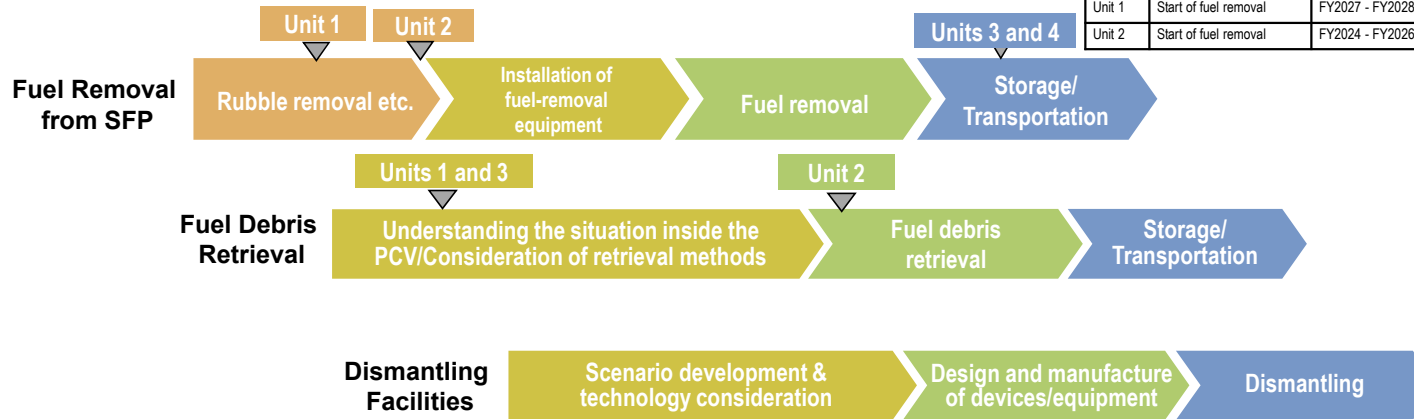


Main decommissioning work and steps

Fuel removal from the spent fuel pool was completed on December 22 2014 at Unit 4 and February 28 2021 at Unit 3.
Trial fuel debris retrieval at Unit 2 commenced from September 10 2024 and a milestone of the Mid-and-Long-Term Roadmap "Commencing fuel debris retrieval at the first Unit" was achieved.
Work continues sequentially toward the start of fuel removal from Units 1 and 2 and fuel debris (Note 1) retrieval from Units 1-3.
(Note 1) Fuel assemblies having melted through in the accident with nearby metal materials etc.

<Milestones in the Mid-and-Long-Term Roadmap>

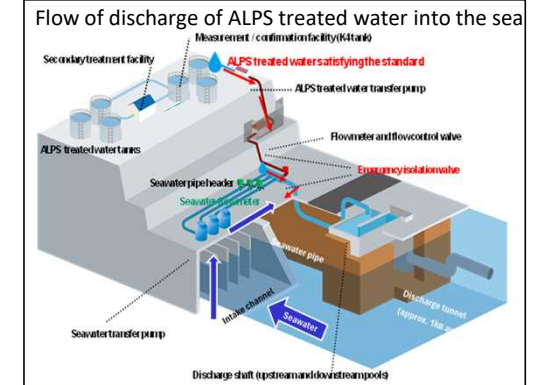
Units	Completion of fuel removal	Within 2031
Unit 1	Start of fuel removal	FY2027 - FY2028
Unit 2	Start of fuel removal	FY2024 - FY2026



Measures for treated water

Handling of ALPS treated water

Regarding the discharge of ALPS treated water into the sea, TEPCO must comply with regulatory and other safety standards to safeguard the public, the surrounding environment and agricultural, forestry and fishery products. To minimize adverse impacts on reputation, ongoing efforts will continue, including enhanced monitoring, ensuring objectivity and transparency by engaging with third-party experts and having safety checked by the IAEA. Moreover, accurate information will be disseminated with full transparency.



Contaminated water management - triple-pronged efforts -

(1) Efforts to promote contaminated water management based on the three basic policies

- "Removing" the contamination source
- "Redirecting" groundwater from the contamination source
- "Preventing leakage" of contaminated water

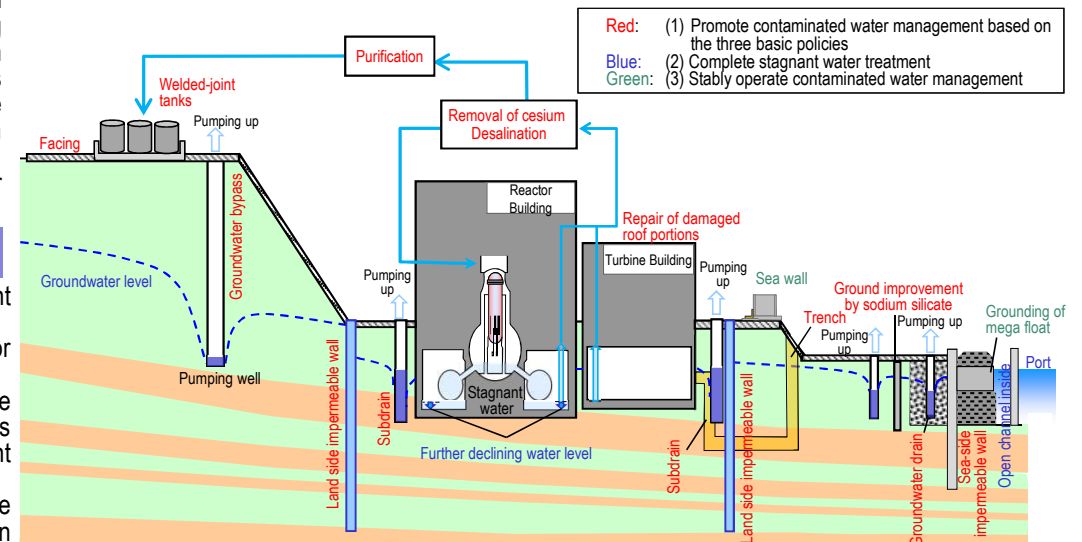
- Strontium-reduced water from other equipment is being re-treated in the Advanced Liquid Processing System (ALPS: multi-nuclide removal system) and stored in welded-joint tanks.
- Multi-layered contaminated water management measures, including land-side impermeable walls and subdrains, have stabilized the groundwater at a low level and the increased contaminated water generated during rainfall is being suppressed by repairing damaged portions of the building roofs facing onsite. Through these measures, the generation of contaminated water has been suppressed and reduced from approx. 540 m³/day (in May 2014) before implementing measures to approx. 70 m³/day (in FY2024). It was confirmed that the milestone of "suppressing the amount of contaminated water generated to 100 m³/day or less during average rainfall within FY2025," which was achieved in FY2023, has been maintained in FY2024.
- Measures will proceed to further reduce and suppress the amount of contaminated water generated to approx. 50-70 m³/day by FY2028.

(2) Efforts to complete stagnant water treatment

- To reduce the stagnant water levels in buildings as planned, work to install additional stagnant water transfer equipment is underway.
- In 2020, treatment of stagnant water in buildings was completed, except for the Units 1-3 Reactor Buildings, Process Main Building and High-Temperature Incinerator Building.
- While assessing the dust impact, measures to reduce the stagnant water level were implemented. In March 2023, the target water level in each building was achieved. For the Units 1-3 Reactor Buildings, "reducing stagnant water in the Reactor Buildings to about half the amount at the end of 2020 during the period FY2022-2024" was achieved.
- For zeolite sandbags on the basement floors of the Process Main Building and High-Temperature Incinerator Building, measures to reduce the radiation dose are being examined with stabilization in mind.

(3) Efforts to stably operate contaminated water management

- As part of the tsunami countermeasures, openings in buildings were closed and work to install sea walls was completed. As countermeasures for heavy rain, sandbags are being installed to suppress direct inflow into buildings while work to enhance drainage channels and other measures is being implemented as planned.



Progress status

- ◆ The temperatures of the Reactor and the Primary Containment Vessel of Units 1-3 have been maintained stable. There was no significant change in the concentration of radioactive materials newly released from Reactor Buildings into the air. It was concluded that the comprehensive cold shutdown state had been maintained.

Results of analysis on the fuel debris samples (first time)

Regarding the first fuel debris samples taken during the trial fuel debris retrieval from Unit 2, non-destructive analysis was conducted and the results were reported in January 2025. This time, major results of the subsequent detailed analysis were compiled as follows. were deemed compliant.

From the perspective of determining the state of places where samples were acquired, the elemental composition, confirmed by solution analysis, identified that the fuel debris was generated by involving various materials during transfer to PCV after the fuel and fuel cladding were melted at the core.

Since the $^{235}\text{U}/\text{U}$ ratio was distributed from 1% to around 4% before the accident, but the analytical results showed approx. 1.9at% with all samples, they may have been mixed during melting and solidification, then leveled. Moreover, the radioactive analysis results suggested the radioactive Cs being volatilized due to high temperatures at the time of the accident and low γ -ray dose rate fuel debris was generated.

In addition, based on observation results of the fractured surface, mainly the Zr-U-O phase, Fe-Ni metal phase, fine mixed phase and space were observed. The fine mixed phase and space were spread across the sample, showing that the samples were relatively easy to crush.

From the perspective of assuming the fuel debris generation process, the U-valence and the existence state of elements like crystallinity on the fuel debris surface differed from the inside and was considered affected under the oxidizing environment. During the next phase, observation and analysis of the fine and crystal structures will continue and the results will be compiled by around autumn.



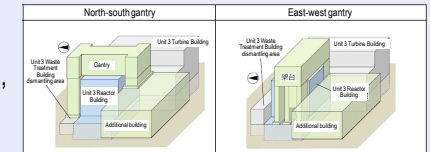
Fuel debris sampling site on the surface inside the Unit 2 pedestal

Unit 3 Examination of design related to fuel debris retrieval

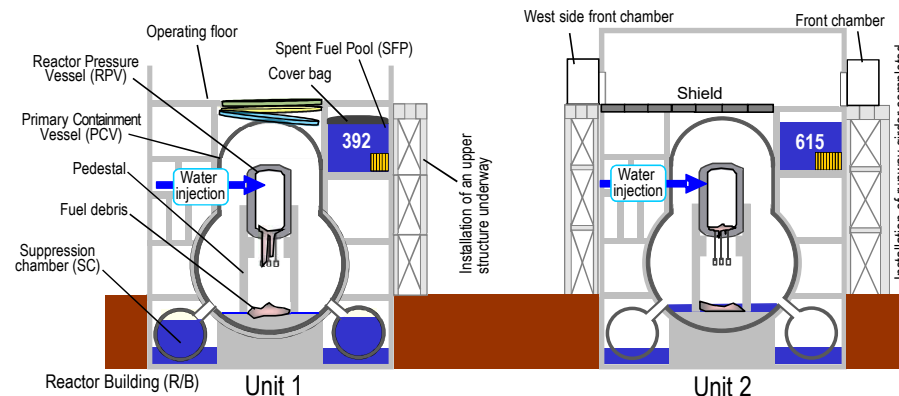
In accordance with the report on recommendations for the selection of retrieval methods issued by the Sub-Committee for the Evaluation of Fuel Debris Retrieval Methods of the Nuclear Damage Compensation and Decommissioning Facilitation Corporation (NDF), TEPCO has examined the design related to Unit 3 fuel debris retrieval.

On July 23, 2025, regarding large-scale fuel debris retrieval, TEPCO determined the methods and reported to the NDF Subcommittee on the work related to preparation until the commencement of full-scale retrieval and its process. The retrieval will be conducted by combining top and side access equipment. Based on the technical basis under a certain assumption, preparation until the commencement of full-scale retrieval is evaluated as around 12-15 years.

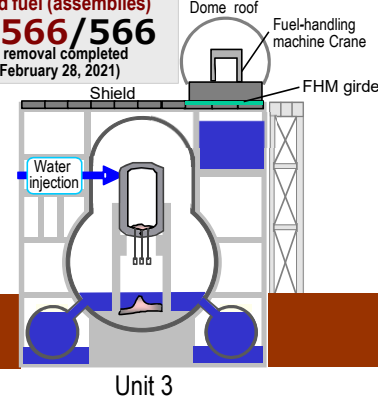
Regarding the draft of the north-south and east-west gantries for the support structure with top access, for the items requiring further confirmation, on-site inspection and design verification will be conducted in the next 1-2 years.



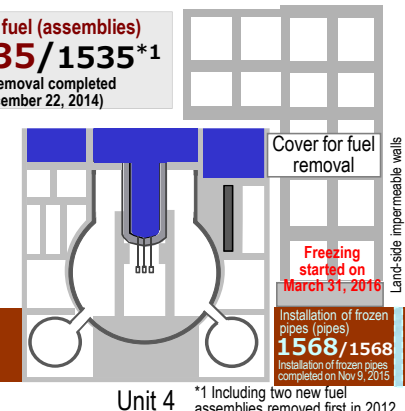
Example of the new structure (support structure of the top access)



Removed fuel (assemblies)
566/566
(Fuel removal completed on February 28, 2021)



Removed fuel (assemblies)
1535/1535*1
(Fuel removal completed on December 22, 2014)



*1 Including two new fuel assemblies removed first in 2012.

Status of discharge of ALPS treated water into the sea

In preparation for the second discharge of ALPS treated water in FY2025, the measurement/confirmation facility tank group C was analyzed. After TEPCO and the external agency confirmed that the analytical results had met discharge criteria, discharge into the sea commenced from July 14. After the commencement, as tornado warning information (Occurrence Accuracy 2) was announced in Okuma and Futaba Towns on July 21, the ALPS treated water dilution/discharge facility was suspended manually as planned in accordance with the implementation plan. After the tornado warning information (Occurrence Accuracy 2) was lifted, no abnormality with the facility was confirmed by the on-site patrol and discharge was resumed on July 22. On July 30, as a tsunami warning was issued, the facility was suspended manually as planned in accordance with the implementation plan. After the tsunami warning was lifted, following confirmation of no abnormality with the facility, discharge will be resumed. Moreover, in the operation parameters and sea-area monitoring, TEPCO will confirm that discharge is conducted as planned, meeting criteria and safety requirements.

