

Fukushima Daiichi Nuclear Power Station

Commencement of the Second Stage of the second discharge for FY2023

< Reference document >
October 5, 2023
Tokyo Electric Power Company Holdings, Inc.
Fukushima Daiichi Decontamination and
Decommissioning Engineering Company

- As the First Stage of the second discharge, on October 3 at 11:30, in order to confirm that ALPS treated water is being diluted as expected, we transferred a very small amount of ALPS treated water (approximately 1m³) to the dilution facility, using transfer facilities. The water was diluted with seawater (approximately 1,200m³) and was stored in the discharge vertical shaft (upper-stream storage).
- On the same day, we sampled the water stored in the discharge vertical shaft (upper-stream storage) and measured tritium concentration. The results showed that the analysis value is approximately equal to the calculated concentration and below 1,500Bq/liter. The sample of the water was also analyzed by the Japan Atomic Energy Agency (hereinafter referred to as, "JAEA") who confirmed that the analysis value is below 1,500 Bq/liter.
- The decision to proceed to the Second Stage will be made depending on weather/sea conditions of tomorrow morning (October 5) .
<Announced by October 4>

- This morning (October 5), we decided to proceed to the Second Stage in the light of weather/sea conditions. We started up the seawater transfer pumps at 10:18 which marked the commencement of the discharge into the sea.
- During the discharge period, water samples will be taken from the seawater pipes to confirm that tritium is being suitably diluted. In addition, in order to confirm that the tritium concentration is less than the discharge suspension level (700Bq/liter) and the investigation level (350Bq/liter), we will continue to take seawater samples daily from 10 locations within 3km of the power station and perform seawater tritium analyses with an increased detection limit of approximately 10Bq/liter. Analysis results for all the water samples will be publicly released as soon as they are obtained.
- We shall 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.

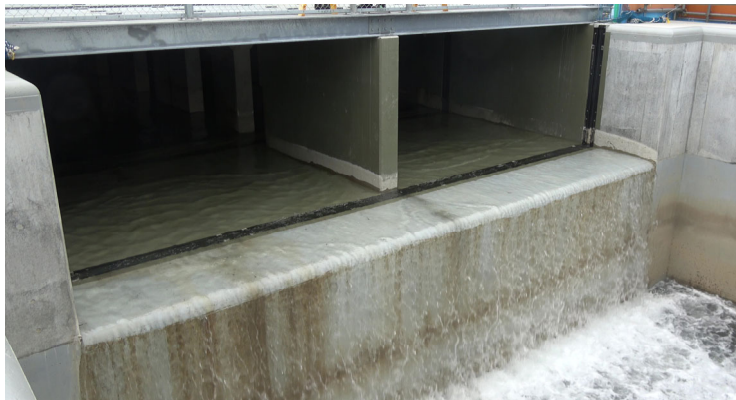
[Reference] Photos of the Second Stage



Operations by TEPCO operators
(the Second Stage)



