ALPS Treated Water Discharge Status Update

December 21, 2023

TEPCO

Tokyo Electric Power Company Holdings, Inc.

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1-1. Sea area monitoring history（1/13）

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○ Measurement results of tritium concentrations in water sampled in the vicinity of the discharge outlet (within 3km of the power station) and outside of the vicinity of the discharge outlet (within a 10km square in front of the power station) since the commencement of the first discharge on August 24 were all below indices (discharge suspension level and investigation level).

○ For quick tritium measurements taken in the vicinity of the discharge outlet, we have increased the frequency from once a week to daily after the commencement of the discharge and promptly disclose the results.

(Unit: Bq/liter)

	Sampling location	Frequency	August											
			24 *1	24 Normal *1,2	25	26	26 Normal *3	27	28	29	30	30 Normal *2,3	31	31 Normal *3
In the vicinity of the discharge outlet	T-1	Once a week*	<6.3	<0.34	<5.6	<6.6	0.97	<6.2	<7.3	<5.9	<6.4	1.0	<6.8	–
	T-2	Once a week*	<6.3	<0.33	<5.5	<6.5	1.1	<6.2	<7.3	<5.9	<6.3	1.3	<6.8	–
	T-0-1	Once a week*	<8.0	<0.34	<6.8	<6.1	0.66	<6.1	–*4	–*4	<6.8	<0.32	<8.2	–
	T-0-1A	Once a week*	<4.6	2.6	<7.6	<6.2	0.087	<6.1	–*4	–*4	<6.9	0.43	10	–
	T-0-2	Once a week*	<8.1	<0.35	<6.8	<6.1	0.92	<6.1	–*4	–*4	<6.8	1.4	<8.2	–
	T-0-3A	Once a week*	<4.7	<0.33	<7.6	<6.8	<0.068	<6.8	–*4	–*4	<7.6	<0.32	<5.1	–
	T-0-3	Once a week*	<8.0	<0.34	<6.9	<6.1	0.14	<6.1	–*4	–*4	<6.8	<0.31	<8.3	–
	T-A1	Once a week*	<6.6	<0.32	<7.6	<6.8	0.13	<6.8	–*4	–*4	<7.6	1.1	<5.1	–
	T-A2	Once a week*	<6.6	<0.32	<7.6	<6.8	0.065	<6.8	–*4	–*4	<7.7	1.5	<5.1	–
	T-A3	Once a week*	<6.6	<0.32	<6.9	<6.8	<0.072	<6.8	–*4	–*4	<7.6	1.1	<5.2	–
Outside the vicinity of the discharge outlet	T-D5	Once a week*	–	–	–	–	–	–	–	–	–	–	<6.8	0.59
	T-S3	Once a week	–	–	–	–	–	–	–	–	<7.6	0.070	–	–
	T-S4	Once a month	–	–	–	–	–	–	–	–	<7.7	0.073	–	–
	T-S8	Once a month	–	–	–	–	–	–	–	–	<7.7	0.062	–	–

※：A “less than” symbol (<) indicates that the analysis result was less than the detection limit.

(light blue box)：Term of discharge of ALPS treated water (Group B)

*：Monitored daily for the time being after the commencement of discharge

*1：Sampled after the commencement of discharge at 3PM

*2：Detection limit 0.4 Bq/liter

*3：Detection limit 0.1 Bq/liter

*4：Sampling suspended due to rough seas

1-1. Sea area monitoring history（2/13）

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(Unit: Bq/liter)

	Sampling location	Frequency	September											
			1	2	3	4	4 Normal *1	5	6	6 Normal *1	7	8	9	10
In the vicinity of the discharge outlet	T-1	Once a week*	<7.2	<6.8	<5.8	<6.6	0.68	<7.1	<7.1	–	<6.1	<5.9	<6.0	<7.8
	T-2	Once a week*	<7.4	<6.8	<5.8	<6.6	0.90	<7.1	<7.1	–	<6.1	<5.9	<6.0	<7.8
	T-0-1	Once a week*	<7.3	<7.3	<6.8	<6.9	<0.34	<6.6	<6.6	–	<8.7	<6.9	<8.0	<7.0
	T-0-1A	Once a week*	<7.3	<8.2	<6.8	<6.9	<0.33	<7.0	<6.6	–	<8.7	<6.9	<8.0	<7.1
	T-0-2	Once a week*	<7.3	<7.3	<6.7	<7.0	0.74	<6.5	<6.6	–	<8.6	<6.8	<8.0	<7.0
	T-0-3A	Once a week*	<7.0	<7.8	<6.5	<5.9	<0.33	<7.6	<6.3	–	<5.3	<7.4	<6.5	<6.5
	T-0-3	Once a week*	<7.3	<8.2	<6.7	<6.8	<0.34	<7.8	<6.6	–	<8.7	<6.9	<8.0	<7.1
	T-A1	Once a week*	<7.1	<7.9	<6.5	<5.9	1.1	<7.6	<6.3	–	<5.3	<7.4	<6.4	<6.5
	T-A2	Once a week*	<7.1	<7.8	<6.5	<7.3	0.88	<7.6	<6.2	–	<5.3	<7.3	<6.6	<6.4
	T-A3	Once a week*	<7.1	<7.9	<6.5	<7.3	0.82	<7.6	<6.3	–	<5.3	<7.3	<6.5	<6.5
Outside the vicinity of the discharge outlet	T-D5	Once a week*	–	–	–	–	–	–	<7.1	<0.34	–	–	–	–
	T-S3	Once a week	–	–	–	–	–	–	–	–	–	–	–	–
	T-S4	Once a month	–	–	–	–	–	–	–	–	–	–	–	–
	T-S8	Once a month	–	–	–	–	–	–	–	–	–	–	–	–

※：A “less than” symbol (<) indicates that the analysis result was less than the detection limit.

*1：Detection limit 0.4 Bq/liter

：Term of discharge of ALPS treated water (Group B)

*：Monitored daily for the time being after the commencement of discharge

1-1. Sea area monitoring history（3/13）

(Unit: Bq/liter)

	Sampling location	Frequency	September											
			11 *1	11 Normal *1,2	12	12 Normal *2	13	13 Normal *2	14	15	16	17	18	18 Normal *3
In the vicinity of the discharge outlet	T-1	Once a week*	<7.0	0.21	<7.2	–	<7.2	–	<6.5	<7.3	<6.7	<7.0	<7.6	<0.31
	T-2	Once a week*	<7.0	0.24	<7.2	–	<7.2	–	<6.5	<7.4	<6.8	<6.9	<7.6	<0.31
	T-0-1	Once a week*	<6.8	0.10	<7.7	–	<6.6	–	<7.5	<7.8	<7.6	<7.8	<7.4	<0.36
	T-0-1A	Once a week*	<6.8	0.12	<7.8	–	<6.5	–	<7.5	<7.7	<7.5	<7.7	<7.3	<0.34
	T-0-2	Once a week*	<6.8	0.13	<7.7	–	<6.5	–	<7.5	<7.7	<7.6	<7.7	<7.3	<0.31
	T-0-3A	Once a week*	<6.2	0.10	<7.0	–	<5.9	–	<6.6	<7.4	<6.8	<6.9	<7.6	<0.35
	T-0-3	Once a week*	<6.8	0.16	<7.8	–	<6.5	–	<7.5	<7.7	<7.5	<7.8	<7.3	<0.34
	T-A1	Once a week*	<7.0	0.078	<7.0	–	<5.9	–	<6.7	<5.5	<7.2	<5.5	<6.7	<0.31
	T-A2	Once a week*	<7.0	0.097	<7.0	–	<5.9	–	<6.7	<5.5	<7.3	<5.4	<6.7	<0.31
	T-A3	Once a week*	<7.0	0.16	<7.0	–	<5.9	–	<6.7	<5.5	<7.2	<5.5	<6.7	<0.31
Outside the vicinity of the discharge outlet	T-D5	Once a week*	–	–	–	–	<7.2	0.11	–	–	–	–	–	–
	T-S3	Once a week	–	–	<7.1	<0.068	–	–	–	–	–	–	–	–
	T-S4	Once a month	–	–	<7.1	0.087	–	–	–	–	–	–	–	–
	T-S8	Once a month	<6.2	0.098	–	–	–	–	–	–	–	–	–	–

※：A "less than" symbol (<) indicates that the analysis result was less than the detection limit.

：Term of discharge of ALPS treated water (Group B)

*：Monitored daily for the time being after the commencement of discharge

*1：Sampled before 9AM, prior to the completion of the discharge

*2：Detection limit 0.1 Bq/liter

*3：Detection limit 0.4 Bq/liter

1-1. Sea area monitoring history（4/13）

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(Unit: Bq/liter)

	Sampling location	Frequency	September 19	20	20 Normal *1	21	22	23	24	25	25 Normal *1	26	27	27 Normal *1
In the vicinity of the discharge outlet	T-1	Once a week*	<5.0	<6.9	–	<5.0	<5.3	<6.5	<6.7	<7.2	<0.31	<5.6	<6.2	–
	T-2	Once a week*	<5.0	<6.9	–	<5.0	<5.3	<6.5	<6.7	<7.2	<0.31	<5.6	<6.3	–
	T-0-1	Once a week*	<5.5	<7.9	–	<6.5	<6.3	<6.5	<7.6	<8.7	<0.35	<7.9	<6.2	–
	T-0-1A	Once a week*	<5.6	<8.2	–	<6.5	<6.3	<6.5	<7.5	<8.7	<0.35	<7.9	<6.2	–
	T-0-2	Once a week*	<5.6	<7.9	–	<6.5	<6.2	<6.5	<7.5	<8.7	<0.30	<7.9	<6.2	–
	T-0-3A	Once a week*	<5.0	<6.1	–	<5.0	<5.3	<6.5	<6.7	<7.2	<0.35	<5.6	<6.2	–
	T-0-3	Once a week*	<5.5	<7.9	–	<6.5	<6.3	<6.5	<7.5	<8.7	<0.35	<7.9	<6.2	–
	T-A1	Once a week*	<6.9	<5.9	–	<6.6	<7.0	<7.6	<5.1	<6.3	<0.30	<7.3	<6.6	–
	T-A2	Once a week*	<6.9	<5.9	–	<6.7	<7.0	<7.6	<5.1	<6.3	<0.30	<7.3	<6.7	–
	T-A3	Once a week*	<7.0	<6.3	–	<6.6	<7.0	<7.6	<5.1	<6.3	<0.29	<7.3	<6.6	–
Outside the vicinity of the discharge outlet	T-D5	Once a week*	–	<6.1	<0.34	–	–	–	–	–	–	–	<6.3	<0.35
	T-S3	Once a week	–	–	–	–	–	–	–	–	–	–	–	–
	T-S4	Once a month	–	–	–	–	–	–	–	–	–	–	–	–
	T-S8	Once a month	–	–	–	–	–	–	–	–	–	–	–	–

※：A “less than” symbol (<) indicates that the analysis result was less than the detection limit.

*1：Detection limit 0.4 Bq/liter

*：Monitored daily for the time being after the commencement of discharge

1-1. Sea area monitoring history（5/13）

TEPCO

(Unit: Bq/liter)

	Sampling location	Frequency	September 28	September 29	September 30	October 1	October 2	October 2 Normal *1	October 3	October 4	October 4 Normal *1	October 5 *2	October 5 Normal *1,2	October 6
In the vicinity of the discharge outlet	T-1	Once a week*	<6.7	<4.9	<7.3	<6.0	<5.8	<0.34	<6.7	<6.9	−	<5.8	<0.31	<5.8
	T-2	Once a week*	<6.7	<4.7	<7.3	<6.0	<5.7	<0.33	<6.6	<6.8	−	<5.7	<0.31	<5.7
	T-0-1	Once a week*	<6.8	<6.8	<7.9	<8.3	<7.0	<0.35	<6.5	<7.3	−	<7.8	<0.31	<7.0
	T-0-1A	Once a week*	<6.8	<6.8	<7.9	<8.0	<6.9	<0.35	<6.4	<7.3	−	<7.6	5.2	<7.4
	T-0-2	Once a week*	<6.8	<6.9	<8.0	<8.4	<7.0	<0.36	<6.4	<7.2	−	<7.6	<0.33	<7.0
	T-0-3A	Once a week*	<6.7	<4.7	<7.4	<6.2	<5.8	<0.35	<6.8	<6.9	−	<5.9	<0.32	<5.8
	T-0-3	Once a week*	<6.8	<7.0	<7.7	<8.0	<7.0	<0.35	<6.4	<7.2	−	<7.7	<0.32	<6.4
	T-A1	Once a week*	<9.3	<7.8	<8.1	<8.0	<5.6	<0.30	<7.3	<7.5	−	<7.7	<0.30	<7.0
	T-A2	Once a week*	<5.5	<7.8	<8.0	<8.0	<5.7	<0.30	<7.5	<7.5	−	<7.7	<0.31	<7.0
	T-A3	Once a week*	<7.2	<7.6	<8.0	<8.1	<5.6	<0.30	<7.4	<7.4	−	<7.6	<0.30	<7.1
Outside the vicinity of the discharge outlet	T-D5	Once a week*	−	−	−	−	−	−	−	<6.8	<0.35	−	−	−
	T-S3	Once a week	−	−	−	−	−	−	−	−	−	−	−	−
	T-S4	Once a month	−	−	−	−	−	−	−	−	−	−	−	−
	T-S8	Once a month	−	−	−	−	−	−	−	−	−	−	−	−

※：A "less than" symbol (<) indicates that the analysis result was less than the detection limit.

：Term of discharge of ALPS treated water (Group C)

*：Monitored daily for the time being after the commencement of discharge

*1：Detection limit 0.4 Bq/liter

*2：Sampled after the commencement of discharge at 2PM

1-1. Sea area monitoring history（6/13）

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(Unit: Bq/liter)

	Sampling location	Frequency	October											
			7	8	9	9 Normal *1	10	11	12	12 Normal *1	13	14	15	16
In the vicinity of the discharge outlet	T-1	Once a week*	<5.8	<6.1	<7.2	being measured	<6.9	<6.5	<6.3	−	<6.5	<6.1	<5.5	<6.0
	T-2	Once a week*	<5.8	<6.1	<7.1	being measured	<6.9	<6.6	<6.3	−	<6.5	<6.2	<5.5	<6.0
	T-0-1	Once a week*	<6.7	<8.2	<7.9	being measured	−*2	<7.3	<7.3	−	<7.3	<8.7	<7.3	<7.8
	T-0-1A	Once a week*	9.4	<8.2	11	12	−*2	<7.3	14	−	11	<8.7	14	16
	T-0-2	Once a week*	<6.8	<8.1	<7.9	being measured	−*2	<7.3	<7.3	−	<7.3	<8.7	<7.3	<7.8
	T-0-3A	Once a week*	<5.8	<6.1	<7.2	<0.072	−*2	<6.8	<6.3	−	<6.5	<6.1	<5.6	<6.0
	T-0-3	Once a week*	<6.7	<8.2	<7.8	0.45	−*2	<7.3	<7.2	−	<7.2	<8.6	<7.3	<7.8
	T-A1	Once a week*	<6.4	<5.5	<6.7	being measured	−*2	<6.8	<8.7	−	<8.6	<6.2	<7.2	<7.2
	T-A2	Once a week*	<5.9	<5.5	<6.7	being measured	−*2	<6.8	<8.6	−	<8.6	<5.6	<7.2	<7.2
	T-A3	Once a week*	<5.8	<5.5	<6.8	being measured	−*2	<6.8	<8.6	−	<8.6	<5.7	<7.2	<7.2
Outside the vicinity of the discharge outlet	T-D5	Once a week*	−	−	−	−	−	−	<6.4	<0.070	−	−	−	−
	T-S3	Once a week	−	−	−	−	−	−	<6.4	being measured	−	−	−	−
	T-S4	Once a month	−	−	−	−	−	−	<6.4	being measured	−	−	−	−
	T-S8	Once a month	−	−	−	−	−	−	<6.5	being measured	−	−	−	−

※：A "less than" symbol (<) indicates that the analysis result was less than the detection limit.

：Term of discharge of ALPS treated water (Group C)

*：Monitored daily for the time being after the commencement of discharge

*1：Detection limit 0.1 Bq/liter

*2：Sampling suspended due to bad weather condition

1-1. Sea area monitoring history（7/13）

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(Unit: Bq/liter)

	Sampling location	Frequency	October											
			16 Normal *1	17	18	19	19 Normal *1	20	21	22	23*2	23 Normal *1,2	24	25
In the vicinity of the discharge outlet	T-1	Once a week*	4.3	<6.5	<7.1	<7.2	–	<5.5	<5.6	<5.3	<6.5	1.3	<6.5	<5.8
	T-2	Once a week*	0.66	<6.5	<7.1	<7.1	–	<5.5	<5.6	<5.2	<6.5	0.80	<6.5	<5.8
	T-0-1	Once a week*	1.0	<6.7	<5.9	<8.3	–	<7.0	<6.8	<7.3	<6.7	1.3	<7.8	<7.5
	T-0-1A	Once a week*	14	<6.7	<5.8	<8.5	–	<7.0	22	16	<6.7	0.71	<7.7	<7.5
	T-0-2	Once a week*	1.2	<6.7	8.9	<8.4	–	<7.0	<6.8	<7.3	<6.7	0.40	<7.7	<7.5
	T-0-3A	Once a week*	0.74	<6.5	<7.1	<7.1	–	<5.5	<5.6	<5.3	<6.5	<0.33	<6.5	<5.8
	T-0-3	Once a week*	1.0	<6.7	<6.7	<8.4	–	<7.0	<6.8	<7.3	<6.7	1.0	<7.7	<7.5
	T-A1	Once a week*	0.50	<8.3	<7.2	<7.5	–	<7.5	<8.5	<5.7	<6.8	0.37	<7.5	<7.8
	T-A2	Once a week*	0.56	<8.3	<7.2	<7.5	–	<7.5	<8.4	<5.7	<6.9	<0.31	<7.5	<7.8
	T-A3	Once a week*	0.80	<8.3	<7.2	<7.5	–	<7.5	<8.5	<5.7	<6.8	<0.32	<7.5	<7.8
Outside the vicinity of the discharge outlet	T-D5	Once a week*	–	–	–	<7.5	<0.34	–	–	–	<6.9	<0.32	–	–
	T-S3	Once a week	–	–	–	–	–	–	–	–	–	–	–	–
	T-S4	Once a month	–	–	–	–	–	–	–	–	–	–	–	–
	T-S8	Once a month	–	–	–	–	–	–	–	–	–	–	–	–

※：A "less than" symbol (<) indicates that the analysis result was less than the detection limit.

(shaded)：Term of discharge of ALPS treated water (Group C)

*：Monitored daily for the time being after the commencement of discharge

*1：Detection limit 0.4 Bq/liter

*2：Sampled before 9AM, prior to the completion of the discharge

1-1. Sea area monitoring history（8/13）

TEPCO

(Unit: Bq/liter)

	Sampling location	Frequency	October						November					
			26	27	28	29	30	31	1	1 Normal *2	2*3	2 Normal *2,3	3	4
In the vicinity of the discharge outlet	T-1	Once a week*	<6.5	<6.4	<7.2	<6.8	<6.4	<7.1	<7.9	<0.32	<6.0	0.35	<8.1	<8.0
	T-2	Once a week*	<6.6	<6.3	<7.2	<6.8	<6.4	<7.1	<7.9	<0.33	<8.3	0.36	<8.1	<8.2
	T-0-1	Once a week*	<7.6	<7.8	<8.3	<7.8	–*1	–*1	<7.8	<0.35	<8.0	<0.36	<6.2	<6.3
	T-0-1A	Once a week*	<7.7	<7.8	<8.3	<7.9	–*1	–*1	<7.8	<0.34	<8.0	6.9	7.1	<6.2
	T-0-2	Once a week*	<7.6	<7.8	<8.3	<7.9	–*1	–*1	<7.8	<0.33	<8.1	<0.37	<6.2	<6.2
	T-0-3A	Once a week*	<6.6	<6.3	<7.3	<6.9	–*1	–*1	<7.9	<0.32	<5.4	<0.26	<8.1	<8.2
	T-0-3	Once a week*	<7.6	<7.8	<8.3	<7.9	–*1	–*1	<7.8	<0.34	<8.0	<0.36	<6.2	<6.2
	T-A1	Once a week*	<6.2	<6.6	<6.6	<6.6	–*1	–*1	<6.6	<0.31	<8.2	<0.31	<5.7	<9.2
	T-A2	Once a week*	<6.2	<6.5	<6.6	<6.6	–*1	–*1	<6.4	<0.31	<8.2	<0.30	<5.7	<9.2
	T-A3	Once a week*	<6.2	<6.6	<6.6	<6.6	–*1	–*1	<6.6	<0.32	<8.2	<0.31	<5.7	<9.2
Outside the vicinity of the discharge outlet	T-D5	Once a week*	–	–	–	–	–	–	<7.9	<0.33	–	–	–	–
	T-S3	Once a week	–	–	–	–	–	–	–	–	–	–	–	–
	T-S4	Once a month	–	–	–	–	–	–	–	–	–	–	–	–
	T-S8	Once a month	–	–	–	–	–	–	–	–	–	–	–	–

※：A "less than" symbol (<) indicates that the analysis result was less than the detection limit.

：Term of discharge of ALPS treated water (Group A)

*：Monitored daily for the time being after the commencement of discharge

*1：Sampling suspended due to bad weather condition

*2：Detection limit 0.4 Bq/liter

*3：Sampled after the commencement of discharge at 2PM

1-1. Sea area monitoring history（9/13）

TEPCO

(Unit: Bq/liter)

	Sampling location	Frequency	November											
			5	6	6 Normal *1	7	8	8 Normal *3	9	9 Normal *1	10	11	12	13
In the vicinity of the discharge outlet	T-1	Once a week*	<7.6	<5.6	<0.34	<6.9	<5.5	–	<5.5	–	<6.9	<5.8	<7.0	<6.3
	T-2	Once a week*	<7.5	<5.5	0.38	<6.9	<5.5	–	<5.5	–	<7.0	<5.8	<6.9	<6.3
	T-0-1	Once a week*	<7.5	<7.2	0.36	–*2	<6.7	–	<6.4	–	<8.1	–*2	<4.7	<9.0
	T-0-1A	Once a week*	<7.6	9.0	9.5	–*2	<6.8	–	<6.4	–	11	–*2	<4.6	<9.0
	T-0-2	Once a week*	<7.5	<7.1	<0.31	–*2	<6.7	–	<8.4	–	<8.1	–*2	<4.7	<8.9
	T-0-3A	Once a week*	<7.6	<5.4	0.54	–*2	<5.5	–	<5.6	–	<7.0	–*2	<6.9	<6.3
	T-0-3	Once a week*	<7.5	<7.1	<0.31	–*2	<6.7	–	<6.4	–	<8.1	–*2	<5.1	<9.0
	T-A1	Once a week*	<5.7	<6.5	<0.39	–*2	<7.2	–	<7.5	–	<6.9	–*2	<7.8	<7.6
	T-A2	Once a week*	<5.7	<6.5	<0.38	–*2	<7.2	–	<7.5	–	<6.9	–*2	<7.8	<7.6
	T-A3	Once a week*	<5.7	<6.5	<0.39	–*2	<7.2	–	<7.6	–	<6.8	–*2	<7.8	<7.6
Outside the vicinity of the discharge outlet	T-D5	Once a week*	–	–	–	–	–	–	<7.5	<0.34	–	–	–	–
	T-S3	Once a week	–	–	–	–	<7.7	being measured	–	–	–	–	–	–
	T-S4	Once a month	–	–	–	–	<7.7	being measured	–	–	–	–	–	–
	T-S8	Once a month	–	–	–	–	<7.8	being measured	–	–	–	–	–	–

※：A “less than” symbol (<) indicates that the analysis result was less than the detection limit.