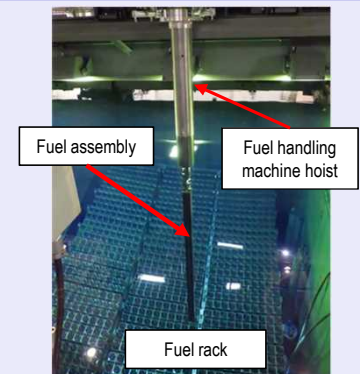
Regarding nuclides (targeted for monitoring) which may theoretically exist in the contaminated water but without significant concentrations detected in the past analysis of contaminated and treated water, any significant existence in contaminated water is checked annually. The results of analysis on nuclides targeted for monitoring in FY2024 showed concentrations of all five nuclides at less than 1/100 of the legal discharge limit and therefore the concentration of radioactive materials in contaminated water had remained unchanged.

Unit 5 Commencement of spent fuel removal

Among 1542 fuel assemblies (1374 spent fuel and 168 non-irradiated fuel) stored in the Unit 5 Reactor Building, transfer of spent fuel to the common pool commenced from July 23, 2025. The first removal (22 fuel assemblies/removal) was conducted in July. After inspection of the common pool, the removal will be resumed from November and around eight removals will be conducted within FY2025.

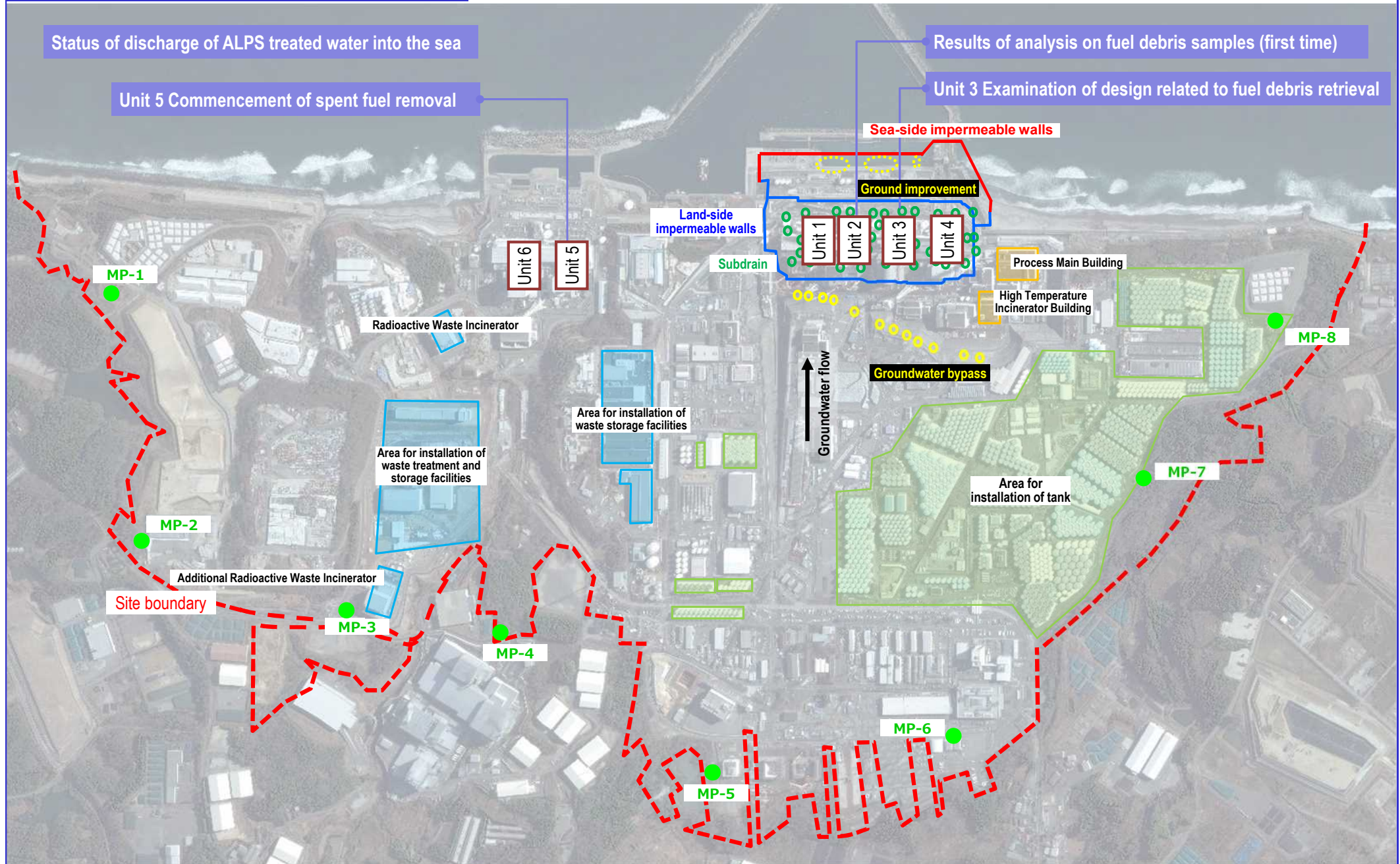
Fuel removal from Unit 5 will be conducted within a scope that does not impact on fuel removal from Units 2 and 1 and will be temporarily suspended after fuel removal from Unit 2 commences on FY2026.

All fuel removal from Units 1-6 will be completed within FY2031.



Fuel removal from Unit 5 SFP (July 23, 2025)

Major initiatives – Locations on site

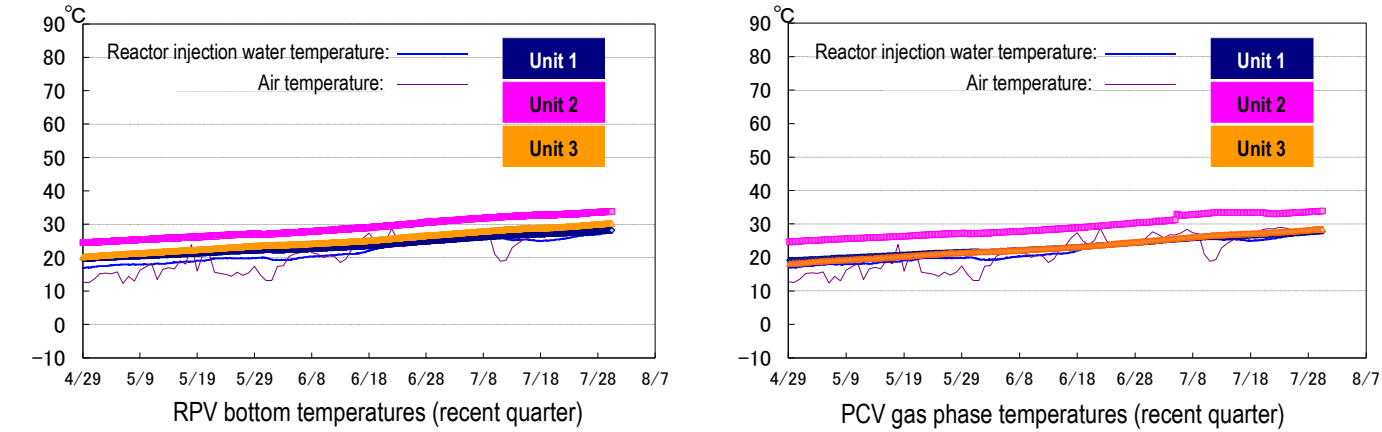


Provided by Japan Space Imaging Corp., photo taken on January 14, 2024
Product (C) [2024] Maxar Technologies.

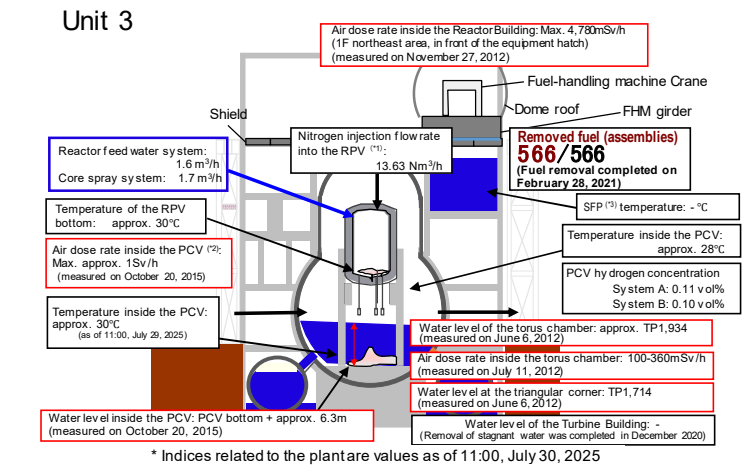
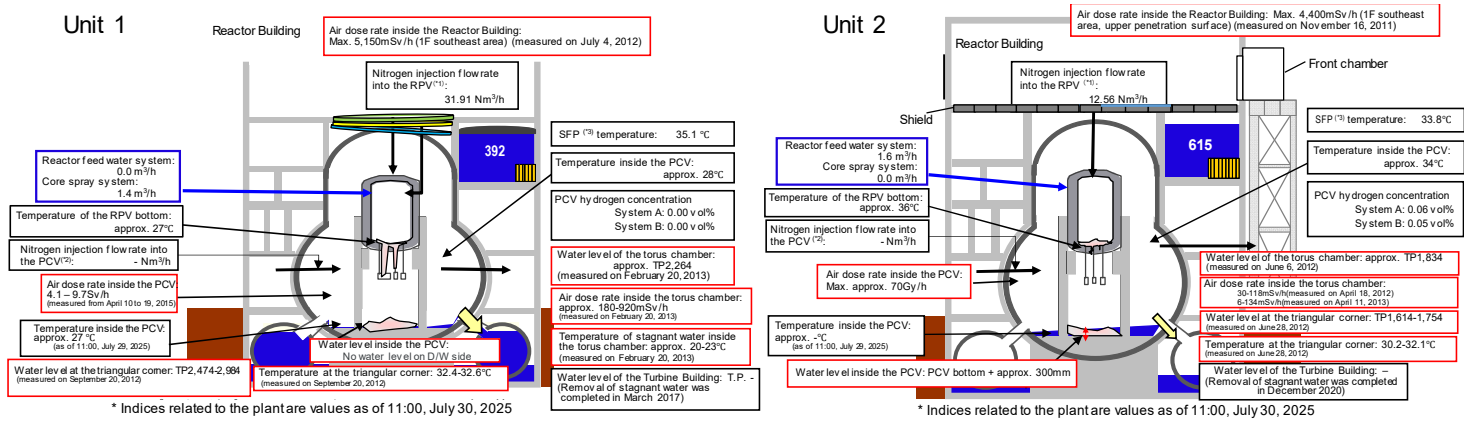
I. Confirmation of the reactor conditions

Temperatures inside the reactors

Through continuous reactor cooling by water injection, the temperatures of the Reactor Pressure Vessel (RPV) bottom and the Primary Containment Vessel (PCV) gas phase were maintained as shown below for recent, though they varied depending on the unit and location of the thermometer.



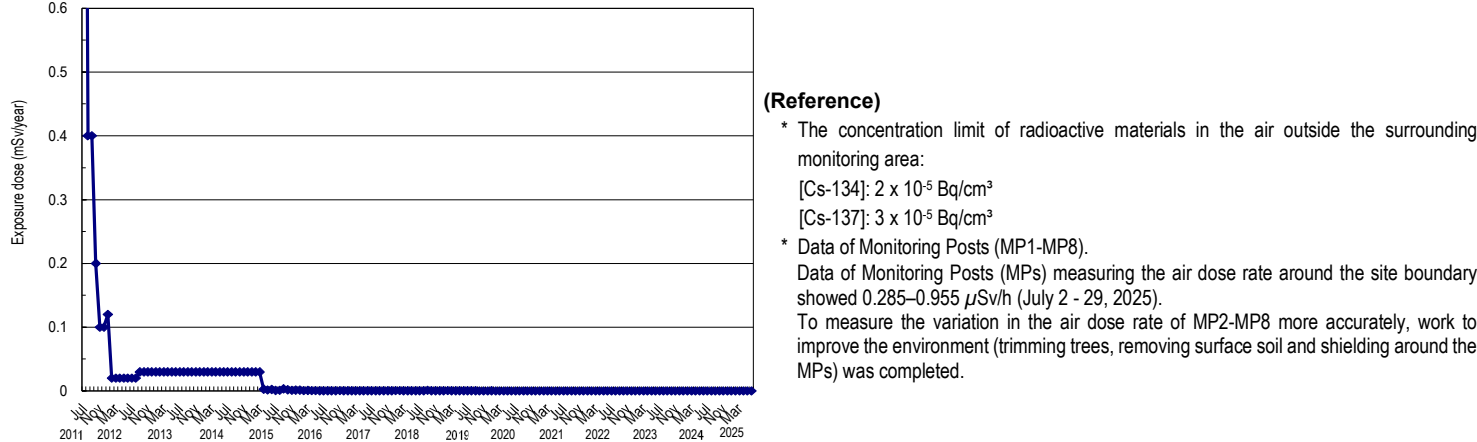
*1 The trend graphs show part of the temperature data measured at multiple points.
*2 A part of data could not be measured due to maintenance and inspection of the facility and other work.



Release of radioactive materials from the Reactor Buildings

As of June 2025, the concentration of radioactive materials newly released from Reactor Building Units 1-4 into the air and measured at the site boundary was evaluated at approx. 9.4×10^{-12} Bq/cm³ and 7.1×10^{-12} Bq/cm³ for Cs-134 and -137 respectively, while the radiation exposure dose due to the release of radioactive materials there was less than 0.00004 mSv/year.

Annual radiation dose at site boundaries by radioactive materials (cesium) released from Reactor Building Units 1-4



(Reference)
* The concentration limit of radioactive materials in the air outside the surrounding monitoring area:
[Cs-134]: 2×10^{-5} Bq/cm³
[Cs-137]: 3×10^{-5} Bq/cm³
* Data of Monitoring Posts (MP1-MP8).
Data of Monitoring Posts (MPs) measuring the air dose rate around the site boundary showed 0.285-0.955 μ Sv/h (July 2 - 29, 2025).
To measure the variation in the air dose rate of MP2-MP8 more accurately, work to improve the environment (trimming trees, removing surface soil and shielding around the MPs) was completed.

