FY2025 ALPS treated water discharge plan (draft)

＜Reference document＞
January 23, 2025
Tokyo Electric Power Company Holdings, Inc.
Fukushima Daiichi Decontamination & Decommissioning Engineering Company

- Last fiscal year, we announced its FY2024 ALPS treated water discharge plan (draft) on January 25, 2024. After reflecting opinions from various stakeholders, the FY2024 discharge plan was finalized and announced on March 28, 2024.
- The first to sixth discharges out of the seven discharges planned for this fiscal year have already been completed, and during the discharge periods we confirmed that the ALPS treated water (tritium) is being suitably diluted by analyzing the concentrations of tritium in the water after it has been diluted with seawater (tritium concentration measurements are approximately the same as estimates and fall below 1,500Bq/L).
- Quick measurement results for the concentration of tritium in seawater obtained by TEPCO have also proven that the ALPS treated water is being discharged safely as planned.

<The information above was announced on January 25, March 28, and November 5, 2024, respectively.>

- As with last fiscal year, we hereby announce the ALPS treated water discharge plan (draft) for FY2025.
- As a general rule, we will start by discharging ALPS treated water with a low concentration of tritium. The annual tritium in the ALPS treated water to be discharged in FY2025 is planned to be approximately 15 trillion Bq, which is below of the annual discharge limit of tritium, 22 trillion Bq, indicated in the basic policy of the government (the same as the control target for the Fukushima Daiichi Nuclear Power Station before the accident).
- We will continue to remain vigilant as we discharge ALPS treated water into the sea so as to maintain safety and consistency.

【Main points of the FY2025 ALPS treated water discharge plan (draft)】
- Number of annual discharges: 7 times
- Annual amount of water to be discharged: Approx. 54,600m³
- Annual amount of tritium to be discharged: Approx. 15 trillion Bq

Basic thinking behind the discharge plan

- As a general rule, **we will start by discharging water with a low concentration of tritium**.
- Based on this general rule, **we will create a discharge plan for the following fiscal year at the end of each fiscal year and announce it**. In addition to tritium concentrations, space needed for facilities required for decommissioning, and the need to secure enough relay tanks used for holding ALPS treated water after secondary treatment are also considered during the drafting of the discharge plan.

※ Issues that will be considered when formulating the discharge plan

– Based on tritium concentration trends in the water generated daily, we will decide whether to prioritize the amount of water being generated daily or in storage when discharging water during the next fiscal year in order to reduce the annual amount of tritium to be discharged while ensuring that the concentration of radioactive substances, with the exception of tritium, meet regulatory standards (sum of the ratios of the concentration of each radionuclide to the regulatory concentration limit is less than 1).

– During the initial stage of discharge, we will discharge stored water that does not requires secondary treatment in order to keep the process smooth.

– The preparation of relay tanks and inspection/repairs required due to the deterioration over time of storage tanks on site is also considered.

Consideration when deliberating the FY2025 discharge plan

- As a general rule, water with low tritium concentration shall be discharged first as before. And when deliberating the ALPS treated water discharge plan, the following issues are taken into consideration.

  ① Estimates of the tritium concentrations in contaminated water (slide 4)

  ② The amount of contaminated water generated (slide 5)

  ③ Site usage (slide 6)

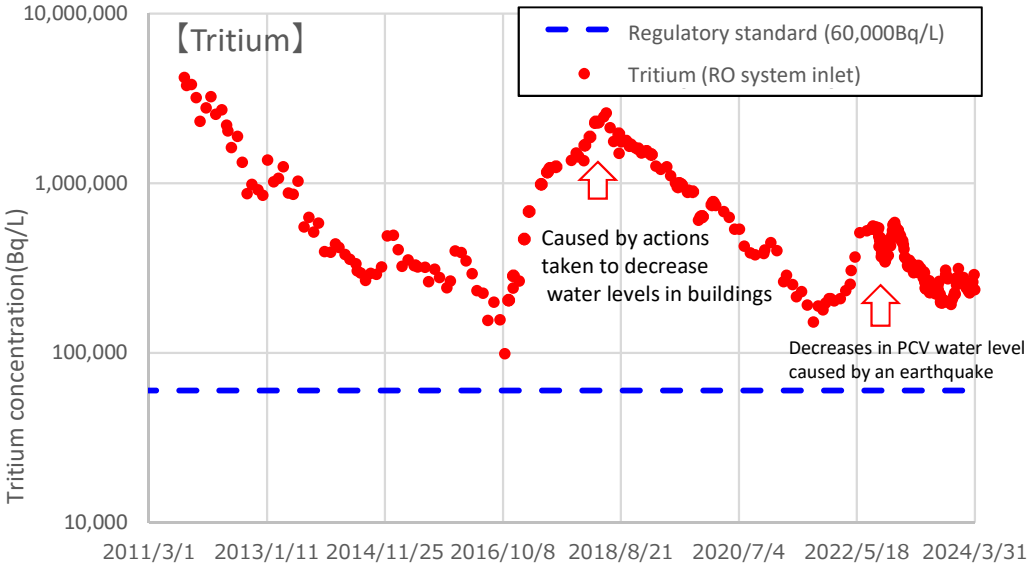
  ④ Other considerations (slide 8)

