

Fukushima Daiichi Nuclear Power Station

Facility inspection results and preparations for the First Stage of the third discharge of FY2023

< Reference document >
October 30, 2023
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Fukushima Daiichi Decontamination and
Decommissioning Engineering Company

- From October 5 until October 23, we discharged the ALPS treated water in the measurement/confirmation facility tank group C as the second discharge for FY2023. (Total volume of discharged water: 7,810m³; Total tritium volume: Approximately 1.1 trillion Bq)
- Samples have been taken from the seawater pipe every day to measure tritium concentrations in order to confirm that tritium is being suitably diluted during the discharge period. As a result, we have confirmed that the analysis values are approximately equal to calculated concentrations, and below 1,500Bq/liter.
- In order to obtain results quicker, the detection limit for seawater samples taken was raised to approximately 10Bq/liter and tritium analysis was performed every day. All of the obtained results were below the discharge suspension level (700Bq/liter) and the investigation level (350Bq/liter).
- From October 24, we are performing facility inspection after the second discharge (tank group C). If no abnormalities are found in the inspection, in preparation for the third discharge, we will transfer ALPS treated water to transfer pipe on October 30 and will commence the 1st Stage of the third discharge on October 31. The 2nd Stage, which marks the beginning of the third discharge(tank group A) of ALPS treated water into the sea, will start on November 2.
- We have already confirmed that the analysis results of measurement/confirmation facility tank group A meet the government's regulatory standards. The analysis result was also verified by external agency.

< Announced by October 26 >

- From October 24 to 29, we implemented facility inspections which include follow-up observation of the waterproof coating bubble found inside the upper stream storage tank during the previous inspection, and check of the seating function of motor-operated valves used to isolate tank groups B,C during the discharge of water from tank group A.
- Since no abnormalities were found during the facility inspection, today, we began filling the ALPS treated water transfer pipes with ALPS treated water from measurement/confirmation facility tank group A in preparation for the third discharge.
- Tomorrow (October 31), as the First Stage of the third discharge, we will transfer a very small amount of ALPS treated water (approximately 1m³) to the dilution facility using transfer facilities where it will be diluted with seawater (approximately 1,200m³) in order to confirm that ALPS treated water is being diluted as expected, and store the water in the discharge vertical shaft (upper-stream storage). This water that will be stored in the discharge vertical shaft (upper-stream storage) will also be sampled.
- Going forward, the tritium concentration in the sampled water will be measured to confirm that the actual concentration is approximately the same as the calculated concentration, and below 1,500Bq/liter.
- We will continue to engage in this process with the utmost vigilance to ensure that there are no unintentional discharge of ALPS treated water into the sea.

Facility inspections

- We have performed daily patrol inspections since the commencement of discharge, and inspection after the discharge of tank group C. We have confirmed that there are no abnormalities with facilities. Details of inspections are as follows:

