Japan's Side Event

Current status of the decommissioning in Fukushima Daiichi Nuclear Power Station

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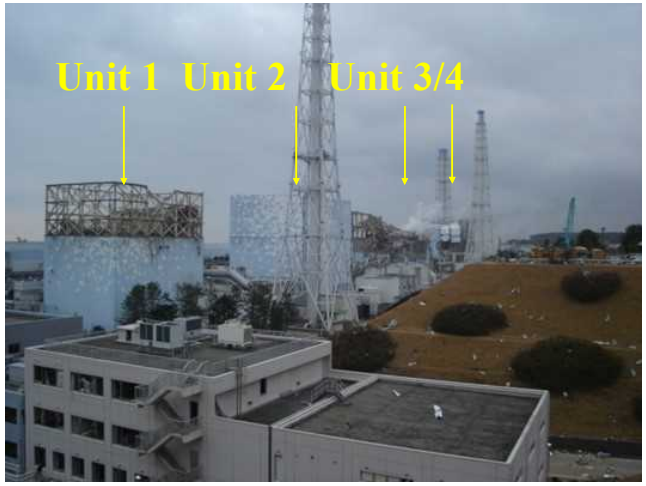
Accident at Fukushima Daiichi in March 2011

Unit	1	2	3	4	5	6
Operating on Mar. 11	●	●	●	–	–	–
Meltdown	●	●	●	–	–	–
Explosion	●	–	●	●	–	–

Currently, Units 1 to 3 are in cold shutdown status



1. The latest work toward decommissioning

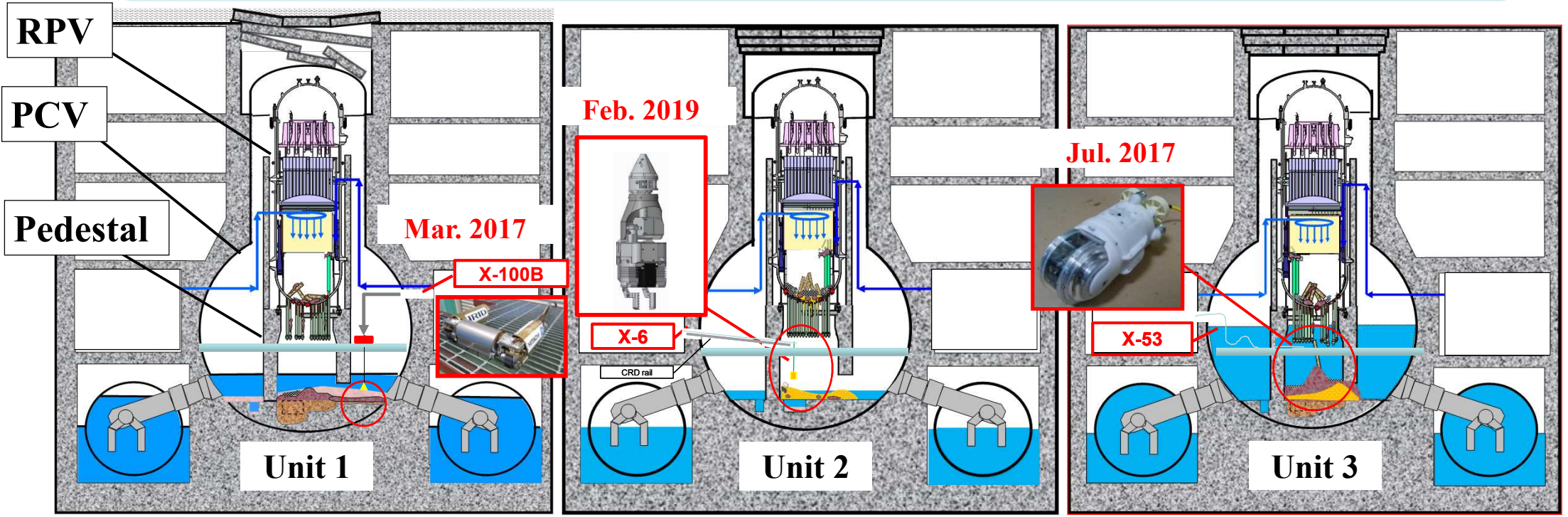
IRID has contributed to some work shown here

Assumed distribution of fuel debris in Units 1 to 3 reactor buildings

Robotic exploration

Analysis of accident progression

Muon Survey



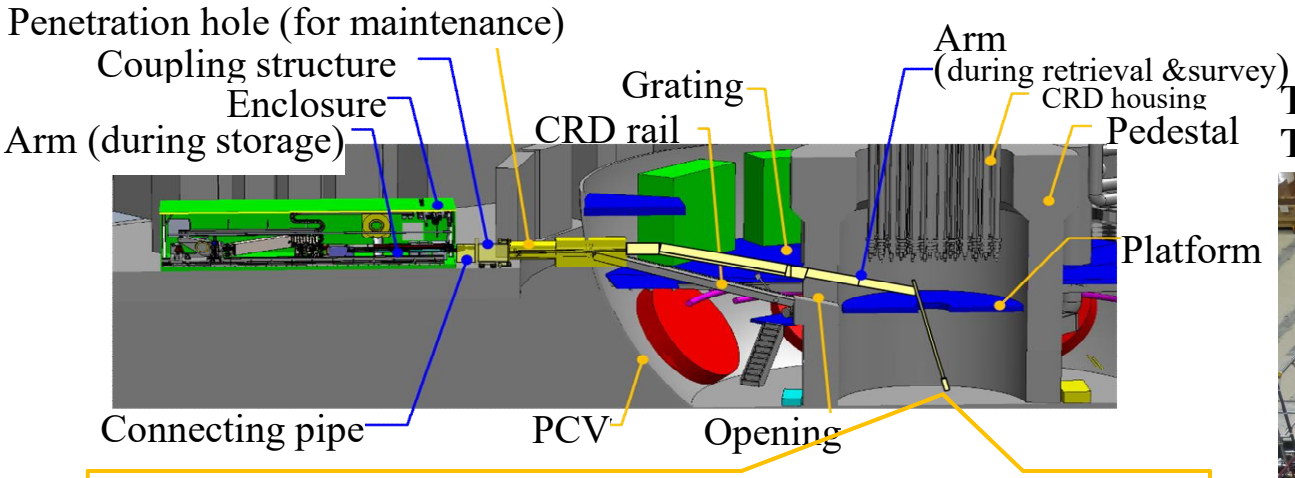
Trial retrieval to start at Unit 2 in the near future