Note 1: Different formulas and coefficients were used to evaluate the radiation dose in the facility operation plan and monthly report. The evaluation methods were integrated in September 2012. As the fuel removal from the spent fuel pool (SFP) commenced for Unit 4, the radiation exposure dose from Unit 4 was added to the items subject to evaluation since November 2013. The evaluation has been changed to a method considering the values of continuous dust monitors since FY2015, with data to be evaluated monthly and announced the following month.
Note 2: Radiation dose was calculated using the evaluation values of release amount from Units 1-4 and Units 5 and 6. The radiation dose of Unit 5 and 6 was evaluated based on expected release amount during operation until September 2019 but the evaluation method was reviewed and changed to calculate based on the actual measurement results of Units 5 and 6 from October.
Note 3: Dose assessment has been changed since July 2024 due to the change of standard meteorology, etc. in the implementation plan (effective July 8, 2024).

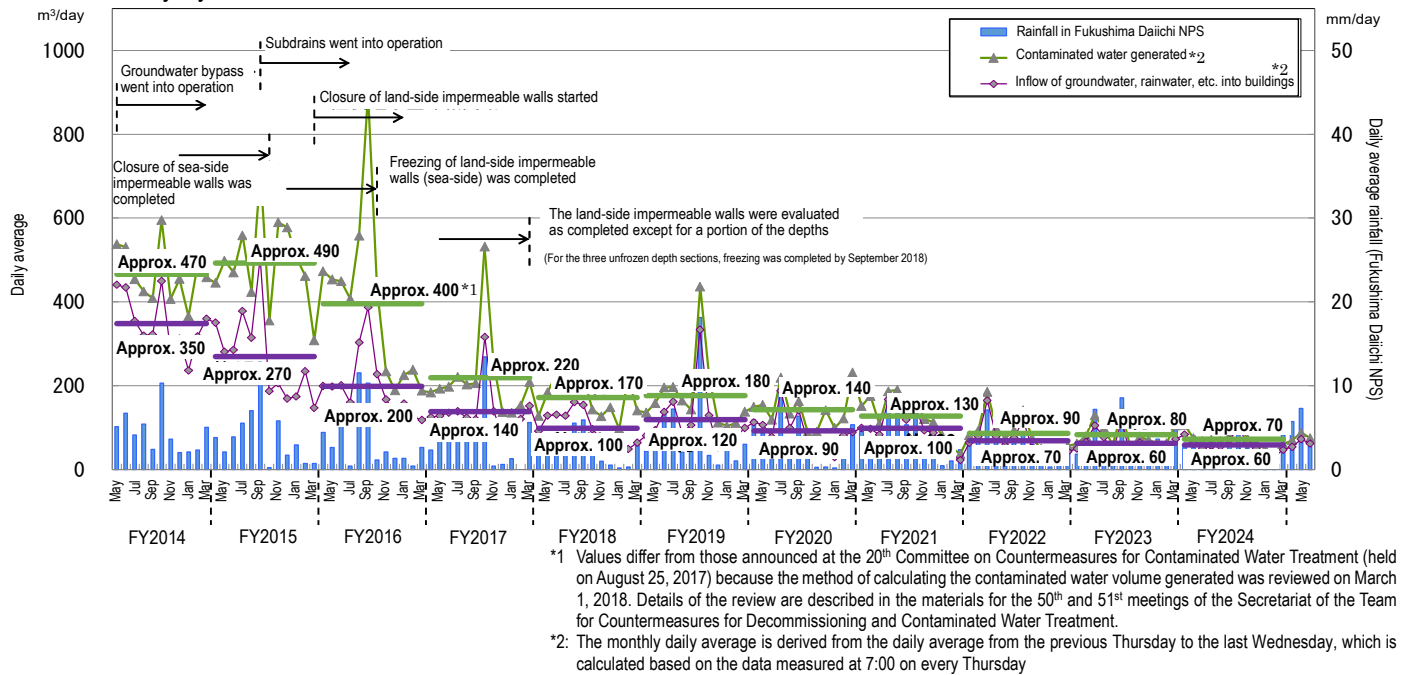
Other indices

There was no significant change in indices, including the pressure in the PCV and the PCV radioactivity density (Xe-135) for monitoring criticality, nor was any anomaly in the cold shutdown state or criticality sign detected.
Based on the above, it was confirmed that the comprehensive cold shutdown state had been maintained and the reactors remained in a stabilized condition.

II. Progress status by each plan

Measures for contaminated water and treated water

- Status of contaminated water generated
 - Multi-layered contaminated water management measures, including land-side impermeable walls and subdrains, have stabilized the groundwater at a low level and the increased contaminated water generated during rainfall is being suppressed by repairing damaged portions of building roofs facing onsite. Through these measures, the generation of contaminated water has been suppressed and reduced from approx. 540 m³/day (in May 2014) before implementing measures to approx. 70 m³/day (in FY2024). It was confirmed that the milestone of "suppressing the amount of contaminated water generated to 100 m³/day or less during average rainfall within FY2025," which was achieved in FY2023, has been maintained in FY2024.
 - Measures will proceed to further reduce the amount of contaminated water generated and suppress to approx. 50-70 m³/day by FY2028.



*1 Values differ from those announced at the 20th Committee on Countermeasures for Contaminated Water Treatment (held on August 25, 2017) because the method of calculating the contaminated water volume generated was reviewed on March 1, 2018. Details of the review are described in the materials for the 50th and 51st meetings of the Secretariat of the Team for Countermeasures for Decommissioning and Contaminated Water Treatment.
*2: The monthly daily average is derived from the daily average from the previous Thursday to the last Wednesday, which is calculated based on the data measured at 7:00 on every Thursday

Figure 1: Changes in contaminated water generated and inflow of groundwater and rainwater into buildings

➤ Operation of the Water-Treatment Facility Special for Subdrains & Groundwater drains

- At the Water-Treatment Facility Special for Subdrains & Groundwater drains, release started from September 14, 2015, and up until July 22, 2025, 2735 release operations had been conducted. The water quality of all temporary storage tanks satisfied the operational target.

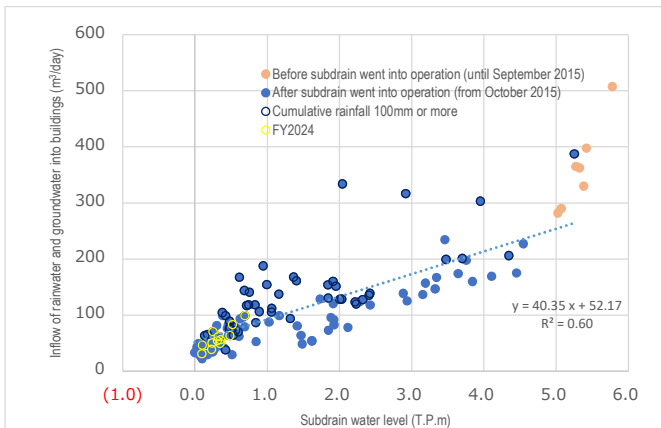


Figure 2: Correlation between inflow such as groundwater and rainwater into buildings and the water level of Units 1-4

➤ Implementation status of facing

- Facing is a measure that involves asphaltting the on-site surface to reduce the radiation dose, prevent rainwater from infiltrating the ground and reduce the amount of underground water flowing into buildings. As of the end of June 2025, 97% of the planned area (1,450,000 m² on site) had been completed. For the area inside the land-side impermeable walls, implementation proceeds appropriately after constructing a yard from implementable zones that leave the decommissioning work unaffected. As of the end of June 2025, 55% of the planned area (60,000 m²) had been completed.

➤ Status of the groundwater level around buildings

- Regarding the groundwater level in the area inside the land-side impermeable walls, the difference between the inside and outside has remained constant, though the groundwater level on the mountain side varied due to rainfall. The groundwater level of the groundwater drain observation well remained sufficiently lower than the ground surface, at around T.P.+1.4m (the height of the ground surface: T.P.+2.5m).
- Regarding the subdrains of Units 1-4, the pumping amount varied depending on precipitation. The pumping amount in the T.P.+2.5m area remained constant after the facing in this area was completed.

➤ Operation of the multi-nuclide removal system and other water-treatment facilities

- Regarding the multi-nuclide removal system (existing), hot tests using radioactive water were conducted (System A: from March 30, 2013, System B: from June 13, 2013, System C: from September 27, 2013). On March 23, 2022, an inspection prior-to-use certificate was granted by the Nuclear Regulation Authority (NRA) and the entire inspection prior to use was completed. For the multi-nuclide removal system (additional), an inspection prior to use certificate was granted by the NRA on October 12, 2017. Regarding the multi-nuclide removal system (high-performance), hot tests using radioactive water were conducted from October 18, 2014. In March 2, 2023, an inspection prior to use certificate was granted by the NRA and the entire inspection prior to use was completed.
- Treatment measures comprising the removal of strontium by cesium-adsorption apparatus (KURION), the secondary cesium-adsorption apparatus (SARRY) and the third cesium-adsorption apparatus (SARRY II) continued. Up until July 17, 2025, approx. 794,000 m³ had been treated.

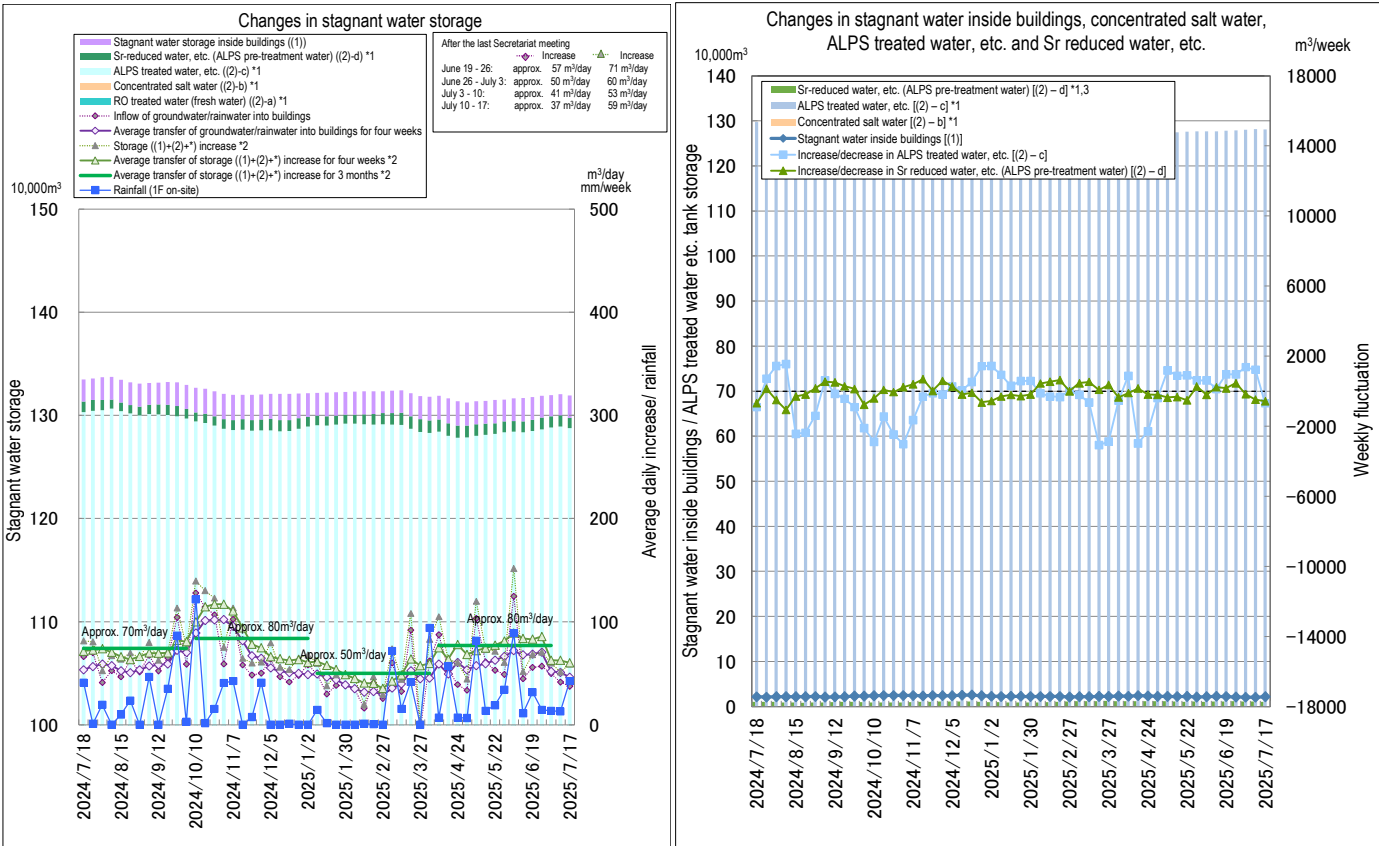
➤ Risk reduction of strontium-reduced water

- To reduce the risks of strontium-reduced water, treatment using existing, additional and high-performance multi-nuclide removal system is underway. Up until July 17, 2025, approx. 960,000 m³ had been treated.

➤ Storage status of stagnant water and amount of ALPS treated water, etc. stored in tanks

- The volume of ALPS treated water, etc. was approx. 1,283,298 m³ as of July 17, 2025.
- The total volume of ALPS treated water discharged into the sea since the discharge commenced on August 24, 2023, was approx. 93,997 m³ as of the completion of the first discharge in FY2025.

As of July 17, 2025



(1): Stagnant water storage inside buildings (Units 1-4, Process Main Building, High Temperature Incinerator Building, Waste Liquid Supply Tank, SPT (A), SPT (B), Units 1-3 CST, buffer tank)
(2): Units 1-4 tank storage ([(2)-a RO-treated water (fresh water)] + [(2)-b Concentrated salt water] + [(2)-c ALPS treated water, etc.] + [(2)-d Sr-reduced water, etc. (ALPS pre-treatment water)])
*: Water amount from tank bottom to water-level gauge 0% (DS)
*1: Water amount for which the water-level gauge indicates 0% or more
*2: Calculated in the method of contaminated water generated ([Inflow of groundwater/rainwater into buildings] + (other transfer) + (chemical injection into ALPS)), amount of ALPS treated water discharged was not taken into account.
*3: Amount of Sr-reduced water and others increased and decreased depending on the operation status of facilities due to clog of the cross-flow filter for the multi-nuclide removal system.