▭：Term of discharge of ALPS treated water (Group A)

*：Monitored daily for the time being after the commencement of discharge

*1：Detection limit 0.4 Bq/liter

*2：Sampling suspended due to bad weather condition

*3：Detection limit 0.1 Bq/liter

1-1. Sea area monitoring history（10/13）

TEPCO

(Unit: Bq/liter)

	Sampling location	Frequency	November											
			13 Normal *1	14	15	15 Normal *1	16	17	18	19	20 *3	20 Normal *3,4	21	21 Normal *1
In the vicinity of the discharge outlet	T-1	Once a week*	being measured	<5.8	<6.9	–	<8.8	<7.8	<9.3	<6.3	<7.0	1.7	<6.6	–
	T-2	Once a week*	being measured	<5.9	<6.9	–	<8.6	<7.7	<9.3	<6.2	<7.1	0.60	<6.5	–
	T-0-1	Once a week*	being measured	<6.6	<6.2	–	<7.1	<7.9	–*2	<7.4	<8.1	being measured	<7.0	–
	T-0-1A	Once a week*	being measured	7.2	10	–	<7.3	<7.9	–*2	<7.4	<8.1	being measured	<7.0	–
	T-0-2	Once a week*	being measured	<6.5	<6.2	–	7.9	<7.8	–*2	<7.4	<8.1	0.77	<7.1	–
	T-0-3A	Once a week*	being measured	<5.7	<6.9	–	<8.8	<8.0	–*2	<6.3	<7.0	being measured	<6.7	–
	T-0-3	Once a week*	being measured	<6.6	<6.2	–	<7.3	<7.9	–*2	<7.3	<8.1	being measured	<7.2	–
	T-A1	Once a week*	0.082	<6.8	<8.6	–	<8.8	<5.5	–*2	<8.6	<7.3	1.5	<9.0	–
	T-A2	Once a week*	0.16	<6.8	<8.8	–	<8.6	<5.5	–*2	<8.8	<7.2	0.60	<8.9	–
	T-A3	Once a week*	0.15	<7.0	<8.6	–	<8.8	<5.5	–*2	<8.8	<7.2	0.37	<8.9	–
Outside the vicinity of the discharge outlet	T-D5	Once a week*	–	–	<8.6	being measured	–	–	–	–	–	–	<7.2	being measured
	T-S3	Once a week	–	–	–	–	–	–	–	–	–	–	–	–
	T-S4	Once a month	–	–	–	–	–	–	–	–	–	–	–	–
	T-S8	Once a month	–	–	–	–	–	–	–	–	–	–	–	–

※：A "less than" symbol (<) indicates that the analysis result was less than the detection limit.

：Term of discharge of ALPS treated water (Group A)

*：Monitored daily for the time being after the commencement of discharge

*1： Detection limit 0.1 Bq/liter
*2：Sampling suspended due to bad weather condition
*3： Sampled before 8AM, prior to the completion of the discharge
*4： Detection limit 0.4 Bq/liter

1-1. Sea area monitoring history（11/13）

TEPCO

(Unit: Bq/liter)

	Sampling location	Frequency	November										December	
			22	23	24	25	26	27	27 Normal *1	28	29	30	1	2
In the vicinity of the discharge outlet	T-1	Once a week*	<6.5	<5.5	<5.3	<6.3	<7.1	<5.7	<0.34※1	<5.5	<6.0	<7.4	<4.9	<5.5
	T-2	Once a week*	<6.4	<5.5	<5.2	<6.3	<7.1	<5.8	<0.34※1	<5.5	<6.0	<7.4	<4.9	<5.5
	T-0-1	Once a week*	<7.1	<6.4	<7.2	<7.3	<8.1	<6.4	being measured	<6.8	<5.9	<7.3	<7.3	<6.8
	T-0-1A	Once a week*	<7.0	<6.4	<7.2	<7.3	<8.2	<6.5	being measured	<6.7	<5.8	<7.2	<7.2	<6.7
	T-0-2	Once a week*	<7.0	<6.5	<7.3	<7.3	<8.1	<6.5	<0.26※1	<6.7	<5.8	<7.3	<7.2	<6.7
	T-0-3A	Once a week*	<6.6	<5.5	<5.2	<6.3	<7.1	<5.7	being measured	<5.5	<6.0	<7.4	<4.9	<5.5
	T-0-3	Once a week*	<7.1	<6.5	<7.3	<7.3	<8.2	<6.4	being measured	<6.8	<5.9	<7.3	<7.2	<6.7
	T-A1	Once a week*	<7.4	<7.2	<5.7	<5.2	<5.7	<7.8	<0.36※1	<6.7	<5.9	<6.8	<8.8	<8.1
	T-A2	Once a week*	<7.7	<7.2	<5.7	<5.2	<5.6	<7.8	<0.36※1	<6.7	<5.9	<6.8	<8.8	<8.1
	T-A3	Once a week*	<7.6	<7.2	<5.6	<5.2	<5.7	<7.8	<0.36※1	<6.7	<5.9	<6.8	<8.8	<8.1
Outside the vicinity of the discharge outlet	T-D5	Once a week*	—	—	—	—	—	<7.8	being measured	—	—	—	—	—
	T-S3	Once a week	—	—	—	—	—	—	—	—	—	—	—	—
	T-S4	Once a month	—	—	—	—	—	—	—	—	—	—	—	—
	T-S8	Once a month	—	—	—	—	—	—	—	—	—	—	—	—

※：A "less than" symbol (<) indicates that the analysis result was less than the detection limit.

*：Monitored daily for the time being after the commencement of discharge

*1：Detection limit 0.4 Bq/liter

※1：Revised on December 25, 2023 (A "less than" symbol (<) is added)

1-1. Sea area monitoring history（12/13）

TEPCO

(Unit: Bq/liter)

	Sampling location	Frequency	December											
			3	4	4 Normal *1	5	6	7	7 Normal *2	8	9	9 Normal *1	10	11
In the vicinity of the discharge outlet	T-1	Once a week*	<6.7	<6.0	being measured	<6.3	<5.8	<5.0	−	<5.2	<6.1	−	<6.2	<6.3
	T-2	Once a week*	<6.7	<6.1	being measured	<6.2	<5.7	<5.0	−	<5.2	<6.1	−	<6.3	<6.2
	T-0-1	Once a week*	<5.1	<5.8	being measured	<7.5	<8.0	<7.3	−	<6.3	<8.3	−	<4.8	<6.5
	T-0-1A	Once a week*	<5.1	<5.8	being measured	<7.5	<8.0	<7.3	−	<6.3	<8.4	−	<6.2	<6.5
	T-0-2	Once a week*	<5.1	<5.8	being measured	<7.5	<7.9	<7.2	−	<6.3	<8.5	−	<4.9	<6.5
	T-0-3A	Once a week*	<6.9	<6.0	being measured	<6.2	<5.9	<5.0	−	<5.2	<6.0	−	<6.2	<6.3
	T-0-3	Once a week*	<5.1	<5.8	being measured	<7.4	<8.0	<7.2	−	<6.3	<8.3	−	<7.4	<6.5
	T-A1	Once a week*	<6.1	<8.1	being measured	<8.4	<5.2	<6.5	−	<8.6	<7.9	−	<6.8	<5.2
	T-A2	Once a week*	<6.1	<8.1	being measured	<8.3	<7.5	<6.5	−	<8.6	<7.8	−	<6.8	<5.3
	T-A3	Once a week*	<6.1	<8.1	being measured	<8.3	<5.3	<6.5	−	<8.7	<7.9	−	<6.9	<5.3
Outside the vicinity of the discharge outlet	T-D5	Once a week*	−	−	−	−	−	−	−	−	<6.0	being measured	−	−
	T-S3	Once a week	−	−	−	−	−	−	−	−	−	−	−	−
	T-S4	Once a month	−	−	−	−	−	−	−	−	−	−	−	−
	T-S8	Once a month	−	−	−	−	−	<6.6	being measured	−	−	−	−	−

※：A “less than” symbol (<) indicates that the analysis result was less than the detection limit.
*：Monitored daily for the time being after the commencement of discharge

*1： Detection limit 0.4 Bq/liter
*2： Detection limit 0.1 Bq/liter

1-1. Sea area monitoring history（13/13）

TEPCO

(Unit: Bq/liter)

	Sampling location	Frequency	December									
			11 Normal *1	12	13	14	14 Normal *1	15	16	17	18	18 Normal *3
In the vicinity of the discharge outlet	T-1	Once a week*	being measured	<7.0	<6.7	<6.7	–	<6.1	<6.9	<6.5	<5.8	being measured
	T-2	Once a week*	being measured	<7.0	<6.7	<6.7	–	<6.1	<6.9	<6.5	<5.8	being measured
	T-0-1	Once a week*	being measured	–*2	–*2	<7.0	–	<5.9	<6.8	–*2	<5.8	being measured
	T-0-1A	Once a week*	being measured	–*2	–*2	<5.5	–	<5.8	<6.7	–*2	<5.9	being measured
	T-0-2	Once a week*	being measured	–*2	–*2	<5.9	–	<5.9	<6.8	–*2	<5.9	being measured
	T-0-3A	Once a week*	being measured	–*2	–*2	<6.7	–	<6.1	<6.9	–*2	<5.7	being measured
	T-0-3	Once a week*	being measured	–*2	–*2	<8.1	–	<5.9	<7.0	–*2	<5.9	being measured
	T-A1	Once a week*	being measured	–*2	–*2	<8.1	–	<6.5	<7.5	–*2	<6.8	being measured
	T-A2	Once a week*	being measured	–*2	–*2	<8.1	–	<6.5	<7.5	–*2	<6.8	being measured
	T-A3	Once a week*	being measured	–*2	–*2	<8.1	–	<6.5	<7.5	–*2	<6.8	being measured
Outside the vicinity of the discharge outlet	T-D5	Once a week*	–	–	–	<8.1	being measured	–	–	–	–	–
	T-S3	Once a week	–	–	–	–	–	–	–	–	–	–
	T-S4	Once a month	–	–	–	–	–	–	–	–	–	–
	T-S8	Once a month	–	–	–	–	–	–	–	–	–	–

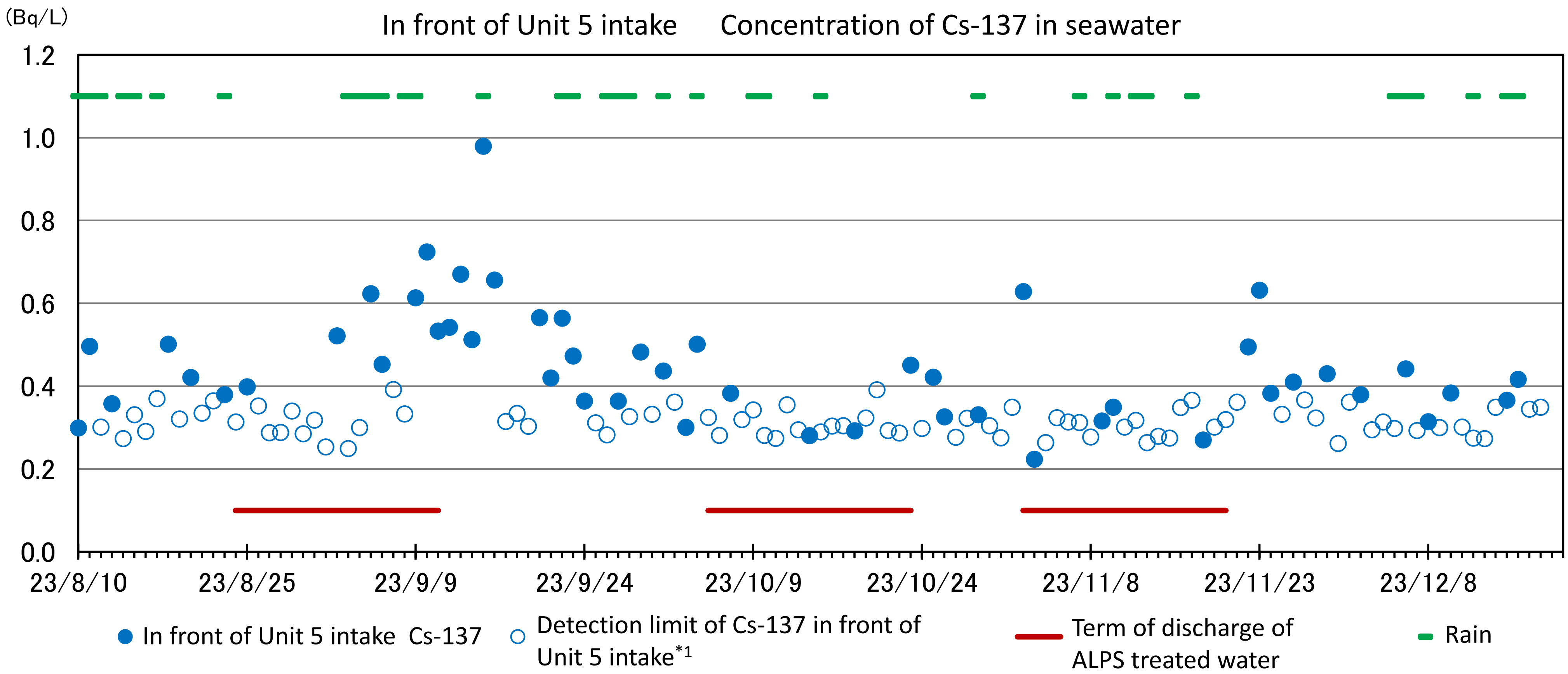
※：A "less than" symbol (<) indicates that the analysis result was less than the detection limit.
*：Monitored daily for the time being after the commencement of discharge

*1： Detection limit 0.1 Bq/liter
*2： Sampling suspended due to bad weather condition
*3： Detection limit 0.4 Bq/liter

1-2. Unit 5 intake channel monitoring

TEPCO

- Sea water monitoring results at near the intake for seawater to be used for dilution during the discharge of ALPS treated water have confirmed that values are similar to those outside of the term of the discharge.



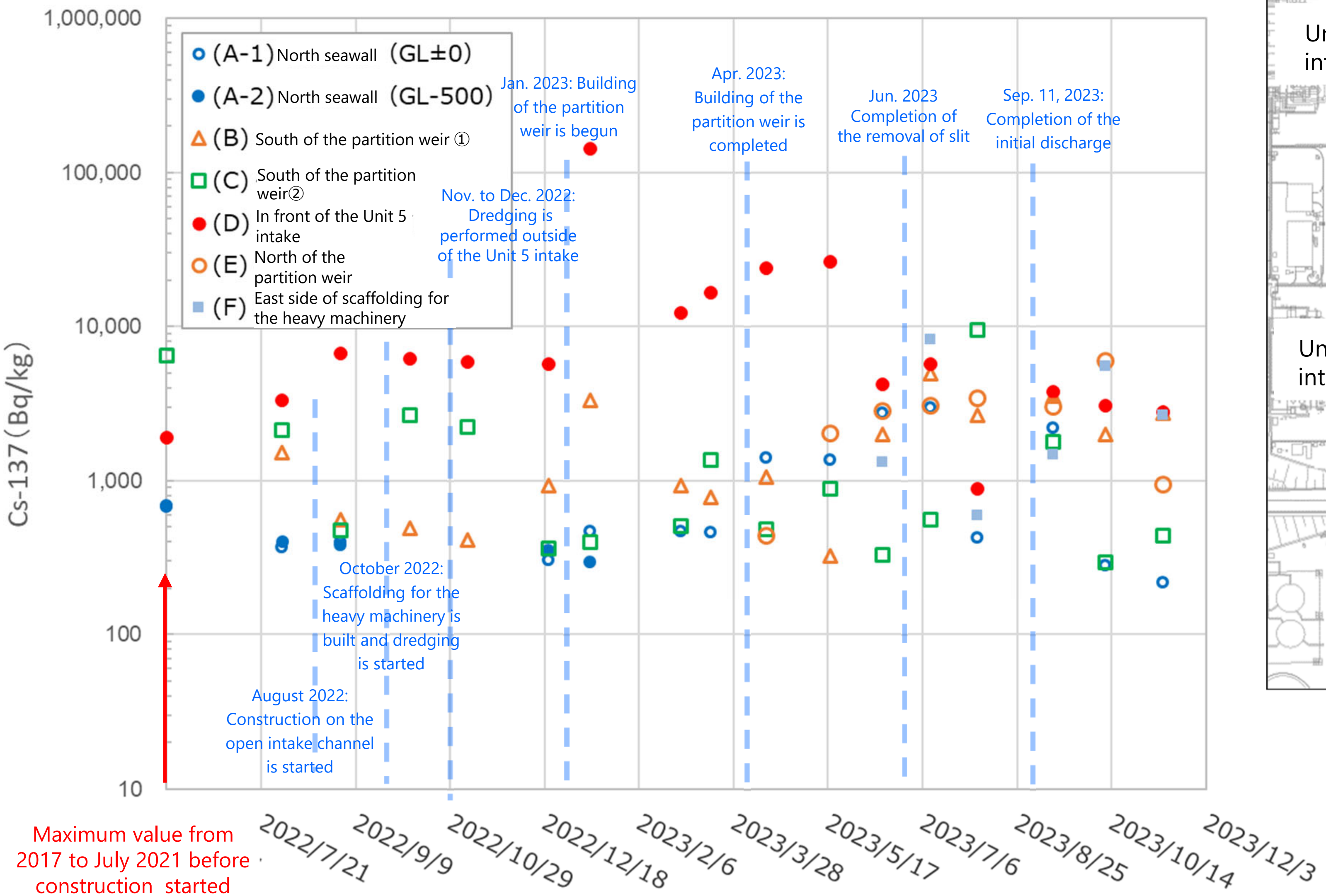
*1: Detection limit is displayed on the graph when the concentration is lower than detection limit.

※The location of seawater monitoring inside the Unit 5/6 intake open channel has been changed to the sampling location near the intake for seawater to be used for dilution (changed from “in front of the Unit 6 intake” to “in front of the Unit 5 intake”).

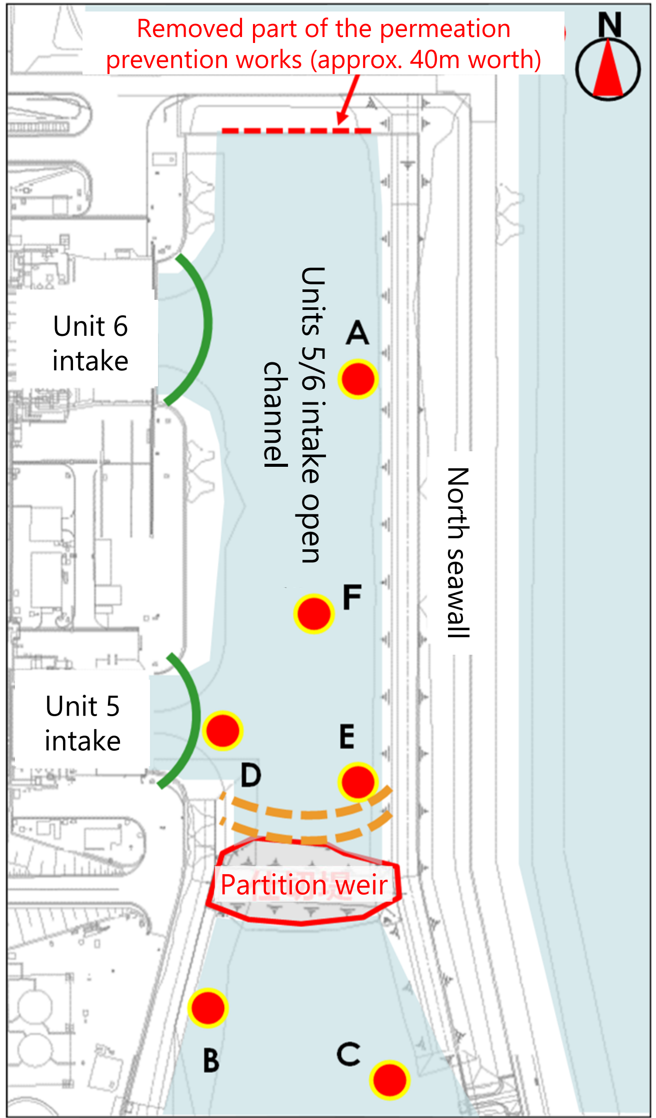
1-3. Monitoring results for seabed soil inside the Unit 5/6 intake open channel (1)

TEPCO

- Monitoring results for seabed soil in front of Unit 5 intake did not show significant fluctuations from the beginning of construction until December 2022. While they showed higher readings after January 2023, we have confirmed that these readings decreased after the completion of silt removal.
- We will continue to monitor the seabed soil.



Maximum value from 2017 to July 2021 before construction started

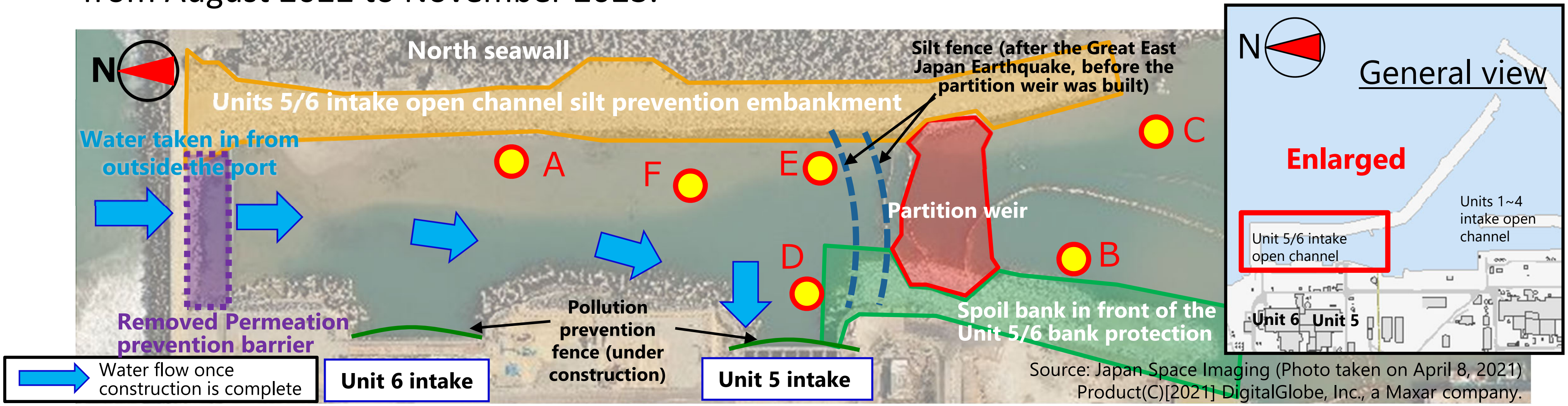


<Legend>
- : Sampling location in construction
- : Silt fence (before the partition weir was built)
- : Pollution prevention fence

1-3. Monitoring results for seabed soil inside the Unit 5/6 intake open channel (2)

TEPCO

➢ The following shows monitoring results for seabed soil inside the unit 5/6 intake open channel from August 2022 to November 2023.