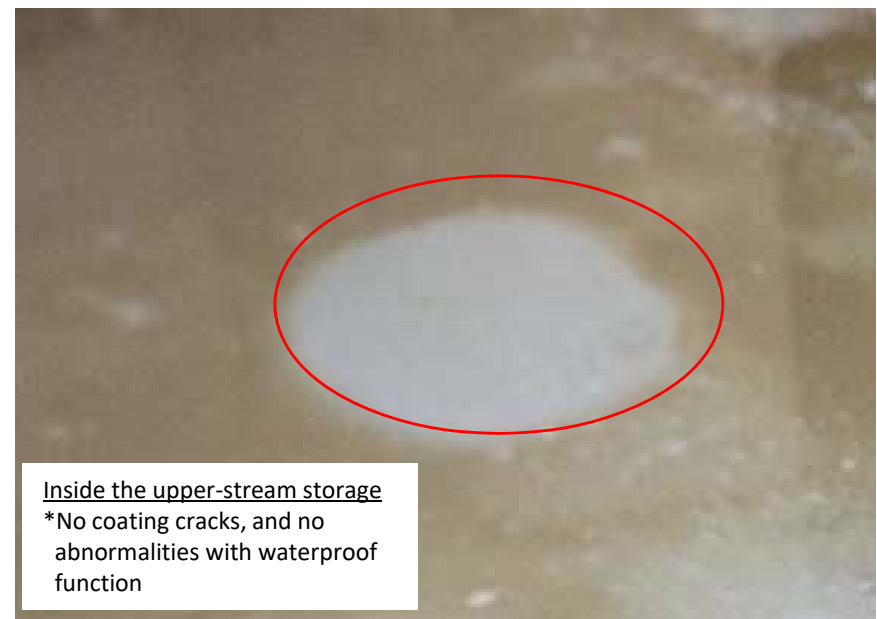
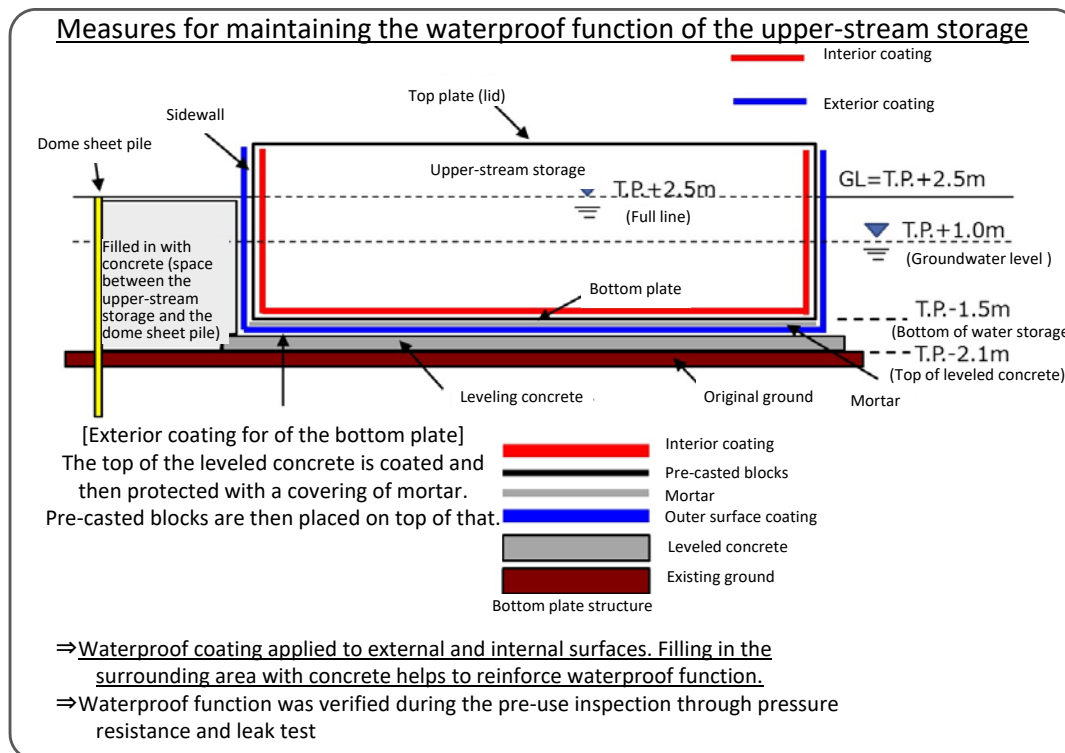
Facility name	Patrol inspection details	Inspection after the completion of the discharge from tank group C	results
Measurement/confirmation facility	External inspection (measurement/confirmation tanks) - Visual check for any abnormalities	Inspections implemented in accordance with the long-term inspection plan (agitators) - Insulation resistance measurement Others - Measures to reduce clogging of ALPS treated water transfer pump inlet strainer by circulating/agitating water in tank group A	No abnormalities
Transfer facility	External inspection (ALPS treated water transfer pump/transfer pipes) - Visual check for abnormalities - Check for abnormal sounds using tool	External inspection (ALPS treated water transfer pump/transfer pipes) - Visual check for abnormalities Others - Strainer cleaning, check for leakage through MO valve seat	No abnormalities
Dilution facility	External inspection (seawater transfer pipes/seawater pipe header, etc.) - Visual check for abnormalities - Check for abnormal sounds using tool External inspection (discharge vertical shaft (upper-stream storage)) - Visual check for abnormalities	External inspection (seawater transfer pipes/seawater pipe header, etc.) - Visual check for abnormalities External inspection (discharge vertical shaft (upper-stream storage)) - Periodic observation of condition inside the storage	No abnormalities
Discharge facility	External inspection (discharge vertical shaft (down-stream storage)) - Visual check for abnormalities *Submerged areas, such as the discharge tunnel, etc., have been omitted from these inspections	External inspection (discharge vertical shaft (down-stream storage)) - Visual check for abnormalities *Underwater areas such as discharge tunnel, etc. are excluded	No abnormalities
Seawater intake facility	External inspection (partitioning weirs) - Visual check for abnormalities	External inspection (partitioning weirs) - Visual check for abnormalities	No abnormalities