- Each condition is explained on the following pages

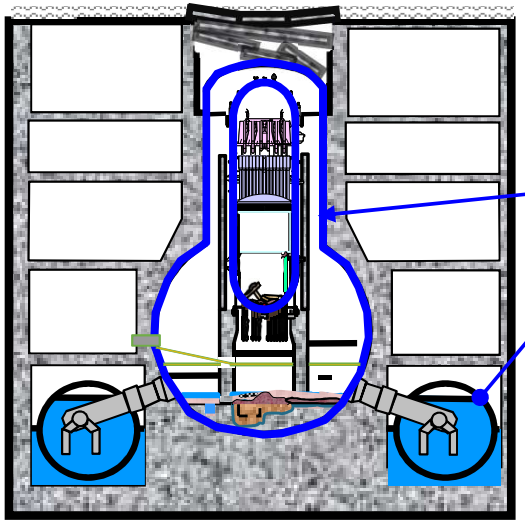
① Estimates of the tritium concentrations in contaminated water

- There was no significant increase in the concentration of tritium in contaminated water.
- However, the Nuclear Regulation Authority has requested that the water levels in the primary containment vessels (PCV) and suppression chambers (S/C) be lowered as quickly as possible in consideration of seismic resistance/safety.
- Tritium concentrations inside the PCVs are high (Unit 1: Approx. 20 million Bq/L; Approx. 4,800m³; Unit 3: Approx. 10 million Bq/L; Approxi. 6,600m³), and water drained from them to reduce water levels will be treated as stagnant water from inside the building, so we expect※ to see fluctuations in the concentrations of tritium in the contaminated water generated during FY2025.
- Therefore, the FY2025 discharge plan calls for the ALPS treated water currently being stored that has relatively low concentrations of tritium and does not require secondary treatment to be discharged.

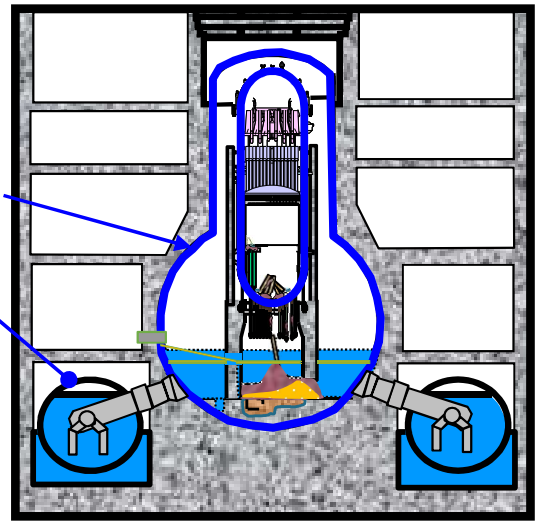
※ The same goes for draining from pipes and equipment in the future during the course of decommissioning