Figure 3: Status of stagnant water storage

➤ Status of discharge of ALPS treated water

As of July 30, 2025

Measurement object	Requirement and operation target	Measurement results	Compliance with requirement
[TEPCO] Tritium concentration in seawater (sea-area monitoring at 4 points within 3 km of the Power Station)	• Discharge suspension level: 700 Bq/L or less • Investigation level: 350 Bq/L or less	(Sampled on July 29) • Below the lower detection limit (less than 4.7 – 7.8 Bq/L)	○ ○
[TEPCO] Tritium concentration in seawater (sea-area monitoring at 1 point within a 10 km radius from the Power Station)	• Discharge suspension level: 30 Bq/L or less • Investigation level: 20 Bq/L or less	(Sampled on July 28) • Below the lower detection limit (less than 6.7 Bq/L)	○ ○
[Ministry of the Environment] Tritium concentration in seawater (at 6 points off the coast of Fukushima Prefecture)	• National safety requirement: 60,000 Bq/L • WHO drinking water guidelines: 10,000 Bq/L	(Sampled on July 2) • Below the lower detection limit (less than 8 Bq/L)	○ ○
[Fisheries Agency] Tritium concentration in marine products (flounder and others)	-	(Sampled on July 25) • Below the lower detection limit (less than 9.2 Bq/kg)	○
[Fukushima Prefecture] Tritium concentration in seawater (at 9 points off the coast of Fukushima Prefecture)	• National safety requirement: 60,000 Bq/L • WHO drinking water guidelines: 10,000 Bq/L	(Sampled on June 12) • Below the lower detection limit (less than 3.8 – 4.0 Bq/L)	○ ○

- From April 10 to 28, 2025, the first discharge of ALPS treated water into the sea in FY2025 was conducted.
- Regarding the status of sea-area monitoring on handling ALPS treated water, more tritium measurement points for seawater and fish were established near the power station and off the coast of Fukushima Prefecture and

measurements of tritium and Iodine-129 of seaweed near the power station were added from April 20, 2022. As of July 30, 2025, no significant variation had been detected.

- Regarding sea-area monitoring conducted by TEPCO at 4 points within 3 km of the power station, quick measurements taken of the tritium concentration in the seawater sampled on July 29 showed concentrations under the lower detection limit (less than 4.7 – 7.8 Bq/L) at all points, which were below the TEPCO operation indices of 700 Bq/L (discharge suspension level) and 350 Bq/L (investigation level).
- Regarding sea-area monitoring conducted by TEPCO at 1 point within a 10 km radius of the power station, quick measurements taken of the tritium concentration in the seawater sampled on July 28 showed concentrations under the detection limit (less than 6.7 Bq/L), which was below the TEPCO operation indices of 30 Bq/L (discharge suspension level) and 20 Bq/L (investigation level).
- The quick measurement results obtained by each organization were as follows:
Ministry of the Environment: The analytical results (obtained via quick measurements) for seawater sampled on July 2 at 6 sampling points off the coast of Fukushima Prefecture showed tritium concentrations below the lower detection limit (less than 8 Bq/L) at all sampling points, which would have no adverse impact on human health and the environment.
Fisheries Agency: Quick analytical results for tritium in flounder sampled on July 25 showed tritium concentrations below the lower detection limit (less than 9.2 Bq/kg) in all samples.
Fukushima Prefecture: On June 12, tritium concentrations in seawater at 9 sampling points off the coast of Fukushima Prefecture below the lower detection limit were recorded (less than 3.8 – 4.0 Bq/L) at all sampling points, which would have no adverse impact on human health and the environment.

Fuel removal from the spent fuel pools

Work to help remove spent fuel from the pool is progressing steadily while ensuring seismic capacity and safety.

➤ Progress of work toward fuel removal at Unit 1

- Before installing a large cover over the Reactor Building, ground assembly of steel frames in the off-site yard and installation on-site are both underway.
- In the off-site yard, ground assembly of the Temporary work platform, upper and Bottom frameworks and box rings was completed. Ground assembly of the moving roof and the overhead crane for rubble removal is underway.
- On site, the installation of the Upper framework, box rings, the large cover ventilation equipment, and other facilities is underway.
- For Unit 1, prior to fuel removal, rubble will be removed inside the large cover. To avoid the risk of the auxiliary hoist of the fuel-handling equipment falling during rubble removal, an additional cover was installed over the spent fuel pool (SFP) gate on June 27, 2025.
- During the mockup test, it was confirmed that even if the auxiliary hoist fell over the additional cover, it would not affect the SFP gate.
- Installation of the large cover Upper framework will complicate SFP water injection using a concrete pump truck. Accordingly, to diversify the water injection means in addition to the existing water injection using the SFP cooling facility, a new means of water injection (via an alternative line) was installed.
- Installing a large cover will require the process to be extended. Given the fact that the detailed dose impact can be confirmed from the operating floor, shielding needs to be added as an additional means of reducing radiation exposure and the work time needs to be reviewed. There are also more often days when work was forced to be suspended due to bad weather, trouble with large cranes used for work and other reasons.
- Given the potential for future process extensions for similar reasons, combined with the need to account for reduced work hours due to intense summer heat and other factors, we are revising the expected completion date for installing the large cover from around summer 2025 to within FY2025.
- For starting fuel removal (FY2027-2028), we can shorten future timelines by revising work procedures and other aspects after we complete rubble removal. Accordingly, the start date currently remains unchanged.
- To remove rubble effectively, we need to fully assess all rubble conditions, as uncertainties remain in the process. We will consider whether to revise the entire timeline after we reach the mid-stage of rubble retrieval.

➤ Progress of work toward fuel removal at Unit 2

- Work to install runway girders, which support the rails to be used when the fuel removal system moves between the Reactor Building and the front chamber, was completed. During the next phase, work on ancillary equipment was conducted as part of efforts to install the fuel-removal system.
- To ensure visibility during fuel removal, a purification system was installed in the spent fuel pool.
- The fuel-handling equipment was transported from the factory on May 21, 2025, carried into the site of the Fukushima Daiichi Nuclear Power Station on May 24, and hoisted within Fuel removal work platform on May 30.
- At present, work to lay the power supply and control cables of the fuel-handling equipment is underway.
- During the next phase, power will be transmitted to the fuel-handling equipment, recovery tests will be conducted and on-site test operation will proceed.
- Progress toward work for the fuel removal to be commenced in FY2026 remains steady at present and work prioritizing safety will proceed.

Fuel debris retrieval

➤ Unit 2 PCV internal investigation/ status of fuel debris trial retrieval

- For the robotic arm, given the discovery of degrading components during testing, similar components have been replaced and a full inspection is underway. At present, inner cables are being replaced.
- During the next phase, after an operational check on the robot arm, insertion into the enclosure, and one-through test following the overall inspection, preparation will proceed toward on-site work.
- Based on the test status of the robot arm, the details of the process will be closely examined to safely and carefully proceed with the trial retrieval.

Plans to store, process and dispose of solid waste and decommission of reactor facilities

Promoting efforts to reduce and store waste generated appropriately and R&D to facilitate adequate and safe storage, processing and disposal of radioactive waste

➤ Management status of rubble and trimmed trees

- As of the end of June 2025, the total storage volume for concrete and metal rubble was approx. 412,700 m³ (+2,100 m³ compared to the end of May with an area-occupation rate of 68%). The total storage volume of trimmed trees was approx. 68,700 m³ (a slight increase, with an area-occupation rate of 39%). The total storage volume of used protective clothing was approx. 9,500 m³ (-100 m³, with an area-occupation rate of 38%). The total storage volume of radioactive solid waste (incinerated ash and others) was approx. 38,500 m³ (a slight increase, with an area-occupation rate of 60%). The increase in rubble was due to decontamination of flanged tanks, move for site preparation, and work around Units 1-4 buildings, etc.

➤ Management status of secondary waste from water treatment

- As of July 3, 2025, the total storage volume of waste sludge was 513 m³ (area-occupation rate: 73%), while that of concentrated waste fluid was 9,473 m³ (area-occupation rate: 92%). The total number of stored spent vessels, High-Integrity Containers (HICs) for the multi-nuclide removal system and others, was 5,911 (area-occupation rate: 86%).

Reduction in radiation dose and mitigation of contamination

Effective dose-reduction at site boundaries and purification of port water to mitigate the impact of radiation on the external environment

➤ Status of the groundwater and seawater on the east side of Turbine Building Units 1-4

- In the Unit 1 intake north side area, the H-3 concentration was below the legal discharge limit of 60,000 Bq/L at all observation holes and remained constant or has been declining overall. The concentration of total β radioactive materials has remained constant overall but increased temporarily from April 2020 and is even currently increasing or declining at a low concentration at observation holes including Nos. 0-1, 0-1-2, 0-2, 0-3-1, 0-3-2 and 0-4. The trend continues to be carefully monitored.
- In the area between the Units 1 and 2 intakes, the H-3 concentration has remained below the legal discharge limit of

60,000 Bq/L at all observation holes. It has been increasing or declining at Nos. 1-14 and 1-17 but has otherwise remained constant or been declining overall. The concentration of total β radioactive materials has remained constant overall but has been increasing at No. 1-6 and increasing or declining at low concentration at Nos. 1-8, 1-9, 1-11, 1-12 and 1-14. The trend continues to be carefully monitored.

- In the area between the Units 2 and 3 intakes, the H-3 concentration has been below the legal discharge limit of 60,000 Bq/L at all observation holes. It has remained constant or been declining at many observation holes overall. The concentration of total β radioactive materials has remained constant overall but has been increasing and larger fluctuation was seen at No. 2-5. The trend continues to be carefully monitored.
- In the area between the Units 3 and 4 intakes, the H-3 concentration has been below the legal discharge limit of 60,000 Bq/L at all observation holes and remained constant or been declining overall. The concentration of total β radioactive materials has remained constant overall but has been increasing or declining at Nos. 3-4 and 3-5. The trend continues to be carefully monitored.
- In the groundwater on the east side of the Turbine Buildings, as with the total β radioactive materials, the concentration of cesium has also remained constant as the overall area but been increasing or declining at observation holes with a low concentration and exceeded the previous highest record at some observation holes. Investigations will continue, including to ascertain the impact of rainfall.
- The concentration of radioactive materials in drainage channels has remained constant overall, despite increasing during rainfall. In Drainage Channel D, drainage of the low-dose area on the west side of the site started to pass from August 30, 2022. It has remained low, despite concentrations of cesium and total β radioactive materials increasing during rainfall. From November 29, 2022, continuous monitors were installed and drainage around the Units 1 and 2 switch yard started to pass.
- In the open channel area of the seawater intake for Units 1 to 4, the concentration of radioactive materials in seawater has remained below the legal discharge limit and been declining long term, despite the temporary increases in Cs-137 and Sr-90 observed during rainfall. They have also been declining following the completed installation and the connection of steel pipe sheet piles for the sea-side impermeable walls. The concentration of Cs-137 remained slightly higher in front of the south-side impermeable walls and slightly lower on the north side of the east breakwater since March 20, 2019, when the silt fence was transferred to the center of the open channel due to mega float-related construction.
- In the port area, the concentration of radioactive materials in seawater has remained below the legal discharge limit and been declining long term, despite temporary increases in Cs-137 and Sr-90 observed during rainfall. They have remained below the level of those in the Units 1-4 intake open channel area and been declining following the completed installation and connection of steel pipe sheet piles for the sea-side impermeable walls.
- In the area outside the port, regarding the concentration of radioactive materials in seawater, those of Cs-137 and Sr-90 declined and remained low after steel pipe sheet piles for the sea-side impermeable walls were installed and connected. Regarding the concentration of Cs-137, a temporary increase was sometimes observed on the north side of the Units 5 and 6 outlets and near the south outlet due to the influence of weather, marine meteorology and other factors. Regarding the concentration of Sr-90, variation was observed in FY2021 in the area outside the port (north and south outlets). Monitoring of the tendency continues, including the potential influence of weather, marine meteorology and others. During the period for which ALPS treated water was discharged, the tritium concentration increased at the sampling point near the discharge outlet, but this was considered within the assumed range based on the oceanic dispersion simulation results.