1-1 Preparation for Fuel Debris Retrieval at Unit 2

IRID has contributed to some work shown here

Equipment for trial retrieval and internal investigation at Unit 2

■ **Tuning of systems and devices for the robot arm, and training are being conducted.**



Investigation Item	Measuring devices to be mounted
Detailed vision	Pan-tilt camera
3D rendering	Airborne laser scanning equipment
Gamma ray dose rate	Gamma camera
Neutron flux	Neutron detector

The robot arm (at Naraha Center for Remote Control Technology Development)

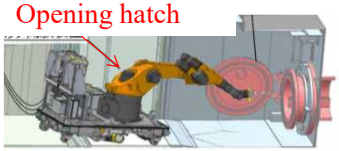
Source: IRID

Steps for trial fuel debris retrieval at Unit 2

1. Installing Isolation Room

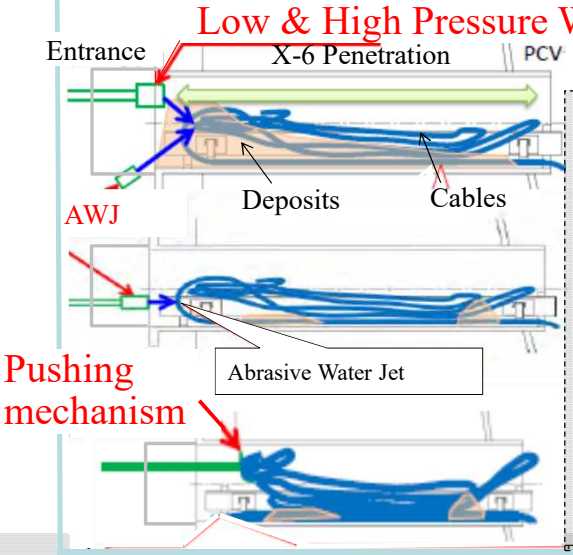
- Necessary before opening penetration hatch to PCV

2. Opening X-6 Penetration Hatch



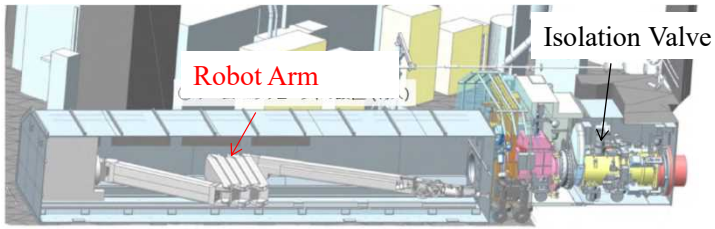
- Hatch Opening Machine

3. Remove deposits (incl. cables) inside X-6 penetration



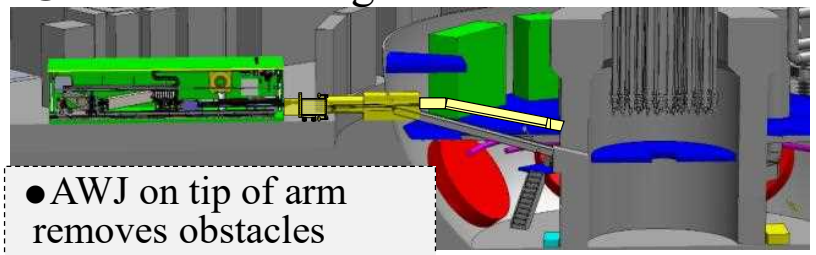
- Pushing deposits by low and high pressure water
- Removing cables with AWJ
- Pushing cables with pushing mechanism

4. Installing Robotic Arm System



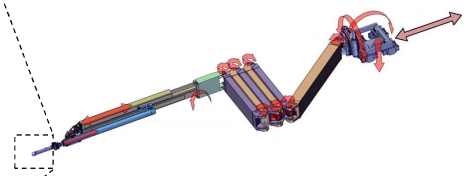
5. Internal investigation & trial retrieval

