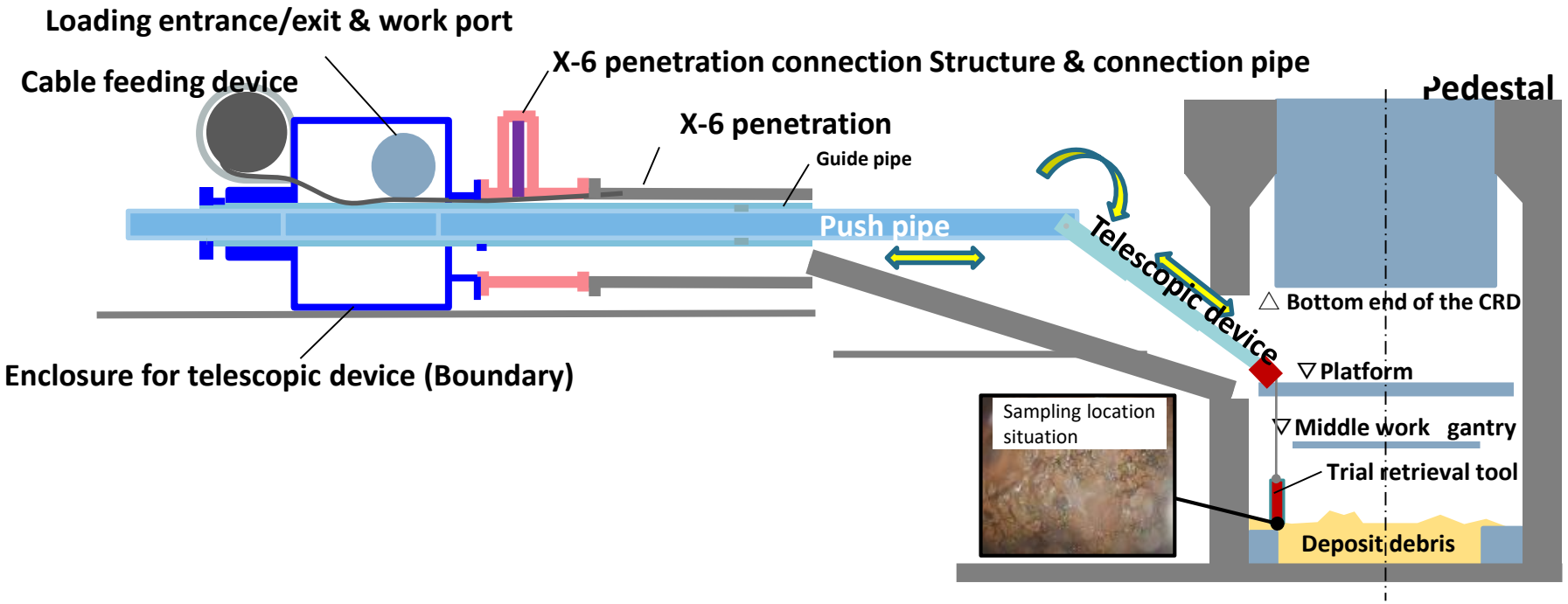


The materials that have been cut off

Equipment for removing deposits (for flushing high pressure water and using abrasive water jet)

Supplementary method for trial retrieval at Unit 2: telescopic device

- We decided to employ the telescopic device, which has been confirmed to be accessible to the bottom of the pedestal through past investigations, as supplementary method of internal investigation and trial retrieval.



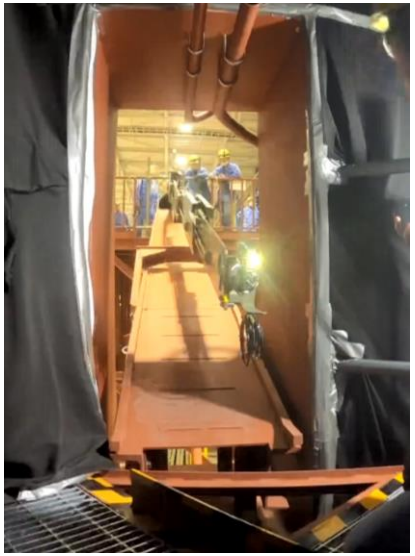
Outline of telescopic device

Status of Mockup of the Telescopic Trial Retrieval Equipment

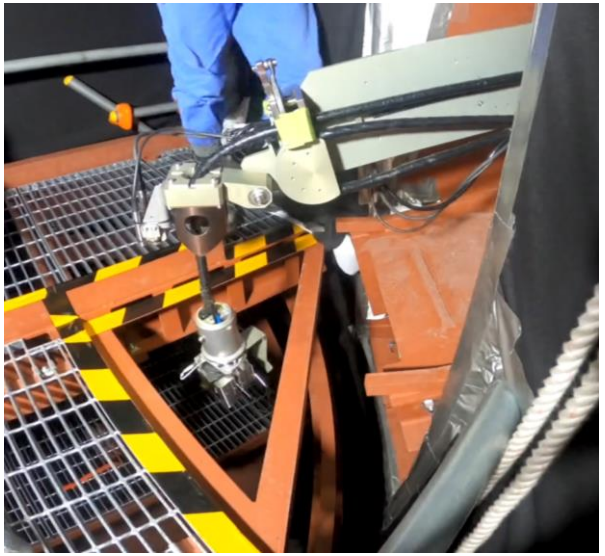
- Mockup testing is currently underway at the manufacturer's factory in preparation for the Unit 2 fuel debris trial retrieval .