Dilution facility (discharge vertical shaft (upper-stream storage)) inspection results

- On October 26, we conducted an inspection inside the upper-stream storage as a follow-up observation.
 - Compared to the previous inspection (September 2023), no significant changes were seen and no cracks were found in the coating, thereby indicating that there are no abnormalities with waterproof function.
 - No changes were seen in the size of the coating bubbles more than 10cm in width (four locations in total) which were found during the previous inspection.
 - Coating bubbles (Width: more than 10cm) were found in six locations on the floor and walls (including the aforementioned four locations)

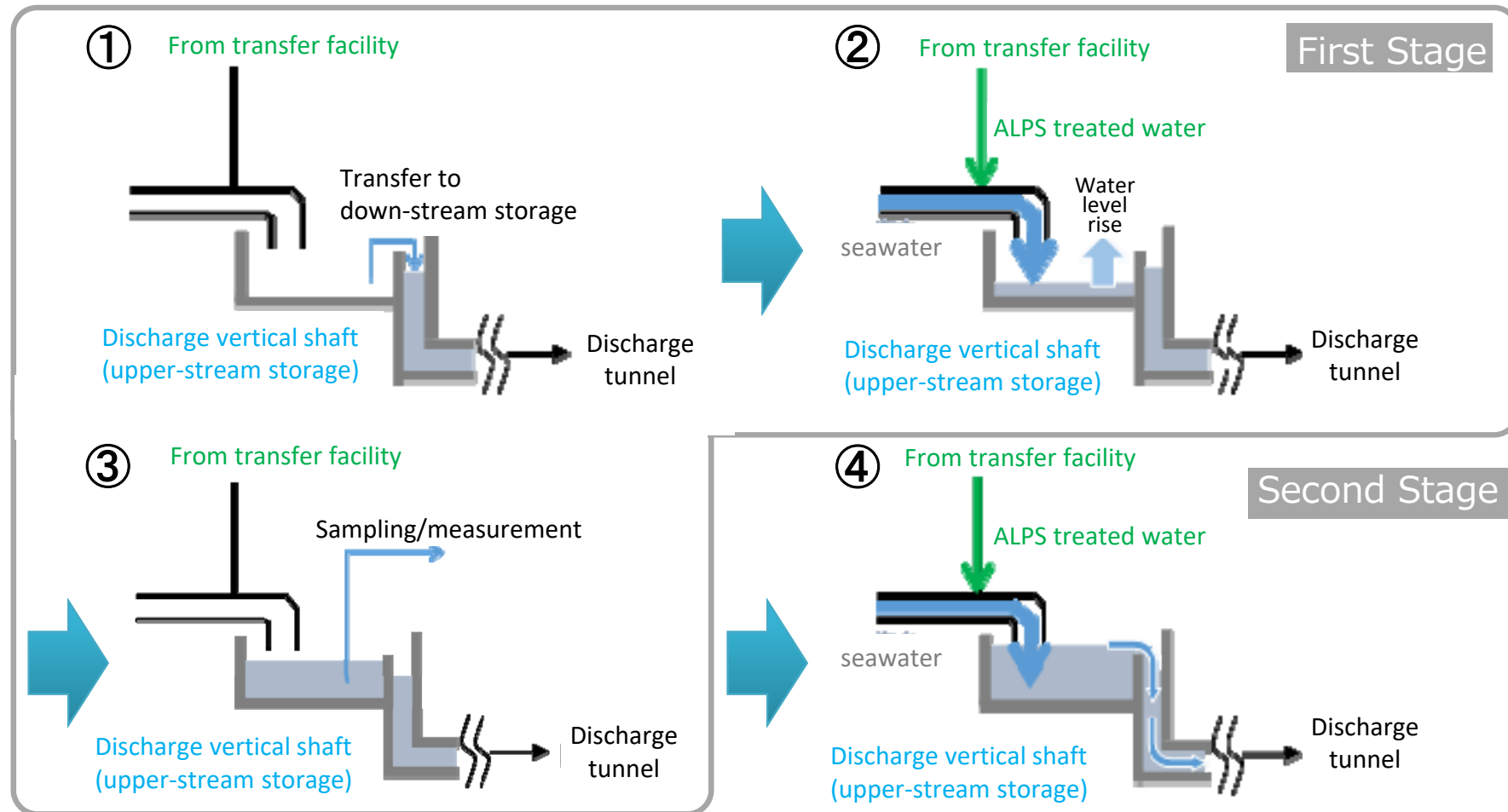


Inside the upper-stream storage



Inside the upper-stream storage
 *No coating cracks, and no abnormalities with waterproof function

[Reference] Method of initially discharging small amounts



- ① The discharge vertical shaft (upper-stream storage) will be emptied.
- ② A very small amount of (approximately 1m^3) ALPS treated water will be diluted with seawater (approximately $1,200\text{m}^3$) and then held in the discharge vertical shaft (upper-stream storage).
- ③ The water in the discharge vertical shaft (upper-stream storage) will be sampled and the tritium concentration will be measured in order to confirm that actual concentration is approximately the same as the calculated tritium concentration, and that the concentration of tritium is less than $1,500\text{Bq/liter}$. [Processes ① through ③ comprise the First Stage]