Tritium concentrations in contaminated water



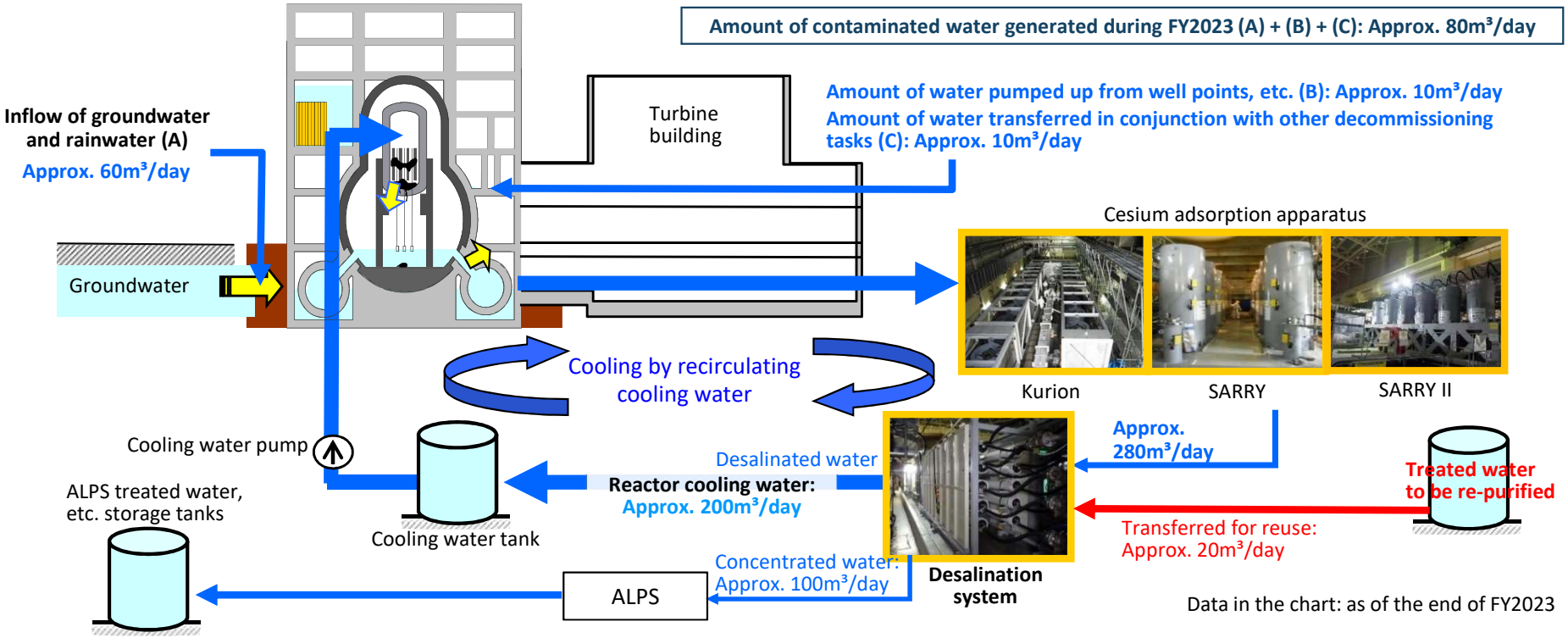
Unit 1



Unit 3

② Amount of contaminated water generated (As of FY2023)

- During FY2023, contaminated water was generated at a rate of approximately 80m³/day with approximately 60m³ of that water flowing into buildings on a daily basis. Approximately 10m³/day of contaminated groundwater from 2.5m above sea level (well points) was pumped up and approximately 10m³/day of contaminated water was transferred in conjunction with other decommissioning tasks.
  The data for FY2024 is currently being compiled and is expected to show a decline in these numbers, but just to be safe we've assumed that the numbers will be the same as FY2023.
- In conjunction with the decrease in the amount of contaminated water being generated, the amount of fresh water injected as reactor coolant is showing a downward trend, so the required amount of desalinated water will be secured by replenishing the desalination system with treated water to be re-purified that is currently being stored in tanks (approximately 20m³/day).
  This will not result in an increase in the amount of ALPS treated water, etc., and will have no impact on the amount of water being stored in tanks in the long run.



Data in the chart: as of the end of FY2023

③ Site usage

- In addition to the E area (currently being used for flanged tank dismantling), which will be the construction site for facilities needed for the retrieval of fuel debris from Unit 2, the J8 and J9 areas in the vicinity of the E area will also be the construction site for facilities needed for the retrieval of fuel debris from Unit 3.

- The J8※1 and J9 areas tank dismantling will begin with the J9 tanks that will be drained first in conjunction with the discharge into the sea.