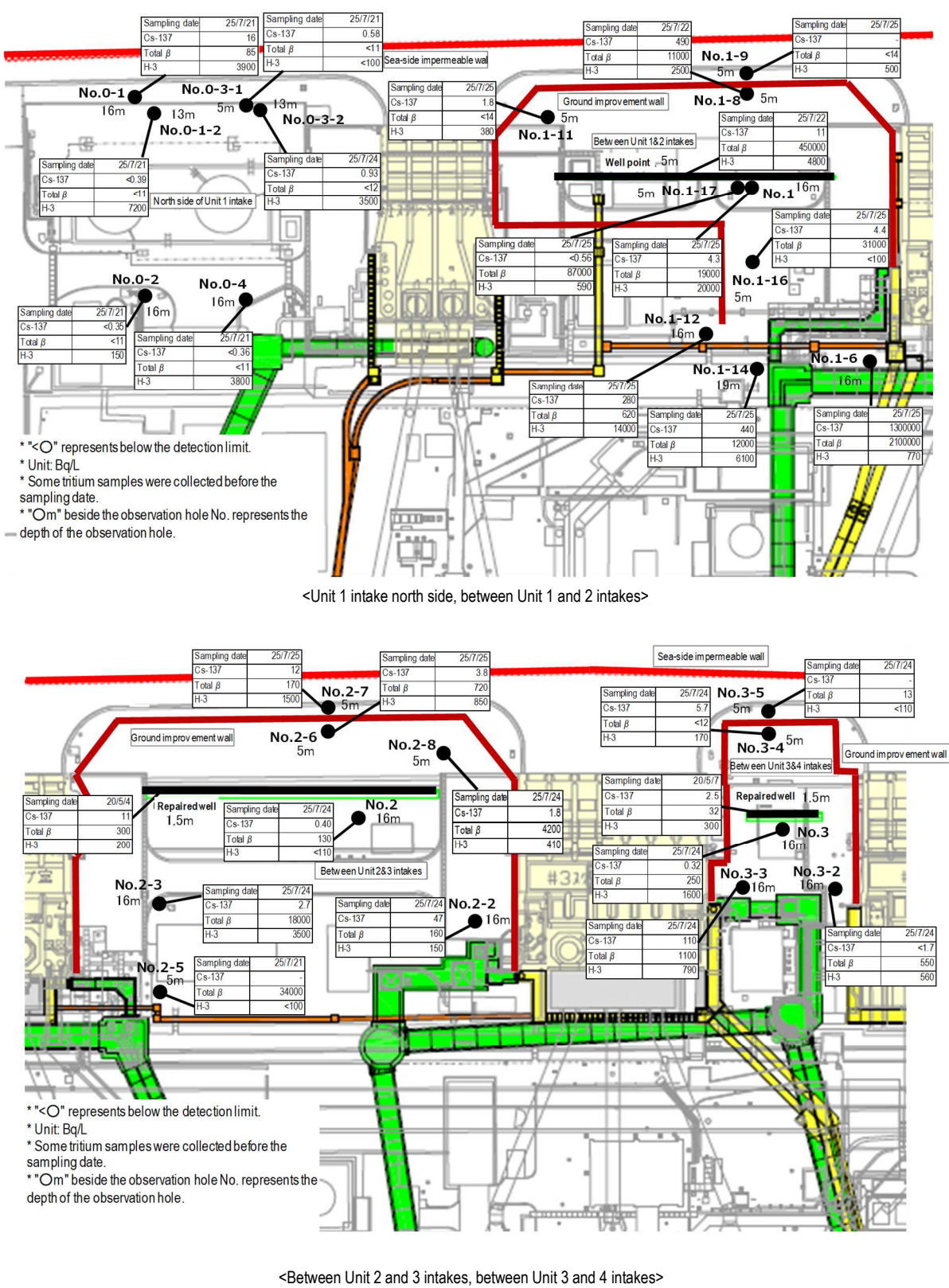


Figure 4: Groundwater concentration on the Turbine Building east side

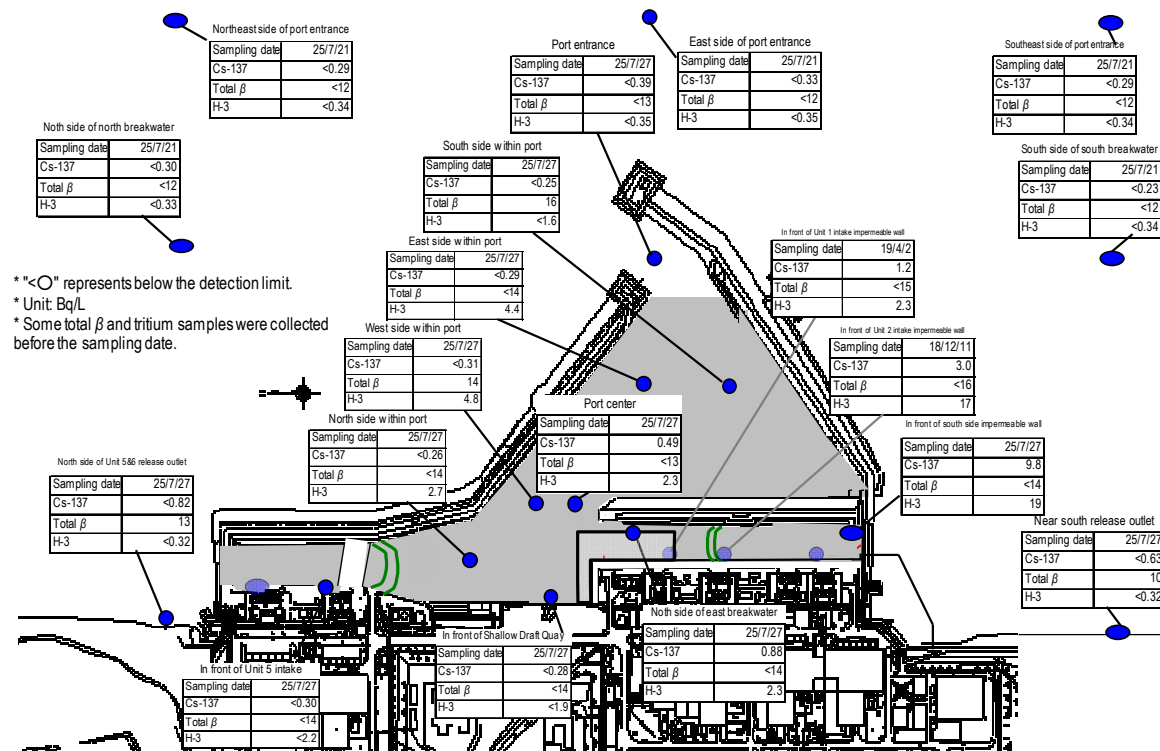


Figure 5: Seawater concentration around the port

Outlook of the number of staff required and efforts to improve the labor environment and conditions

Adequate number of staff will be secured in the long-term, while firmly implementing radiation control of workers. The work environment and labor conditions will be continuously improved by responding to the needs on the site.

➤ Staff management

- The monthly average total of personnel registered for at least one day per month to work on site during the past quarter from March – May 2025 was approx. 8,900 (cooperating company workers and TEPCO HD employees), which exceeded the monthly average workforce (approx. 7,600). Accordingly, sufficient personnel were registered to work on site.
- It was confirmed with the prime contractors that the estimated manpower necessary for the work in August 2025 (approx. 4,400 workers per day: cooperating company workers and TEPCO HD employees) would be secured at present. The average numbers of workers per day per month (actual values) for the most recent two years were maintained, at approx. 3,500 to 4,900.
- The number of workers from both within and outside Fukushima Prefecture increased slightly. As of June 2025, the local employment ratio (cooperating company workers and TEPCO HD employees) remained constant at around 70%.
- The average exposure doses of workers were approx. 2.16, 2.18 and 2.08 mSv/person-year during FY2022, 2023 and 2024, respectively (The legal exposure dose limits are 100 and 50 mSv/person-year respectively over five years, the TEPCO HD management target is 20 mSv/person-year).
- For most workers, the exposure dose remained sufficiently within the limit and allowed them to continue engaging in radiation work.

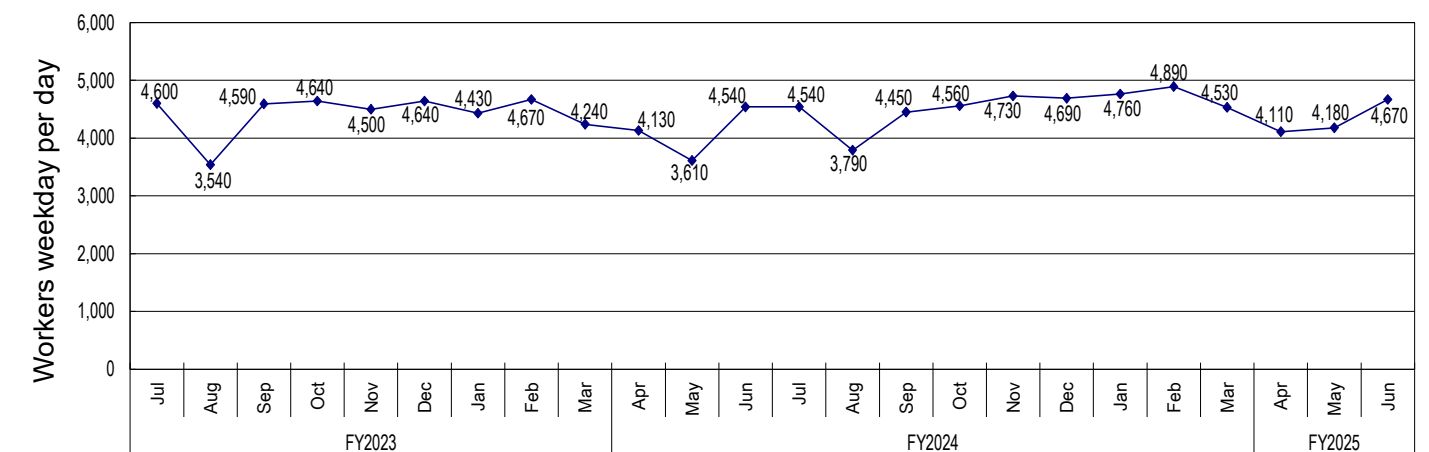


Figure 6: Changes in the average number of workers weekday per day for each month of the most recent 2 years (actual values)

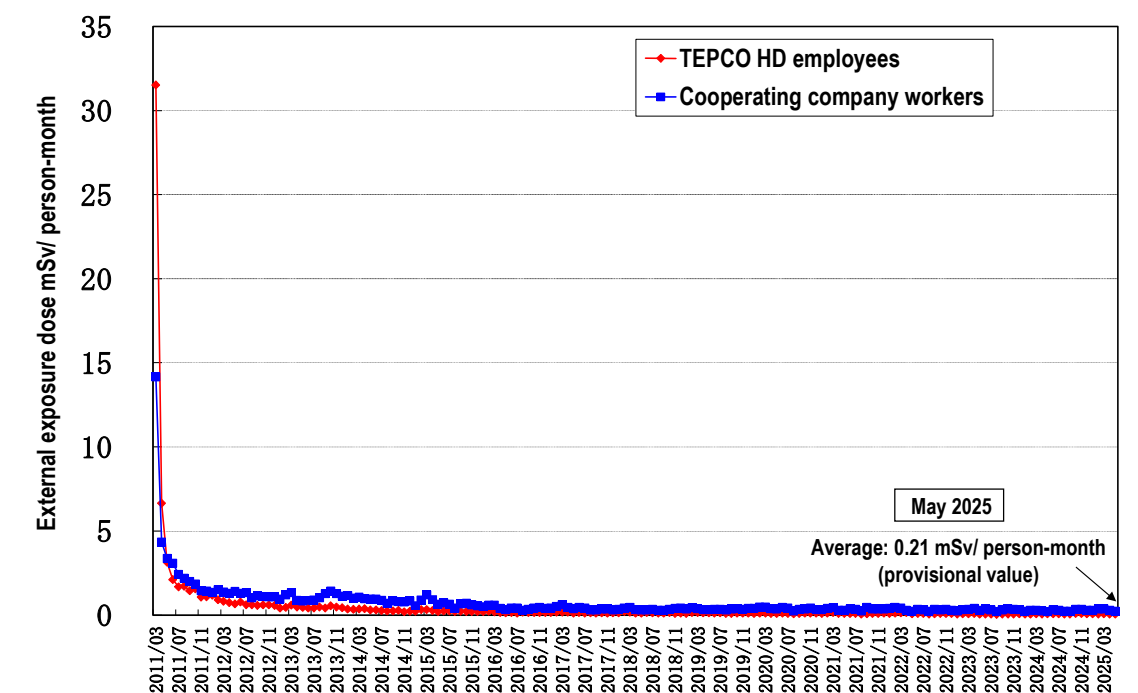


Figure 7: Changes in monthly average exposure dose of individual worker (monthly exposure dose since March 2011)

➤ Survey to improve the work environment

- With the aim of improving the work environment for the power station workers, an annual survey is being conducted. Distribution of the 16th survey questionnaire sheet will start sequentially from late August and the results will be summarized in December 2025.
- In this survey, there are no significant changes in the structure of questions. A major change is in the question on “concerns about radiation and contamination”, where answer choices were reviewed so that more detailed answers could be selected regarding the factor of concern.
- Efforts to create “a safe and comfortable workplace environment” continue.

➤ Health management of workers in the Fukushima Daiichi Nuclear Power Station

- As health management measures in line with the guidelines of the Ministry of Health, Labour and Welfare (issued in August 2015), a scheme was established and operated, whereby prime contractors confirmed reexamination at medical institutions and the subsequent status of workers who were diagnosed as requiring “detailed examination and treatment” in the health checkup, with TEPCO confirming the operation status by the prime contractors.
- The recent report on the management status of the health checkup during the fourth quarter (January - March) in FY2024 confirmed that the prime contractors had provided appropriate guidance and managed operations properly under the scheme. The report on the follow-up status during the third quarter in FY2024 previously confirmed that

responses to workers, which had not been completed by the time of the previous report, were being provided on an ongoing basis and checking of operations would continue.

➤ Status of heat stroke cases

- In FY2025, measures to further prevent heat stroke commenced from April to cope with the intense heat period.
- In FY2025, four workers suffered heat stroke due to works until July 28 (in FY2024, three workers up until the end of July). An environment encouraging workers to appeal any unwellness will continue to be created and countermeasures will be taken to prevent heat stroke.

➤ Countermeasures for infectious diseases

- Countermeasures for various infectious diseases (influenza, norovirus, COVID-19, etc.) depend on personal decisions and basic countermeasures (visiting medical institutions when feeling unwell, ventilation, avoidance of the “Three Cs,” frequent handwashing, etc.) being implemented appropriately by each worker and TEPCO proceeds with decommissioning while prioritizing safety.

Others

➤ Progress status of the Mid-and-Long-Term Plan of accident investigation in the Fukushima Daiichi Nuclear Power Station