Sampling points		Before construction	2022					2023										
		2017 to July 2021	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
A−1 North side of the Unit 5/6 open channel North side of the silt fence (GL±0m)	Cs−134	4.4〜52.3	33.2	36.0	−	−	31.5	37.2	39.8	39.8	40.1	33.9	66.5	65.5	33.6	65.9	34.6	32.0
	Cs−137	163.6〜678.6	371.6	398.8	−	−	303.2	468.1	460.2	460.2	1,414.0	1,360.0	2,752.0	2,957.0	422.3	2,195.0	281.8	216.7
A−2 North side of the Unit 5/6 open channel North side of the silt fence (GL-0.5m)	Cs−134	14.4〜58.5	33.6	32.5	−	−	38.3	33.4	※Only sampled from the surface (GL±0m) since sand was removed during dredging									
	Cs−137	310.0〜689.8	404.0	383.2	−	−	356.4	299.1										
B South side of the partition weir ① (South side of the silt fence)	Cs−134	723.0	34.5	42.1	65.6	55.4	46.7	73.9	49.1	43.1	62.6	47.8	60.1	97.1	59.9	92.5	52.4	53.2
	Cs−137	6,475.0	1,528.0	553.9	492.4	412.8	936.0	3,331.0	936.1	777.0	1,061.0	323.8	2,008.0	4,943.0	2,649.0	3,528.0	2,004.0	2,732.0
C South side of the partition weir ② (South side of the silt fence)	Cs−134	183.0	51.3	47.2	68.7	59.7	51.8	40.3	30.9	40.3	44.6	61.6	59.5	47.7	234.8	59.3	37.1	39.6
	Cs−137	1,893.0	2,114.0	476.0	2,671.0	2,242.0	360.8	400.5	503.5	1,356.0	485.9	886.9	330.5	560.6	9,519.0	1,773.0	295.9	441.2
D Unit 5 intake	Cs−134	—	101.6	184.0	213.7	160.4	108.7	3,546.0	167.4	472.0	690.7	586.2	63.7	141.4	64.5	75.2	70.7	50.2
	Cs−137	—	3,301.0	6,714.0	6,198.0	5,941.0	5,678.0	144,000.0	12,290.0	16,972.0	24,760.7	26,400.0	4,189.0	5,699.0	951.7	3,876.2	3,085.0	2,810.0
E North side of the partition weir	Cs−134	—									42.8	59.8	86.8	98.7	96.8	56.9	147.0	35.6
	Cs−137	—									437.1	2,022.0	2,822.0	3,069.0	3,438.0	3,022.0	5,975.0	936.5
F East side of scaffolding for the heavy machinery	Cs−134	—											40.2	166.1	45.3	53.7	98.0	52.4
	Cs−137	—											1,312.0	8,303.0	592.4	1,481.0	5,569.0	2,676.0

※ Unit: Bq/Liter, Figures in grey were below the detection limit.

1. Monitoring history regarding discharge

2. Sea area dispersion simulation

3. Facility inspections after the completion of the 3rd discharge

4. Transfer of ALPS treated water preparation for the 4th discharge

5. Transfer of ALPS treated water preparation for the 5th and 6th discharges

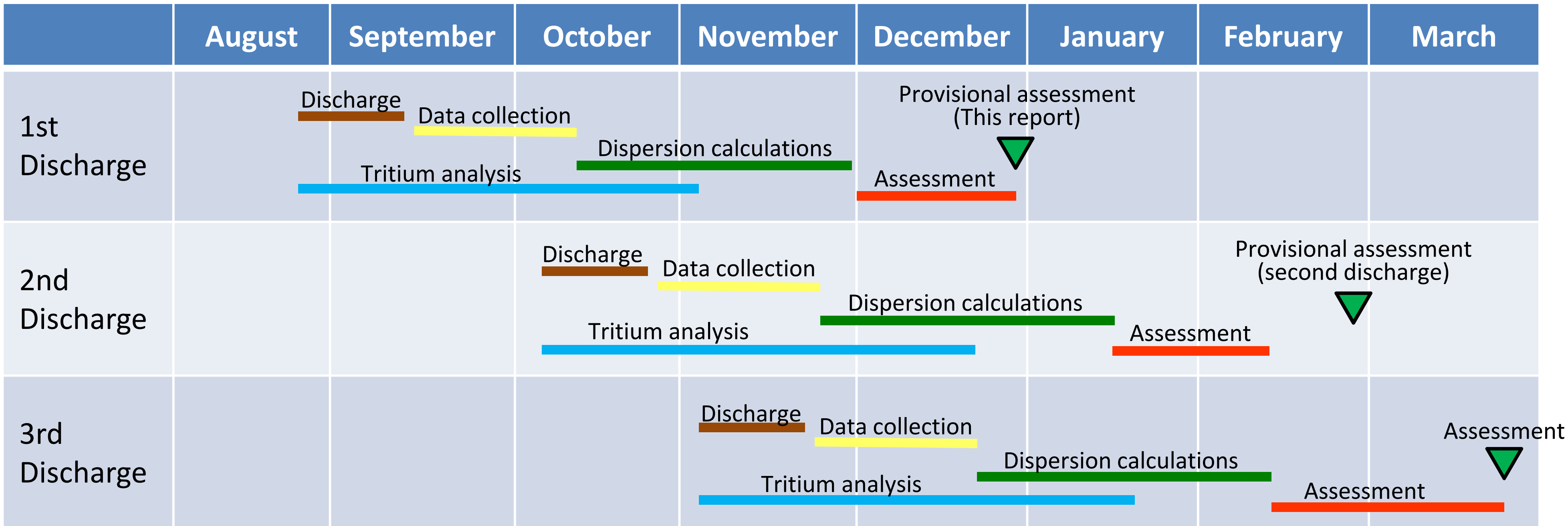
6. Changes to future discharge method

7. Countermeasures to prevent marine life from adhering to dilution/discharge facility

8. Miscellaneous

2-1. Validating the ocean dispersion simulation

- In order to verify the validity of the ocean dispersion simulation used for the radiological environmental impact assessment, tritium dispersion calculations estimated from actual tritium discharge volumes and meteorological /marine meteorological data are being compared/assessed with sea area monitoring data.
- We are currently calculating dispersion for the second discharge period (October 5 ~ October 23).
- This is a provisional report on the results of the comparison between dispersion calculations and sea area monitoring data for the first discharge period (August 24 ~ September 11).
- We will continue to compare and verify dispersion calculations with sea area monitoring results for the second and third discharge periods.



2-2. Validation approach

Validity is being verified using the following approach.

- 10 locations near the discharge outlet (within a 3km radius from the power station port) and 4 locations within the 10km square off the coast of the power station, which could detect the increase in concentrations, have been selected for comparison.

- The results from normal measurement have been selected because they are thought to contain little uncertainty (quick measurements have been excluded).

- Since there is little sea area monitoring data, the simulation contains uncertainty, and the simulation cannot reproduce minute differences in concentrations at a certain location, validation is **not based on a comparison of numerical figures, but rather whether or not concentration increase trends (dispersion tendencies) are being reproduced.**

2-3. Overview of the dispersion simulation for the first discharge period

TEPCO

- Dispersion calculations for the first discharge period (August 24 - September 11) were made based on the following conditions.
  - The dispersion model was the same model used for the radiological environmental impact assessment
  - Tritium discharge rate were calculated from the concentrations measured at the measurement/confirmation facility and the daily discharge flow volume, and these data were entered into the model

Calculation conditions for the first discharge period.
(The model is the same as that used for the radiological environmental impact assessment report)

Amount of tritium discharged

・8/24 13:03 – 9/10 14:52 (Constant)

Discharge rate＝2.66E+09Bq/hr （＝140,000Bq/L×456m3/day×1000L/m3÷24hr/day）

・9/11 10:33 - 12:15

Discharge rate＝1.32E+09Bq/hr （＝140,000Bq/L×16m3×1000L/m3÷102/60hr）

Meteorological/marine meteorological data

・ Actual meteorological/marine meteorological data from the discharge period (Meteorological Agency, JAMSTEC, etc.)

Reference

Tritium discharge volume used for the dispersion simulation in the radiological environmental impact assessment

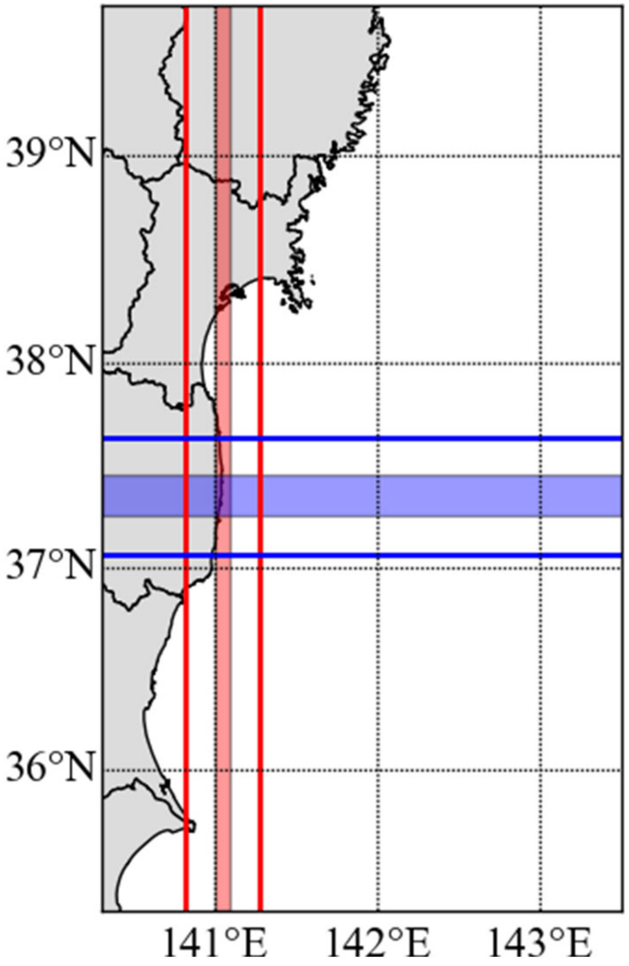
・Constant throughout the year

Discharge rate＝2.51 E+09 Bq/hr (=22 trillion Bq/year ÷ 8760hr/yr)

[Reference] Overview of dispersion simulation (Regional Ocean Modeling System)

TEPCO

- We use a model that has been validated through dispersion calculations for cesium concentration in seawater after the Fukushima Daiichi Nuclear Accident.
- Furthermore, we calculate at a higher resolution to enable a highly detailed simulation of the sea area in the vicinity of the power station.



- The Regional Ocean Modeling System (ROMS） is applied to the area off the coast of Fukushima
- Sea area flow data
  - Use data[1] which interpolated Metrological Agency's short-term weather forecast data to the driving force of the sea surface
  - Use reanalyzed data of the sea （JCOPE2M[2][3]） as the source data for boundary conditions and data assimilation* for open ocean
- Model scope: North latitude: 35.30 - 39.71 degrees、 East longitude: 140.30 - 143.50 degrees （490km×270km); gradually improve resolutions of sea area approx. 22.5km north-south x approx. 8.4km east-west around the power station （The resolution for the area between the red/blue hatching and the red/blue lines in the figure to the left has been gradually reduced to the minimum assessment area size of approximately 200m²)
  - Resolution (all area): Approx. 925m north-south x approx. 735m (approx. 1km) east-west, vertical direction: 30 layers
  - Resolution (vicinity): Approx. 185m north-south x approx. 147m (approx. 200m) east-west, vertical direction: 30 layers
- Actual meteorological /marine meteorological data
  - Use meteorological/marine meteorological data from the discharge period

*Data assimilation: Method for incorporating actual data into numerical simulations. Also referred to as "nudging."

[1] Atsushi HASHIMOTO, Hiromaru HIRAGUCHI, Yasushi TOYODA, Kou NAKAYA, "Predicting Japan's Climate Changes in conjunction with Global Warming (Vol.1), -Application to Weather Forecast/Analysis System NuWFAS's Long-Term Climate Forecasts-", Central Research Institute of Electric Power Industry Report, 2010.

[2] Miyazawa, Y., A. Kuwano-Yoshida, T. Doi, H. Nishikawa, T. Narazaki, T. Fukuoka, and K. Sato, 2019: Temperature profiling measurements by sea turtles improve ocean state estimation in the Kuroshio-Oyashio Confluence region, Ocean Dynamics, 69, 267-282.

[3] Miyazawa, Y., S. M. Varlamov, T. Miyama, X. Guo, T. Hihara, K. Kiyomatsu, M. Kachi, Y. Kurihara, and H. Murakami, 2017: Assimilation of high-resolution sea surface temperature data into an operational nowcast/forecast system around Japan using a multi-scale three dimensional variational scheme, Ocean Dynamics, 67, 713-728.

2-4-1. Monitoring results from the first discharge period (Overview)

◯ Since the commencement of discharge on August 24, quick measurements that obtain tritium concentration in seawater (target detection limit: less than 10Bq/liter) were performed for samples taken from 10 locations near the discharge outlet (within a 3km vicinity of the power station) and four locations on the outside of the area around the discharge outlet (within a 10km square off the coast of the power station). The maximum concentration detected during the first discharge period (August 24 - September 11) was 10 Bq/liter taken from location T-0-1A on August 31, and all values were below indicators (discharge suspension level, investigation level).

◯ The highest concentrations detected during normal monitoring (target detection limit: less than 0.4Bq/liter or less than 0.1Bq/liter) were 2.6Bq/liter in the vicinity of the discharge outlet (within a 3km radius of the power station) (T-0-1A, August 24), and 0.59Bq/liter, outside of the area around the discharge outlet (within a 10km square off the coast of the power station) (T-D5, August 31) respectively.

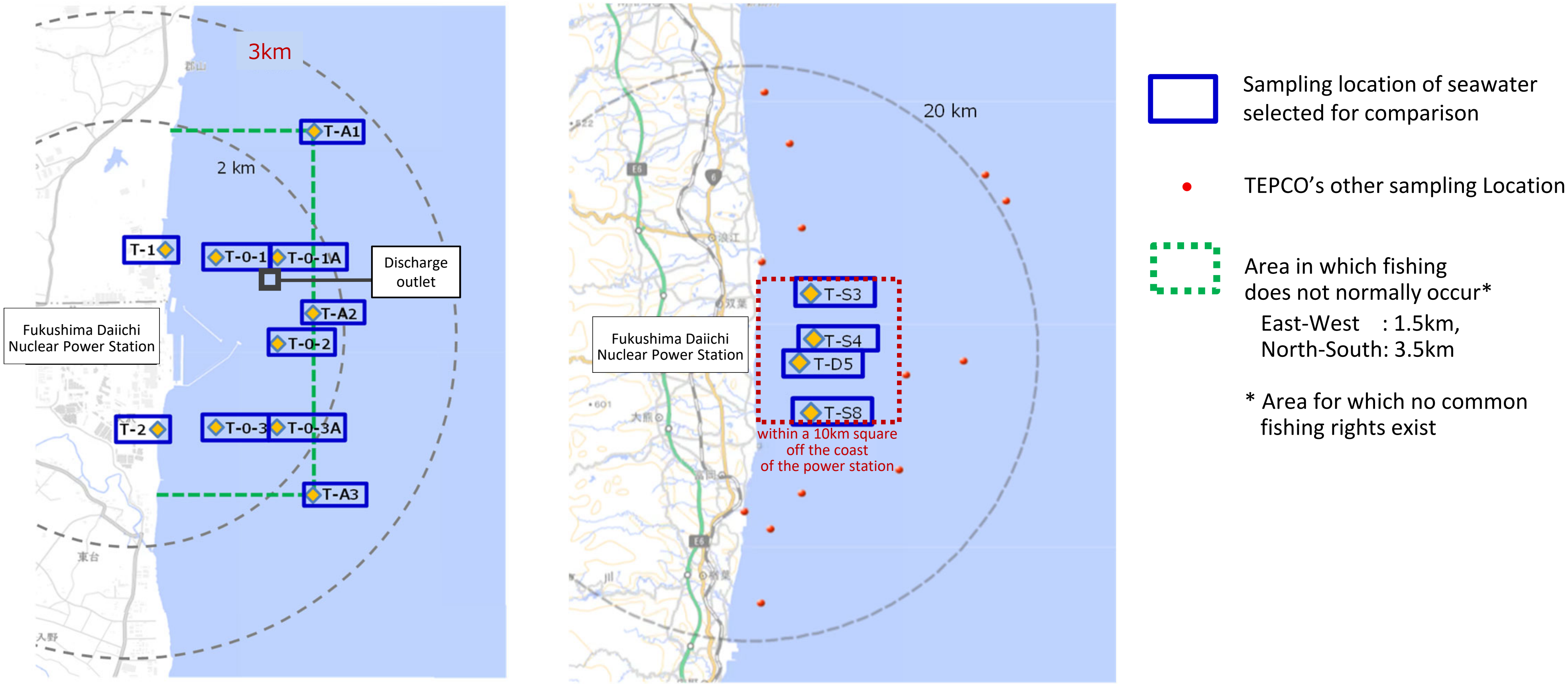


Fig. Sampling locations of seawater selected for comparison with dispersion simulation

2-4-2. Monitoring results from the first discharge period (1/3)

TEPCO

- The following chart shows the sea area monitoring results for the first discharge period.
- Verification was based on tritium concentrations detected through normal measurements on August 24, 26, 30, 31, September 4 and September 11. (Indicated in the black boxes)

(Unit: Bq/liter)

	Sampling location	Frequency	August											
			24 *1	24 Normal *1,2	25	26	26 Normal *3	27	28	29	30	30 Normal *2,3	31	31 Normal *3
In the vicinity of the discharge outlet	T-1	Once a week*	<6.3	<0.34	<5.6	<6.6	0.97	<6.2	<7.3	<5.9	<6.4	1.0	<6.8	–
	T-2	Once a week*	<6.3	<0.33	<5.5	<6.5	1.1	<6.2	<7.3	<5.9	<6.3	1.3	<6.8	–
	T-0-1	Once a week*	<8.0	<0.34	<6.8	<6.1	0.66	<6.1	–*4	–*4	<6.8	<0.32	<8.2	–
	T-0-1A	Once a week*	<4.6	2.6	<7.6	<6.2	0.087	<6.1	–*4	–*4	<6.9	0.43	10	–
	T-0-2	Once a week*	<8.1	<0.35	<6.8	<6.1	0.92	<6.1	–*4	–*4	<6.8	1.4	<8.2	–
	T-0-3A	Once a week*	<4.7	<0.33	<7.6	<6.8	<0.068	<6.8	–*4	–*4	<7.6	<0.32	<5.1	–
	T-0-3	Once a week*	<8.0	<0.34	<6.9	<6.1	0.14	<6.1	–*4	–*4	<6.8	<0.31	<8.3	–
	T-A1	Once a week*	<6.6	<0.32	<7.6	<6.8	0.13	<6.8	–*4	–*4	<7.6	1.1	<5.1	–
	T-A2	Once a week*	<6.6	<0.32	<7.6	<6.8	0.065	<6.8	–*4	–*4	<7.7	1.5	<5.1	–
	T-A3	Once a week*	<6.6	<0.32	<6.9	<6.8	<0.072	<6.8	–*4	–*4	<7.6	1.1	<5.2	–
Outside the vicinity of the discharge outlet	T-D5	Once a week	–	–	–	–	–	–	–	–	–	–	<6.8	0.59
	T-S3	Once a month	–	–	–	–	–	–	–	–	<7.6	0.070	–	–
	T-S4	Once a month	–	–	–	–	–	–	–	–	<7.7	0.073	–	–
	T-S8	Once a month	–	–	–	–	–	–	–	–	<7.7	0.062	–	–

※：A "less than" symbol (<) indicates that the analysis result was less than the detection limit.

（shaded box）：Term of discharge of ALPS treated water (Group B)

*：Monitored daily for the time being after the commencement of discharge

*1：Sampled after the commencement of discharge at 3PM

*2：Detection limit 0.4 Bq/liter

*3：Detection limit 0.1 Bq/liter

*4：Sampling suspended due to rough seas

2-4-2. Monitoring results from the first discharge period (2/3)

(Unit: Bq/liter)

	Sampling location	Frequency	September											
			1	2	3	4	4 Normal *1	5	6	6 Normal *1	7	8	9	10
In the vicinity of the discharge outlet	T-1	Once a week*	<7.2	<6.8	<5.8	<6.6	0.68	<7.1	<7.1	–	<6.1	<5.9	<6.0	<7.8
	T-2	Once a week*	<7.4	<6.8	<5.8	<6.6	0.90	<7.1	<7.1	–	<6.1	<5.9	<6.0	<7.8
	T-0-1	Once a week*	<7.3	<7.3	<6.8	<6.9	<0.34	<6.6	<6.6	–	<8.7	<6.9	<8.0	<7.0
	T-0-1A	Once a week*	<7.3	<8.2	<6.8	<6.9	<0.33	<7.0	<6.6	–	<8.7	<6.9	<8.0	<7.1
	T-0-2	Once a week*	<7.3	<7.3	<6.7	<7.0	0.74	<6.5	<6.6	–	<8.6	<6.8	<8.0	<7.0
	T-0-3A	Once a week*	<7.0	<7.8	<6.5	<5.9	<0.33	<7.6	<6.3	–	<5.3	<7.4	<6.5	<6.5
	T-0-3	Once a week*	<7.3	<8.2	<6.7	<6.8	<0.34	<7.8	<6.6	–	<8.7	<6.9	<8.0	<7.1
	T-A1	Once a week*	<7.1	<7.9	<6.5	<5.9	1.1	<7.6	<6.3	–	<5.3	<7.4	<6.4	<6.5
	T-A2	Once a week*	<7.1	<7.8	<6.5	<7.3	0.88	<7.6	<6.2	–	<5.3	<7.3	<6.6	<6.4
	T-A3	Once a week*	<7.1	<7.9	<6.5	<7.3	0.82	<7.6	<6.3	–	<5.3	<7.3	<6.5	<6.5
Outside the vicinity of the discharge outlet	T-D5	Once a week	–	–	–	–	–	–	<7.1	<0.34	–	–	–	–
	T-S3	Once a month	–	–	–	–	–	–	–	–	–	–	–	–
	T-S4	Once a month	–	–	–	–	–	–	–	–	–	–	–	–
	T-S8	Once a month	–	–	–	–	–	–	–	–	–	–	–	–

※：A "less than" symbol (<) indicates that the analysis result was less than the detection limit.