Telescopic trial retrieval equipment (photo taken from above the equipment)

Inserting the guide pipe



Inserting the equipment into the pedestal opening



Suspending and lowering the end jig through the grating opening

Primary Steps of Unit 2 PCV Internal Investigations and Trial Retrieval

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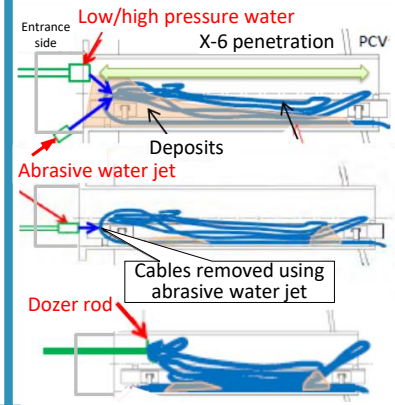
1. Isolation chamber installation

2. Opening of the X-6 penetration hatch

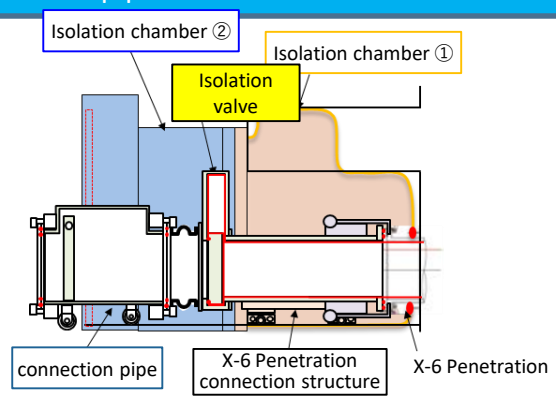
3. Removal of deposits from inside the X-6 penetration

Removing deposits/cables from inside the X-6 penetration



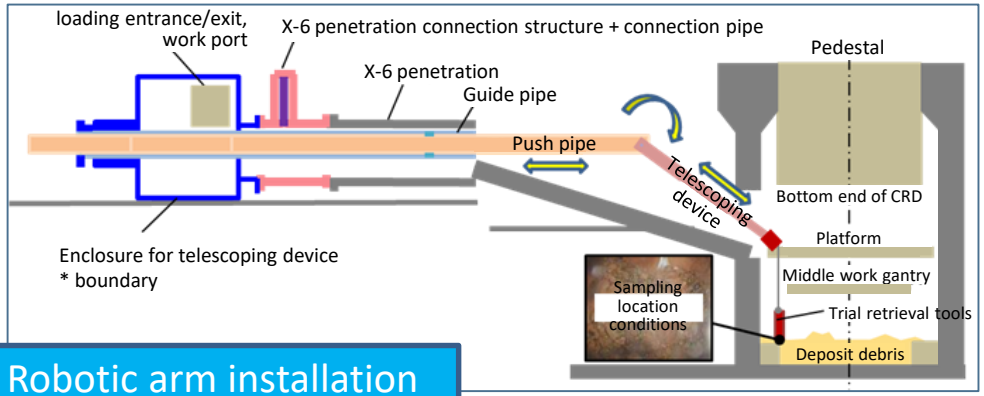
- Deposits pushed with low/high-pressure water
- Cables removed with Abrasive water jet
- Cables pushed with dozer rod

4. Installation of X-6 penetration connection structure and connection pipe

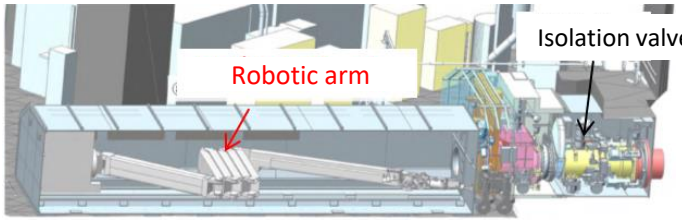


Approval application pending

5. Installation of telescopic device
6. Trial retrieval (debris sampling using telescopic device)

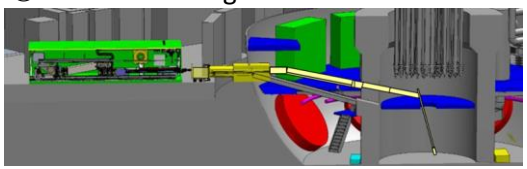


7. Robotic arm installation



8. Internal investigation/debris sampling using robotic arm

① Internal investigation



② Debris sampling using robotic arm

End of fuel debris recovery device

ALPS Treated Water Discharge Status Update

Tokyo Electric Power Company Holdings, Inc

Discharge record of FY2023

- There was no abnormality in tritium concentration both after dilution and discharge of ALPS treated water into the sea.
- No abnormality was found in external observation, etc. of dilution/discharge facility.

	Tank Group	Commenced	Completed	Discharge amount (before dilution)	Amount of tritium	Tritium Concentration after the dilution
1st discharge	Group K4-B	Aug. 24	Sep. 11	7,788m^3	Approx. 1.1 trillion Bq	Max. 220 Bq/liter
2nd discharge	Group K4-C	Oct. 5	Oct. 23	7,810m^3	Approx. 1.1 trillion Bq	Max. 189 Bq/liter
3rd discharge	Group K4-A	Nov. 2	Nov. 20	7,753m^3	Approx. 1.0 trillion Bq	Max. 220 Bq/liter
4th discharge	Group K4-B	Feb. 28	Mar. 17	7,794m^3	Approx. 1.3 trillion Bq	Max. 254 Bq/liter
Total	–	Aug. 24	Mar. 17	31,145m^3	Approx. 4.5 trillion Bq	

ALPS treated water discharge plan in FY2024

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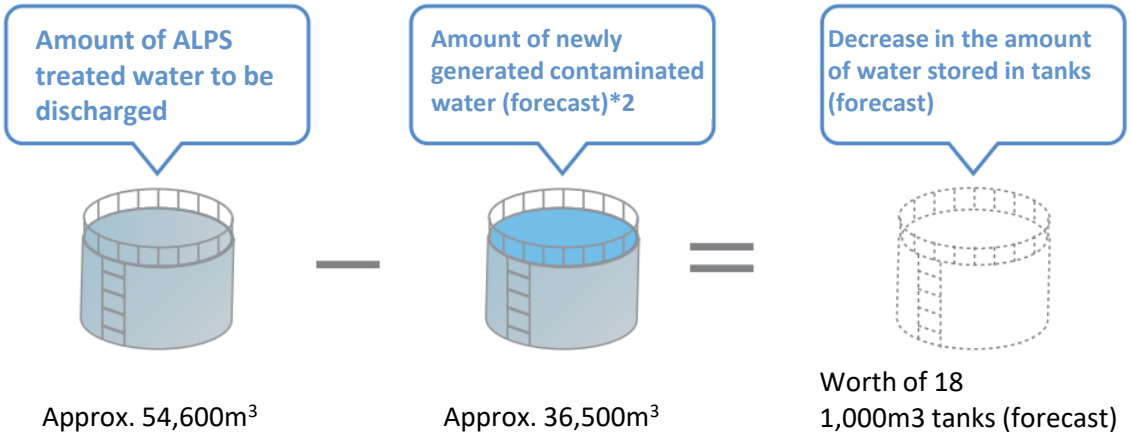
- In FY2024, 7 discharges are planned, and 54,600 m^3 of ALPS treated water with 14 trillion Bq of tritium is to be discharged.