Key switch operations during the Second Stage

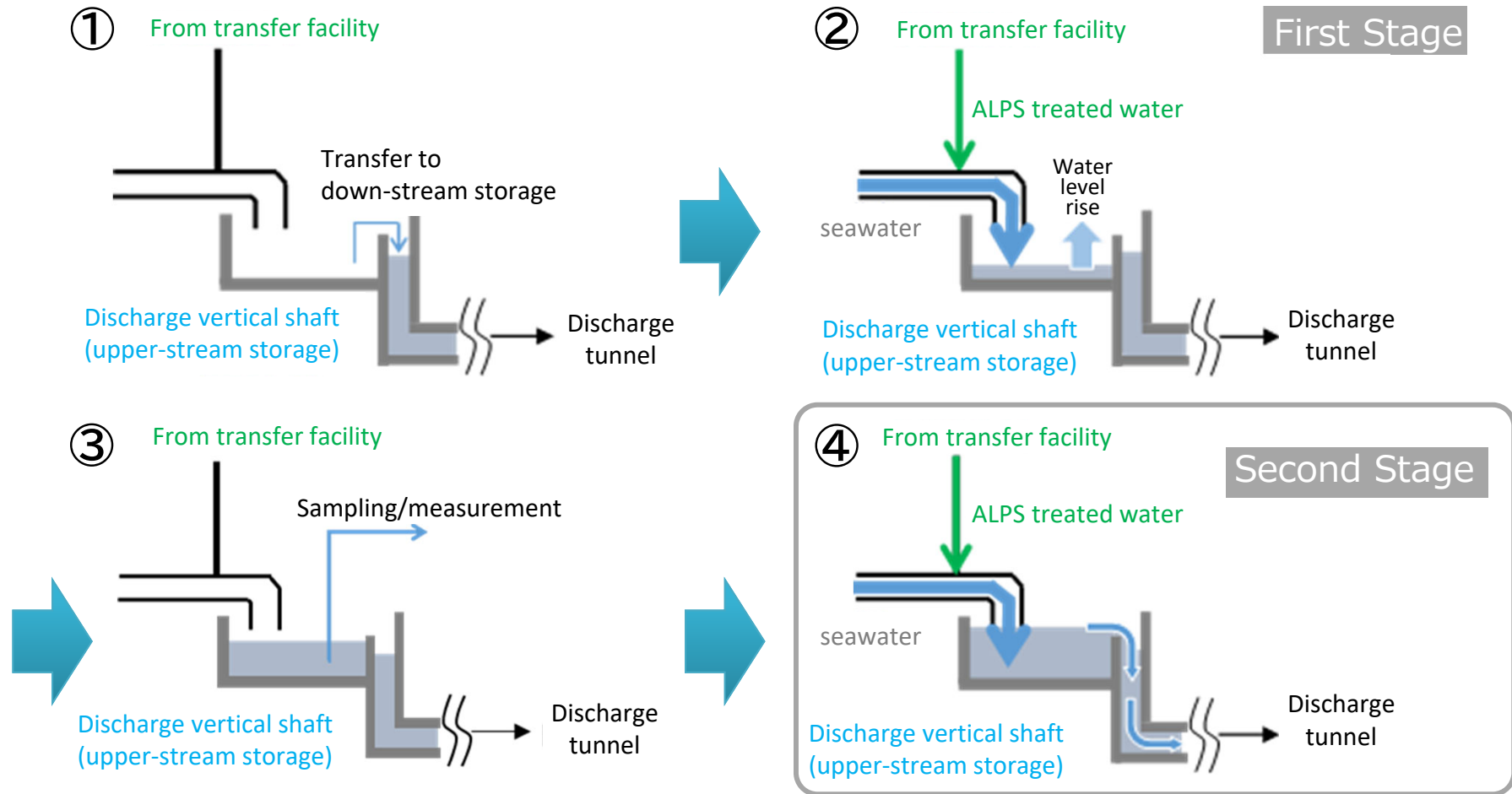


ALPS treated water diluted with seawater
overflowing from the upper-stream storage
to the down-stream storage

[Reference] Today's completed tasks

- 10:18 : Commenced the discharge into the sea
(started up the seawater transfer pumps)
- 10:28 : Confirmed overflow from the upper- stream storage to the
down-stream storage
- 10:32 : Confirmed that there are no abnormalities with down-stream storage
- 11:32 : Commenced ALPS treated water transfer procedure
- 11:45 : Confirmed that there are no abnormalities in the field

[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 1m³) ALPS treated water will be diluted with seawater (approximately 1,200m³) 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 1,500Bq/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

- Following the completion of the inspection after the initial discharge, we will commence the 1st Stage of the second discharge on October 3. The 2nd Stage, which marks the beginning of the second discharge of ALPS treated water into the sea, will start on October 5.