(light blue box)：Term of discharge of ALPS treated water (Group B)

*：Monitored daily for the time being after the commencement of discharge

*1：Detection limit 0.4 Bq/liter

2-4-2. Monitoring results from the first discharge period (3/3)

TEPCO

(Unit: Bq/liter)

	Sampling location	Frequency	September											
			11 *1	11 Normal *1,2	12	12 Normal *2	13	13 Normal *2	14	15	16	17	18	18 Normal *3
In the vicinity of the discharge outlet	T-1	Once a week*	<7.0	0.21	<7.2	–	<7.2	–	<6.5	<7.3	<6.7	<7.0	<7.6	<0.31
	T-2	Once a week*	<7.0	0.24	<7.2	–	<7.2	–	<6.5	<7.4	<6.8	<6.9	<7.6	<0.31
	T-0-1	Once a week*	<6.8	0.10	<7.7	–	<6.6	–	<7.5	<7.8	<7.6	<7.8	<7.4	<0.36
	T-0-1A	Once a week*	<6.8	0.12	<7.8	–	<6.5	–	<7.5	<7.7	<7.5	<7.7	<7.3	<0.34
	T-0-2	Once a week*	<6.8	0.13	<7.7	–	<6.5	–	<7.5	<7.7	<7.6	<7.7	<7.3	<0.31
	T-0-3A	Once a week*	<6.2	0.10	<7.0	–	<5.9	–	<6.6	<7.4	<6.8	<6.9	<7.6	<0.35
	T-0-3	Once a week*	<6.8	0.16	<7.8	–	<6.5	–	<7.5	<7.7	<7.5	<7.8	<7.3	<0.34
	T-A1	Once a week*	<7.0	0.078	<7.0	–	<5.9	–	<6.7	<5.5	<7.2	<5.5	<6.7	<0.31
	T-A2	Once a week*	<7.0	0.10	<7.0	–	<5.9	–	<6.7	<5.5	<7.3	<5.4	<6.7	<0.31
	T-A3	Once a week*	<7.0	0.16	<7.0	–	<5.9	–	<6.7	<5.5	<7.2	<5.5	<6.7	<0.31
Outside the vicinity of the discharge outlet	T-D5	Once a week	–	–	–	–	<7.2	0.11	–	–	–	–	–	–
	T-S3	Once a month	–	–	<7.1	<0.068	–	–	–	–	–	–	–	–
	T-S4	Once a month	–	–	<7.1	0.087	–	–	–	–	–	–	–	–
	T-S8	Once a month	<6.2	0.098	–	–	–	–	–	–	–	–	–	–

※ : A "less than" symbol (<) indicates that the analysis result was less than the detection limit.

(blue box) : Term of discharge of ALPS treated water (Group B)

* : Monitored daily for the time being after the commencement of discharge

*1 : Sampled beforethe 9 AM, prior to the completion of the discharge

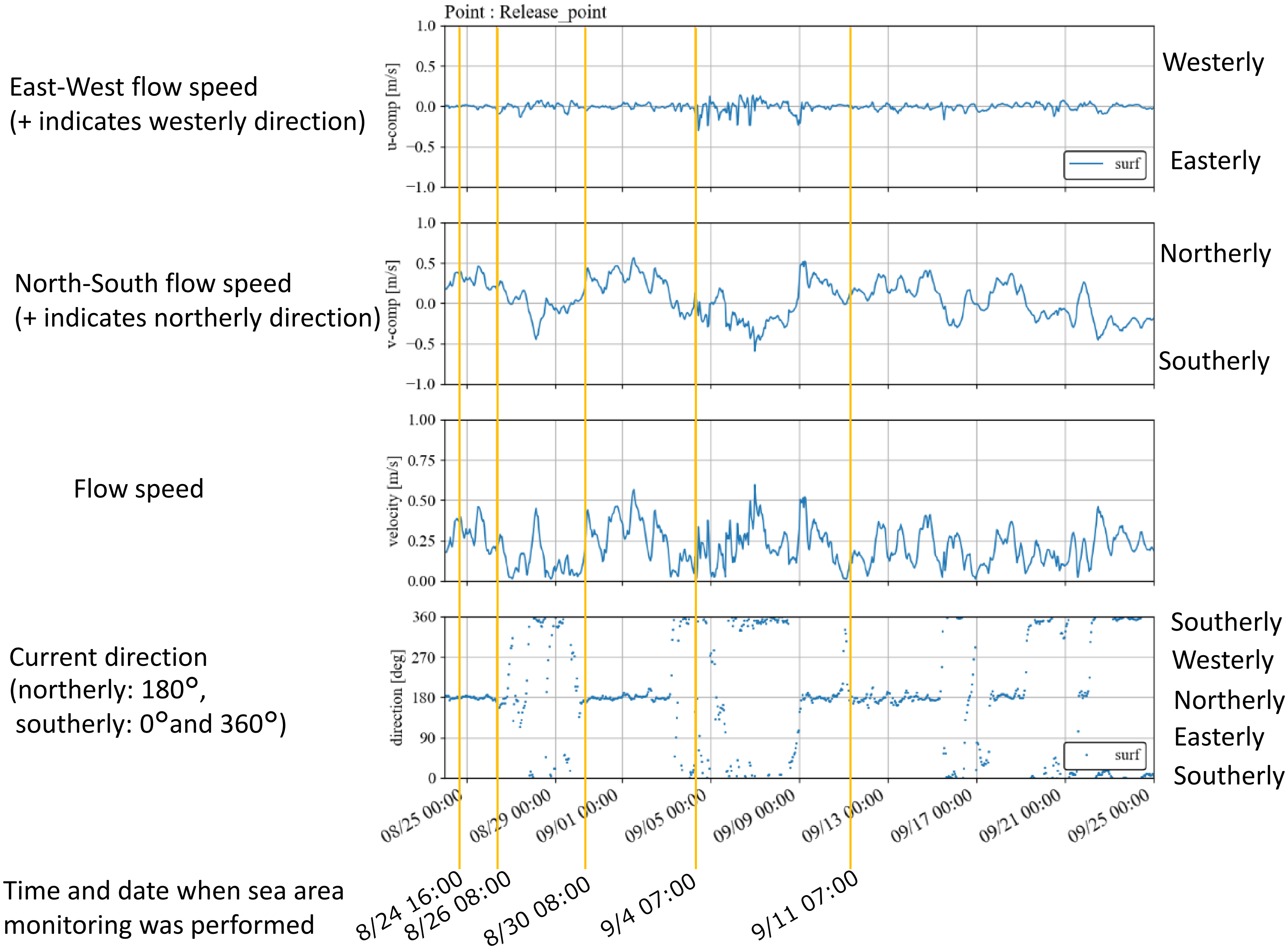
*2 : Detection limit 0.1 Bq/liter

*3 : Detection limit 0.4 Bq/liter

2-5-1. Ocean current direction and flow speed of the surface layer by the discharge outlet (dispersion simulation results)

TEPCO

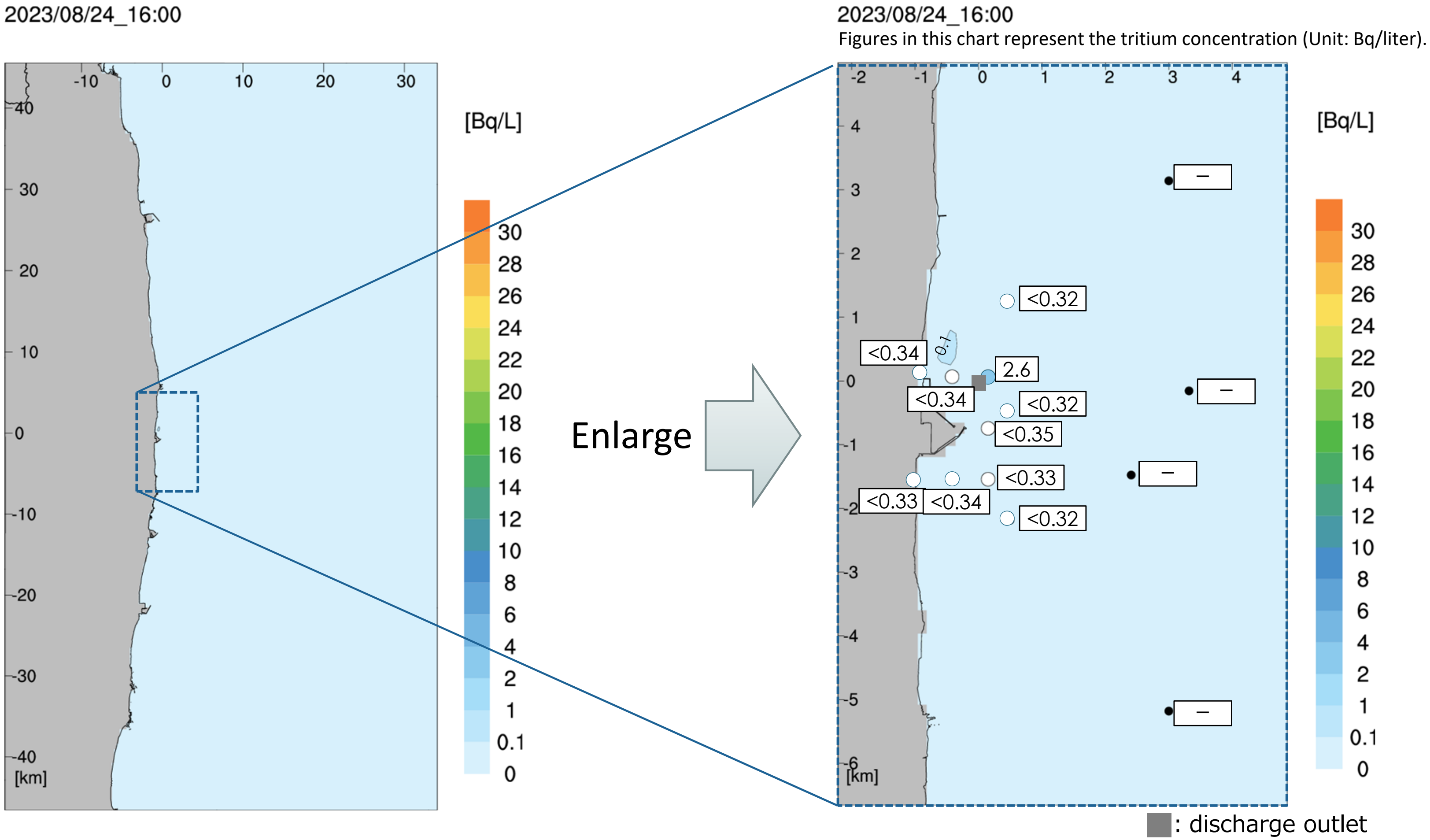
- Marine meteorological data since 12 AM on August 24, when the discharge was commenced, is as follows.



2-5-2. Comparison of dispersion calculation results and monitoring results (August 24, 4 PM)

TEPCO

- The following figures show the dispersion simulation results for 4PM on August 24, which is approximately three hours after the commencement of discharge, and the sea area monitoring results for the same timeframe.
- The simulation results show that ocean current is in the northerly direction and tritium tend to disperse to the north. This trend is generally consistent with monitoring results. (Refer to 2-5-1. Ocean current direction and flow speed of the surface layer by the discharge outlet (dispersion simulation results) for more details)

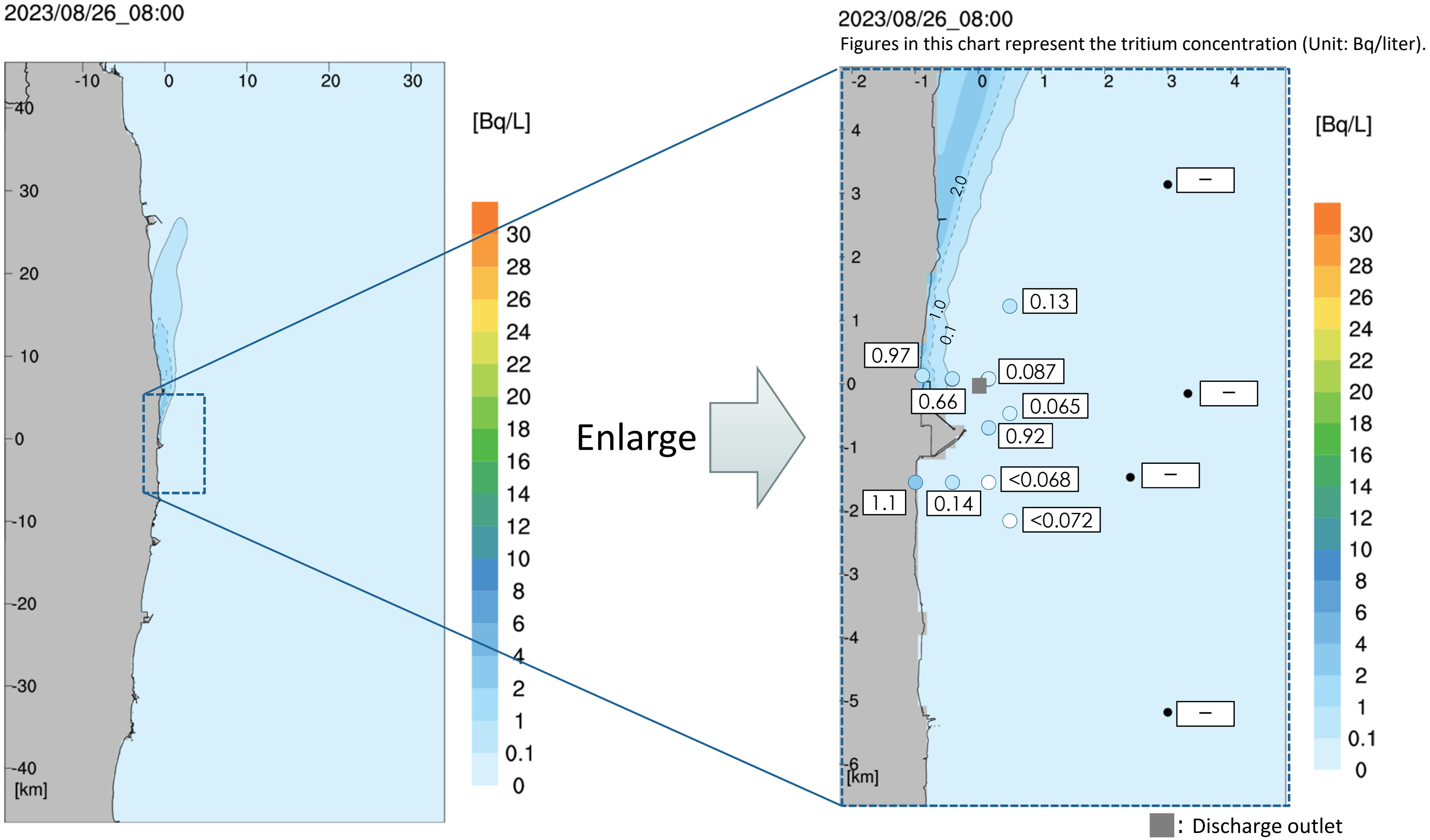


August 24, 4 PM dispersion calculation results (ocean surface concentration distribution map) and monitoring results comparison
○ indicates monitoring result concentrations, white circles indicate ND. ● indicate that no monitoring took place during this timeframe

2-5-2. Comparison of dispersion calculation results and monitoring results (August 26, 8 AM)

TEPCO

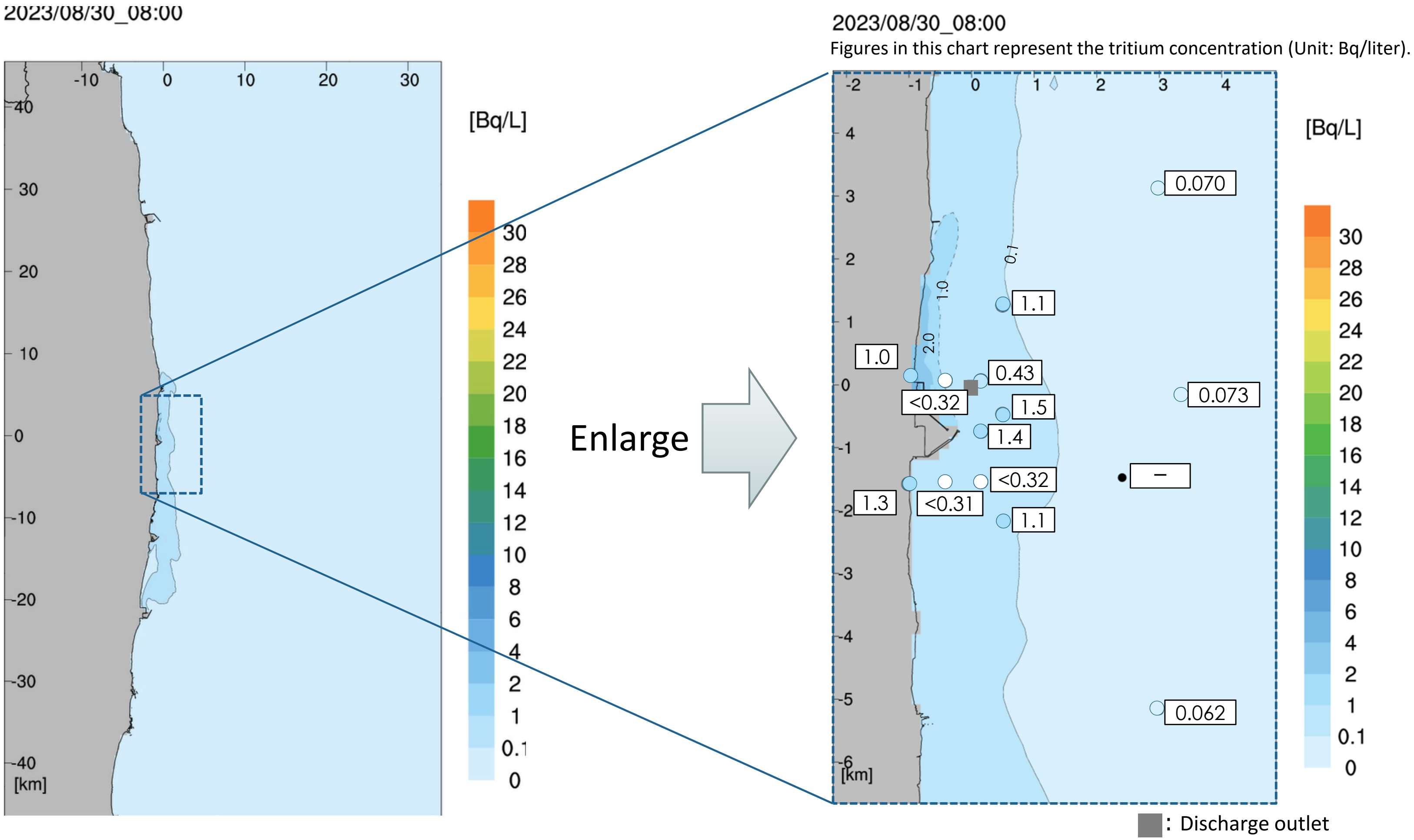
- The following figures show the dispersion simulation results for 8AM on August 26 and the sea area monitoring results for the same timeframe.
- The simulation results show that ocean current is in the northerly direction and tritium tend to disperse to northward. This trend is generally consistent with monitoring results.



August 26, 8 AM dispersion calculation results (ocean surface concentration distribution map) and monitoring results comparison
○ indicates monitoring result concentrations, white circles indicate ND. ● indicate that no monitoring took place during this timeframe

2-5-2. Comparison of dispersion calculation results and monitoring results (August 30, 8 AM)

- The following figures show the dispersion simulation results for 8AM on August 30 and the sea area monitoring results for the same timeframe.
- The simulation results show that ocean currents are slow in the north-south direction, so the scope of dispersion extends to the north-south. This trend is generally consistent with monitoring results.

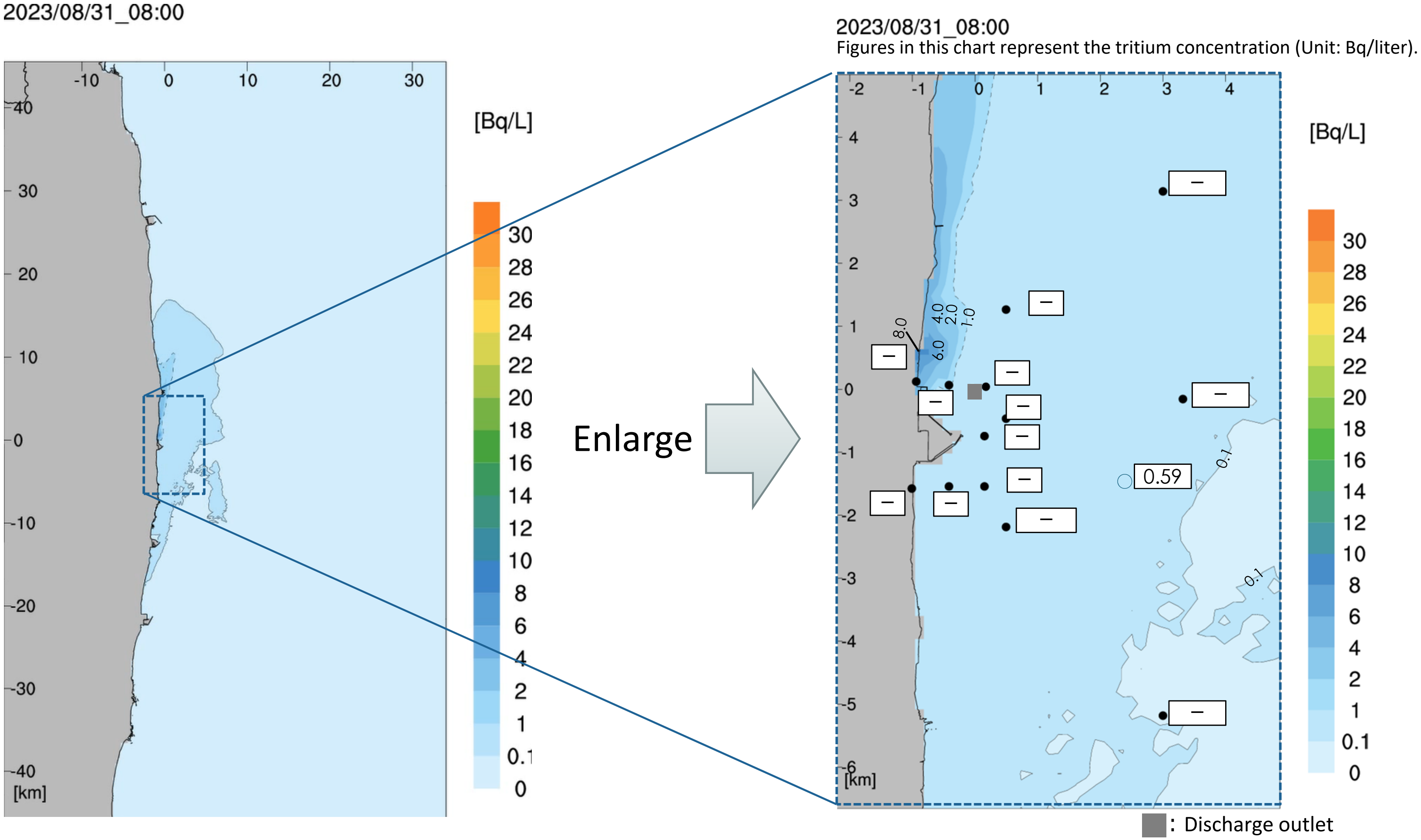


August 30, 8 AM dispersion calculation results (ocean surface concentration distribution map) and monitoring results comparison
○ indicates monitoring result concentrations, white circles indicate ND. ● indicate that no monitoring took place during this timeframe

2-5-2. Comparison of dispersion calculation results and monitoring results (August 31, 8 AM)

TEPCO

- The following figures show the dispersion simulation results for 8AM on August 31 and the sea area monitoring results for the same timeframe.
- The simulation results show that ocean currents are slow in the north-south direction, so the scope of dispersion extends in the direction of the coast. This trend is generally consistent with monitoring results.