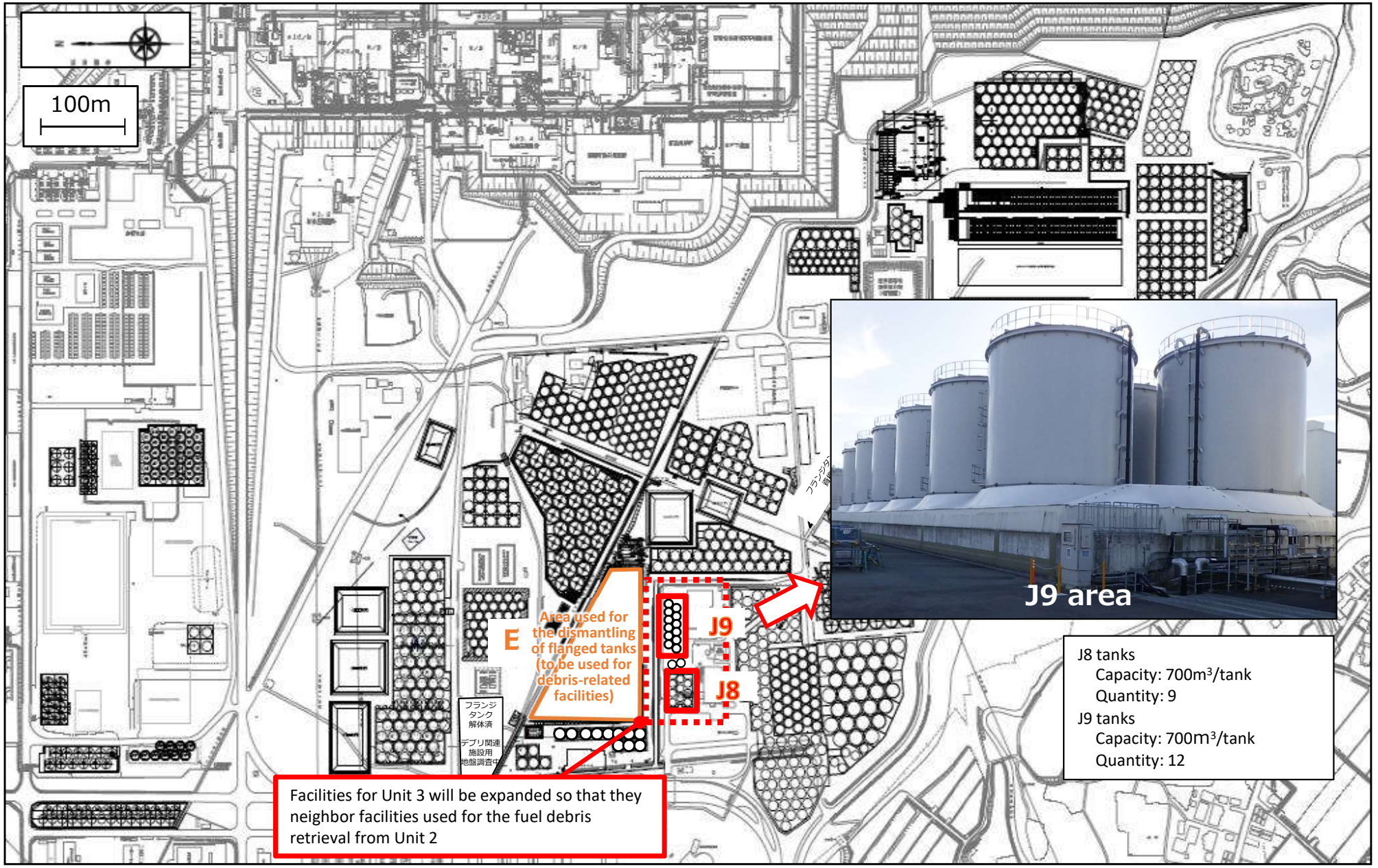
- The J8 and J9 area tank dismantling implementation plan was submitted on August 1, 2024. Tank dismantling will begin after it has been authorized (Dismantling period: Second half of FY2024~end of FY2025※2).

- Prior to dismantling, the remaining water inside the J9 tanks will be treated and preparations, such as removing obstructions from the vicinity that do not interfere with tank storage functions, etc., will be made.

※1 Since the J8 area tanks are being used to store treated water to be re-purified, dismantling will begin after the water inside them has been transferred to other tanks that have been emptied.

※2 The J8 and J9 area tank dismantling will be the first time that welded tanks have been dismantled, so we will prioritize safety and move forward while checking procedures and accumulating knowledge.

【Reference】 Areas of dismantled tank groups



④Other considerations

Full inspection of measurement/confirmation tanks and cleaning of the bottoms

- Full inspections of the tanks (including cleaning of the bottoms) have been planned for the maintenance/management of ALPS treated water discharge facilities, and the time required to do so has been allotted.