	Commencement	Completion	Discharge amount (before dilution)	Amount of tritium
The 1st	April	May	Approx. 7,800m^3	1.5 trillion Bq
The 2nd	May	June	Approx. 7,700m^3	1.4 trillion Bq
The 3rd	June	July	Approx. 7,800m^3	1.3trillion Bq
The 4th	July	August	Approx. 7,800m^3	1.7 trillion Bq
The 5th	August	September	Approx. 7,800m^3	2.4 trillion Bq
The 6th	September	October	Approx. 7,800m^3	2.7 trillion Bq
The 7th	February	March	Approx. 7,800m^3	3.0 trillion Bq

An inspection is planned between the 6th and 7th discharge.

Site usage

- Due to the discharge of ALPS treated water during FY2024, we expect that we will be able to reduce 18 tanks of ALPS treated water stored in tanks
- We plan to use the J8 and J9 areas to construct facilities needed for the retrieval of fuel debris from Unit 3.
- During FY2024, the tanks in the J8※1 and J9 areas will be emptied and dismantling will begin



※1 Since the tanks in the J8 area store water that does not satisfy criteria for discharge into the environment and therefore needs secondary treatment, the water in these tanks will be transferred to tanks that have been emptied as fresh water has been replenished.
※2 As of March 2024, we have conservatively calculated the amount of contaminated water being generated daily as 100m³

The first and second discharge of ALPS treated water in FY2024

- The first discharge of ALPS treated water in FY2024 (Management No: 24-1-5) was commenced on April 19
- On April 24, discharge was automatically suspended due to the suspension of on-site power system A. Since there was no abnormality in ALPS treated water discharge facility, discharge was recommenced on 5:16 p.m. on the same day, and was completed on May 7 as scheduled.
- The second discharge of ALPS treated water in FY2024 (Management No: 24-2-6) is being conducted as follows.

FY 2024	Tank group	Tritium concentration	Commenced	Completed	Amount of discharge (scheduled)	Amount of tritium radioactivity (scheduled)
The 1st (24-1-5)	Group C	190,000 Bq/liter	April 19, 2024	May 7, 2024	7,851m^3	Approx. 1.3 trillion Bq
The 2nd (24-2-6)	Group A	170,000 Bq/liter	May 17, 2024	June 4, 2024 (scheduled)	Approx. 7,800m^3	Approx. 1.4 trillion Bq

1-1. Outline of the 6th discharge (Management Number: 24-2-6)

Outline of discharge for group K4-A			
Attributes of the treated water	Concentration of the 29 types of radionuclides (excluding tritium) in scope of measurement/evaluation	**Within regulatory requirements** (sum of the ratios of legally required concentrations of radioactive substances is less than 1) (sum of the ratios of concentration: **0.17**) (details on p1 of the link)	
	Tritium concentration	**170,000Bq**/liter (details on p2 of the link)	
	Concentration of the 39 significant types of radionuclides measured voluntarily	**No significant radionuclides identified** (details on p3 of the link)	
	Status of water quality assessment	**Within government and prefectural requirements** (details on p4 of the link)	
	Water temperature	Same as outdoor temperature. After diluted to 740 times (design dilution factor), same as sea water temperature (not the same as plant's thermal discharge)	
Expected volume of treated water discharge		**Approximately 7,800m^3**	

Status of Sea Area Monitoring

Tokyo Electric Power Company Holdings, Inc

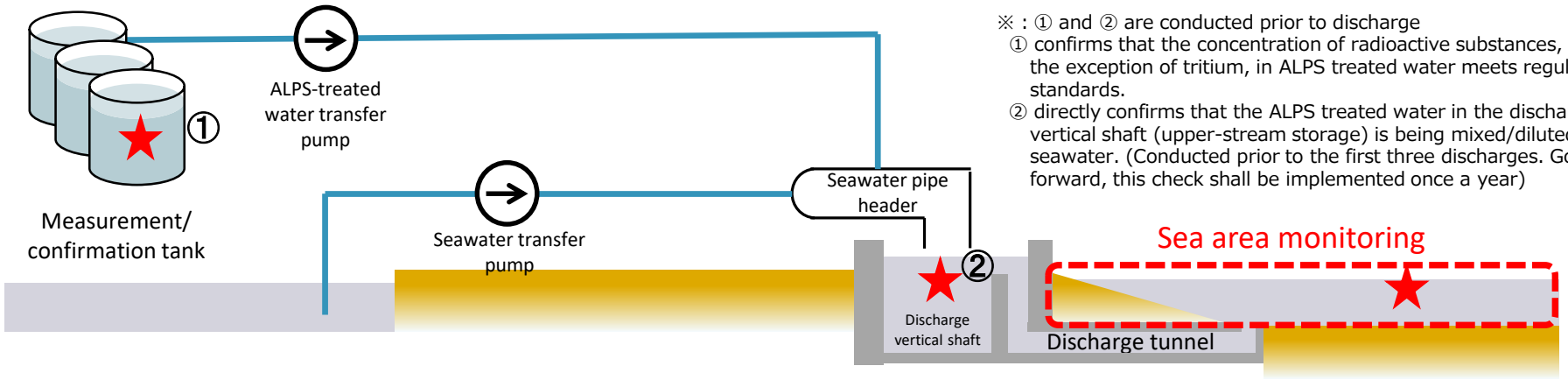
Sea area monitoring plan

【Formulating/implementing sea area monitoring plans】

○ As the entity in charge of the discharge of water treated with multi-nuclide removal equipment (ALPS treated water), we monitor sea areas while focusing on the area in the vicinity of the discharge outlet, and have increased the number of tritium measurement locations for seawater and fish along the coast of Fukushima Prefecture as well as in the vicinity of the power station. We have also formulated and revised sea area monitoring plans to include additional measurements of tritium and iodine 129 in the seaweed in the vicinity of the power station. (Announced on March 24, 2022)

○ In accordance with this revised sea area monitoring plan, we began taking samples on April 20, 2022 to ascertain conditions pertaining to tritium and marine organisms.