①Internal investigation



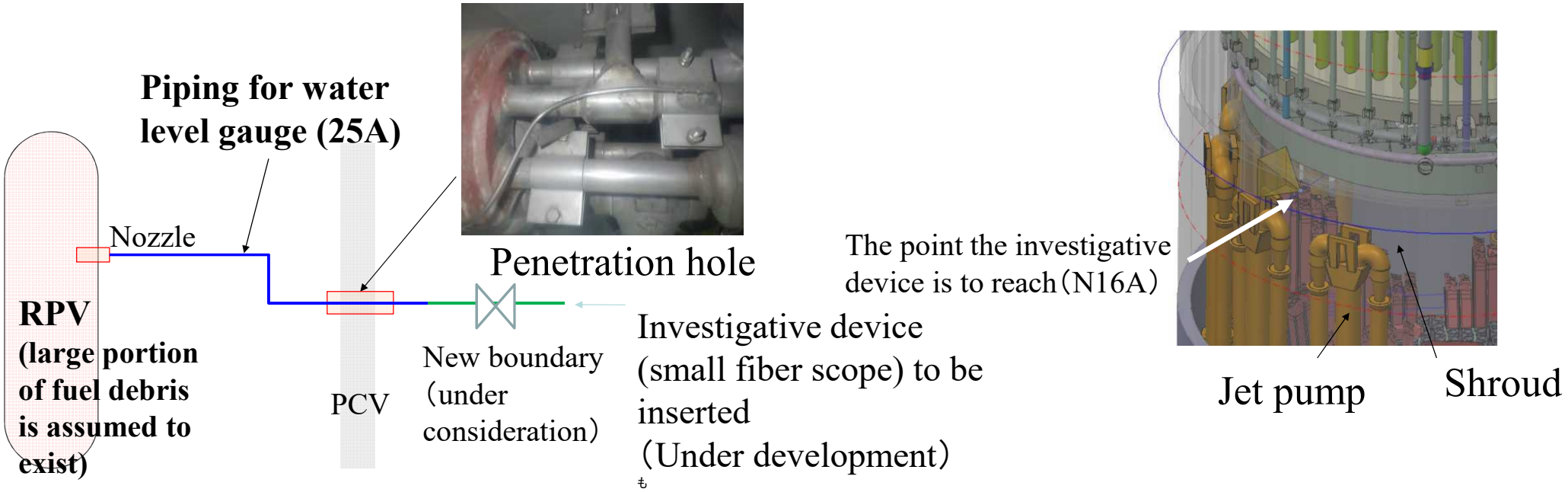
- AWJ on tip of arm removes obstacles

②Trial retrieval



Toward the internal investigation of the RPV at Unit 2

- **In FY2024, we will investigate the internal structures of the RPV to develop a fuel debris retrieval method. We will employ a fiberscope inserted through the RPV's water level gauge piping.**
- **As part of our preparatory work, we are currently conducting cleansing procedures within the PCV penetration hole. Our goal is to minimize radiation exposure during the investigation.**



Outline of the RPV internal investigation

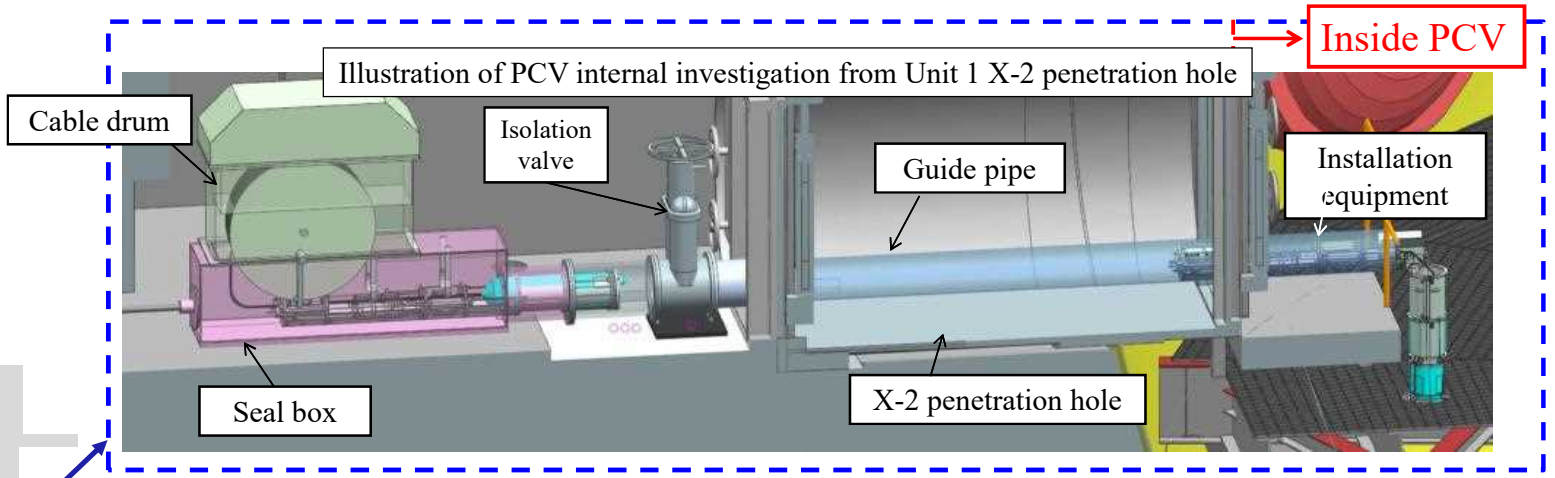
Interior part of RPV

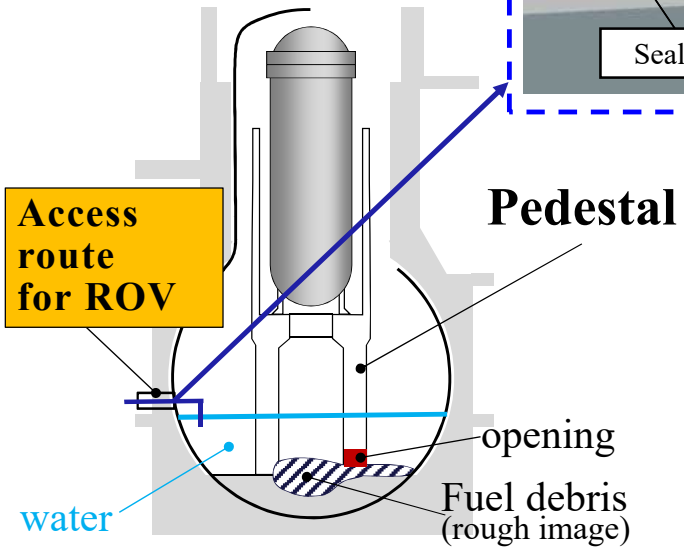
1-2 PCV Internal Investigation at Unit 1

IRID has contributed to some work shown here

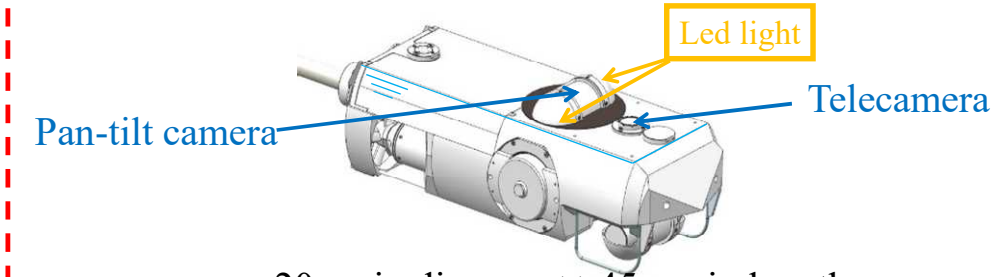
Unit 1 internal investigation using ROVs (from 2022 to 2023)

- **It is aimed to ascertain the distribution and properties of deposits etc. inside and outside the pedestal in order to consider methods and equipment for retrieving the fuel debris.**
- **Further accident progression analysis and assessment of pedestal integrity are being conducted based on the information obtained from the investigation.**



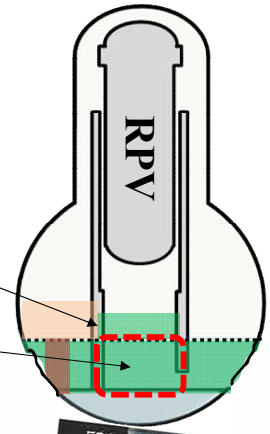


An example of investigative ROV (for taking detailed footage)



Key findings regarding the pedestal by ROV investigations at Unit 1

The observed base parts show concrete at the lower inner part of the pedestal eroded and rebars exposed.



