

Fukushima Daiichi Nuclear Power Station Completion of the Discharge from Measurement/Confirmation Facility Tank Group C (Second Discharge)

< Reference document >
October 23, 2023
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Fukushima Daiichi Decontamination and
Decommissioning Engineering Company

- The discharge of ALPS treated water from measurement/confirmation facility tank group C began on October 5 (approximately 7,800m³), planning to take approximately 17 days.
- 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 been able to confirm that the analysis values are approximately equal to calculated concentrations, and below 1,500Bq/liter.
- Seawater samples have also been taken every day, and the detection limit has been raised to approximately 10Bq/liter in order to quickly obtain tritium concentration measurement results. As a result, we have confirmed that the analysis values are below both the discharge suspension level (700Bq/liter) and the investigation level (350Bq/liter).

< Announced by October 22 >

- Since the commencement of discharge on October 5, the amount of ALPS treated water being discharged has remained constant at approximately 460m³/day, and daily quick analysis results of tritium concentrations in the seawater have confirmed that the ALPS treated water is being discharged safely as planned.
- The transfer of ALPS treated water from measurement/confirmation facility tank group C was completed at 1:19 PM on October 22. On October 23, the flush out of the water remaining in the ALPS treated water transfer line was completed at 12:08 PM and the completion of this task marked the end of the second discharge of ALPS treated water into the sea. (Total amount of water discharged: approx. 7,810 m³, Total amount of tritium discharged: approx. 1.1 trillion Bq)
- We will drain the water in the upper-stream storage and will inspect the storage to observe the condition of waterproof coating inside the storage which were previously inspected. We will also check the seat function of motor-operated valves that will be used to isolate tank groups B,C during the discharge from tank group A. Furthermore, based on the operational experience from the second discharge, we will start the circulation/agitation of tank group A to reduce clogging in the strainer located at ALPS treated water transfer pump inlet. During the second discharge, we brushed the strainer 26 times by using a handle, which includes 4 times of draining as part of the strainer cleaning process.
- Going forward, we will remain vigilant to ensure that there are no unintentional discharges of ALPS treated water into the sea.

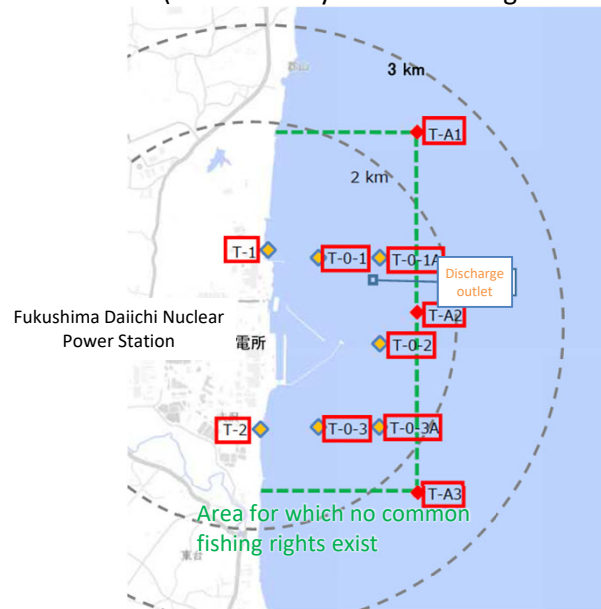
[Reference] Manual shutdown by operators (in response to sea area monitoring)

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)



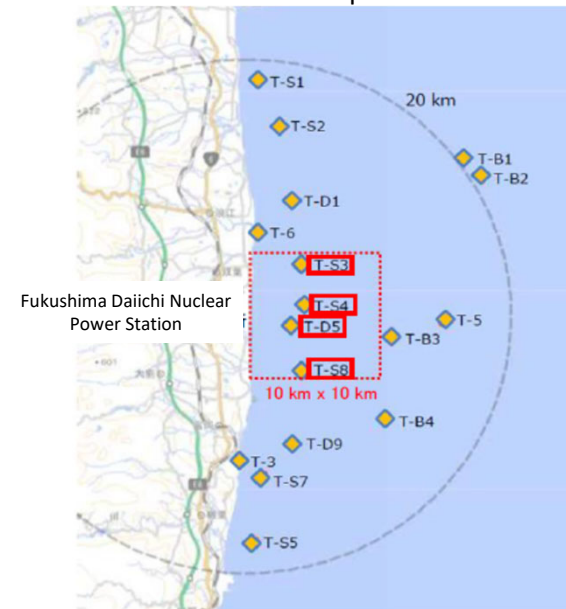
- Seawater tritium analysis is implemented once a week at all points on Figures 1 and 2 below, with the detection limit set to 0.1-0.4Bq/liter.
- In addition, quick tritium measurements with the detection limit set to 10Bq/liter will be implemented at the locations outlined in the red frames in Figures 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)

[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)