★ :Sampling locations



※ : ① and ② are conducted prior to discharge
① confirms that the concentration of radioactive substances, with the exception of tritium, in ALPS treated water meets regulatory standards.
② directly confirms that the ALPS treated water in the discharge vertical shaft (upper-stream storage) is being mixed/diluted with seawater. (Conducted prior to the first three discharges. Going forward, this check shall be implemented once a year)

Confirmation performed prior to the discharge and sea area monitoring

Sea area monitoring plan
Sampling locations（1/2）

- Since April 2022, we increased the number of sampling locations, subjects and frequency, and set detection limits so that they match the government's target values.
- An indicator for determining discharge suspension (discharge suspension level) and an indicator for determining if any issues need to be addressed at any time before this suspension level has been reached (investigation level) were set for the concentration of tritium in seawater

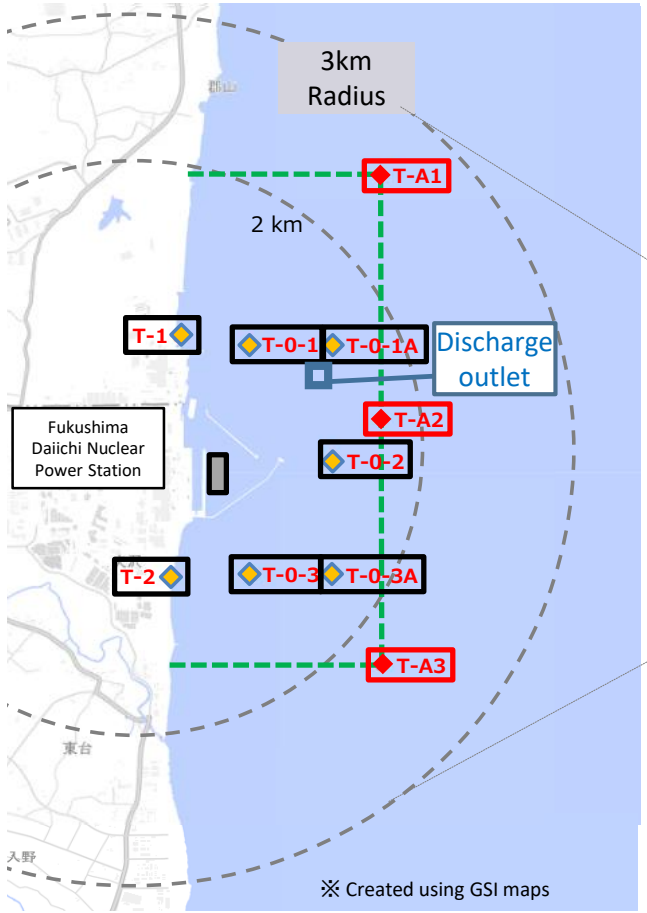


Figure 1.
Power station vicinity (within a 3km radius outside the port)

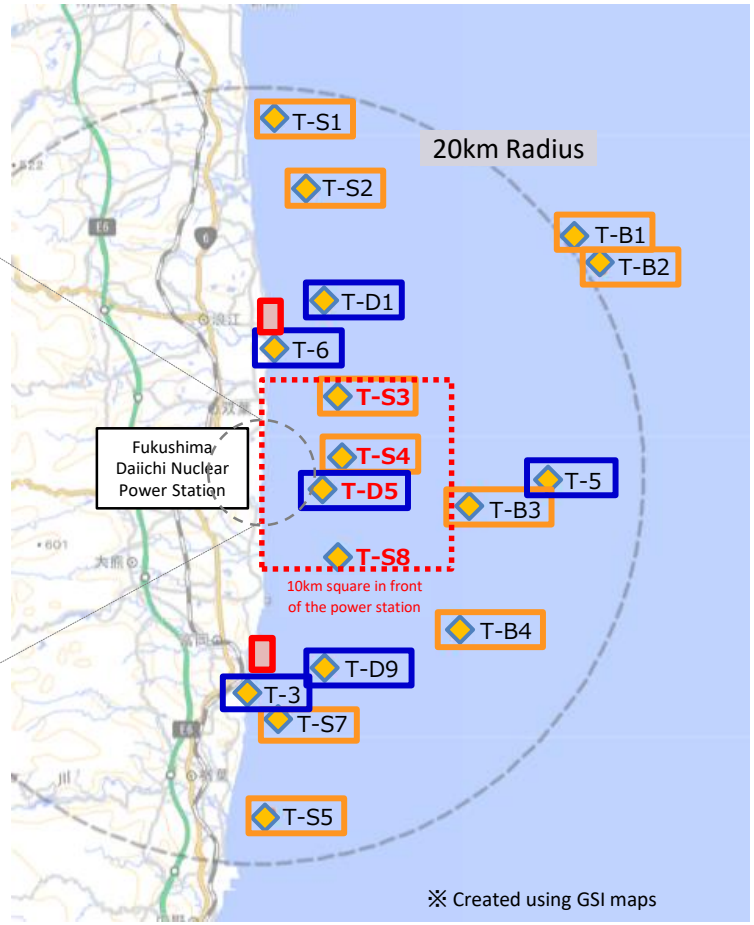


Figure 2.
Within a 20km of the shoreline

【Sampling points enhanced since FY2022】

- : Locations where the detection limit was lowered (seawater)
- : Locations were sampling was added (seawater)
- : Locations where frequency was increased (seawater)
- : Locations where tritium measurement was added in addition to cesium measurement (seawater, fish)
- : No changes (seaweed)
- : Locations where sampling was added (seaweed*1)
- : Area where fishing is not conducted on a daily basis*2
  E-W1.5km N-S3.5km

*1：Sampling locations were selected depending on growth conditions
*2：Area for which no common commercial fishing rights exist