Pedestal

Investigation Area

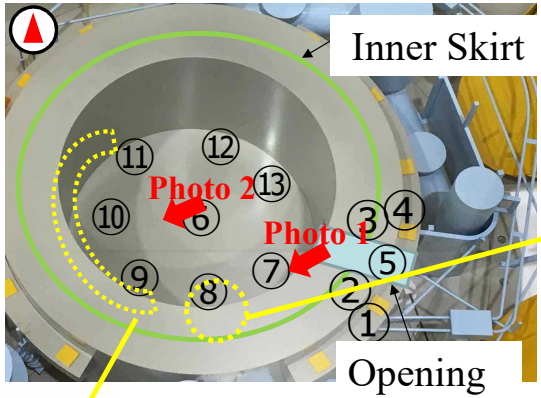


Photo 1: Point ⑧at pedestal base

(Key Findings)

-Pedestal concrete has been eroded around almost its entire circumference.
-The missing sections are all approximately the same height.

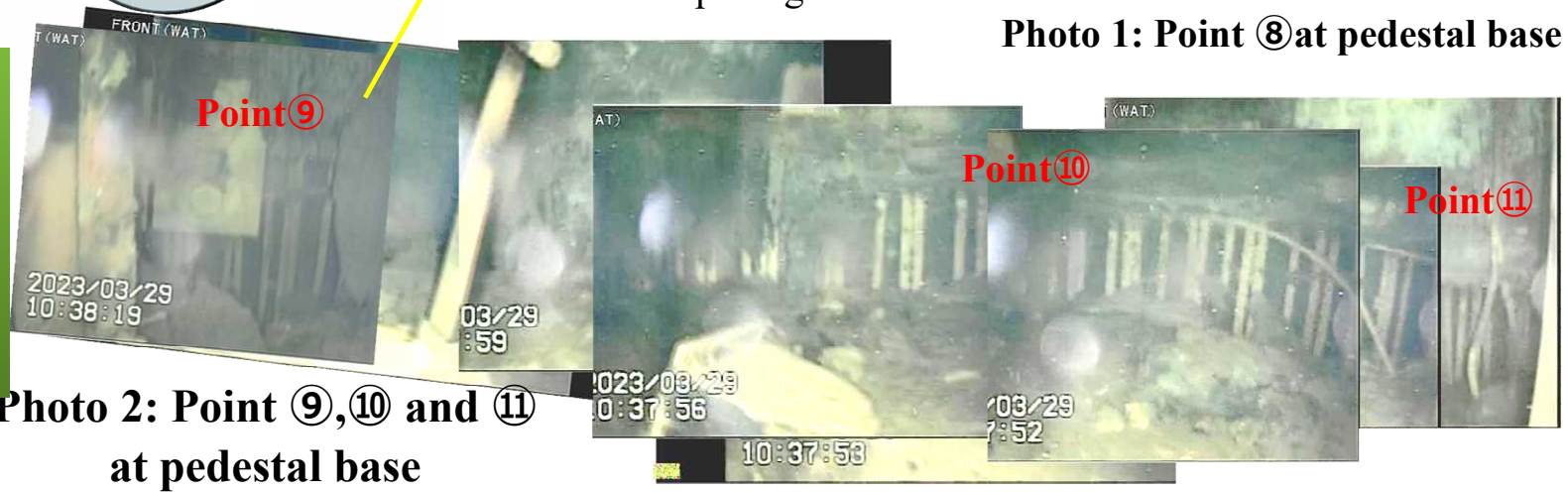


Photo 2: Point ⑨,⑩ and ⑪ at pedestal base

Assessment and measures based on the findings at Unit 1
(1) Evaluation of the strength of the inner skirt

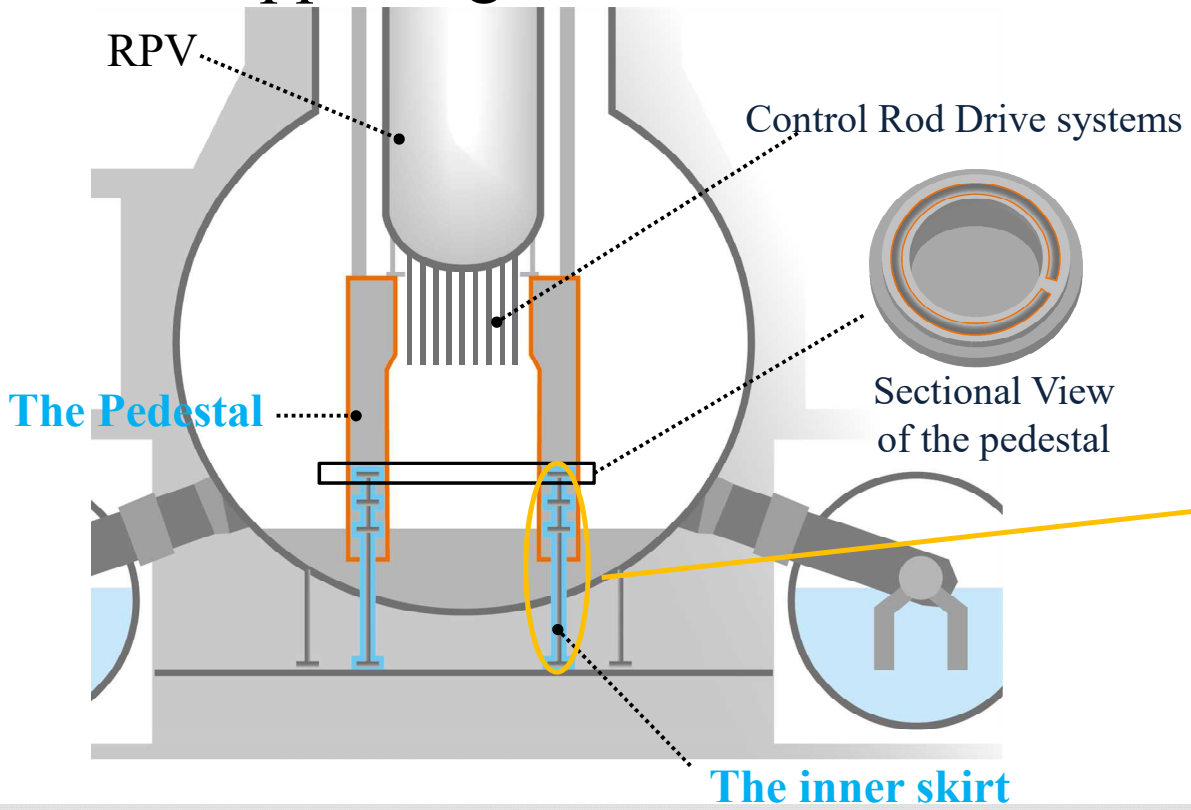
- **Three steps are being taken, considering that the concrete has been lost at the lower part of the pedestal.**