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	Details on the next page
3 rd discharge	Measurement/confirmation facility (K4 area) Group A:	Approx. 7,800m ³	Secondary treatment: No Tritium concentration: 130,000Bq/liter ※ ¹ Total amount of tritium: 1.0 trillion Bq ※ ¹	
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 Second Discharge for Group K4-C

Outline of discharge for group K4-C		
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	140,000Bq/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 190Bq/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
Tritium	2.33	➔	0.0032
			} 0.0035 (1/290 of government requirements)

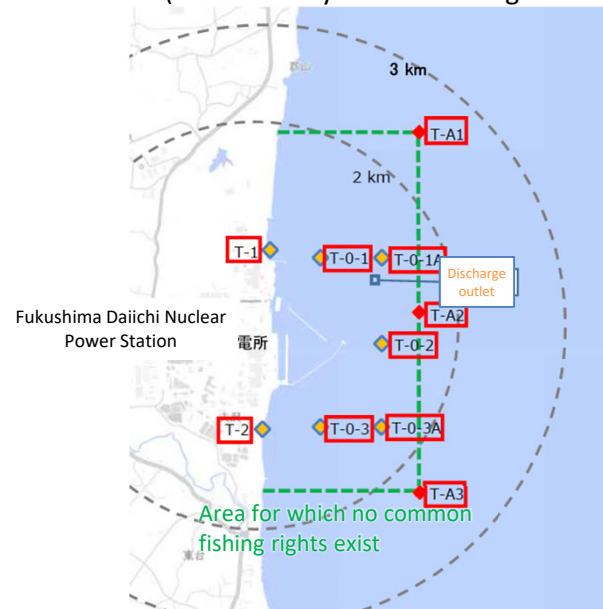
[Reference] Manual shutdown by operators (in response to sea area monitoring)

Partially edited excerpt from "Attachment 1: Information about the Discharge of Multi-nuclide Removal Equipment Treated Water into the Sea" (published on August 22, 2023)



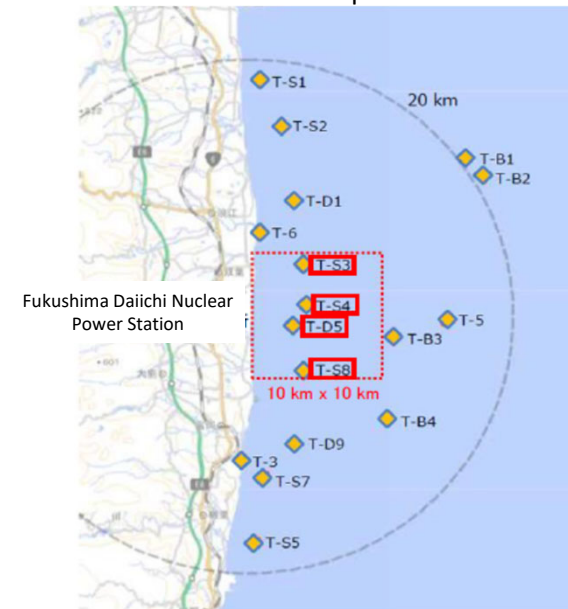
- Seawater tritium analysis is implemented once a week at all points on Figures 1 and 2 below, with the detection limit set to 0.1-0.4Bq/liter.
- In addition, quick tritium measurements with the detection limit set to 10Bq/liter will be implemented at the locations outlined in the red frames in Figures 1 and 2 below. In the case "discharge suspension level" indicators are exceeded, the discharge into the sea will be suspended.
- After the commencement of the discharge, in light of the monitoring frequency outlined by the various organizations within the Comprehensive Monitoring Plan, frequency of quick tritium measurements specifically near the discharge outlets shown in Figure 1 will be increased from once a week to everyday for the time being.

Figure 1. Sampling locations within a 3km radius of the power station (in the vicinity of the discharge outlet)



: Monitoring locations for quick tritium measurements (10 locations)
Indicator (discharge suspension level): 700Bq/liter
 Analysis frequency: once a week → Every day for the time being

Figure 2. Sampling locations within a 10km square in front of the power station



: Monitoring locations for quick tritium measurements (4 locations)
Indicator (discharge suspension level): 30Bq/liter
 Analysis frequency: Once a week (T-D5),
 Once a month (T-S3, T-S4, T-S8)