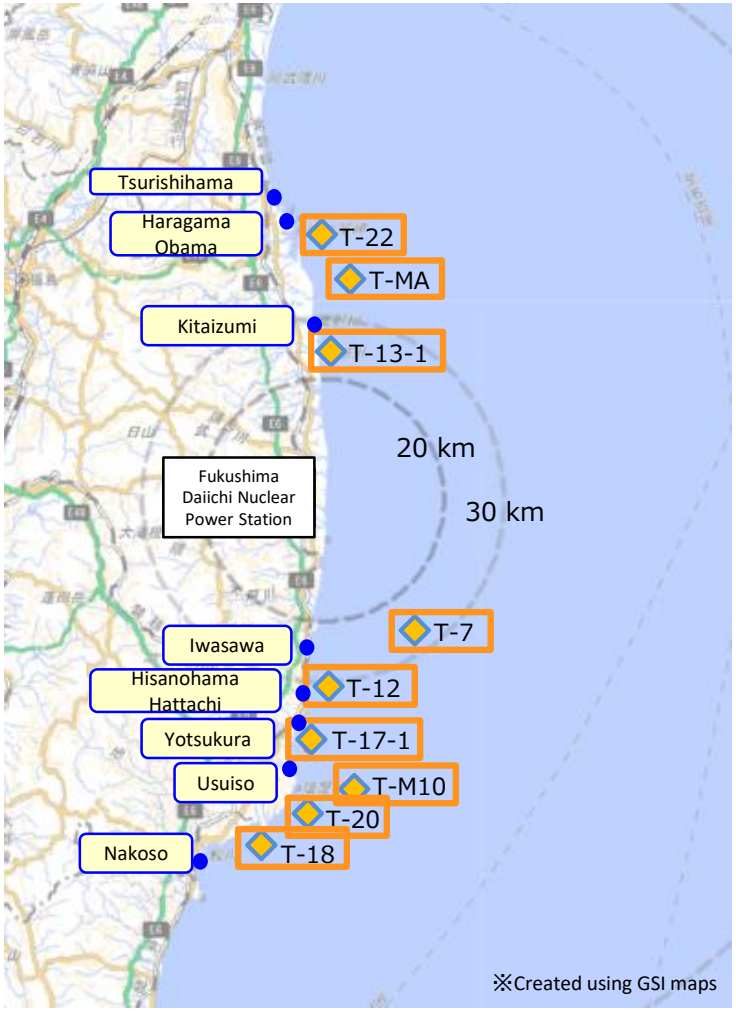
※The symbols and locations of T-A1, T-A2 and T-A3 in Figure 1 have been corrected so that they match the Comprehensive Monitoring Plan rather than the Sea area monitoring plan publicly disclosed on March 24, 2022

Red letter T-○：Locations (10) where indicators (discharge suspension level, investigation level) have been set. Indicator (discharge suspension level): 700Bq/liter; indicator (investigation level): 350Bq/liter
Measurements that enable quick results to be obtained are additionally implemented in order to check to see if conditions differ from normal (tritium detection limit set at below 10Bq/liter)

Red letter T-○：Locations (4) where indicators (discharge suspension determination level, investigation level) have been set. Indicator (discharge suspension determination level): 30Bq/liter; indicator (investigation level): 20Bq/liter
Measurements that enable quick results to be obtained are additionally implemented in order to check to see if conditions differ from normal (tritium detection limit set at below 10Bq/liter)

Sea area monitoring plan
Sampling locations （2/2）

・Since April 2022, the number of sampling locations for analyzing tritium in seawater was increased.



【Sampling locations enhanced in April 2022】

▭ : Locations where tritium measurement was added in addition to cesium measurement (seawater)

● : Major beaches in Fukushima prefecture

Figure 3.
Outside of a 20km radius off the coast

＜Reference＞ Concentration ranges observed to date

The following charts show the observed range of measured concentrations since prior to the commencement of discharge

【 Seawater 】

Range observed after the commencement of discharge		Tritium concentrations (Bq/liter)	Cesium 137 concentrations (Bq/liter)
Within a 3km radius outside the port	Maximum - minimum values detected during August 2023 - March 2024	0.045 - 14	0.0088 - 0.91※
Within a 20km radius of the shoreline	Maximum - minimum values detected during August 2023 - March 2024	0.071 - 1.4	0.0012 - 0.11
Outside a 20km radius off the shoreline	Maximum - minimum values detected during August 2023 - March 2024	0.071 - 0.13	0.0012 - 0.0058

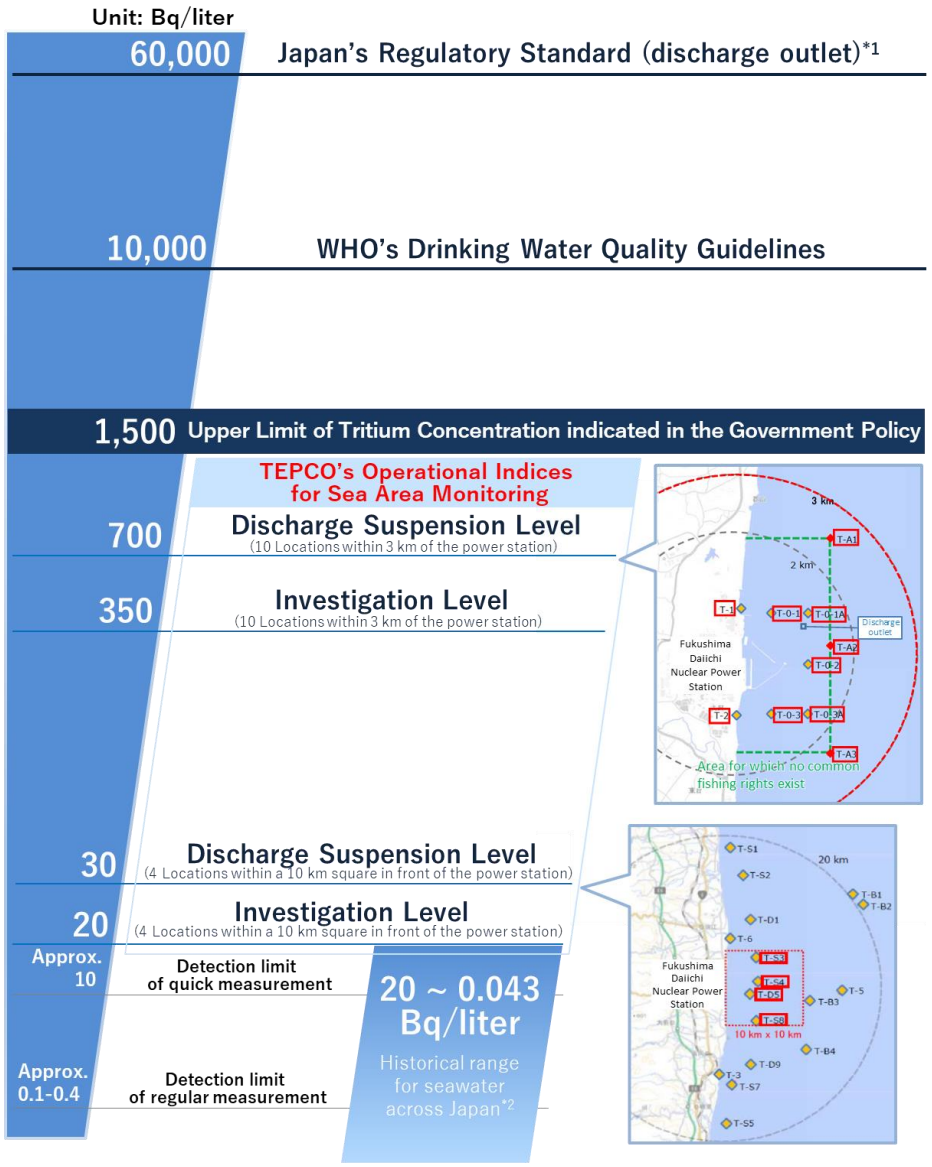
※： Includes temporary spikes attributed to rainfall