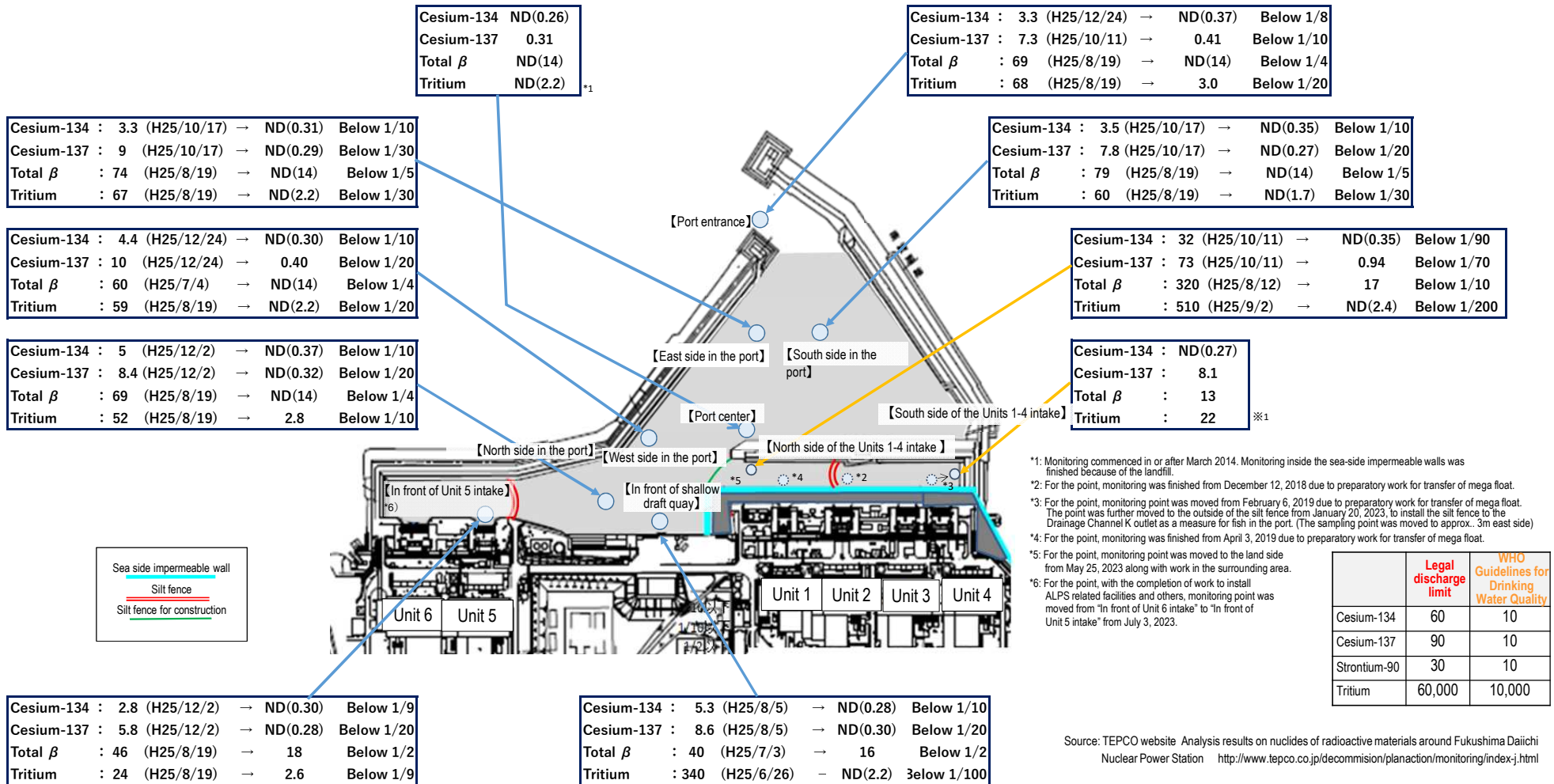
- TEPCO is responsible for the accident at the Fukushima Daiichi Nuclear Power Station (hereinafter referred to as 1F) and should investigate and analyze it continuously. In the “Internal Accident Report”, “Nuclear Power Safety Reform Plan”, and “Examination of Unsolved Issues”, TEPCO has conducted thorough investigations and analyses, including organizing the facts related to the accident, cause analysis, and extraction of lessons. TEPCO has clarified many matters including issues provided by the National Diet of Japan Fukushima Nuclear Accident Independent Investigation Commission and has appropriately reflected them in safety measures. To ensure no recurrence of events like the 1F accident and acquire information to help clarify the whole picture (an in-depth study of the accident progress) and make power reactors even safer, many insights need to be drawn by acquiring on-site information (confirming the actual accident situation), utilized and subsequently reflected in safety measures.
- At the same time, the steady progress of decommissioning at 1F is also important. New useful insights for accident investigation and analysis may be acquired in the course of on-site work. However, inadequate data sampling may alter on-site conditions and result in valuable information being lost. The results of the accident investigation and analysis need to be appropriately organized and shared to proceed with on-site work.
- Based on the background, a cooperation and collaboration system across all nuclear divisions of TEPCO was established in January 2021 related to on-site investigation and analysis of the accident at 1F. Information on the decommissioning process and the needs for accident investigation is being shared regularly (monthly) to ensure the investigative efforts and accident analysis can progress.
- To help implement future investigations of the accident at 1F according to plan and effectively, the Mid-and-Long-Term Plan of the 1F accident investigation was formulated and published in November 2021.
- The plan is being revised based on the latest work progress and status.

Status of seawater monitoring within the port (comparison between the highest values in 2013 and the latest values)

“The highest value” → “the latest value (sampled during June 30 - July 28)”¹⁾; unit (Bq/L); ND represents a value below the detection limit

Summary of TEPCO data as of July 29, 2025

Note: The Total β measurement value is the total radioactivity concentration of radioactive materials that emit β -ray (Potassium-40, Cesium-137, Strontium-90, progeny nuclide Yttrium-90, etc.). In general, approx. 12 Bq/L of natural nuclide Potassium-40 is included in seawater.



Status of seawater monitoring around outside of the port (comparison between the highest values in 2013 and the latest values)

Unit (Bq/L); ND represents a value below the detection limit; values in () represent the detection limit; ND (2013) represents ND throughout 2013

(The latest values sampled during June 23 - July 28)

Summary of TEPCO data as of July 29, 2025

	Legal discharge limit	WHO Guidelines for Drinking Water Quality
Cesium-134	60	10
Cesium-137	90	10
Strontium-90	30	10
Tritium	60,000	10,000

【Northeast side of port entrance (offshore 1 km)】

Cesium-134	: ND (H25)	→	ND(0.27)
Cesium-137	: ND (H25)	→	ND(0.33)
Total β	: ND (H25)	→	ND(13)
Tritium	: ND (H25)	→	ND(0.34)

【East side of port entrance (offshore 1 km)】

Cesium-134	: ND (H25)	→	ND(0.37)
Cesium-137	: 1.6 (H25/10/18)	→	ND(0.33) Below 1/2
Total β	: ND (H25)	→	ND(13)
Tritium	: 6.4 (H25/10/18)	→	ND(0.35) Below 1/10

【Southeast side of port entrance (offshore 1 km)】

Cesium-134	: ND (H25)	→	ND(0.33)
Cesium-137	: ND (H25)	→	ND(0.31)
Total β	: ND (H25)	→	ND(13)
Tritium	: ND (H25)	→	ND(0.34)

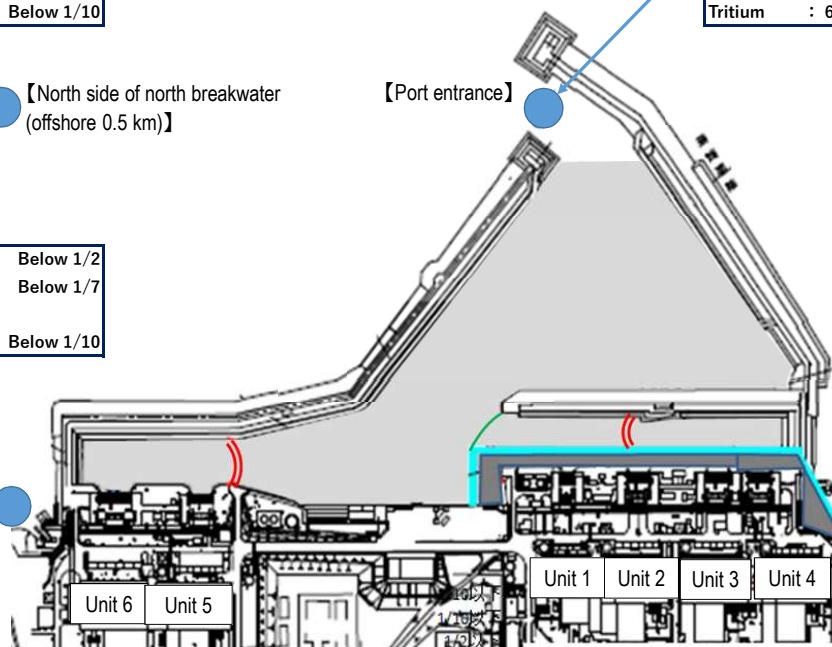
Cesium-134	: ND (H25)	→	ND(0.26)
Cesium-137	: ND (H25)	→	ND(0.31)
Total β	: ND (H25)	→	14
Tritium	: 4.7 (H25/8/18)	→	ND(0.33) Below 1/10

【North side of north breakwater (offshore 0.5 km)】

Cesium-134	: 1.8 (H25/6/21)	→	ND(0.64) Below 1/2
Cesium-137	: 4.5 (H25/3/17)	→	ND(0.63) Below 1/7
Total β	: 12 (H25/12/23)	→	13
Tritium	: 8.6 (H25/6/26)	→	0.69 Below 1/10

【North side of Unit 5 and 6 release outlet】

Sea side impermeable wall
Silt fence
Silt fence for construction



Note: The Total β measurement value is the total radioactivity concentration of radioactive materials that emit β-ray (Potassium-40, Cesium-137, Strontium-90, progeny nuclide Yttrium-90, etc.). In general, approx. 12 Bq/L of natural nuclide Potassium-40 is included in seawater.

Cesium-134	: 3.3 (H25/12/24)	→	ND(0.37) Below 1/8
Cesium-137	: 7.3 (H25/10/11)	→	0.41 Below 1/10
Total β	: 69 (H25/8/19)	→	ND(14) Below 1/4
Tritium	: 68 (H25/8/19)	→	3.0 Below 1/20

【South side of south breakwater (offshore 0.5 km)】

Cesium-134	: ND (H25)	→	ND(0.33)
Cesium-137	: ND (H25)	→	ND(0.30)
Total β	: ND (H25)	→	15
Tritium	: ND (H25)	→	ND(0.34)

Cesium-134	: ND (H25)	→	ND(0.81)
Cesium-137	: 3 (H25/7/15)	→	ND(0.85) Below 1/3
Total β	: 15 (H25/12/23)	→	12
Tritium	: 1.9 (H25/11/25)	→	ND(0.32) Below 1/2

【Near south release outlet (*)】

* Due to erosion, the sampling point was moved from approx. 320m south to approx. 1,300m south from the south release outlet in December 2021. In September 2023, since erosion was eliminated, the sampling point was returned to the original point, approx. 320m south from the south release outlet. Moreover, due to erosion, the sampling point has been moved again to approx. 1,300m south from the south release outlet since June 11, 2024.

Source: TEPCO website, Analysis results on nuclides of radioactive materials around Fukushima Daiichi Nuclear Power Station <http://www.tepco.co.jp/decommission/planaction/monitoring/index-j.html>

Appendix 2
July 31, 2025



1 Contaminated water management

- Efforts to promote contaminated water management based on three basic policies:
 - "Removing" the contamination source
 - "Redirecting" groundwater from the contamination source
 - "Preventing leakage" of contaminated water

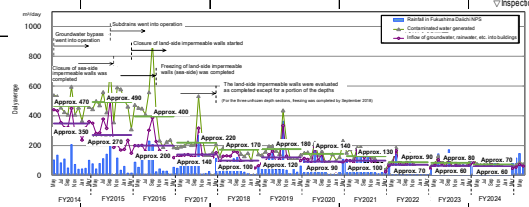
Milestones of the Mid- and Long-Term Roadmap (major target processes)

- [Completed] Suppressing the amount of contaminated water generated to 150 m³/day or less (within 2020)
- [Completed] Suppressing the amount of contaminated water generated to 100 m³/day or less (within 2025)
- [Completed] Treatment of stagnant water in buildings was completed* (within 2020) *Except for Units 1-3 Reactor Buildings, Process Main Building and High Temperature Incinerator Building.
- [Completed] Stagnant water in Reactor Buildings was reduced to about a half of the level at the end of 2020 (FY2022-FY2024)

Reference 1/6

July 31, 2025
Secretariat of the Team for
Countermeasures for Decommissioning,
Contaminated Water and Treated Water