- ④ Then, TEPCO will move on to the Second Stage which will be continuous discharge into the sea.

[Reference] FY2023 Discharge Plan

- Currently, we are performing facility inspection after the second discharge (tank group C). If no abnormalities are found in the inspection, we will transfer ALPS treated water to transfer pipe on October 30 and will commence the 1st Stage of the third discharge on October 31. The 2nd Stage, which marks the beginning of the third discharge(tank group A) of ALPS treated water into the sea, will start on November 2.

1 st discharge	Measurement/confirmation facility (K4 area) Group B:	Approx. 7,800m ³	Secondary treatment: No Tritium concentration: 140,000Bq/liter Total amount of tritium: 1.1 trillion Bq	Completed
2 nd discharge	Measurement/confirmation facility (K4 area) Group C:	Approx. 7,800m ³	Secondary treatment: No Tritium concentration: 140,000Bq/liter Total amount of tritium: 1.1 trillion Bq	Completed
3 rd discharge	Measurement/confirmation facility (K4 area) Group A:	Approx. 7,800m ³	Secondary treatment: No Tritium concentration: 130,000Bq/liter Total amount of tritium: 1.0 trillion Bq	Details on the next page
4 th discharge	K4 area Group E (Transferred to Measurement/confirmation facility group B ※ ²): K3 area Group A (Transferred to Measurement/confirmation facility group B ※ ²):	Approx. 4,500m ³ Approx. 3,300m ³	Secondary treatment: No Tritium concentration: 170,000~210,000Bq/liter ※ ¹ Total amount of tritium: 1.4 trillion Bq ※ ¹	