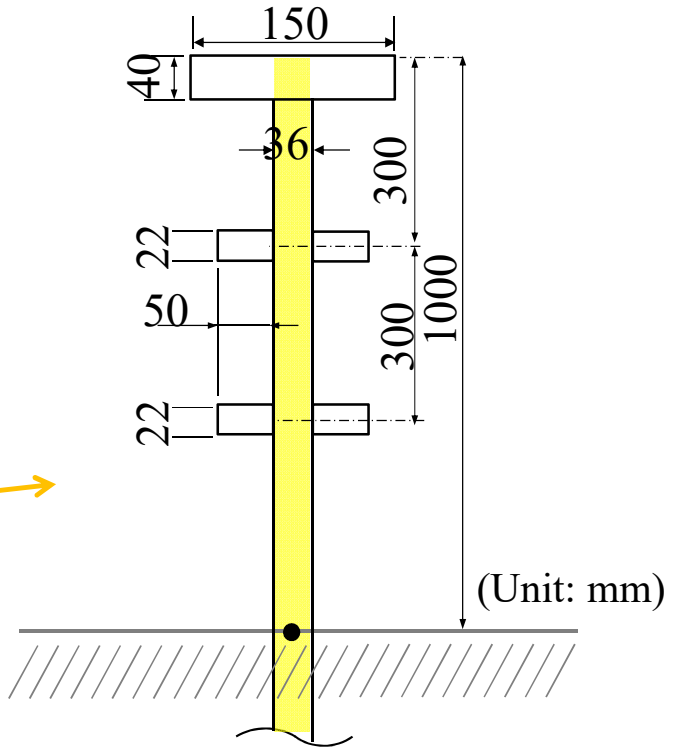
1. Assessment of the effects have been conducted by evaluating the strength of the inner skirt remaining in the pedestal. The result shows, even with the Mar. 2011 class earthquake, the structure will not suffer large scale collapse.

Assessment and measures based on the findings at Unit 1
(1) Evaluation of the strength of the inner skirt

- **Assuming an earthquake of 600gal, which is almost the same scale as the earthquake on March 11, 2011, we assessed the impact on the inner skirt.**
- **It was evaluated that the inner skirt could withstand the stress generated by a 600gal earthquake.**

Structure supporting the RPV before the accident





Size of inner skirt

Assessment and measures based on the findings at Unit 1
(2) Evaluation of the exposure dose at the site boundary based on the conservative assumption

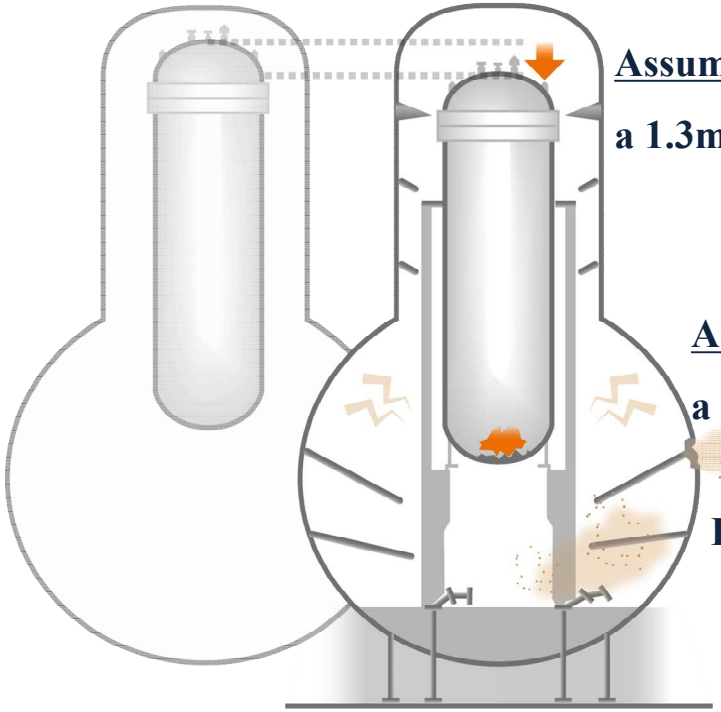
But, we shouldn't be complacent with the assessment result.

2. Assuming that the support function of the pedestal has deteriorated, a conservative scenario has been considered. The results indicate radiation levels of 0.03 to 0.04 mSv per incident at the site boundary, significantly below the 5 mSv per incident threshold for accident scenarios.