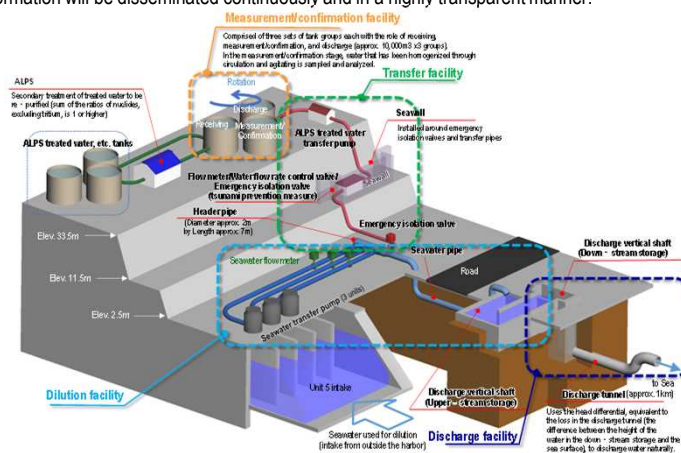
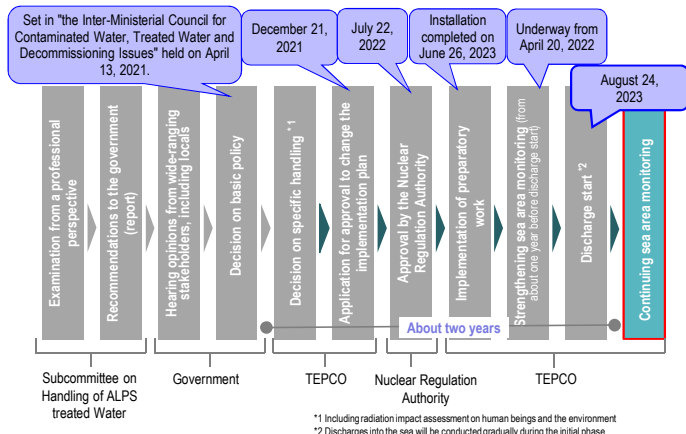
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Contaminated water management [Remove]	Contaminated water treatment facility	▽ Reception start of contaminated water to Central Waste Treatment Building ▽ Decontamination equipment (AREVA) ▽ Evaporative concentration equipment ▽ Cesium Adsorption Apparatus (KURION) ▽ 2nd Cesium Adsorption Apparatus (SARRY)		<div>Cesium Adsorption Apparatus (KURION)</div>		▽ Treatment of RO-condensed salt water complete ▽ Reduction of strontium by Cesium Adsorption Apparatus (KURION) (from 2015.16) ▽ Reduction of strontium by 2nd Cesium Adsorption Apparatus (SARRY) (from 2014.12.26)				▽ Purification of strontium-reduced water in flanged tanks complete ▽ Purification of strontium-reduced water complete						
	Removal of contaminated water from seawater pipe trench	<div>Landing of the second Cesium Adsorption Apparatus (SARRY)</div>		<div>Multi-nuclide removal system (ALPS)</div>	▽ Multi-nuclide Removal System (ALPS) (System A: from 2013.3.30, System B: from 2013.6.13, System C: from 2013.9.27, hot tests conducted) ▽ Multi-nuclide Removal System (additional ALPS) ▽ Multi-nuclide Removal System (high performance ALPS) (from 2014.10.18, hot tests conducted)	▽ Treatment start of strontium-reduced water (ALPS: from 2015.12.4, additional: from 2015.5.27, high-performance: from 2015.4.15) ▽ Multi-nuclide Removal System (from 2017.10.16)				▽ Reduction of strontium by 3rd Cesium Adsorption Apparatus (SARRY II) (from 2019.7.12)						
Contaminated water management [Reduce]	Groundwater bypass	<div>Pumping well</div>	▽ Installation start of groundwater bypass		▽ Operation start of groundwater bypass (drainage started from 2014.5.21)											
	Subdrain		▽ Recovery of existing subdrain pit and start of new installation ▽ Installation start of Water-Treatment Facility special for Subdrain & Groundwater drains		▽ Operation start of subdrain (drainage started from 2015.9.14) (treatment capacity: 1000 m ³ /day)		▽ Enhancement of treatment capacity (2000m ³ /day)									
	Land-side impermeable wall	<div>Subdrain purification system</div>	▽ Installation start of land-side impermeable walls		▽ Freezing start 東側にて維持管理運転開始		▽ Freezing completion (except for some parts)			In some temperature measurement tubes near the K drainage channel cross, temperature exceeded 0°C locally Although no influence was detected on the impermeable function of the land-side impermeable walls but test investigation is underway for the stoppage effect						
	Facing		▽ Completion of waterproof pavement (facing) (except for areas of 2.5 and 6.5m above sea level and around Units 1-4)		▽ Completion of waterproof pavement (facing) (except for around Units 1-4)											
Contaminated water management [Retain]	Bank groundwater measures		▽ Installation start of seaside impermeable walls		▽ Installation of seaside impermeable walls complete ▽ Operation start of groundwater drain (pumping-up started on 2015.11.5)											
	Storage facility	▽ Storage in steel square tanks ▽ Storage in flanged cylindrical tanks ▽ Water leakage (10L) from flanged tank	▽ Water leakage (300L) from flanged tank ▽ Water leakage (100L) from flanged tank ▽ Completion of fence to prevent leakage expanding ▽ Work to raise fence height complete	▽ Leakage of contaminated water from underground reservoir => Start of transfer to tanks ▽ Transfer of contaminated water to tanks complete ▽ Storage in cylindrical steel welded-joint tanks	▽ Completion of replacement of steel square tanks ▽ Completion of purification treatment of RO concentrated salt water ▽ Sprinkling start of rainwater within tank fences by rainwater treatment facility (from 2014.5.21)			<div>Construction of welded-joint tanks</div>	▽ Purification of strontium-reduced water in flanged tanks complete ▽ Transfer and storage of all treated water in welded-joint tanks							
Treatment of stagnant water		▽ Installation of stagnant water transfer equipment/transfer start	▽ Completion of work to improve reliability of transfer line (replacement with PE pipes) ▽ Transfer start from each building to Central Re Building		▽ Start to maintain water-level difference with subdrain water level ▽ Transfer start from each building to Central Re Building		▽ Floor exposure of Unit 1 TB ▽ Separation of stagnant water between Units 1 and 2 ▽ Floor exposure of Unit 1 RWB ▽ Separation of stagnant water between Units 3 and 4 ▽ Floor exposure of Unit 3 RWB		▽ Treatment of stagnant water in buildings complete ▽ Floor exposure of Unit 2 TB, RWB ▽ Floor exposure of Unit 3 TB, RWB ▽ Floor exposure of Unit 4 RWB, TB, RWB		▽ Completed lowering to target water level of Unit 2 RWB ▽ Completed lowering to target water level of Units 1, 3 RWB					
Countermeasures to tsunami risks	Closure of openings		▽ Examination start of measures to close building openings ▽ Work for common pool complete ▽ Work for Units 1 and 2 TB complete ▽ Work for HTI building complete					▽ Work for Process Main Building complete ▽ Work for Unit 3 TB complete		▽ Work for Units 1-3 RWB complete		▽ Measures to close openings were completed ▽ Work for Units 1-4 RWB was completed				
	Seawall	▽ Installation of outer-rise tsunami seawall complete							▽ Construction start of Chishima Trench Tsunami Seawall ▽ Completion of installation ▽ On-site start	Japan Trench tsunami seawall	Japan Trench Tsunami Seawall	Completion of main wall construction				
	Mega float							▽ Start of marine construction Temporary grounding of mega float		▽ Internal filling complete (reduction of tsunami risks)						



2 Handling of ALPS treated water

In "the Inter-Ministerial Council for Contaminated Water, Treated Water and Decommissioning Issues" held on April 13, 2021, the basic policy on how to handle ALPS treated water was set. Based on this, the response of TEPCO was announced on April 16.

Regarding the discharge of ALPS treated water into the sea, TEPCO must comply with regulatory and other safety-related standards to ensure the safety of the public, surrounding environment and agricultural, forestry and fishery products. To minimize adverse impacts on reputation, monitoring will be further enhanced, objectivity and transparency ensured by engaging with third-party experts and safety checked by the IAEA. Moreover, accurate information will be disseminated continuously and in a highly transparent manner.



● Rearing test of marine organisms

All planned marine organisms rearing tests have been completed. The results confirmed by the rearing tests were as follows:

• Marine organisms rearing tests were conducted both in "normal seawater" and in "ALPS treated water diluted with seawater". The marine organisms in these two environments were compared via rearing data to confirm the absence of any significant differences between the two populations.

• TEPCO confirmed that "tritium is not concentrated in the living bodies and that the concentration of tritium in living bodies does not exceed that of the rearing environment" as demonstrated in previous knowledge.

• Flounders and abalones that were being raised in normal seawater were put in "water discharged into the environment" and TEPCO confirmed that there was no remarkable change in the growth of the flounders or abalones around this time. Flounder and abalone were reared in water discharged into the environment for approximately six months and we confirmed that there is no change in the growth of them.

Information provision and communication to foster understanding

- Occasions to deepen the understanding are organized by communications related to decommission via various media and visit to the power station.



- On the dedicated website "Treated Water Portal Site" (Japanese, English, Chinese and Korean) within the TEPCO website, monitoring results of radioactive materials are published timely.



- Visit and dialogue meeting of Fukushima Daiichi Nuclear Power Station have been held since 2019 for 13 cities, towns and villages.



- Through various opportunities such as visit and on-site explanations, communications continue where opinions of related parties are heard, their thoughts are taken seriously, and TEPCO conveys its efforts, thoughts, and countermeasures for reputational damage.

● Status of discharge of ALPS treated water into the sea

Discharge of ALPS treated water into the sea commenced from August 24, 2023, and the 1st discharge was completed on September 11.

During the discharge period, no abnormality was detected by the sea area monitoring conducted by the national government, Fukushima Prefecture and TEPCO.

<Discharges in FY2025>

Tank group discharged	Tank Group A
Tritium concentration	370,000 Bq/L
Discharge commencement	April 10, 2024
Discharge termination	April 28, 2024
Discharge amount	7,853 m ³
Total tritium amount	Approx. 2.9 trillion Bq

● Publication of the Comprehensive Report of the IAEA safety review

The Comprehensive Report on the safety review concerning handling of ALPS treated water was published by the IAEA on July 4, 2023.

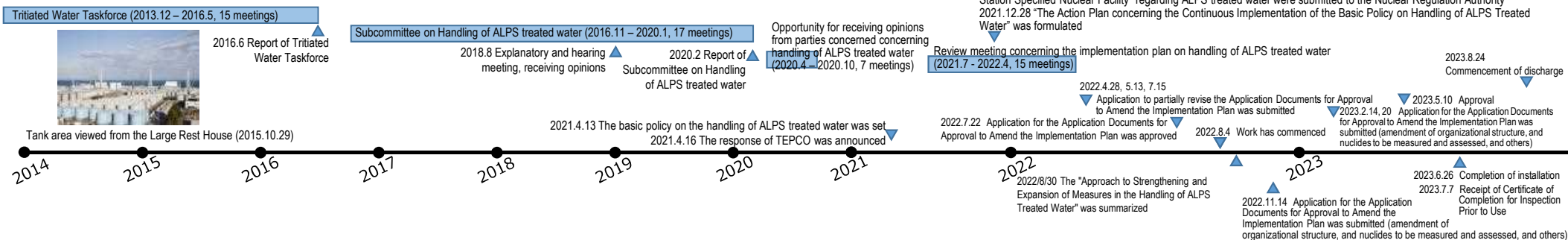
In the Executive Summary of the IAEA Comprehensive Report, the IAEA concluded the following: (1) the activities by Japan associated with the discharge of ALPS treated water into the sea are consistent with relevant international safety standards, (2) the discharge of the ALPS treated water will have a negligible radiological impact on people and the environment.

We will continue to share necessary information with the IAEA, while striving to foster further understanding of the international community about the discharge of ALPS treated water into the sea.

<https://www.iaea.org/topics/response/fukushima-daiichi-alps-treated-water-discharge-comprehensive-reports>



Examination concerning handling of ALPS treated water



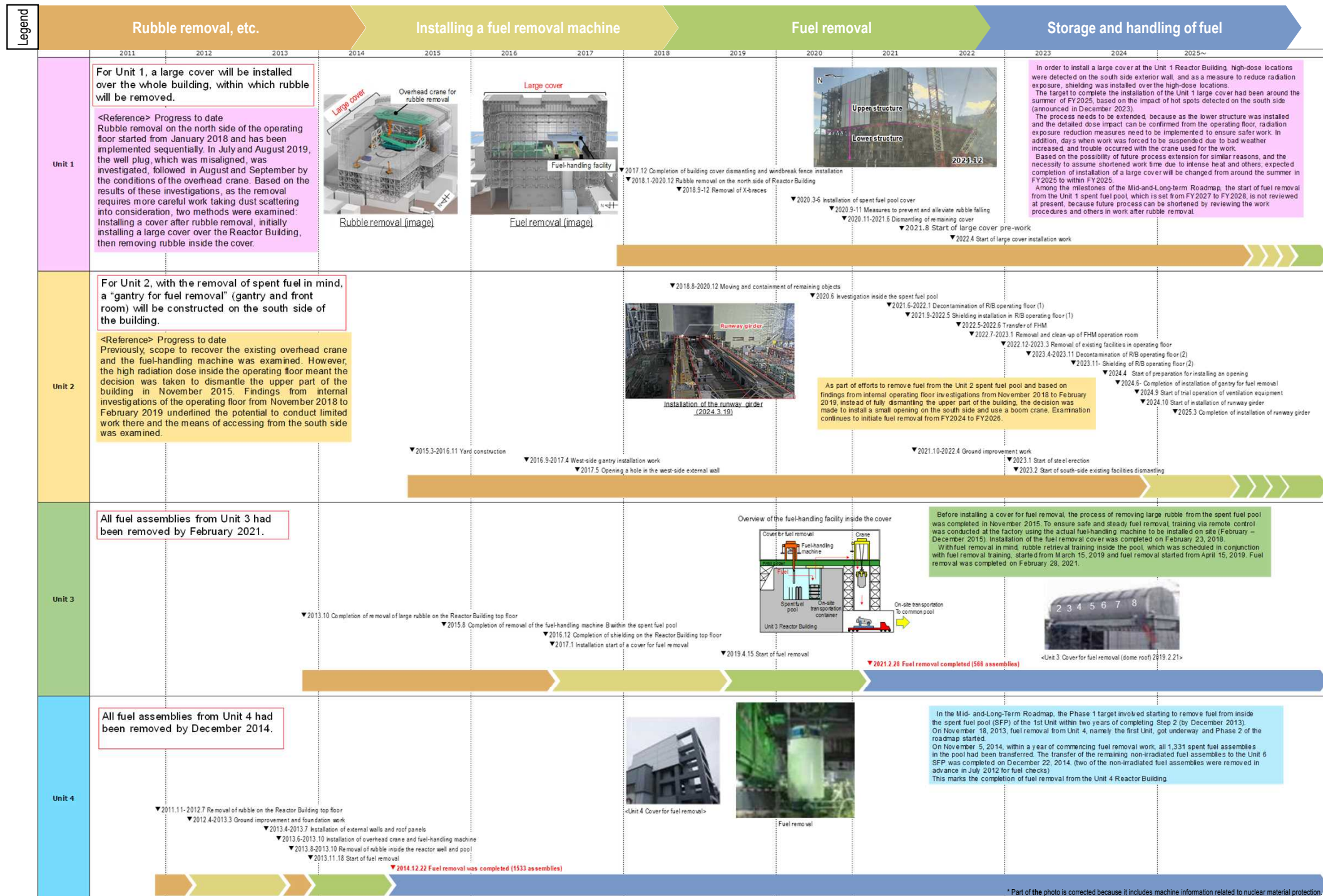
3 Removal of fuel from spent pool

Milestones of the Mid- and Long-Term Roadmap (major target processes)

- Completion of Units 1-6 fuel removal (within 2031)
- Completion of installation of Unit 1 large cover (around FY2023), start of Unit 1 fuel removal (FY2027-2028)
- Start of Unit 2 fuel removal (FY2024-2026)

Reference 3/6

July 31, 2025
Secretariat of the Team for
Countermeasures for Decommissioning,
Contaminated Water and Treated Water



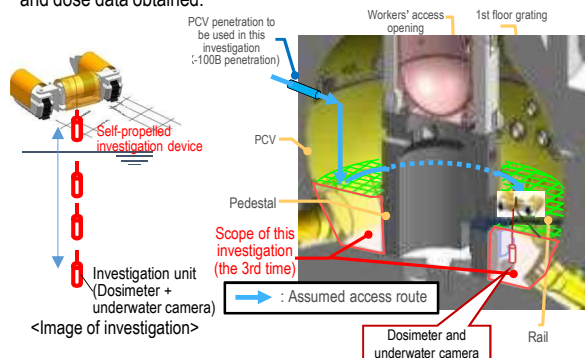
Milestones of the Mid- and Long-Term Roadmap (major target processes)

Commencement of fuel debris retrieval from the first unit (Unit 2). Expanding the scale in stages (From September 10, 2024, trial fuel debris retrieval commenced)

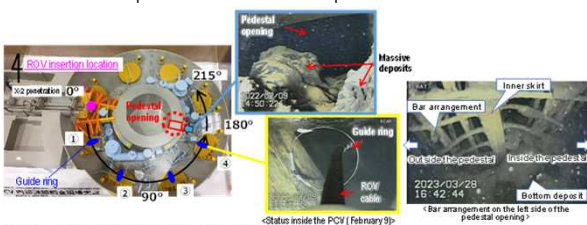
Before removing fuel debris, investigations inside the Primary Containment Vessel (PCV) are conducted to inspect the conditions there, including locations of fuel debris.