➔ Total amount of tritium discharged during FY2023: Approx. **5 trillion Bq**

※¹ Average value of the tank group that was assessed taking into account the radioactive decay until July 1, 2023

※² To be transferred to K4 area tank group B that will be empty after the 1st discharge is completed

[Reference] Outline of third discharge for Group K4-A



Outline of discharge for group K4-A			
Attributes of the treated water	Concentration of the 29 types of radionuclides (excluding tritium) in scope of measurement/evaluation	Within regulatory requirements (sum of the ratios of legally required concentrations of radioactive substances is less than 1) (sum of the ratios of concentration: 0.25*)	(details on p1 of the link)
	Tritium concentration	130,000Bq/liter	(details on p2 of the link)
	Concentration of the 39 significant types of radionuclides measured voluntarily	No significant radionuclides identified	(details on p3 of the link)
	Status of water quality assessment	Within government and prefectural requirements	(details on p4 of the link)
	Water temperature	Same as outdoor temperature. After diluted to 740 times, same as sea water temperature (not the same as plant’s thermal discharge)	
Expected volume of treated water discharge		Approximately 7,800m ³	
Treated water flow rate		Approximately 460m ³ /day (set not to exceed designed maximum on 500m ³ /day)	
Dilution sea water flow rate		Approximately 340,000m ³ /day (same speed as walking in the tunnel [approximated 1m/second])	
Concentration of tritium after dilution		Approximated 180Bq/liter	
Term of discharge		Approximately 17 days	



※ Comparison of concentrations before/after sea water dilution			
	Before dilution	After dilution (740 times)	
29 types	0.25	0.00034	} 0.0032 (1/310 of government requirements)
Tritium	2.17	0.0029	

[Reference] Analysis results for the next tank group from which the ALPS treated water will be discharged (Group A)



- Pre-discharge analysis results for the samples taken from the measurement/confirmation tank (Group A) on July 10, 2023, were obtained. It was confirmed that the water satisfies discharge requirements (Table 1. Disclosed on October 19, 2023).
 - Item 1: For 29 nuclides to be measured and assessed, the sum of the ratios of the concentration of each radionuclide to the regulatory concentration is 0.25, and it is confirmed to be less than 1.
 - Item 2: Analysis results of tritium concentration is 13 x 10⁴ Bq/liter, and it is confirmed to be less than 1 million Bq/liter.
 - Item 1/2: The external agency consigned by TEPCO (Kaken) and the third-party consigned by the Japanese Government (JAEA)^{*1} obtained the same results from their analyses.
 - Item 3/4: It was confirmed that operational targets have been satisfied.

^{*1} ALPS treated water third-party analysis (https://fukushima.jaea.go.jp/okuma/alps/index_e.html)

Table 1 . Pre-discharge analysis results of water in the measurement/confirmation tank (Group A)

Items		Requirement basis	Operational Target	Analysis Results
①	Nuclide to be measured and assessed (29 nuclides)	Implementation plan	The sum of the ratios of the concentration of each radionuclide to the regulatory concentration, except for tritium, is less than 1	0.25 (< 1)
②	Tritium		Tritium concentration is less than 1 million Bq/liter	130,000Bq/liter (less than 1 million Bq/liter)
③	Nuclides voluntarily checked to ensure that they are not significantly present (39 nuclides)	Voluntary	No significant concentrations were found of any of the nuclides	None of the nuclides are present in significant consternation
④	General water quality: 44 criteria		Pre-check of water quality standards ^{*2}	All criteria satisfied

^{*2} Water sampled from the discharge vertical shaft (upper-stream storage) once a year to confirm that legal requirements are being satisfied