  FY2024: Cleaning of the bottom of tank groups A~C and full inspection of tank Group B

  FY2025: Full inspection of Group C

  FY2026: Full inspection of tank Group A planned

Other storage tanks

- Tank areas that are prioritized for inspections and have fulfilled discharge requirements have been reflected in the plan and will be "drained to perform a visual inspection of the inside of the tanks" in succession.
- Tanks that have recently been difficult to drain have been subjected to an internal inspection using a submersible ROV※ and will be subject to observe trend.

※ The video footage from the submersible ROV is clear and confirm the condition of paint and the extent of corrosion visible. If significant corrosion is discovered thickness measurements will be taken from the outside using ultrasonic thickness testing.

- Furthermore, as always all tanks will be subjected to visual inspection once a year and thickness measurements will be taken from the outside once a year for tanks subject to this inspection in accordance with the period of time they have been in service.
- Tanks in poor condition will be drained and sealant reapplied in order to ensure integrity.

FY2025 ALPS treated water discharge plan (draft)（1/2）

- As of January 2025, the FY2025 discharge plan (draft) as follows. There will be seven discharges during the year with each discharge releasing approximately 7,800m³ for an annual discharge of approximately 54,600m³. The annual tritium discharge volume will be approximately 15 trillion Bq.

Management number※1	Transfer source tank※2	Amount of water to be transferred		Discharge commencement period
25-1-12	G4 south area Group B（Transferred to Measurement/Confirmation facility Group A） K3 area Group A/B※5（Transferred to Measurement/Confirmation facility Group A）	※4 ：Approx. 8,000m³ ：Approx. 1,000m³	Secondary treatment: No Tritium concentration: 220,000~370,000Bq/L※3 Total amount of tritium : 2.8 trillion Bq	April
25-2-13	K3 area Groups A/B※5（Transferred to Measurement/Confirmation facility Group C） J1 area Group E（Transferred to Measurement/Confirmation facility Group C）	：Approx.6,900m³ ：Approx. 900m³	Secondary treatment: No Tritium concentration: 220,000~380,000Bq/L※3 Total amount of tritium : 1.9 trillion Bq	June~July
25-3-14	J1 area Group E（Transferred to Measurement/Confirmation facility Group A） G5 area Group E（Transferred to Measurement/Confirmation facility Group A）	：Approx. 7,200m³ ：Approx. 600m³	Secondary treatment: No Tritium concentration: 200,000~380,000Bq/L※3 Total amount of tritium : 2.8 trillion Bq	July~August
25-4-15	G5 area Groups E/C/B（Transferred to Measurement/Confirmation facility Group B）	※5 ：Approx. 9,000m³	Secondary treatment: No Tritium concentration: 200,000~220,000Bq/L※3 Total amount of tritium : 1.6 trillion Bq	September

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※1 The management number is made up of the fiscal year, followed by the discharge number for that fiscal year, and the total number of discharges to date.
For example, “25-1-12” indicates that the data is for the first discharge of FY2025, which is the twelfth discharge to date.

※2 The tank order from which water will be transferred will not be impacted by increases/decreases in the transfer volume (factual measurements). But order of discharge may be moved forward or backward.

※3 Average value of the tank group that was assessed taking into account the radioactive decay until April 1, 2025

※4 Since there will be no water remaining in the receiving tanks (Measurement/Confirmation tank groups A/B) after the tank inspections, the amount of water to be transferred will total approximately 9,000m³ (discharge volume is approximately 7,800m³).

※5 K3 area Group A/B tanks emptied as a result of transfer/discharge during FY2023 and FY2024 will be reused to receive ALPS treated water.

FY2025 ALPS treated water discharge plan (draft)（2/2）

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Management number ※1	Transfer source tank ※2	Amount of water to be transferred		Discharge commencement period
25-5-16	G5 area Groups B/a （Transferred to Measurement/Confirmation facility Group C）	：Approx. 7,800m³	Secondary treatment: No Tritium concentration: 220,000~260,000Bq/L ※3 Total amount of tritium : 1.9 trillion Bq	October~ November
25-6-17	G5 area Groups A/D （Transferred to Measurement/Confirmation facility Group A） G4 north area Groups A/B （Transferred to Measurement/Confirmation facility Group A）	：Approx. 3,900m³ ：Approx. 3,900m³	Secondary treatment: No Tritium concentration: 260,000~300,000Bq/L ※3 Total amount of tritium : 2.2 trillion Bq	November~ December
Inspection suspension (including full inspections of measurement/confirmation facility Group C)				
25-7-18	G4 north area Groups A/B （Transferred to Measurement/Confirmation facility Group A） H2 area Group J （Transferred to Measurement/Confirmation facility Group A）	：Approx. 3,600m³ ：Approx. 4,200m³	Secondary treatment: No Tritium concentration: 260,000~270,000Bq/L ※3 Total amount of tritium : 2.0 trillion Bq	March