Assessment and measures based on the findings at Unit 1
(2) Evaluation of the exposure dose at the site boundary based on the conservative scenario

- **The additional exposure at the site boundary is estimated to be less than 0.04 mSv, even under conservative scenarios, such as "a 1.3m sinking of the RPV" and "a large opening in the PCV".**

An example of the conservative scenario



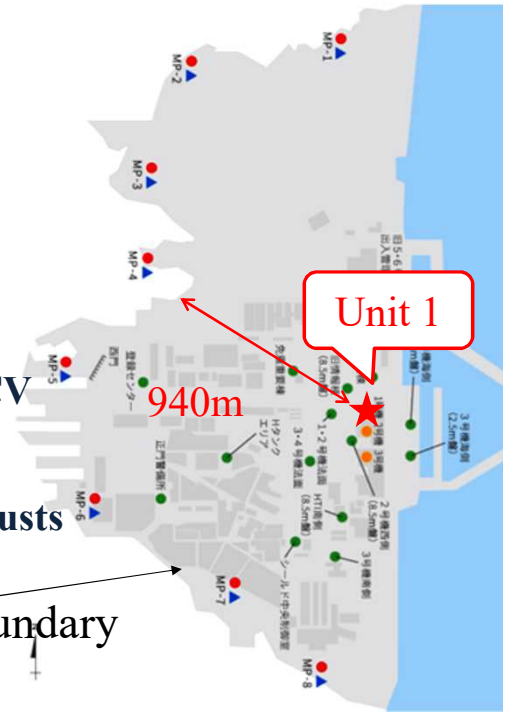
Assumption 1

a 1.3m sinking of the RPV

Assumption 2

a large opening in the PCV

Release of radioactive dusts



Assessment and measures based on the findings at Unit 1
(3) Consideration of mitigation measures in case of emergency

Mitigation measures to be prepared in case of emergency

3. In case of loss of the supporting function, measures to prevent the radioactive dust from dispersing will be in place.

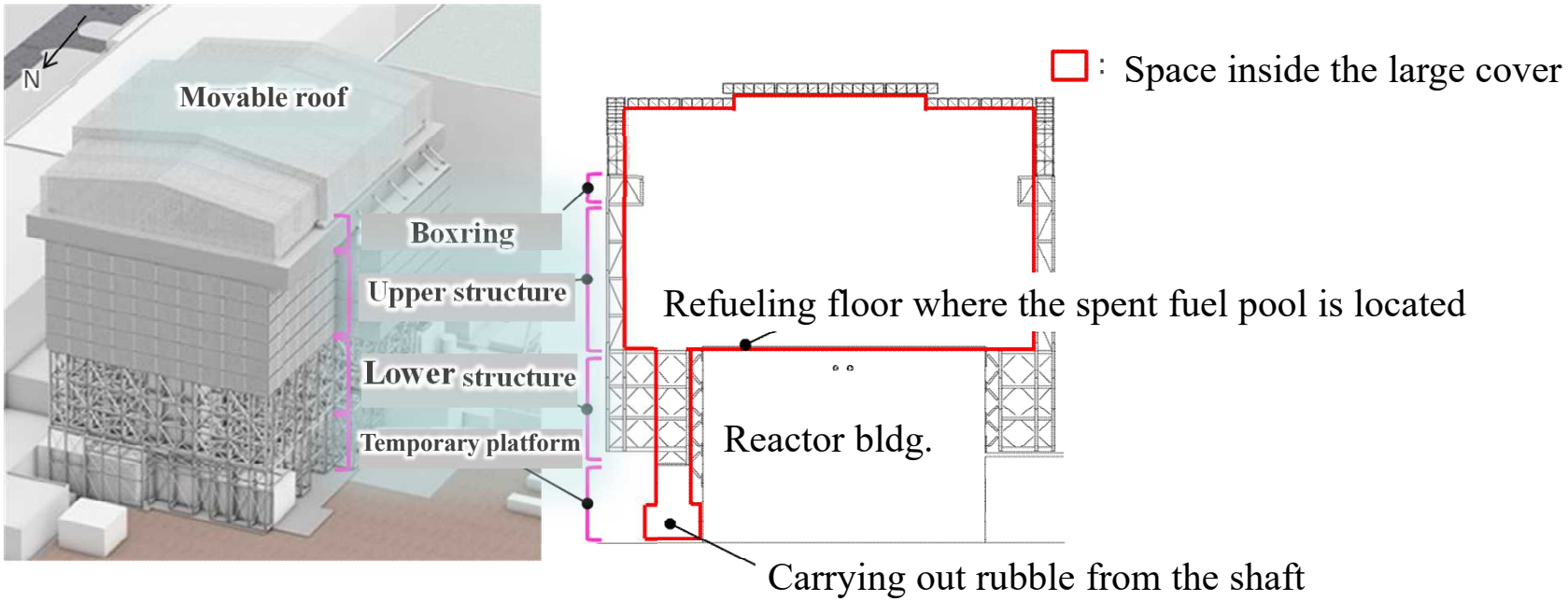
- Preparations are underway to halt nitrogen injection in the event of an emergency, guided by the principle that the nitrogen injection rate should be lower than the exhaust rate to facilitate dust leakage control.
- Agile responses
  - -Restoration of exhaust facilities using mobile equipment etc.

※ Installation of a large cover over the reactor building has already started as part of the preparations for spent fuel removal.

Containment of radioactive dust by installation of a large cover over Unit 1

- **In preparation for the removal of spent fuel from Unit 1's pool, rubble removal will be conducted under a large cover.**
- **The cover will be constructed with minimal gaps to reduce dust scattering.**
- **The cover will be equipped with a ventilation system that includes filters to prevent the dust from escaping into the atmosphere.**