【 Fish/seawater 】

Observed range		Tritium concentrations (Bq/liter)	
		Fish (free water tritium)	Seawater (fish sampling locations)
Prior to discharge	Maximum - minimum values detected during May 2022 - August 2023	0.053 - 0.18	0.037 - 0.39
After the commencement of discharge	Maximum - minimum values detected during August 2023 - November 2023	0.054 - 0.20	0.062 - 0.25

Comparison of tritium concentration in seawater

- Tritium concentrations measured during sea area monitoring after the commencement of discharge fall well below TEPCO's indicators, such as investigation level.
- In the future, it is possible that concentrations of tritium in the seawater may be affected by the concentrations of tritium in the ALPS treated water that is discharged, and exceed those observed in the past.
- However, even if this occurs, sea dispersion simulation results for discharged water performed during the radiological impact assessment have shown that these fluctuations will be within predicted levels and below the investigation level.



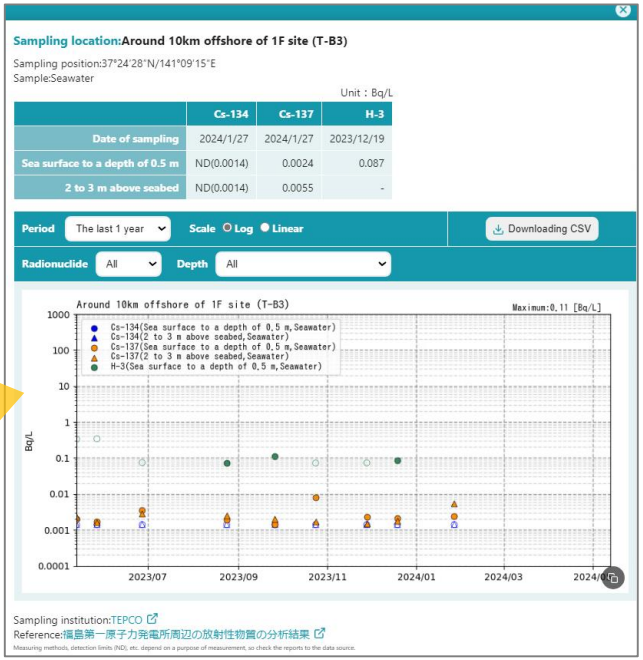
*1: This standard has been stipulated based on the calculation that if a person were to drink approximately 2L of the water coming out of the discharge outlet of a nuclear facility every day for one year, his/her exposure would be 1mSv.
*2: Source: Environmental Radioactivity and Radiation in Japan (Period: April 2019 to March 2022)

Fukushima Prefecture Sea area monitoring results

- Since the commencement of discharge, tritium concentrations that have been measured in the seawater fall below TEPCO's operational indicators and it ensures that the discharge of ALPS treated water has been performed safely as planned.
- In addition to data from TEPCO, data from each agency engaged in Sea area monitoring in Fukushima Prefecture can all be found on the Overarching radiation-monitoring data Browsing system (ORBS) website.

Clicking a measurement point will show graphs for radioactive substances and its concentration trends for that location

Screen image of “Overarching radiation-monitoring data Browsing system ”



Overarching radiation-monitoring data Browsing system （ORBS）
https://www.monitororbs.jp/en/

Contaminated water and countermeasures

Tokyo Electric Power Company Holdings, Inc

Three Policies for contaminated water countermeasures

Policy 1	Removing source of contamination

① Purification of contaminated water using ALPS, etc.

② Removal of contaminated water from trenches (Underground tunnel with piping)

Policy 2	Isolating water from contamination source

③ Pumping up groundwater using groundwater bypass system

④ Pumping up groundwater using subdrain wells

⑤ Installation of Land side Impermeable wall (Ice Wall)

⑥ Ground facing to prevent rain water from penetrating into the ground (site paving)