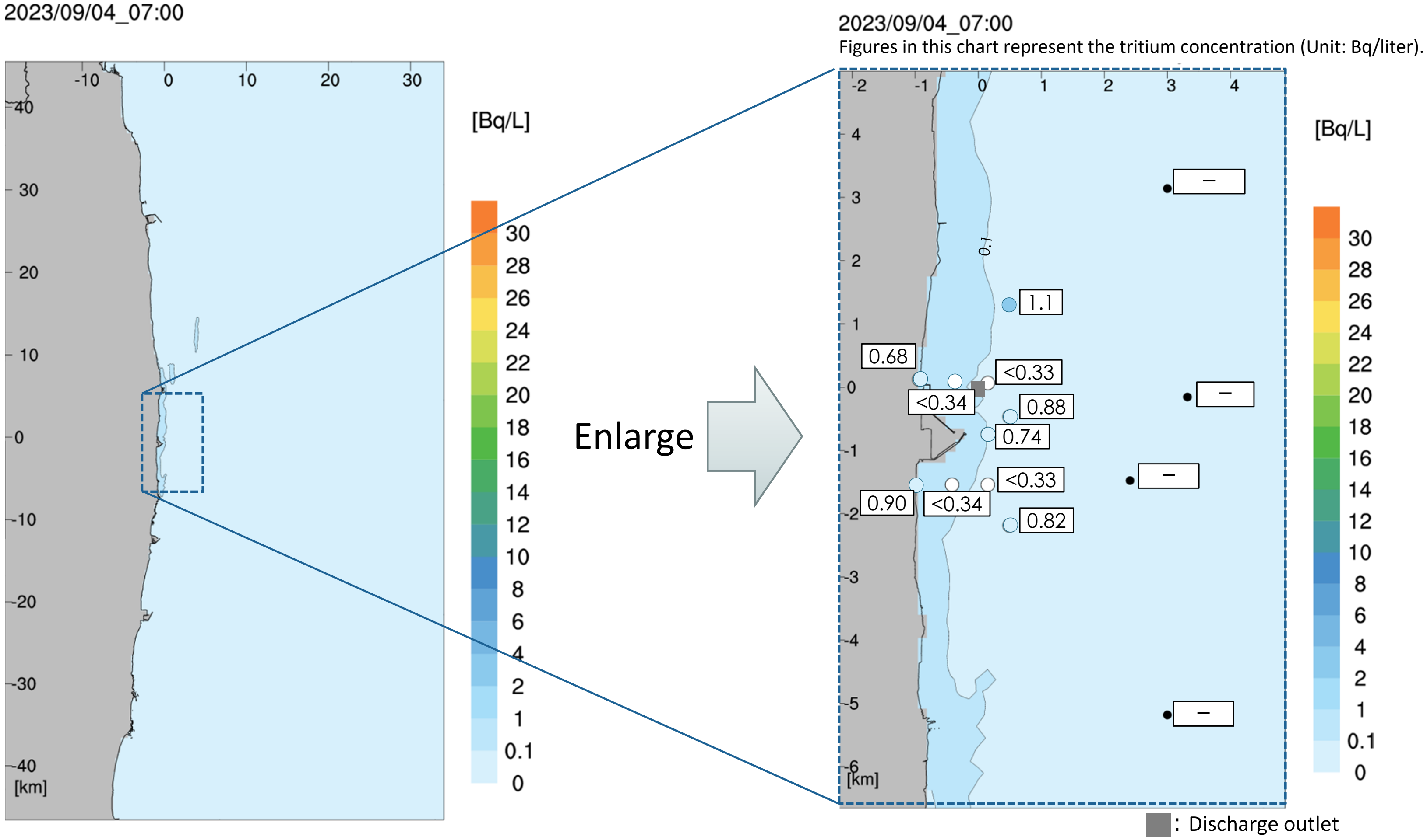


August 31, 8 AM dispersion calculation results (ocean surface concentration distribution map) and monitoring results comparison
○ indicates monitoring result concentrations, white circles indicate ND. ● indicate that no monitoring took place during this timeframe

2-5-2. Comparison of dispersion calculation results and monitoring results (September 4, 7 AM)

TEPCO

- The following figures show the dispersion simulation results for 7AM on September 4 and the sea area monitoring results for the same timeframe.
- The simulation results show that ocean currents are slow in the north-south direction, so the scope of dispersion extends to the north-south. This trend is generally consistent with monitoring results.

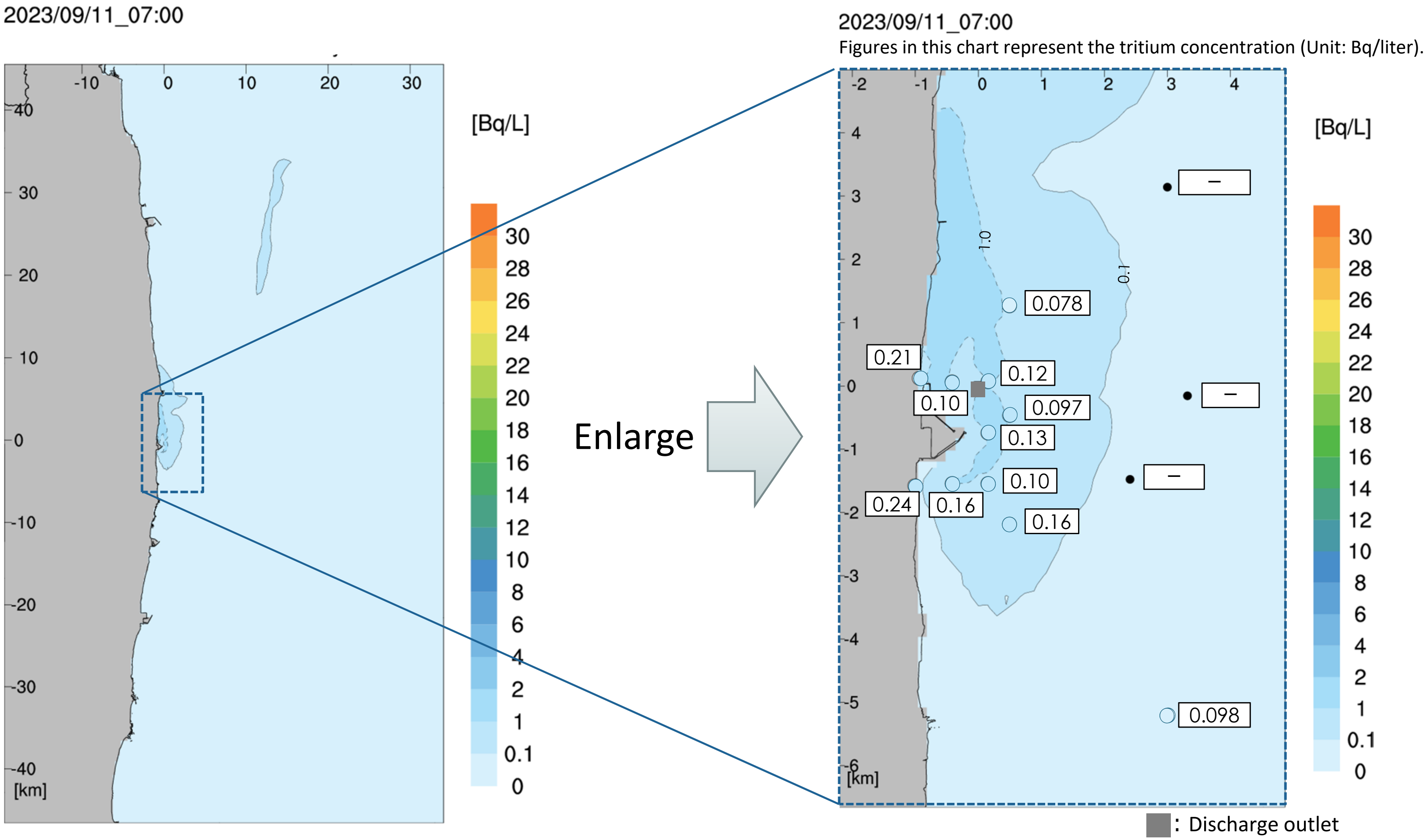


September 4, 7 AM dispersion calculation results (ocean surface concentration distribution map) and monitoring results comparison
○ indicates monitoring result concentrations, white circles indicate ND. ● indicate that no monitoring took place during this timeframe

2-5-2. Comparison of dispersion calculation results and monitoring results (September 11, 7 AM)

TEPCO

- The following figures show the dispersion simulation results for 7AM on September 11 and the sea area monitoring results for the same timeframe.
- The simulation results show that ocean currents are slow in the north-south direction, so the scope of dispersion extends to the north-south. This trend is generally consistent with monitoring results.



September 11, 7 AM dispersion calculation results (ocean surface concentration distribution map) and monitoring results comparison

○ indicates monitoring result concentrations, white circles indicate ND. ● indicate that no monitoring took place during this timeframe

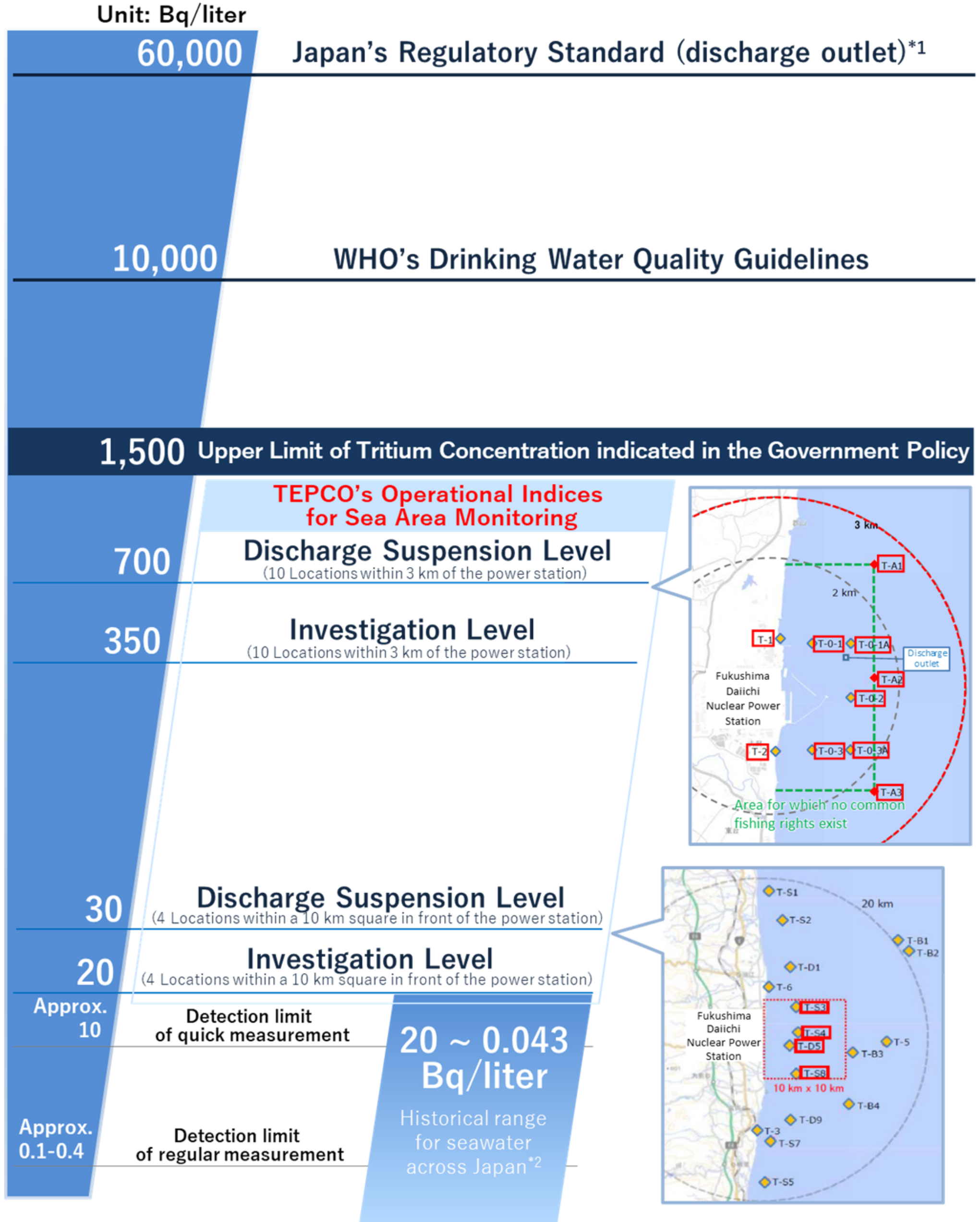
2-6. Conclusion

- A comparison of the results from sea area monitoring during the first discharge period with dispersion simulation results based on actual meteorological/marine meteorological data during the same period was performed.
- Sea area monitoring results from the 14 locations have also shown that tritium is dispersing.
- The trends shown by dispersion simulation and sea area monitoring result from the 14 locations are generally consistent.
- We will continue to compare and verify monitoring results and dispersion simulation results for the second and third discharges

[Reference] Comparison of tritium concentration in seawater

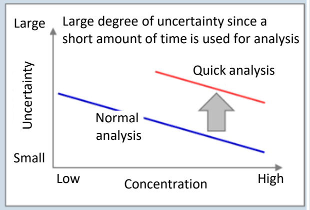
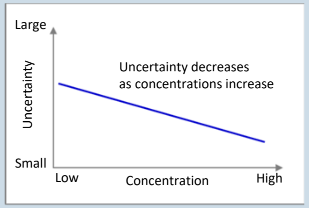
- Tritium concentrations measured during sea area monitoring after the commencement of discharge are within the range of fluctuation identified through past seawater monitoring performed throughout the entirety of Japan.

[Reference] Comparison of concentration of tritium in seawater



*1: This standard has been stipulated based on the calculation that if a person were to drink approximately 2L of the water coming out of the discharge outlet of a nuclear facility every day for one year, his/her exposure would be 1mSv.
*2: Source: Environmental Radioactivity and Radiation in Japan (Period: April 2019 to March 2022)

[Reference] TEPCO's definition of tritium analysis

		TEPCO quick analysis※1	TEPCO normal analysis		[Reference] Investigative research
Tritium concentration (Bq/L)	60,000 / 10,000	700 / 350 / 10	5 / 0.4 / 0.1		0.01
Objective		To quickly ascertain if ALPS treated water dilution/discharge facility and related facilities are operating as designed, and that tritium is dispersing in the sea area as planned.	As with the comprehensive monitoring plan, target sensitivity is set, and normal monitoring is implemented in order to monitor changes in tritium concentrations based on that sensitivity level.		To obtain highly precise and accurate tritium concentrations to enable investigative research agencies to ascertain world-scale distribution conditions and ascertain/assess minuscule changes over time. *TEPCO has no plans to implement this
Characteristics		Detection limits are higher and uncertainty is greater compared to normal analysis 	Uncertainty increases as concentrations decrease 		Advanced technology and several weeks~several months of analysis time utilized to reduce uncertainty as much as possible
Time until results are obtained		Next day	Approximately one week	Approximately one month	More than five months
Pretreatment/ measurement method		Distillation/LSC※2	Distillation/LSC	Electrolytic concentration/LSC	Noble gas mass spectrometry, etc.
Examples	Sample	Seawater: T-0-1A	Seawater: T-0-1A	Seawater: T-0-1A	Trial water※4
	Sampling date	2023/10/16	2023/10/16	2023/9/11	—
	Analysis value	1.6E+01 Bq/liter	1.4E+01 Bq/liter	1.2E-01 Bq/liter	2.4E-02 Bq/liter (0.2 TU)
	Detection limit	7.7E+00 Bq/liter	3.4E-01 Bq/liter	6.8E-02 Bq/liter	—
	Uncertainty※3	± 6.5E+00 Bq/liter	± 1.1E+00 Bq/liter	± 5.4E-02 Bq/liter	approximately ± 5 %

※1 Quick analysis: measurements obtained result quickly ※2 LSC：Liquid scintillation counter
※3 "Uncertainty" refers to the precision of analysis data. "Uncertainty" is calculated using "Expanded uncertainty: Coverage factor k=2"
※4 Source document: Development of the ^{3}He mass spectrometric low-level tritium analytical facility at the IAEA Journal of Analytical Atomic Spectrometry 2022

1. Monitoring history regarding discharge

2. Sea area dispersion simulation

3. Facility inspections after the completion of the 3rd discharge

4. Transfer of ALPS treated water preparation for the 4th discharge

5. Transfer of ALPS treated water preparation for the 5th and 6th discharges

6. Changes to future discharge method

7. Countermeasures to prevent marine life from adhering to dilution/discharge facility

8. Miscellaneous

3. Facility inspection after the completion of the 3rd discharge

TEPCO

- After the completion of the 3rd discharge of ALPS treated water, we have performed inspections as follows and confirmed that there are no abnormalities.

Facility name	Patrol inspection details	Inspection after the 3rd discharge	Results
Measurement/ confirmation facility	**External inspection (measurement/confirmation tanks)** - Visual check for abnormalities	**Inspection implemented in accordance with the long-term inspection plan (agitators/MO valves)** - Insulation resistance measurement, Check for leakage thorough the valve seat **(ongoing)**	No abnormalities
Transfer facility	**External inspection (ALPS treated water transfer pumps/transfer pipes)** - Visual check for abnormalities, Check for abnormal sounds using tool	**External inspection (ALPS treated water transfer pumps/transfer pipes)** - Visual check for abnormalities **(ongoing)** **Others** - Strainer cleaning, Check for leakage through MO valve seat **(ongoing)**	No abnormalities
Dilution facility	**External inspection (seawater transfer pipes/seawater pipe header)** - 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)** - Visual check for abnormalities **(ongoing)** **External inspection (discharge vertical shaft (upper-stream storage))** - Draining of the storage, follow-up observation and repair※ **Others** - Replacement of seawater transfer pumps gland packings, Flow meter inspection	No abnormalities
Discharge facility	**External inspection (discharge vertical shaft (down-stream storage))** - Visual check for abnormalities (Submerged areas, such as the discharge tunnel, etc., will be inspected at a different time)		No abnormalities
Seawater intake facility	**External inspection (partitioning weirs)** - Visual check for abnormalities		No abnormalities

※：Refer to the following pages for details

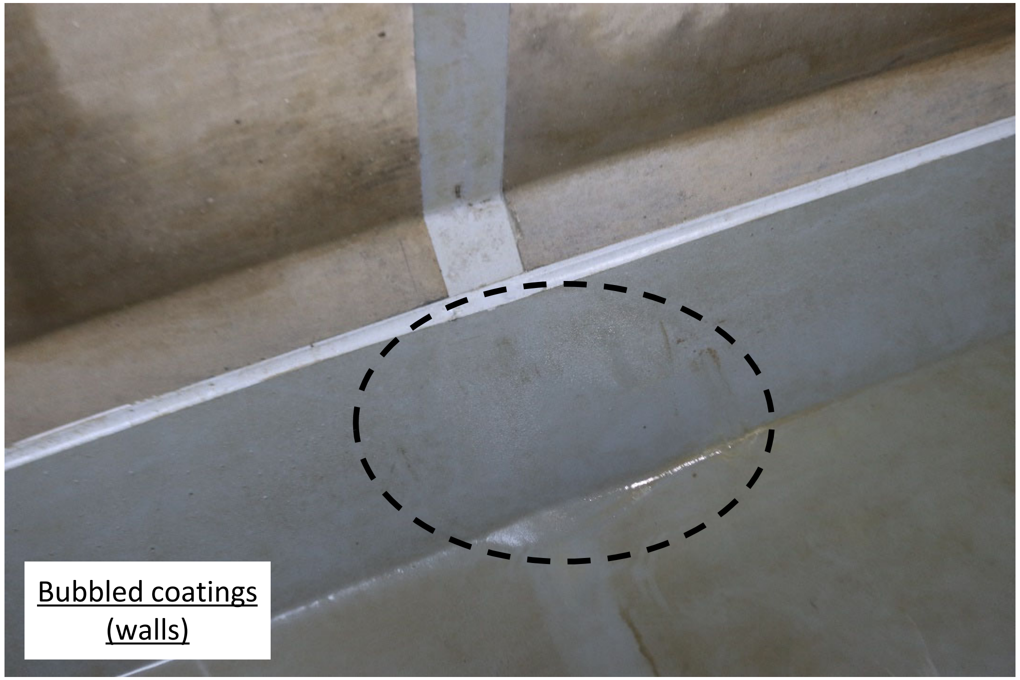
3-1. Dilution facility inspection (Discharge vertical shaft (upper-stream storage)) (1)

TEPCO

- Upper-stream storage internal inspection results are as follows:
  - Structures have been confirmed to be sound.
  - **<u>There is no crack in the waterproof coating and the storage remains waterproof.</u>**
  - Bubbled Coatings (width: more than 10 cm): A total of 24 locations were found (13 bubbles on the bottom, 11 on the walls. After the 2nd discharge, a total of 6 locations were found, 5 on the bottom, and 1 on the wall).
  - The amount of sediment did not hinder the inspection
  - Marine life: Only small barnacles were found adhered to the structure

Inside of upper-stream storage

Bubbled coatings (bottom)