Large cover for spent fuel removal from the spent fuel pool at Unit 1



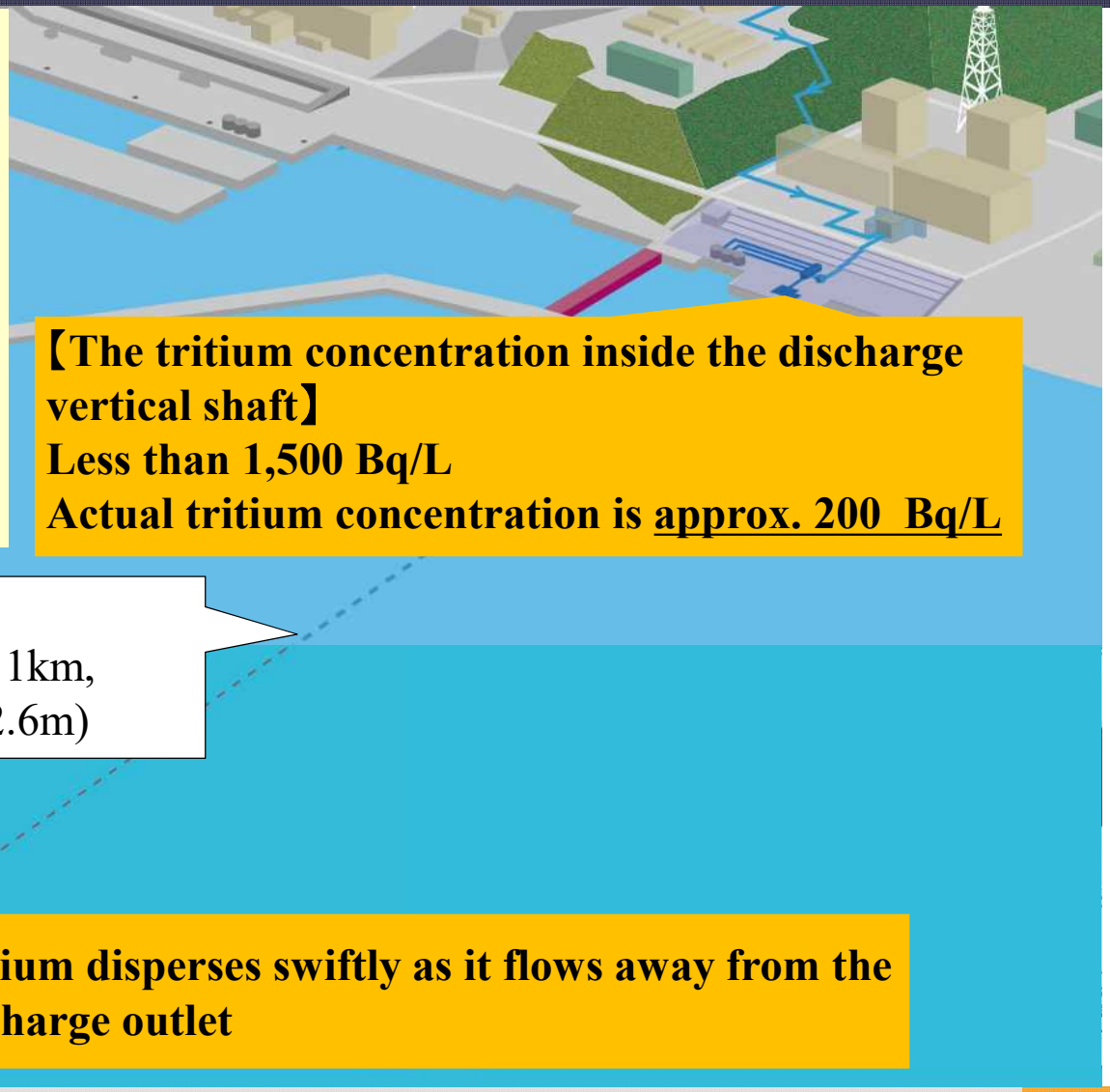
Overview of the large cover

2. ALPS treated water discharge

Design and operations for ALPS treated water discharge

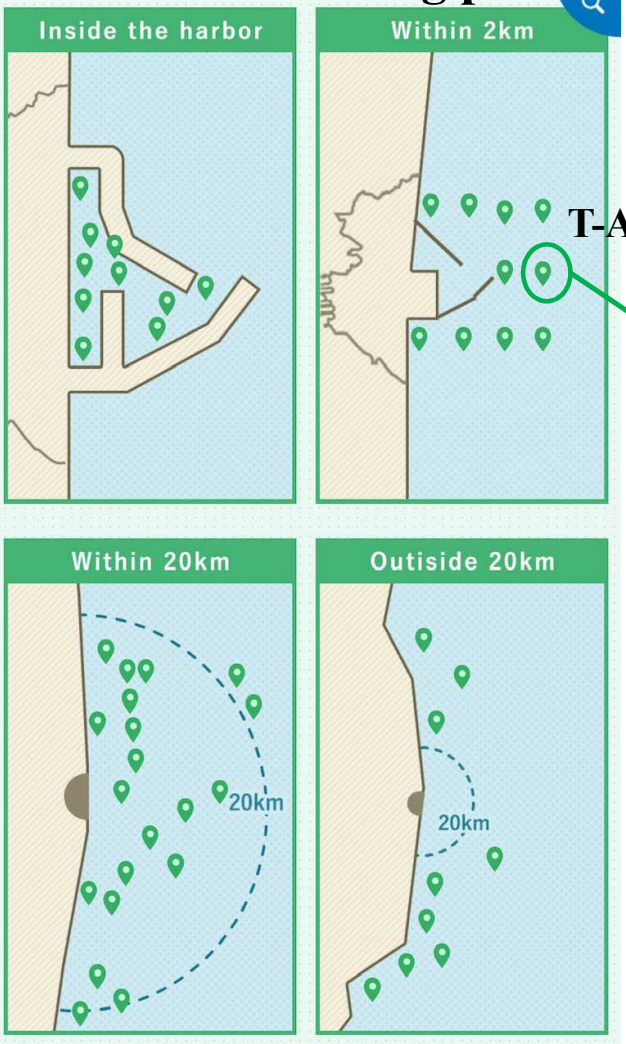
Start of ALPS treated water discharge (August 24, 2023)

- **A large volume of seawater is used to dilute ALPS treated water so that the tritium concentration falls well below the regulatory standard for discharge into the environment.**
- **The tritium concentration in the water to be discharged is less than 1,500Bq/L and the total amount of tritium to be discharged shall be kept under 22 trillion Bq/year.**
- **In the event of an emergency, emergency isolation valves will be closed to terminate the water transfer.**