Unit 1 Investigation overview

- In April 2015, a device having entered the inside of the PCV via a narrow opening (bore:φ100 mm) collected information such as images and airborne dose inside the PCV 1st floor.
- In March 2017, an investigation using a self-propelled investigation device was conducted to inspect the spreading of debris to the basement floor outside the pedestal, with images taken of the PCV bottom status for the first time. The conditions inside the PCV will continue to be examined, based on the imagery and dose data obtained.



In February 2022, "the guide ring" was installed to facilitate the investigation. From March 28, 2023, the investigation inside the pedestal by ROV-A2 started and confirmed that a portion of the bar arrangement was exposed. Regarding the soundness of the pedestal, based on the past earthquake resistant evaluation by the International Research Institute for Nuclear Decommissioning (IRID), it was evaluated that even though a portion of the pedestal was lost, there would be no serious risk. However, as the present information is very limited, the investigation will continue to acquire as much information as possible for continued evaluation.

**Unit 1 PCV internal investigation**

Investigations inside the PCV	1st (2012.10)	<ul style="list-style-type: none">- Acquiring images- Measuring the air temperature and dose rate- Measuring the water level and temperature- Sampling stagnant water- Installing permanent monitoring instrumentation
	2nd (2015.4)	<ul style="list-style-type: none">- Confirming the status of the PCV 1st floor- Acquiring images- Measuring the air temperature and dose rate- Replacing permanent monitoring instrumentation
	3rd (2017.3)	<ul style="list-style-type: none">- Confirming the status of the PCV 1st basement floor- Acquiring images- Measuring the dose rate- Sampling deposit- Replacing permanent monitoring instrumentation
	4th (From 2022.2)	<ul style="list-style-type: none">- Acquiring information inside PCV (inside/outside of the pedestal)- Acquiring images- Measuring deposit thickness and sampling deposit- Detecting deposit debris, 3D mapping
Leakage points from PCV	<ul style="list-style-type: none">- PCV vent pipe vacuum break line bellows (identified in 2014.5)- Sand cushion drain line (identified in 2013.11)	
<u>Evaluation of the location of fuel debris inside the reactor by measurement using muons</u> Confirmed that there was no large fuel in the reactor core. (2015.2-5)		

Unit 2 Investigation overview

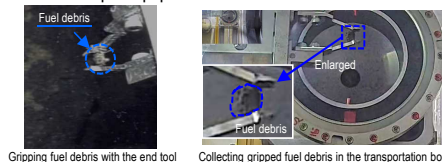
- In January 2017, a camera was inserted from the PCV penetration to inspect the conditions of the rail on which the robot traveled. The results of a series of investigations confirmed some gratings had fallen and deformed as well as a quantity of deposit inside the pedestal.
- In January 2018, the conditions below the platform inside the pedestal were investigated. Based on the analytical results of images obtained in the investigation, deposits, probably including fuel debris, were found at the bottom of the pedestal. Moreover, multiple parts exceeding the surrounding deposits were also detected. We presumed that there were multiple instances of fuel debris falling.
- In February 2019, an investigation touching the deposits at the bottom of the pedestal and on the platform was conducted and confirmed that the pebble-shaped deposits, etc. could be moved and that hard rock-like deposits that could not be gripped may exist.



- In October 2020, a deposits contact investigation at the PCV penetration (X-6 penetration) was conducted. This confirmed that deposits inside the penetration had not deformed and come unstuck.



- From September 10, 2024, the end tool of the telescopic equipment passed through the isolation valve, and the trial fuel debris retrieval commenced. On October 30, fuel debris was gripped with the end tool. On November 2, the guide pipe was pulled off, and the telescopic equipment was stored in the enclosure. On November 7, fuel debris was carried out from the hatch on a side of the enclosure, and the trial retrieval was completed.

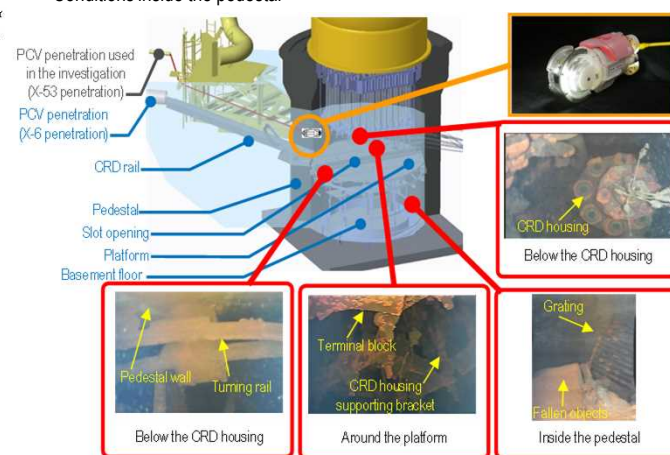
**Unit 2 PCV internal investigation**

Investigations inside the PCV	1st (2012.1)	- Acquiring images - Measuring the air temperature
	2nd (2012.3)	- Confirming water surface - Measuring the water temperature - Measuring the dose rate
	3rd (2013.2 – 2014.6)	- Acquiring images - Sampling stagnant water - Measuring water level - Installing permanent monitoring instrumentation
	4th (2017.1-2)	- Acquiring images - Measuring the dose rate - Measuring the air temperature
	5th (2018.1)	- Acquiring images - Measuring the dose rate - Measuring the air temperature
	6th (2019.2)	- Acquiring images - Measuring the dose rate - Measuring the air temperature - Determining characteristics of a portion of deposit
Leakage points from PCV	- No leakage from the torus chamber rooftop - No leakage from any internal/external surfaces of S/C	
<u>Evaluation of the location of fuel debris inside the reactor by measurement using muons</u> The existence of high-density materials, which were considered to constitute fuel debris, was confirmed at the bottom of RPV and in the lower part and outer periphery of the reactor core. It was assumed that a significant portion of fuel debris existed at the bottom of RPV. (2016.3-7)		

Unit 3 Investigation overview

- In October 2014, the conditions of X-53 penetration, which may be under water and which is scheduled for use to investigate the inside of the PCV, were investigated via remote-controlled ultrasonic test equipment. The results showed that the penetration was not under water.
- In October 2015, to confirm the conditions inside the PCV, an investigative device was inserted into the PCV from X-53 penetration to obtain images, data on dosage and temperature and sample stagnant water. No damage to the structure and walls inside the PCV was identified and the water level was almost identical to estimated values. In addition, the dose inside the PCV was confirmed to be lower than in other Units.
- In July 2017, the inside of the PCV was investigated using the underwater ROV (remotely operated underwater vehicle) to inspect the inside of the pedestal. Analysis of the imagery obtained in the investigation identified damage to multiple structures and the supposed core internals.
- Videos obtained in the investigation were reproduced in 3D. Based on the reproduced images, the relative positions of the structures, such as the rotating platform slipping off the rail with a portion buried in deposits, were visually understood.

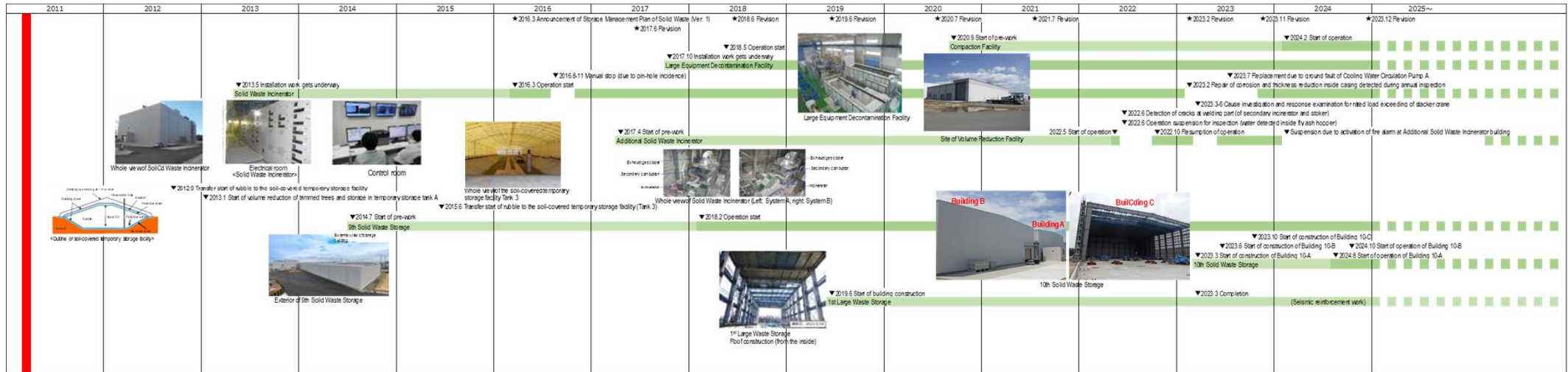
<Conditions inside the pedestal>

**Unit 3 PCV internal investigation**

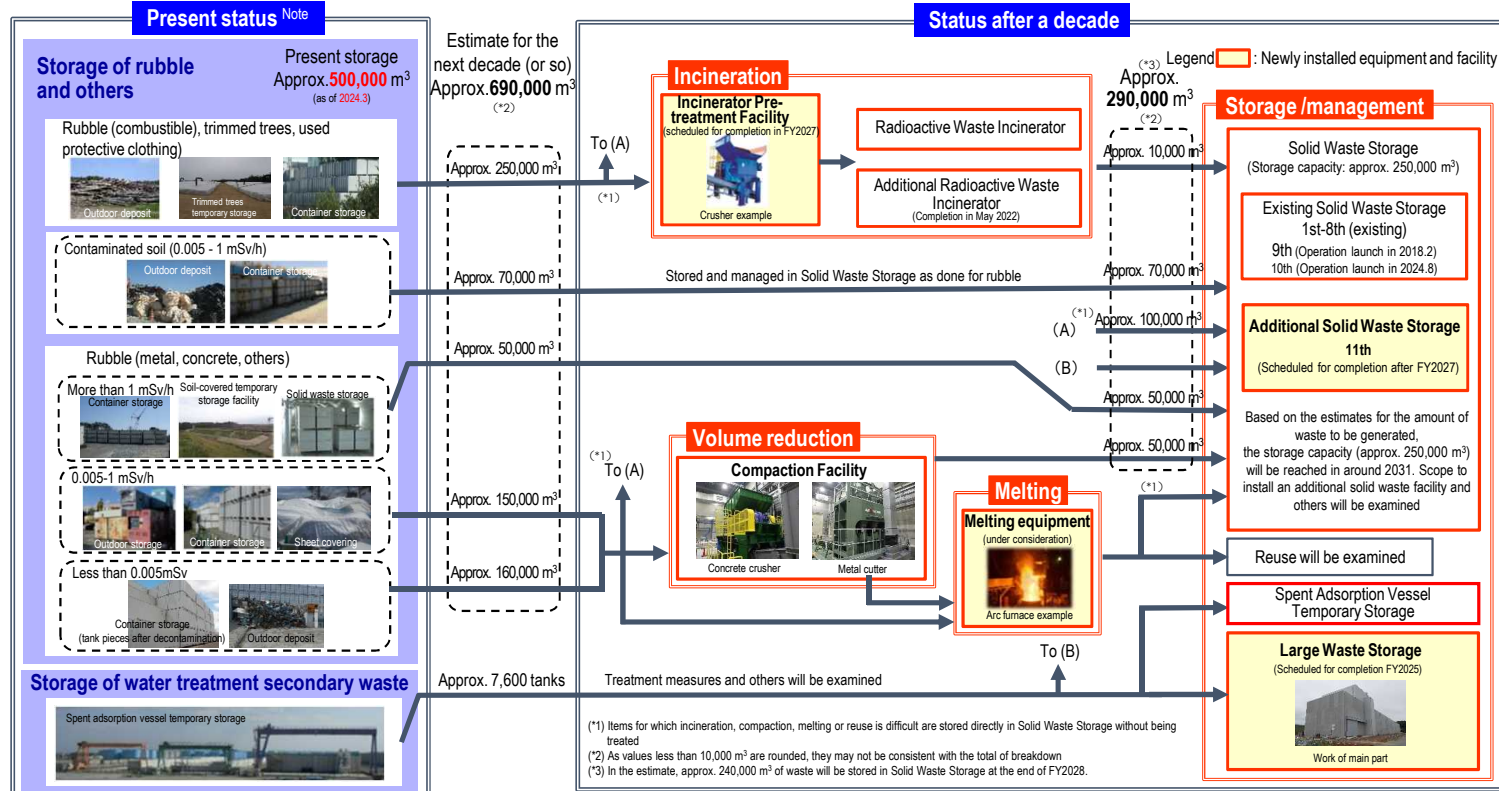
Investigations inside the PCV	1st (2015.10-12)	<ul style="list-style-type: none">- Acquiring images- Measuring the air temperature and dose rate- Measuring the water level and temperature- Sampling stagnant water- Installing permanent monitoring instrumentation (2015.12)
	2nd (2017.7)	<ul style="list-style-type: none">- Acquiring images- Installing permanent monitoring instrumentation (2017.8)
Leakage points from PCV	- Main steam pipe bellows (identified in 2014.5)	
<p>Evaluation of the location of fuel debris inside the reactor by measurement using muons</p> <p>The evaluation confirmed that no large lump existed in the core area where fuel had been placed and that a portion of the fuel debris potentially existed at the bottom of the RPV. (2017.5-9)</p>		

Milestones of the Mid- and Long-Term Roadmap (major target processes)

Eliminating temporary outdoor storage of rubble and others * Except for secondary waste of water treatment and materials for reuse or recycling (within FY2028)



Solid Waste Storage Management Plan for the Fukushima Daiichi Nuclear Power Station (Revision in December 2024)



- The exposure dose at the site boundaries will be reduced by aggregation to indoor storage and eliminating outdoor storage.
- The exposure dosage in exhaust gas from incinerators and at site boundaries is measured and announced on the website and others.

While ensuring reliable exposure dose management for workers, sufficient personnel are secured. Moreover, while getting a handle on on-site needs, the work environment and labor conditions are continuously improved.

Regarding the site-wide reduction in the radiation dose and prevention of contamination spreading, the radiation dose on site was reduced by removal of rubble, topsoil and facing. Moreover, the operation was improved to use environmentally-improved areas as a Green Zone, within which workers are allowed to wear general work clothes and disposable dust-protective masks which are less of a physical burden.