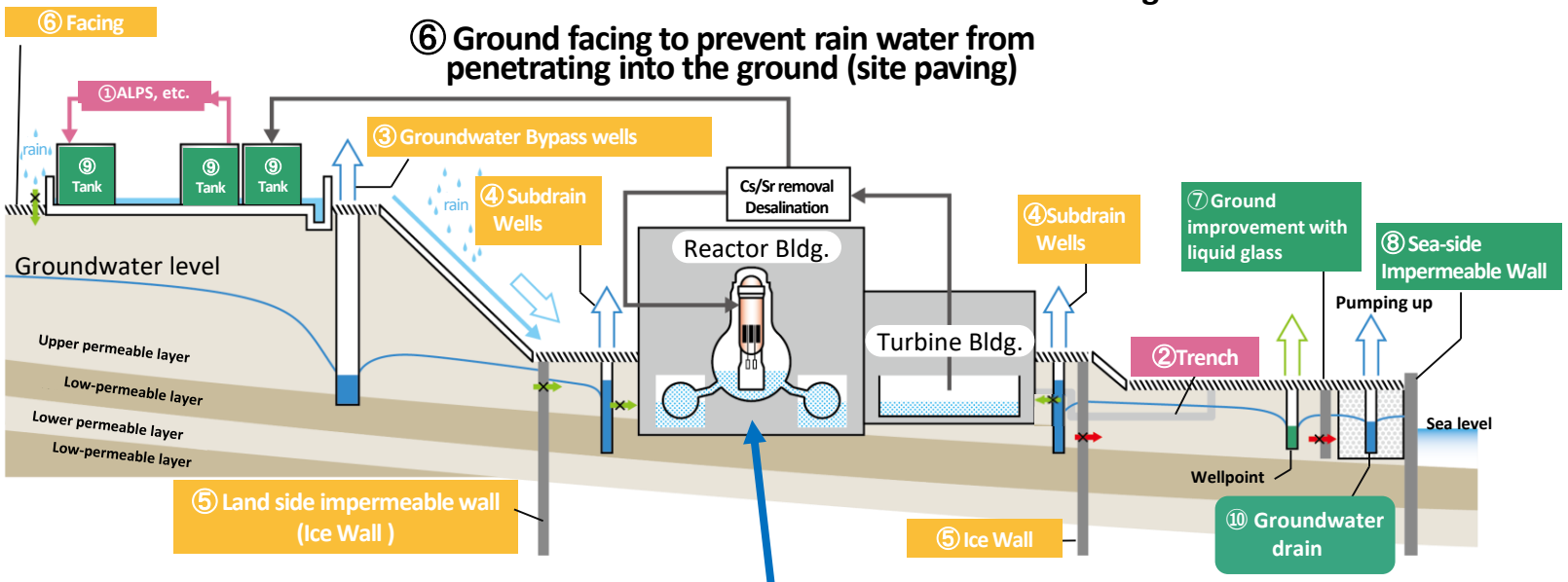
Policy 3	Preventing leakage of contaminated water

⑦ Ground improvement with liquid glass

⑧ Installation of Sea side Impermeable Wall

⑨ Replacing assembled tanks with welded tanks

⑩ Pumping up groundwater using groundwater drain



※Removal of contaminated water in turbine building was completed

Reduction in contaminated water generation ～ ground facing (pavement)～

- Ground facing aims to prevent the penetration of rain water into the ground and the generation of groundwater.
- About 50% of ground facing was completed in the entire area (about 60,000m^2) surrounding Units 1 to 4 buildings.

<Facing in the west side of Unit 3 (Photo of the construction)>

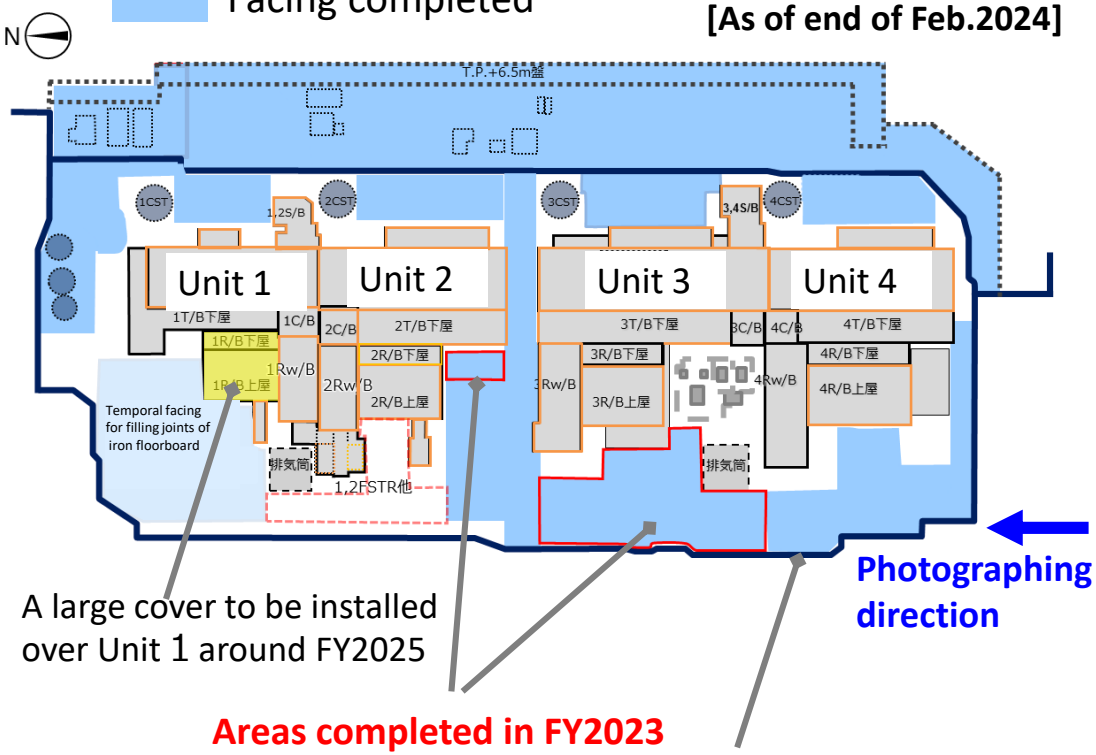
Work area in FY2023 extended to the road between Unit 2 & 3