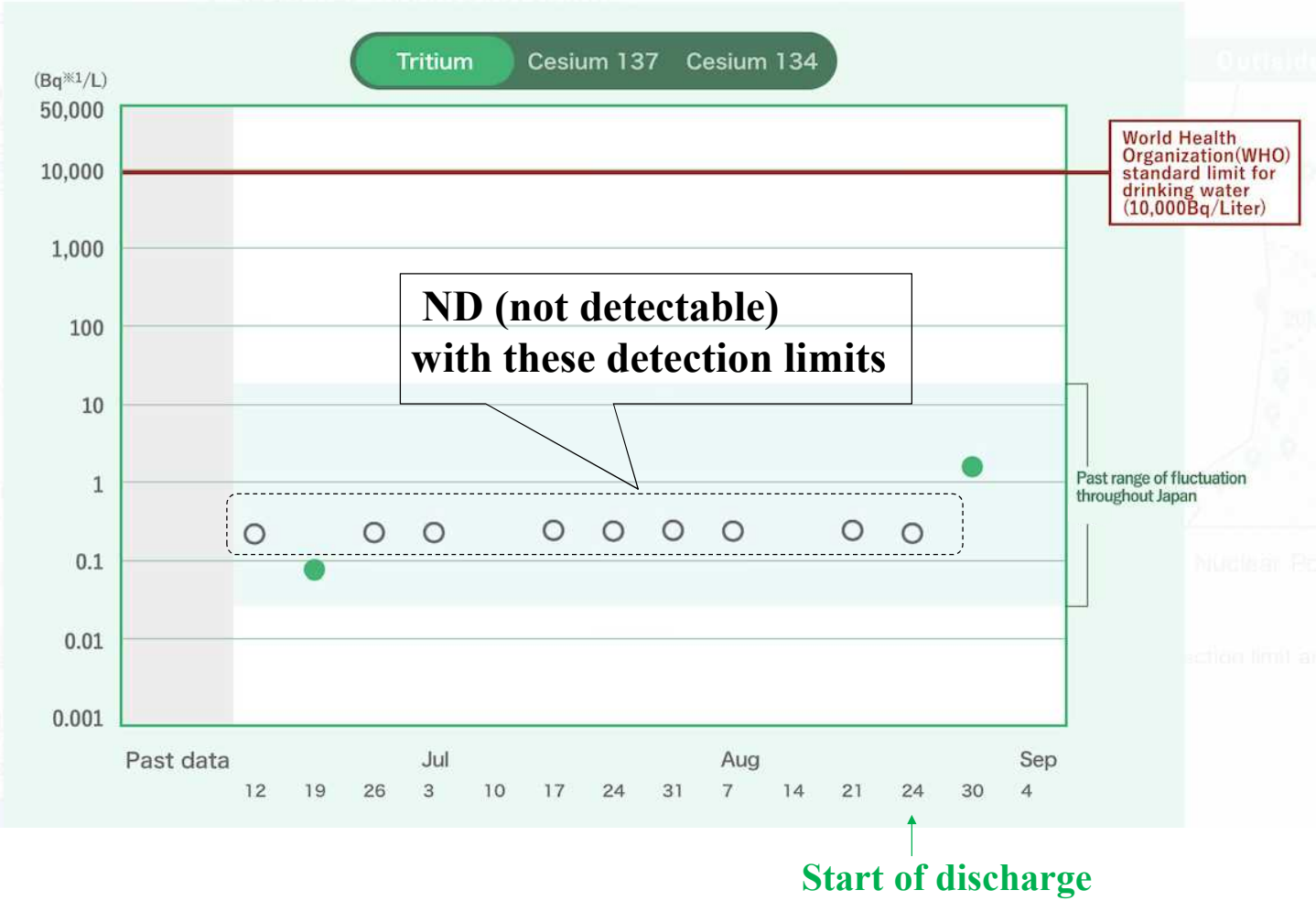


Sea area monitoring of Tritium etc.

TEPCO monitoring points



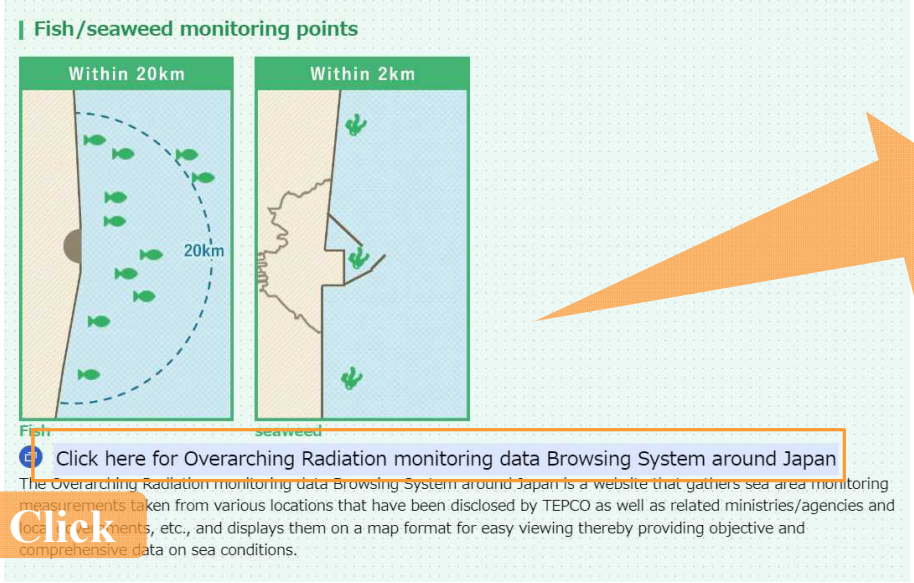
Examples at T-A2 point (1.5km off the Fukushima Daiichi Site)



Overarching Radiation-monitoring data Browsing System (ORBS)

- The system gathers sea area monitoring measurement results disclosed by TEPCO as well as related ministries/agencies and local governments, etc., and displays them in a map format for easy viewing.
- Monitoring data on the concentrations of cesium and tritium in seawater and fish sampled by Fukushima Prefecture, the Nuclear Regulation Authority, the Ministry of the Environment, and TEPCO are available for viewing.

Sea Area Monitoring Results (TEPCO website)



ORBS

https://www.monitororbs.jp

Establishment of an IAEA office at Fukushima Daiichi Nuclear Power Station

- President Kobayakawa of TEPCO has reached an agreement with IAEA Director General Grossi regarding the establishment of an IAEA office at the Fukushima Daiichi Nuclear Power Station to provide accommodation for IAEA staff during their site visits.
- This office is already operational and serving as a central hub for IAEA staff who have come to the site to address the issue of ALPS-treated water.


Thank you for your kind attention
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TEPCO