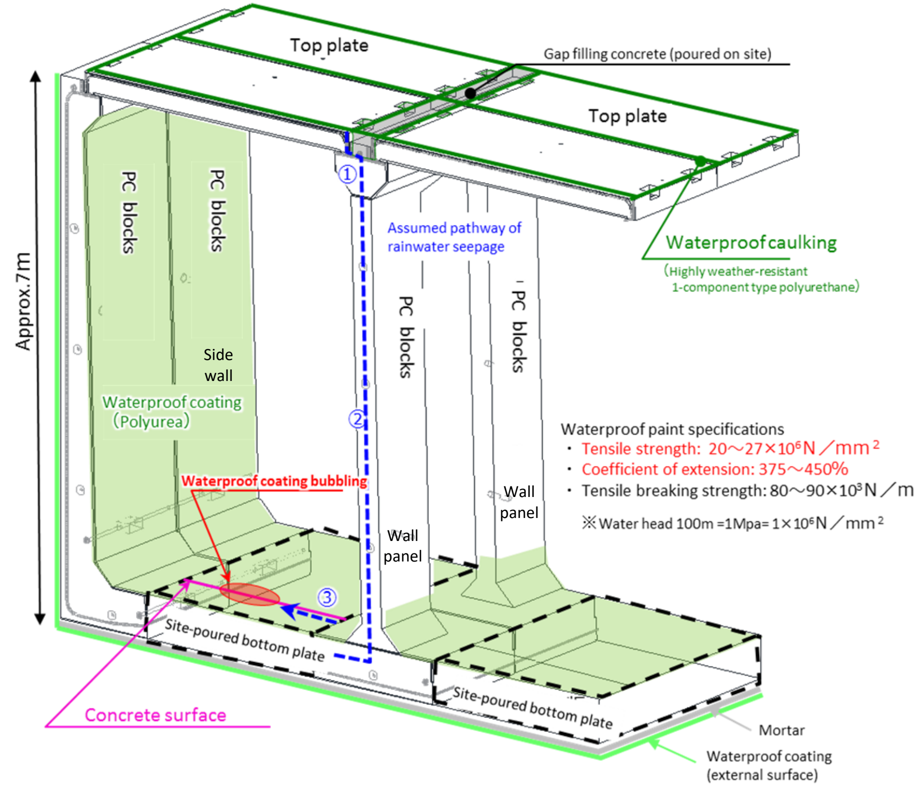
Bubbled coatings (walls)

3-1. Dilution facility inspection
(Discharge vertical shaft (upper-stream storage)) (2)

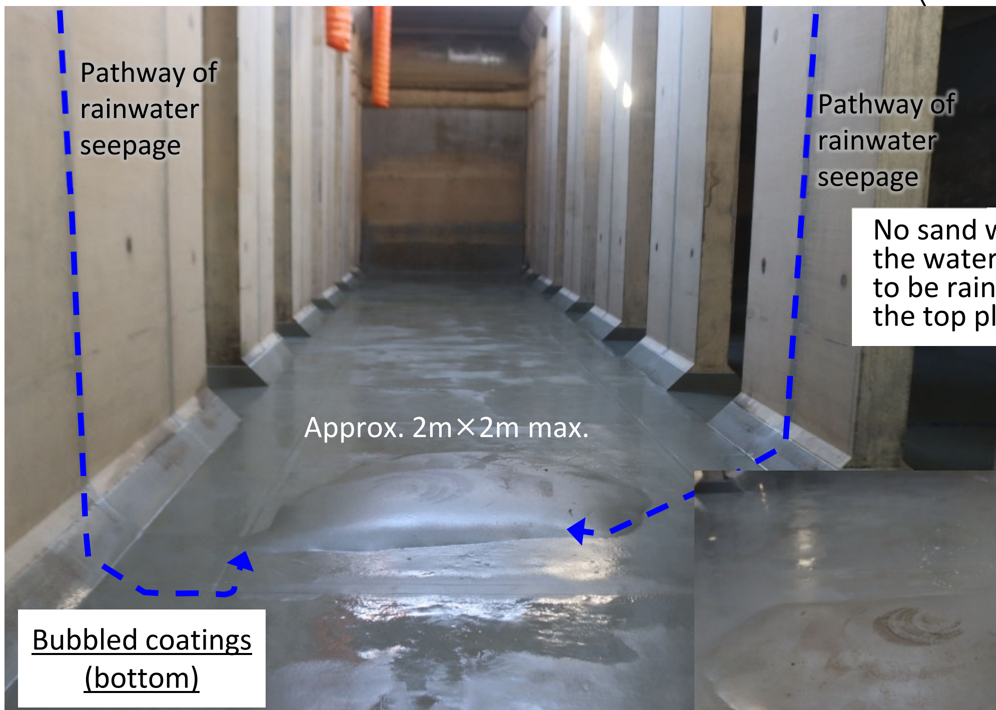
TEPCO

- Prior to repairing the waterproof coating on the inside of the upper-stream storage, an investigation into the cause of the bubbled coatings was conducted and the results are as follows:
  - **<u>By cutting into the caulking in between the wall panel joints allowing rainwater to drain, we observed that this affected the bubbled coatings.</u>**
  - The bubbles were cut out and the rainwater caught underneath the waterproof coatings was drained.
  - Since the bubbled coatings have been eliminated through these measures, we have determined that the cause of the bubbled coatings was as expected (rainwater seeped in through the top plate and found its way to the bottom).

Draining water from the wall panel joints



Coating bubbling mechanism (Concept diagram)



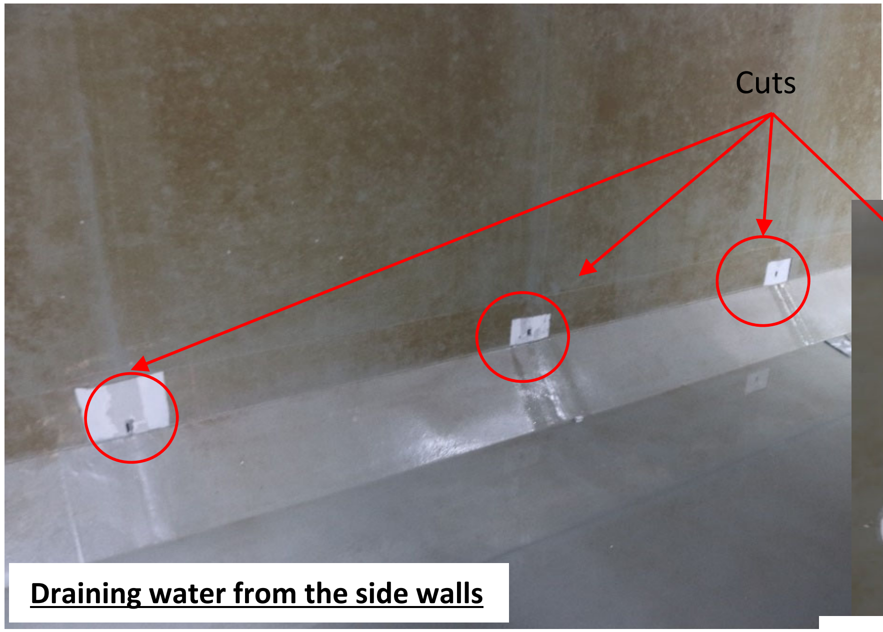
Bubbled coatings (bottom)

Draining water at the bottom

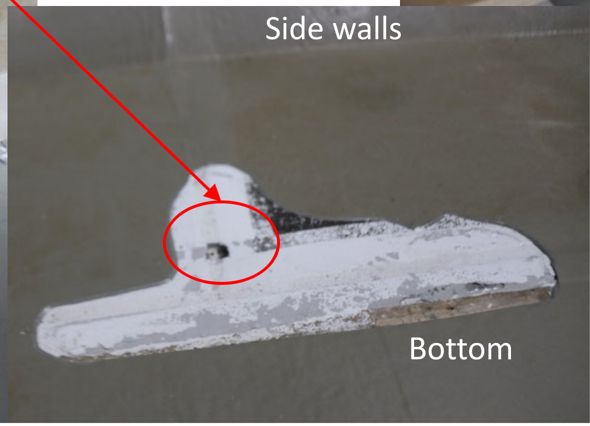
3-2. Dilution facility (discharge vertical shaft (upper-stream storage)) repairs

- To address the seepage of rainwater in through the top plate, which is the cause of the bubbled coatings, we are applying additional waterproof coating to the top plate and establishing a safety path to limit walking route on the top plate.
- To address the bubbled waterproof coatings inside the storage, the following repairs are being implemented in order to engage in preventative maintenance.
- After repairs have been completed, the pressure resistance and leak tests inside the storage will be implemented.

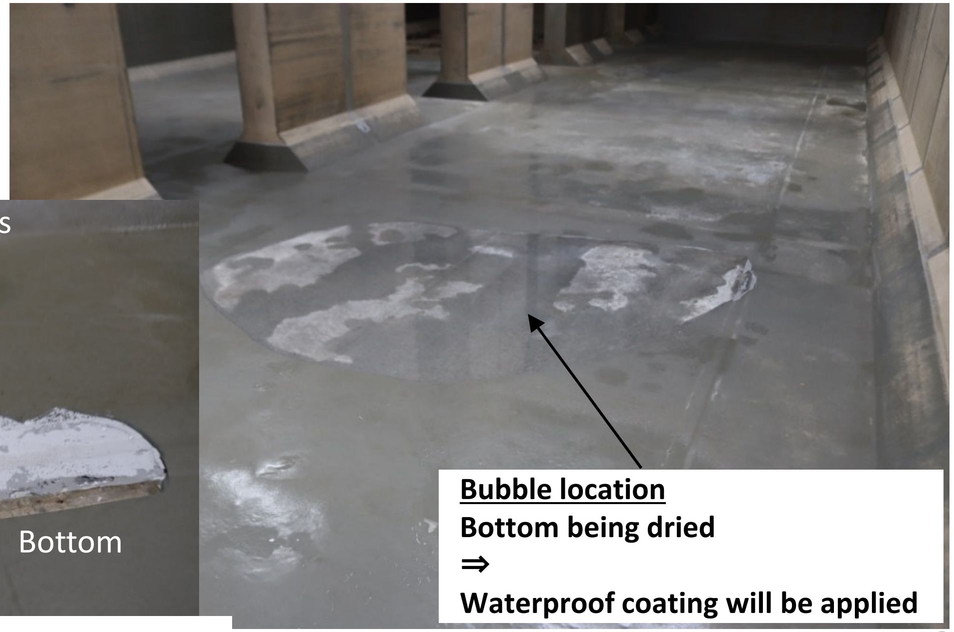
Locations to be repaired	Repair method
Top plate	①Waterproof coating (polyurethane) will be applied to the entire top plate and a safety path will be established to limit walking route
Bubbled waterproof coatings over 10cm in width	①Cut the bubbles to drain the rainwater underneath the waterproof coating that caused the bubbles ②Install a temporary weir around the cut area, treat the surface and apply waterproof coating(Polyurea)
Wall panel joints	①Cut through the caulking between joints where rainwater is expected to accumulate to drain rainwater ②Caulk the cut area after the drainage is completed (Highly weather resistant one-component polyurethane)



Draining water from the side walls



Draining water from the side walls - bottom (boundary)



Bubble location
Bottom being dried
⇒
Waterproof coating will be applied

TEPCO

1. Monitoring history regarding discharge

2. Sea area dispersion simulation

3. Facility inspections after the completion of the 3rd discharge

4. Transfer of ALPS treated water preparation for the 4th discharge

5. Transfer of ALPS treated water preparation for the 5th and 6th discharges

6. Changes to future discharge method

7. Countermeasures to prevent marine life from adhering to dilution/discharge facility

8. Miscellaneous

4. Transfer of ALPS treated water preparation for the 4th discharge

TEPCO

- Transfer from the K4 area group E and K3 area group A to the measurement/confirmation facility group B was completed on December 11 in preparation for the 4th discharge.
- Agitation/circulation commenced on December 15 and samples will be taken on December 22.
- The 4th discharge will commence in late February 2024.

1st discharge	Measurement/confirmation facility (K4 area) Group B:	Approx. 7,800m³	Secondary treatment: No Tritium concentration: 140,000Bq/liter Total amount of tritium: 1.1 trillion Bq	Completed
2nd discharge	Measurement/confirmation facility (K4 area) Group C:	Approx. 7,800m³	Secondary treatment: No Tritium concentration: 140,000Bq/liter Total amount of tritium: 1.1 trillion Bq	Completed
3rd discharge	Measurement/confirmation facility (K4 area) Group A:	Approx. 7,800m³	Secondary treatment: No Tritium concentration: 130,000Bq/liter Total amount of tritium: 1.0 trillion Bq	Completed
4th 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. 4,500m³ Approx. 3,300m³	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

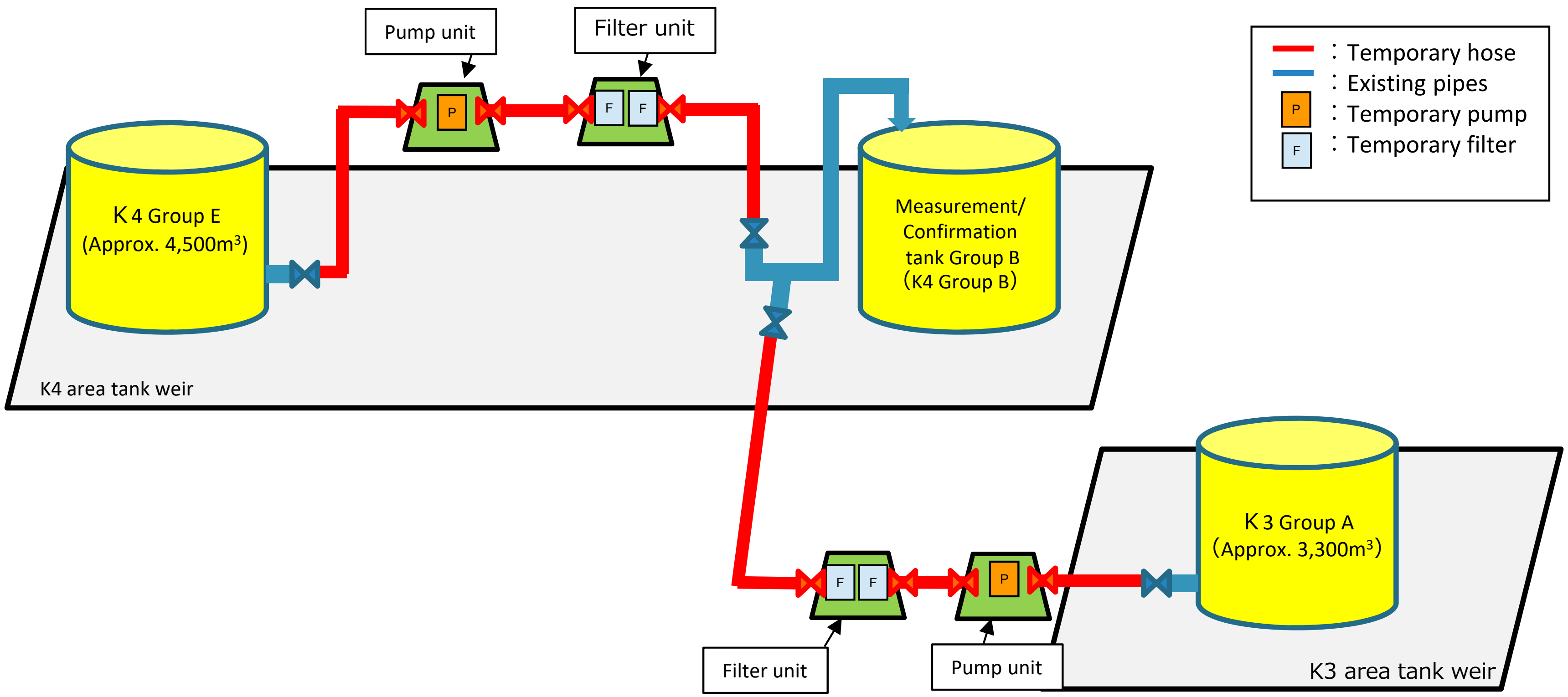
※1 Average value of the tank group that was assessed taking into account the radioactive decay until July 1, 2023

※2 Being transferred to K4 area tank group B that was empty after the 1st discharge was completed

[Reference] Water transfer to measurement/confirmation facility in preparation for the 4th discharge

Partially revised material from the 119th Decommissioning and contaminated water measures team meetings/secretariat conferences

- In preparation for the 4th discharge of ALPS treated water into the sea, ALPS treated water were transferred from tank group E in K4 area and tank group A in K3 area to measurement/confirmation tank group B.
- To transfer the water, temporary equipment including hoses, pumps and filters will be installed as shown in the following diagram. This water transfer will be conducted upon implementing leak countermeasures, such as using dual-layered hoses, etc.



1. Monitoring history regarding discharge

2. Sea area dispersion simulation

3. Facility inspections after the completion of the 3rd discharge

4. Transfer of ALPS treated water preparation for the 4th discharge

5. Transfer of ALPS treated water preparation for the 5th and 6th discharges

6. Changes to future discharge method

7. Countermeasures to prevent marine life from adhering to dilution/discharge facility

8. Miscellaneous

5. Transfer of ALPS treated water preparation for the 5th and 6th discharges

TEPCO

- For the 5th and 6th discharges, which will be implemented during FY2024, the water will be transferred from the K 3-A/B groups, J 4-L group, and J 9-A/B groups to measurement/confirmation facility group C and group A.
- Transfer of the water preparation for the 5th and 6th discharges will commence in January and March 2024, respectively.
- The discharge plan for all of FY2024 will be announced as soon as it has been compiled.

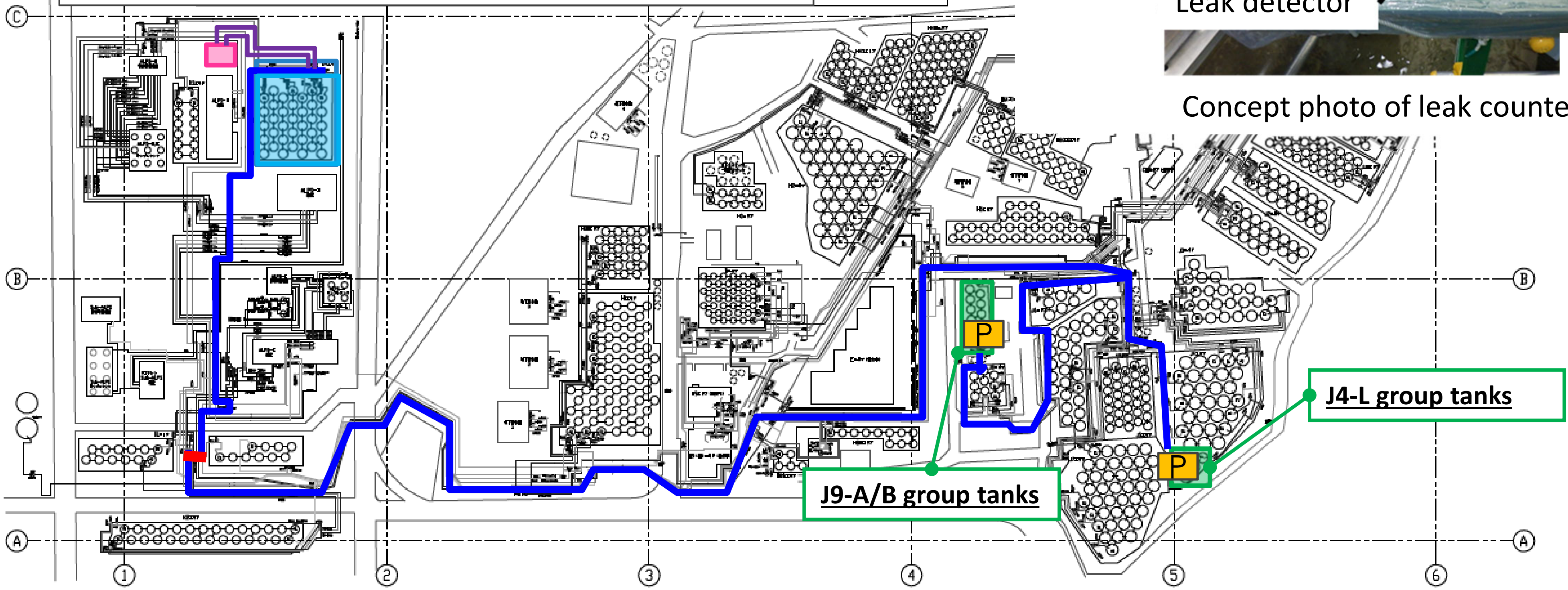
5th discharge	K3 area Group A/B (Transferred to Measurement/confirmation facility group C ※2):	Approx. 4,500m^3	Secondary treatment: No Tritium concentration: 180,000～200,000Bq/liter ※1 Total amount of tritium: 1.5 trillion Bq ※1
	J4 area Group L (Transferred to Measurement/confirmation facility group C ※2):	Approx. 3,300m^3	
6th discharge	J4 area Group L (Transferred to Measurement/confirmation facility group A ※2):	Approx. 2,200m^3	Secondary treatment: No Tritium concentration: 170,000～190,000Bq/liter ※1 Total amount of tritium: 1.4 trillion Bq ※1
	J9 area Group A/B (Transferred to Measurement/confirmation facility group A ※2):	Approx. 5,600m^3	

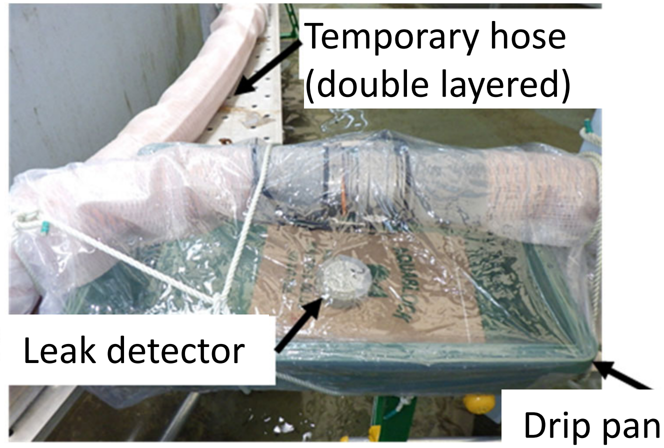
※1 Average value of the tank group that was assessed taking into account the radioactive decay until July 1, 2023

[Reference] Diagram of water transfer for the 5th and 6th discharges

TEPCO

- Existing pipes and temporary equipment (pipes/hoses/filters/pumps) shall be used to transfer water from the source tanks to the measurement/confirmation facility.
- Double layered temporary hoses shall be used and the water shall be transferred after implementing leak countermeasures, such as placing drip pans underneath equipment connections and installing leak detectors.