Landside impermeable wall (Ice wall) installed

<Progress of facing around Unit 1-4>

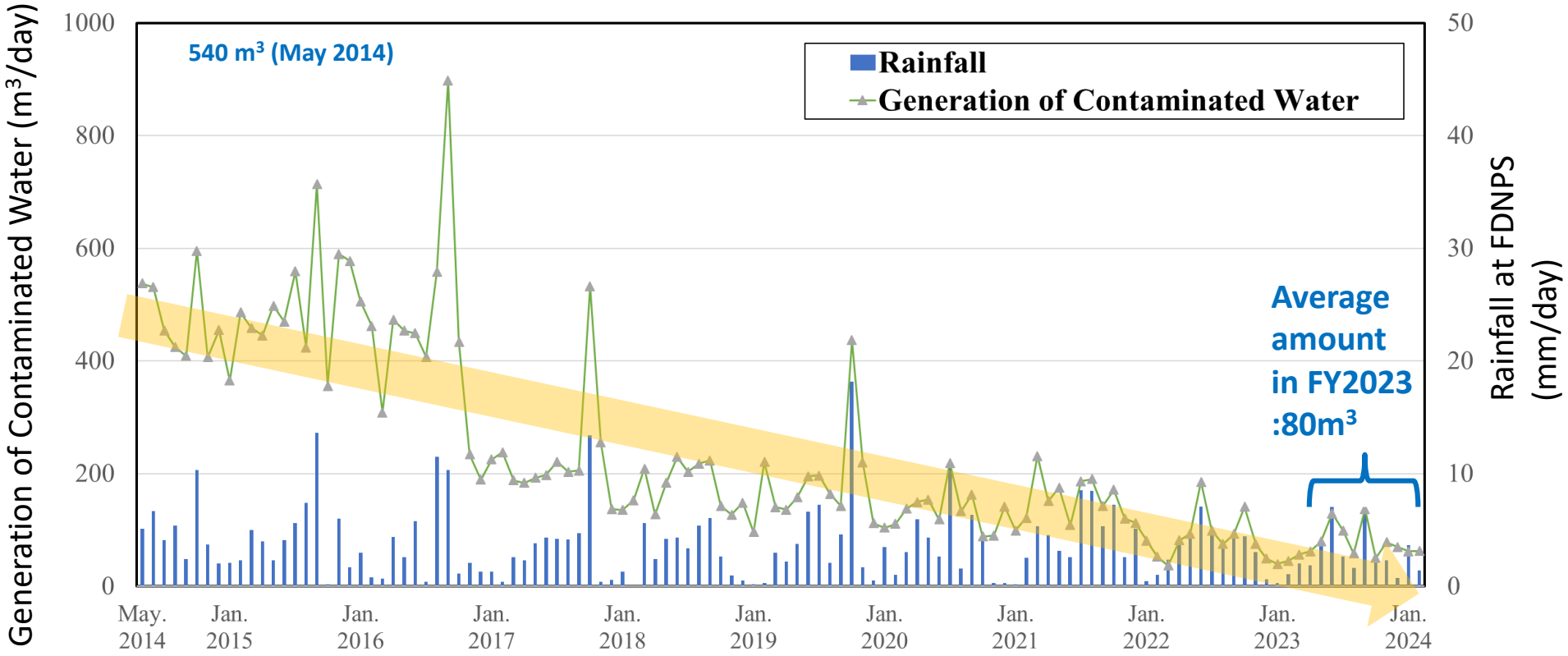
Facing completed

[As of end of Feb.2024]



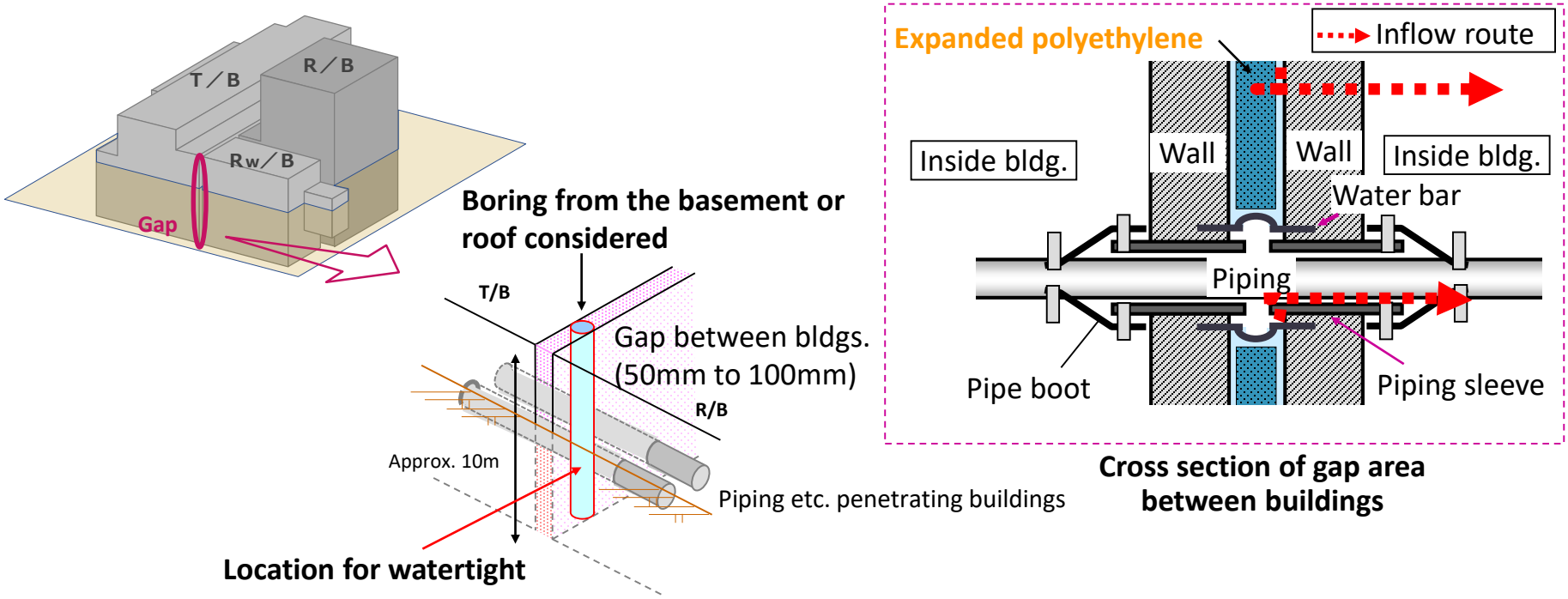
Progress in the effort to reduce contaminated water generation since 2014

- While the milestone set in the Mid-and-Long-Term Roadmap is to reduce the generation of contaminated water to 100 m^3/day in 2025, the latest data in FY2023 show that it has been reduced to 80 m^3/day.
- We aim to reduce the generation to 50-70m^3/day in FY2028.



Reduction in contaminated water generation ～waterproofing at the gap between buildings～

- Since many pipes are penetrating through gaps between the buildings, it is likely that groundwater is seeping into the buildings from the outside walls. Therefore, we will watertight the edges of the gaps.
- For the gaps between the buildings, we are planning to bore the outside wall of the edges of the gaps and construct watertight part by filling the drilled parts with materials such as mortar.



Concept diagram of watertight between buildings