Total amount of tritium to be discharged during FY2024 : Approx.15 trillion Bq

※1 The management number is made up of the fiscal year, followed by the discharge number for that fiscal year, and the total number of discharges to date.
For example, “25-1-12” indicates that the data is for the first discharge of FY2025, which is the twelfth discharge to date.

※2 The tank order from which water will be transferred will not be impacted by increases/decreases in the transfer volume (factual measurements). But order of discharge may be moved forward or backward.

※3 Average value of the tank group that was assessed taking into account the radioactive decay until April 1, 2025

FY2025 order of discharge

- G4 south area Group B
  - Water will be transferred/discharged as planned in accordance with the FY2024 discharge plan.

- K3 area Groups A/B
  - The tanks in the vicinity of Multi-nuclide removal equipment (ALPS) will be discharged as planned so that the space can be effectively utilized in the long period.
  - Of these tanks in the vicinity, water in the tanks in the K3 tank area shall be transferred/discharged and inspections will be conducted to ensure that it can be used for a long period.

- J1 area Group E
  - As a horizontal development of the K4-E side plate corrosion, we plan to conduct sequential internal inspections of the storage tanks.

    Internal inspections will be implemented in the form of visual inspections of drained tanks, however if the tank cannot be drained due to a lack of empty tanks to transfer the water, a submersible ROV will be used to perform the inspection.
  - The J1 area tanks are old and the internal inspection priority is relatively high, however with the exception of tank J1-E, secondary treatment is necessary.

    Therefore, the water in J1-E will be transferred/discharged as soon as possible to perform an inspection. After that, inspections will be conducted by transferring stored water from other tanks in the J1 area in turn, starting from this tank.

- G5 area Groups A~E, G4 north area Groups A/B, H2 area Group J
  - Transfer/discharge will be starting with the tank areas with the lowest tritium concentrations.

【Reference】 Inspections of welded tanks used to store ALPS treated water, etc.

- Welded tanks are designed to have a service life of 20 years as a result of wall thickness specifications that consider sealant specifications/corrosion, but efforts are made to detect abnormalities early by regularly implementing external and internal inspections before the end of this 20 year service period (refer to the chart below), and repairs suitably implemented to maintain integrity over the long-term.

※ Some tanks have been manufactured with a service life of five years (G3, H8, and J1 areas put into service early in 2013) by regular inspections/repairs/sealant reapplication have been implemented to confirm that there is no problem with continued use.

Inspection Type		Liquid in tanks	Target		Frequency	Inspection details
Annual inspection	①Visual inspection	Implemented regardless of whether or not there is liquid in the tanks	All tanks		Once a year	Outer surface: Checked for deformation, cracks, paint peeling, corrosion, and leaks Target areas Sidewalls, nozzles, bolts/nuts, caulking to prevent rain from seeping into the bottom plate, ancillary facilities (vertical ladders, etc.)
	②Sidewall thickness measurements taken from the outside (ultrasonic flaw detection)		・Membrane thickness: Less than 100μm ・Thickness allowance: Less than 1mm ・Service life: More than 10 years		Once a year	Sidewalls: Checked to confirm that there is no abnormal thinning
Full inspection	③Internal inspection (after draining water) (ultrasonic flaw detection)	No	All tanks	Tanks that have been emptied through the discharge of ALPS-treated water, etc.	Once every 10 years	Sidewalls: Paint blistering, peeling, base material thinning Bottom plate: Same as above (Internal paint membrane thickness measurements, wall thickness measurements)
	④Underwater internal inspection (submersible ROV)	Yes		Tanks that cannot be drained		Sidewalls: Paint blistering, peeling, base material corrosion Bottom plate: Same as above

【Reference】 Future tank inspection plans

＊ These current plans may be revised in the future. If revisions are made, they will be announced when the finalized discharge plan is announced.

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- Approx. 1,000 welded tanks will be drained and subjected to internal inspections or submersible ROV inspections if required.