Concept photo of leak countermeasures

1. Monitoring history regarding discharge

2. Sea area dispersion simulation

3. Facility inspections after the completion of the 3rd discharge

4. Transfer of ALPS treated water preparation for the 4th discharge

5. Transfer of ALPS treated water preparation for the 5th and 6th discharges

6. Changes to future discharge method

7. Countermeasures to prevent marine life from adhering to dilution/discharge facility

8. Miscellaneous

6. Changes to future discharge method

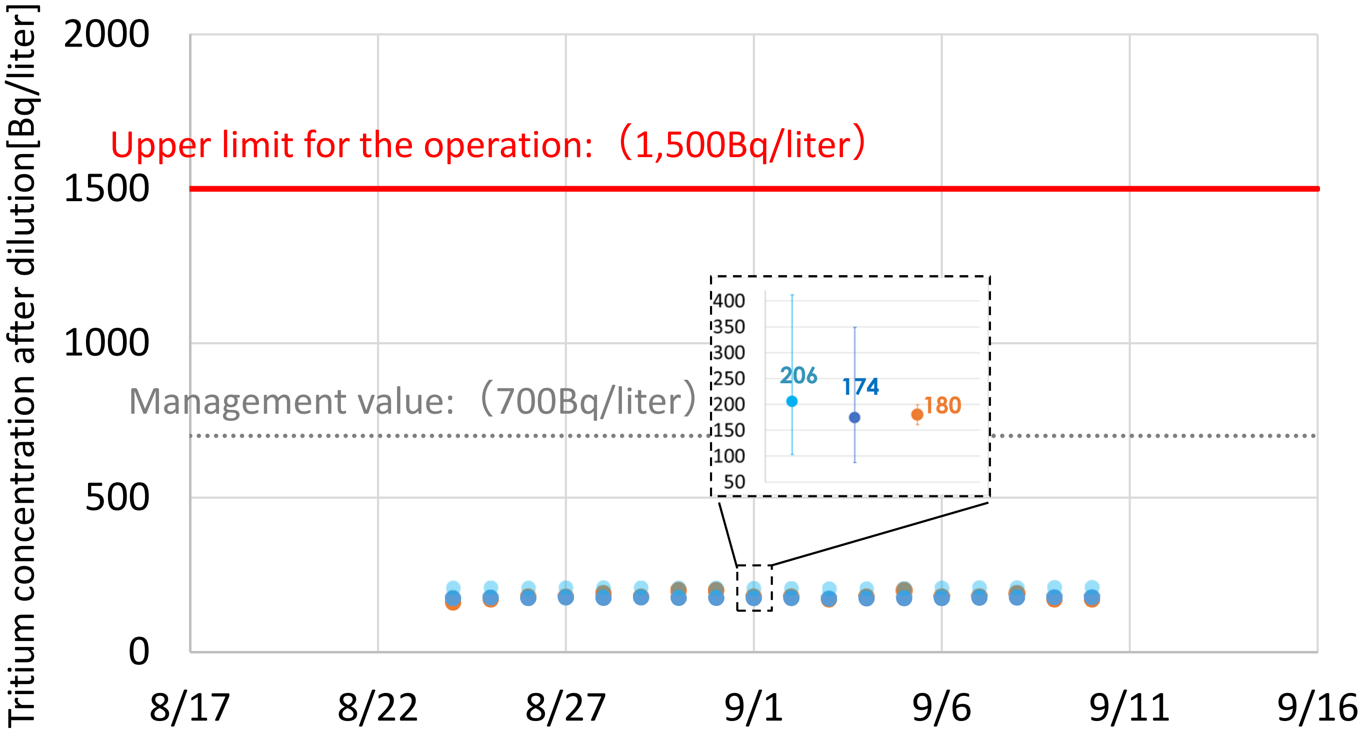
TEPCO

- Since the opinion has been voiced that relying on **only calculations obtained from pre-dilution concentration levels and flow rate to determine the tritium concentration after dilution** when discharging ALPS treated water into the sea leaves cause for concern, prior to discharge, the water is kept in the upper-stream storage where tritium concentrations are measured (First Stage). We have confirmed that the dilution ratio is as designed during the three discharges that have been completed to date.
- Furthermore, during continuous discharge, in addition to calculated values, water is sampled daily from the seawater pipe in order to measure tritium concentration. These "tritium concentration after dilution" are disclosed to the following day (Second Stage). During the three discharges that have been completed to date, we have confirmed that **there is no significant difference between the calculated values and measured values, and that the dilution ratio is as designed** (refer to slides 51 - 53 for details)
- Since records for the first three discharges have confirmed that the dilution ratio at the seawater pipe header is as designed, and that there is no significant difference between calculated values of tritium concentrations after dilution and measured values, we have determined that the objective of this discharge in two stages has been achieved.
- Therefore, we will temporarily cease this discharge in two stages that has been conducted for the first three discharges. Considering the simplified inspection period of seawater transfer pumps, from the 4th discharge onward, we will conduct First Stage once a year in order to confirm that there has been no change to the status of current facilities which enable smooth discharge.

6-1. Tritium concentrations after dilution during the 1st discharge

- During the discharge period, water was sampled daily from the seawater pipe to analyze tritium concentrations.

  ⇒Confirmed to be less than the upper limit for the operation: 1,500Bq/liter



Tritium concentrations after dilution （calculated values and analysis values）

- Calculated values (control value)※1,2
- Calculated values (nominal value)※1,3
- Analysis values (detected values)
- Analysis values (below the detection limit)

※1： Calculated using the following formula
※2：Calculated by considering maintainability of each parameters
※3：Calculated by considering maintainability of each parameters

Tritium concentrations after dilution (Calculated values)

$$= \frac{\text{Tritium concentrations in ALPS treated water}^{※4} \times \text{ALPS treated water transfer flow}}{\text{Seawater transfer flow} + \text{ALPS treated water transfer flow}}$$

※4：Analysis values at measurement/confirmation tanks

	8/24	8/25～9/10
Calculated value: Time of data acquisition	16:00	7:00
Analysis value: Time of specimen sampling	15:22	7:00～10:00

<Analysis values and calculated values in First Stage of discharging small amounts>

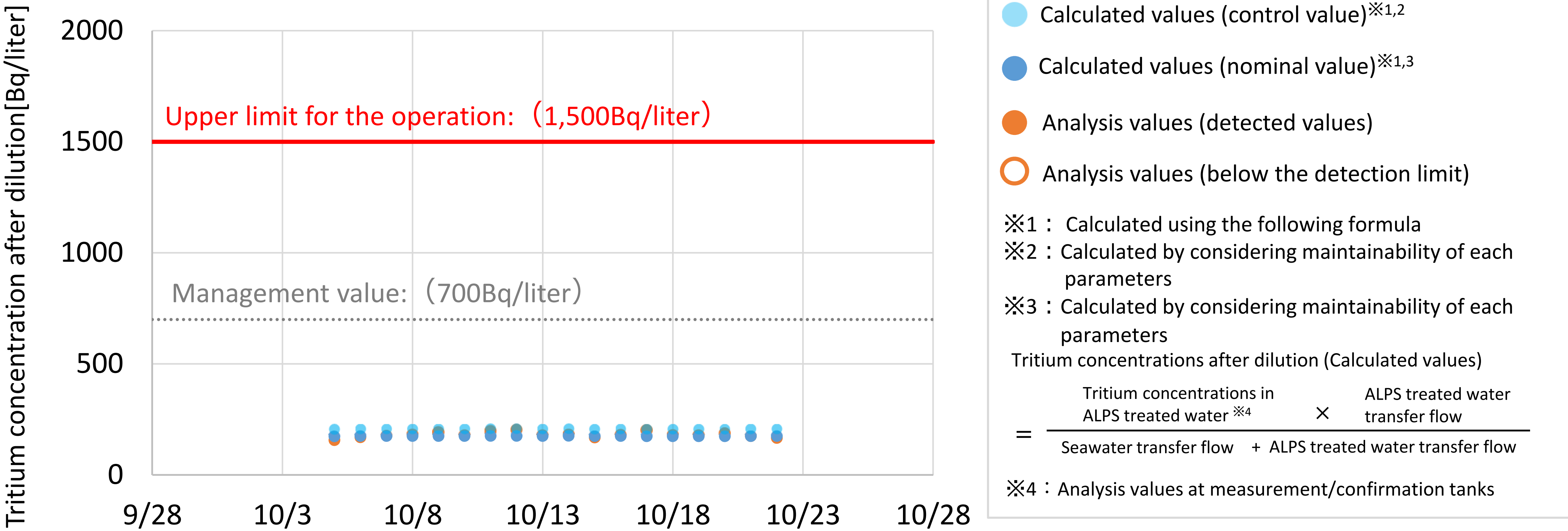
Tritium concentration of water in discharge vertical shaft (upper-stream storage)	
Analysis values	43 ～ 63 Bq/L (Sampled on August 22)
Calculated values	53 ～ 210 Bq/L (Considering the uncertainty in dilution ratio)

6-2. Tritium concentrations after dilution during the 2nd discharge

TEPCO

- During the discharge period, water was sampled daily from the seawater pipe to analyze tritium concentrations.

  ⇒Confirmed to be less than the upper limit for the operation: 1,500Bq/liter



※1: Calculated using the following formula

※2: Calculated by considering maintainability of each parameters

※3: Calculated by considering maintainability of each parameters

Tritium concentrations after dilution (Calculated values)

$$= \frac{\text{Tritium concentrations in ALPS treated water}^{※4} \times \text{ALPS treated water transfer flow}}{\text{Seawater transfer flow} + \text{ALPS treated water transfer flow}}$$

※4: Analysis values at measurement/confirmation tanks

Tritium concentrations after dilution (calculated values and analysis values)

	10/5	10/6～10/22
Calculated value: Time of data acquisition	14:00	7:00
Analysis value: Time of specimen sampling	14:13	7:00～10:00

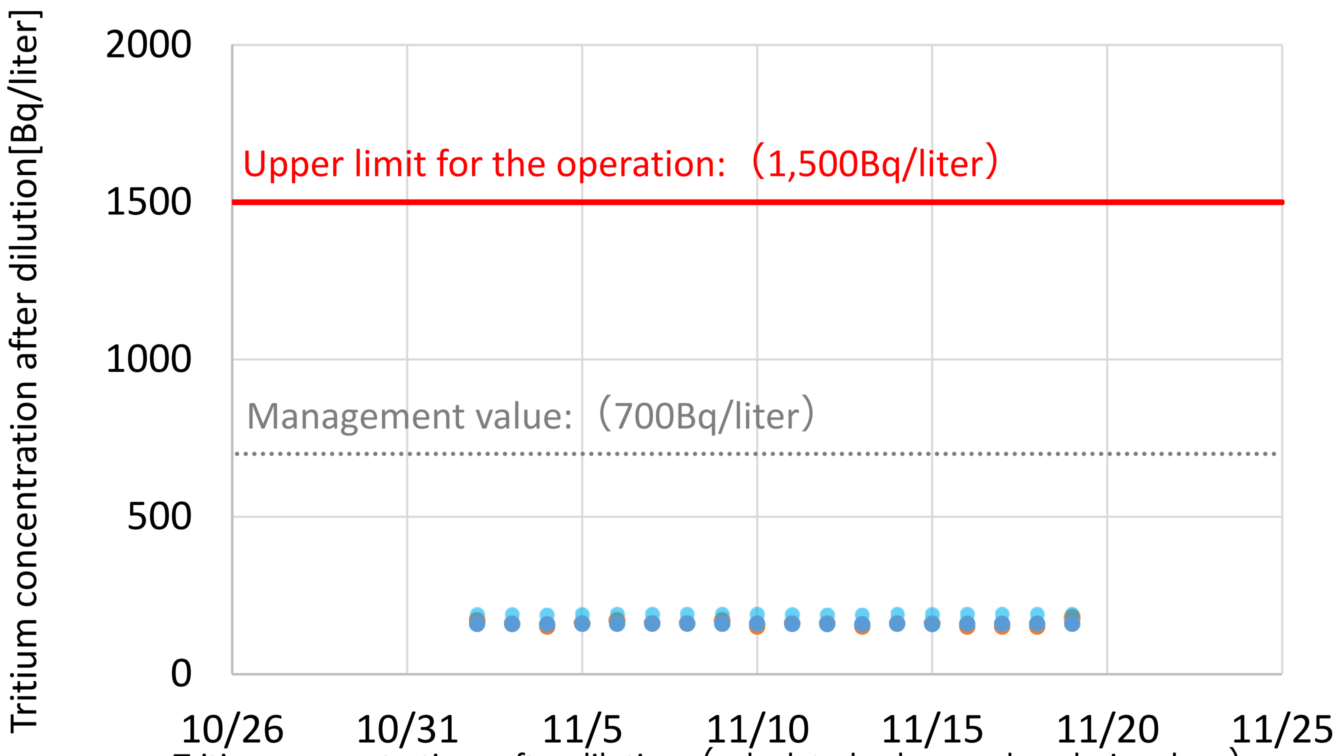
<Analysis values and calculated values in First Stage of discharging small amounts>

Tritium concentration of water in discharge vertical shaft (upper-stream storage)	
Analysis values	43 ～ 63 Bq/L (Sampled on October 3)
Calculated values	53 ～ 210 Bq/L (Considering the uncertainty in dilution ratio)

6-3. Tritium concentrations after dilution during the 3rd discharge

- During the discharge period, water was sampled daily from the seawater pipe to analyze tritium concentrations.

  ⇒Confirmed to be less than the upper limit for the operation: 1,500Bq/liter



Tritium concentrations after dilution （calculated values and analysis values）

- Calculated values (control value) ※1,2
- Calculated values (nominal value) ※1,3
- Analysis values (detected values)
- Analysis values (below the detection limit)

※1： Calculated using the following formula
※2：Calculated by considering maintainability of each parameters
※3：Calculated by considering maintainability of each parameters

Tritium concentrations after dilution (Calculated values)

$$= \frac{\text{Tritium concentrations in ALPS treated water}^{※4} \times \text{ALPS treated water transfer flow}}{\text{Seawater transfer flow} + \text{ALPS treated water transfer flow}}$$

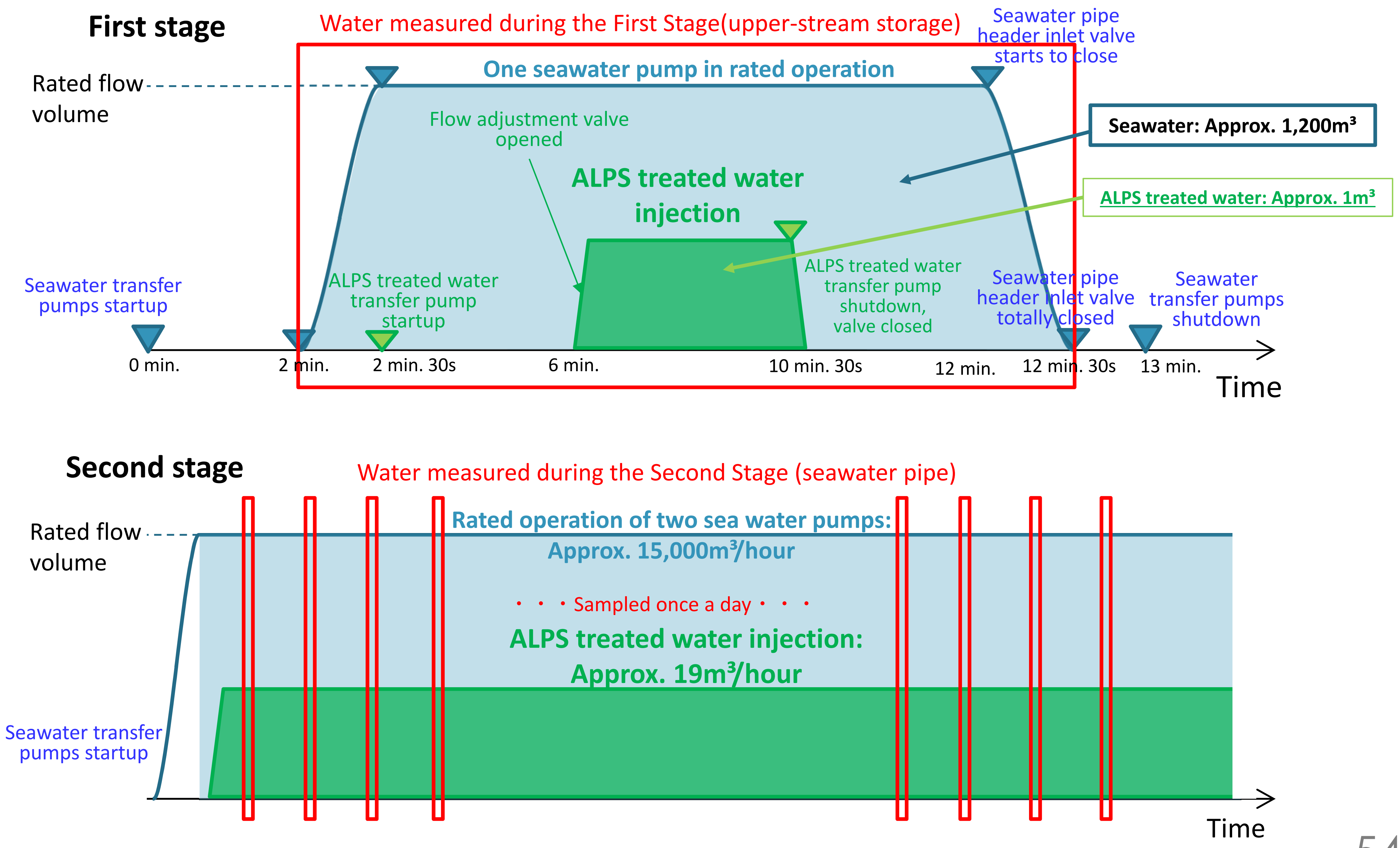
※4：Analysis values at measurement/confirmation tanks

	11/2	11/3～11/19
Calculated value: Time of data acquisition	14:00	7:00
Analysis value: Time of specimen sampling	14:13	7:00～10:00

<Analysis values and calculated values in First Stage of discharging small amounts>

Tritium concentration of water in discharge vertical shaft (upper-stream storage)	
Analysis values	55 ～ 77 Bq/L (Sampled on October 31)
Calculated values	49 ～ 194 Bq/L (Considering the uncertainty in dilution ratio)

[Reference] The difference between the First Stage and the Second Stage



1. Monitoring history regarding discharge

2. Sea area dispersion simulation

3. Facility inspections after the completion of the 3rd discharge

4. Transfer of ALPS treated water preparation for the 4th discharge

5. Transfer of ALPS treated water preparation for the 5th and 6th discharges

6. Changes to future discharge method

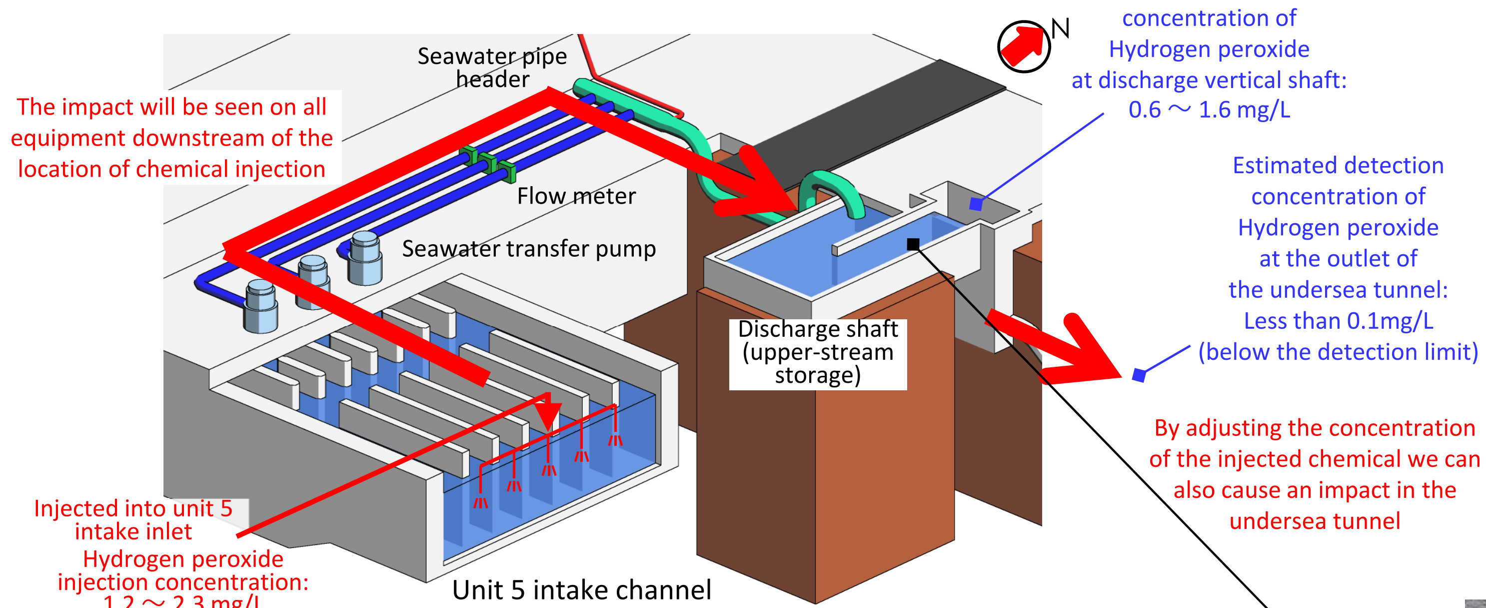
7. Countermeasures to prevent marine life from adhering to dilution/discharge facility

8. Miscellaneous

7-1. Facility overview

TEPCO

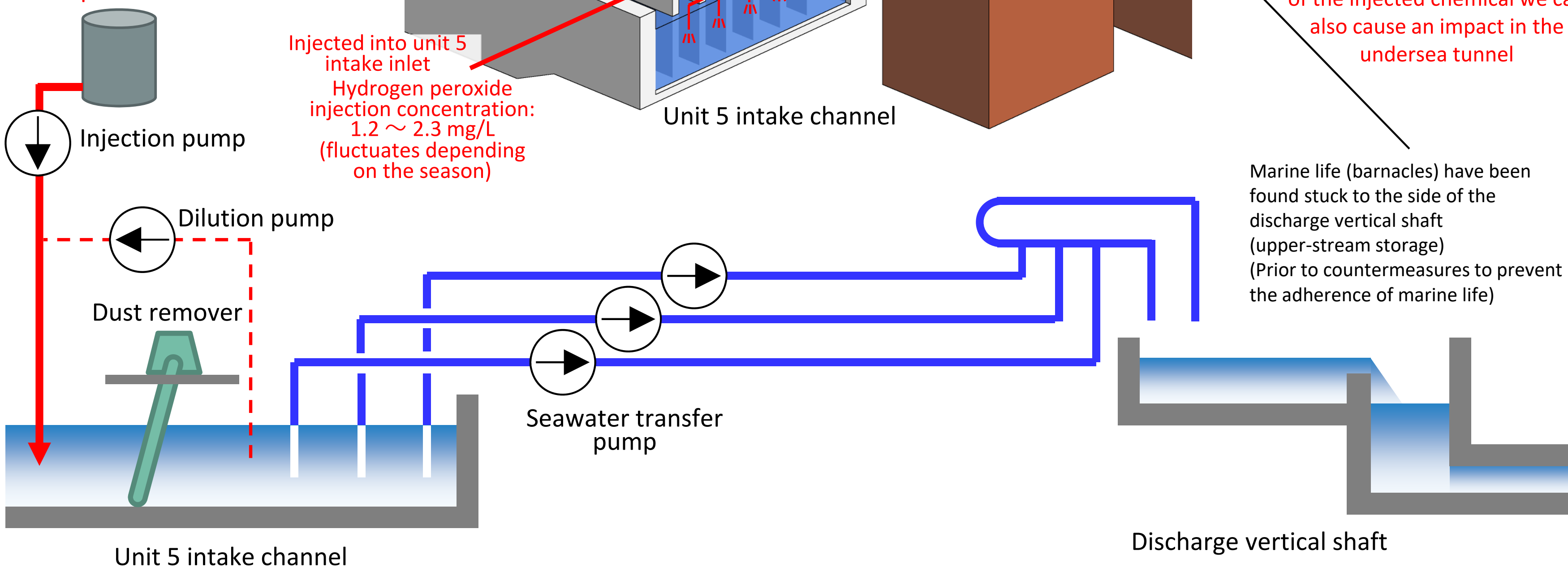
- Hydrogen peroxide※ (H_2O_2) will be injected into the unit 5 intake channel as a measure to prevent marine life from adhering to dilution/discharge facility.
- We expect that this will prevent marine life from adhering to the seawater transfer pumps, seawater transfer pipes, and discharge vertical shaft (upper-stream storage and down-stream storage) and the discharge tunnel, which are all downstream of the intake channel.



※Hydrogen peroxide
<Performance>
・At room temperature it is a colorless, slightly acidic liquid that is used as a disinfectant and a bleach. Doctors often use it as a disinfectant for external use.

・ Breaks down into water and oxygen as a result of the degrading enzymes (catalase) of microorganisms in the seawater

<History of use>
・ Prior to the the Great East Japan Earthquake, hydrogen peroxide had been used to prevent shellfish, etc. from adhering to the Unit 5 circulation pump

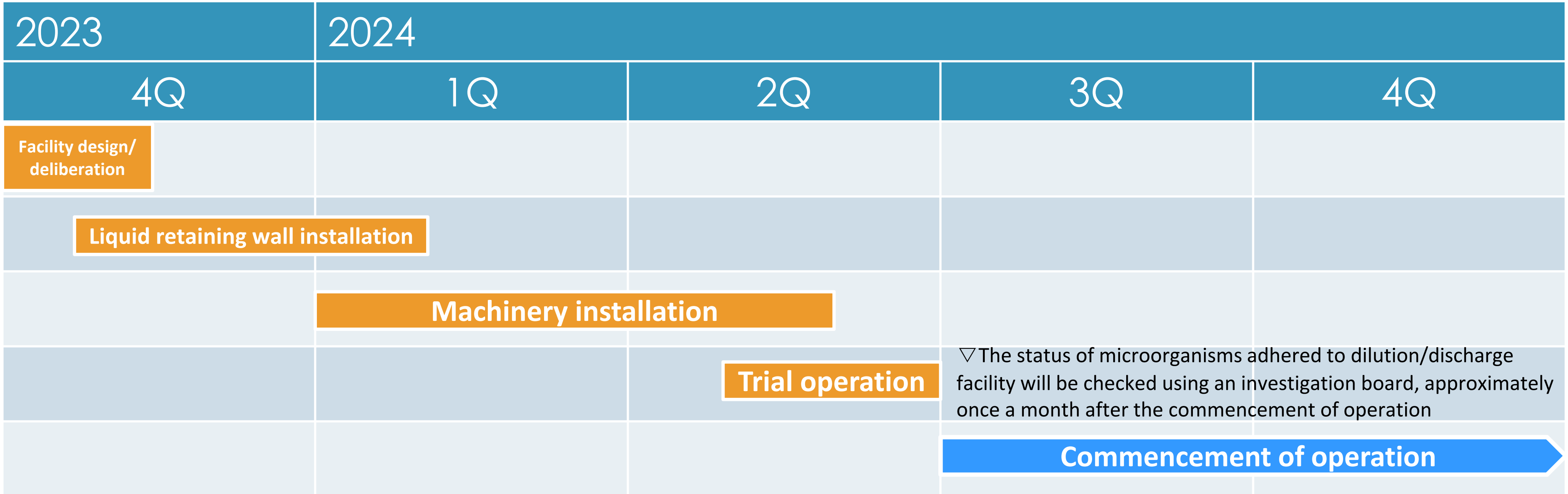


Marine life (barnacles) have been found stuck to the side of the discharge vertical shaft (upper-stream storage)
(Prior to countermeasures to prevent the adherence of marine life)

7-2. Facility installation schedule

TEPCO

[Facility installation schedule]



[Issues to monitor following the commencement of operation]

- An investigation board will be used to check the adherence of microorganisms (approximately once a month)
- Residual concentrations downstream of the chemical injection location will be checked (approximately once a month)

1. Monitoring history regarding discharge

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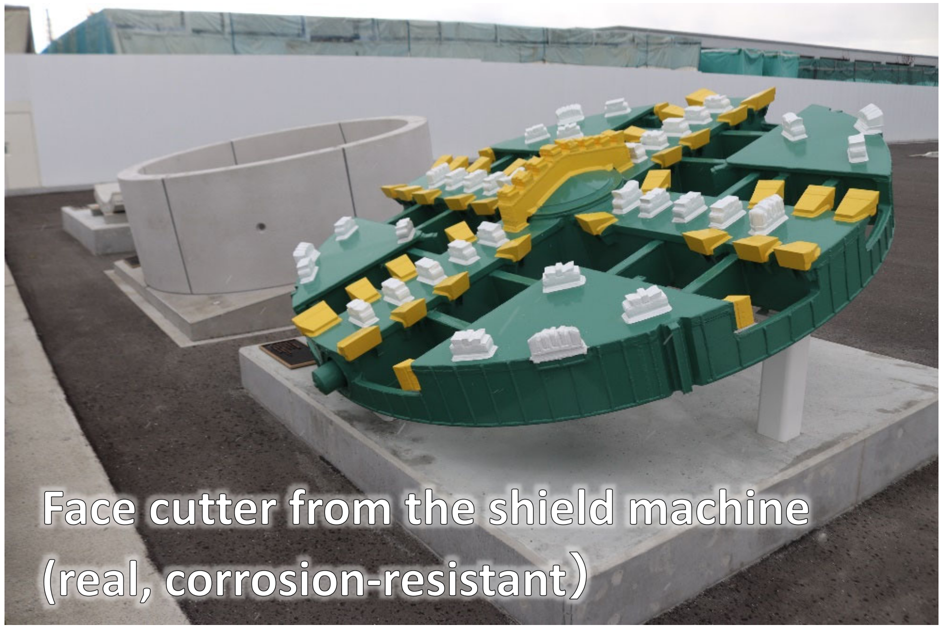
7. Countermeasures to prevent marine life from adhering to dilution/discharge facility

8. Miscellaneous

8-1. Miscellaneous <Introduction of exhibit on the green deck>
～Part of the face cutter off of the shield machine used to dig the discharge tunnel～

TEPCO

- On December 13, we displayed part of the actual cutter surface from the shield machine that was used to dig the discharge tunnel on the green deck.
- A full-scale mockup of the inside tunnel and an actual segment from one of the tunnel walls are also on display so visitors can get a feeling for what the discharge tunnel under the sea looks like and how it has been made waterproof/seismic-resistant.



8-2. Miscellaneous <Long-term plan (Discharge simulation results (1/2))>
Scenario A: Largest amount of tritium

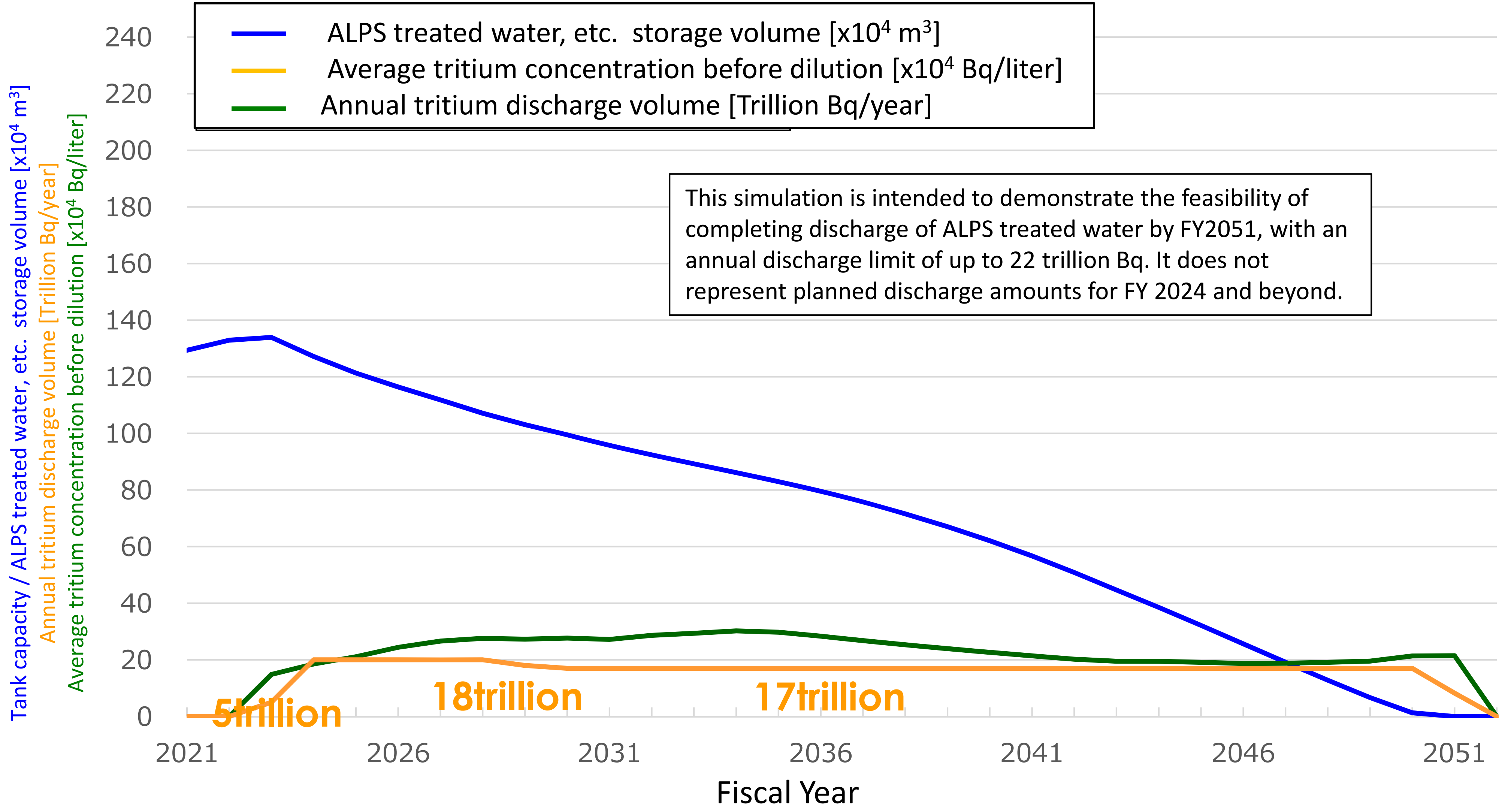
Partially edited excerpt from the 118th Decommissioning and contaminated water measures team meetings/secretariat conferences

(Annual tritium discharge volume)

- 2023FY : 5 trillion Bq/year (carefully discharge small amounts)
- 2024 - 2028FY : 20 trillion Bq/year
- 2029FY : 18 trillion Bq/year
- 2030FY - : 17 trillion Bq/year

(Reference: simulation conditions published in August 2021)

- 2023FY : 11 trillion Bq/year
- 2024 - 2029FY : 22 trillion Bq/year
- 2030 - 2032FY : 18 trillion Bq/year
- 2033FY - : 16 trillion Bq/year



This simulation is intended to demonstrate the feasibility of completing discharge of ALPS treated water by FY2051, with an annual discharge limit of up to 22 trillion Bq. It does not represent planned discharge amounts for FY 2024 and beyond.

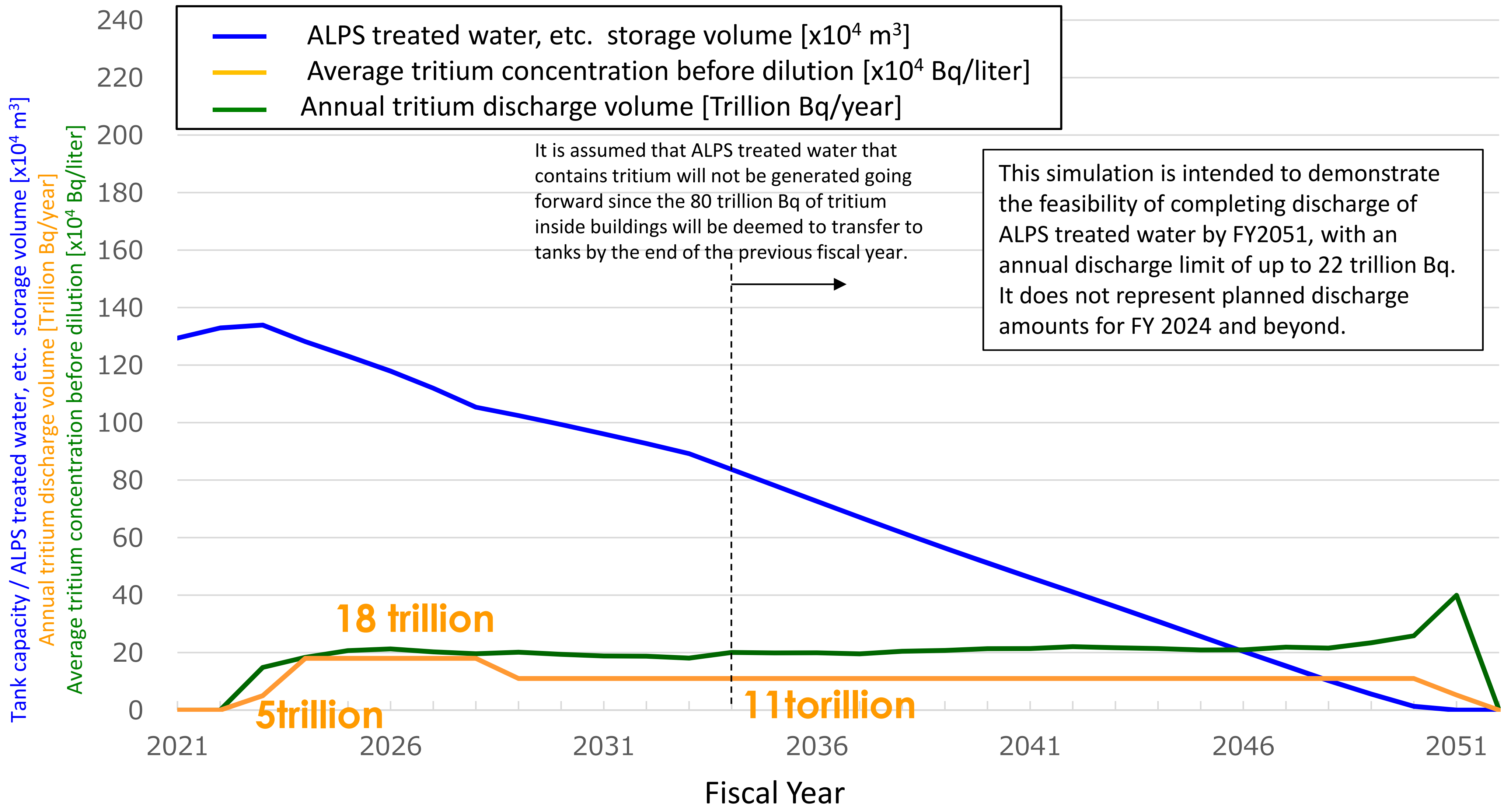
8-2. Miscellaneous <Long-term plan (Discharge simulation results (2/2))>
Scenario B: Least amount of tritium based on current information

(Annual tritium discharge volume)

- 2023FY : 5 trillion Bq/year (carefully discharge small amounts)
- 2024 - 2028FY : 18 trillion Bq/year
- 2029FY - : 11 trillion Bq/year

(Reference: simulation conditions published in August 2021)

- 2023FY : 8 trillion Bq/year
- 2024 - 2028FY : 16 trillion Bq/year
- 2029FY - : 11 trillion Bq/year



[Reference] Simulation conditions in light of the most recent status

Common conditions

Annual tritium discharge volume (Less than 22 trillion Bq/year)	Discharge volume set so that discharge is completed by FY2051 to the extent that there is no impact on site usage plans
Simulated discharge commencement fiscal year	FY2023 (simulation for each fiscal year)
ALPS treated water flow volume	Max: Approximately 460m³/day
Diluting seawater flow volume	Approximately 340,000m³/day (seawater transfer pumps: 2)
ALPS treated water discharge order	The approximate 30,000m³ of water in the K4 tank, which is being used as the measurement/confirmation facility, will be discharged first starting with water with low concentrations of tritium. Thereafter, the water in other tanks and newly generated ALPS treated water will be discharged starting with water with low concentrations of tritium as much as possible.
Tritium decay	Half-life considered to be 12.32 years (approximate 5.5% decrease annually). Decay of the newly generated tritium also considered.
Amount of ALPS treated water generated	FY2023: 120m³/day, FY2024: 110m³/day, FY2025: 100m³/day, FY2026: 90m³/day, FY2027: 80m³/day, FY2028 - FY2051: 70m³/day
Number of discharge days	292 days/year (Operating rate: 80%)

Parameters

Scenario	**A (Largest amount of tritium)**	**B (Least amount of tritium based on current information)**
Tritium concentrations of daily treated ALPS treated water	589,000 Bq/liter (maximum volume during FY2022: December 23, 2022)	254,000 Bq/liter (minimum volume during FY2022: April 8, 2022)
Total amount of tritium inside buildings (as of March 31, 2023)	Approximately 1,020 trillion Bq (the 3,400 trillion Bq that existed when the accident occurred all still remains in buildings/tanks)	Approximately 80 trillion Bq (estimated from the amount of stagnant water in buildings and tritium concentrations in that water)

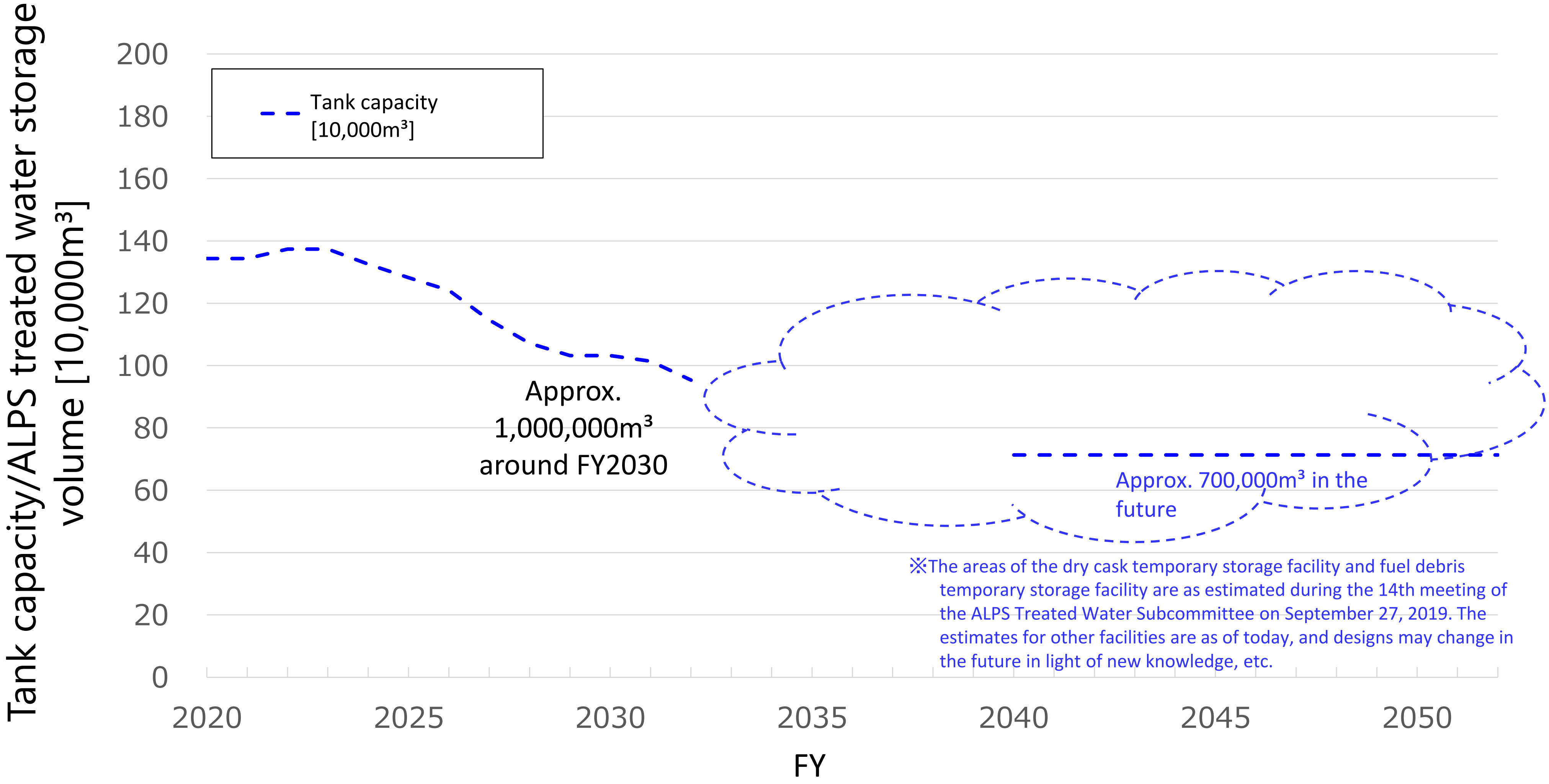
8-2. Miscellaneous <Long term plan (Securing site space)>

Excerpt from handouts used during the 13th meeting to review the ALPS treated water disposal implementation plan (March 18, 2022) (Partially edited)

TEPCO

～ Feasibility of installing facilities upon dismantling and removing tanks ～

- The area inside the dikes for 10,000m³ tanks ranges between approximately 1,200~approx. 2,800m², but through the discharge of approx. 400,000m³ of ALPS treated water into the sea by FY2030, we will secure approximately 50,000~approx. 110,000m² of site space. Furthermore, by discharging approx. 700,000m³ of ALPS treated water in the future, we will be able to secure approx. 80,000~approx. 200,000m² of space on site.
- As a result, we should be able to build the dry cask temporary storage facility that will be needed during the 2030s (for the common pool, approx. 16,000m² ※), as well as the fuel debris temporary storage facility (maximum: approx. 60,000m² ※) that will be needed in the future.



※The areas of the dry cask temporary storage facility and fuel debris temporary storage facility are as estimated during the 14th meeting of the ALPS Treated Water Subcommittee on September 27, 2019. The estimates for other facilities are as of today, and designs may change in the future in light of new knowledge, etc.