Fukushima Daiichi Nuclear Power Station
Status of Progress with Marine Organisms Rearing Tests and Completion of the Rearing Tests

March 27, 2025

Tokyo Electric Power Company Holdings, Inc.

1. Marine Organisms Rearing Tests report as of March

1. Marine Organisms Rearing Tests report as of March (1/2)

Status of Marine Organisms

【 Marine Organisms Rearing Tests facilities (on-site) 】

Neither high mortality nor abnormalities have been observed in flounder, in both series of tanks of “normal seawater” and tanks of “ALPS treated water diluted with seawater”. (As of March 20, 2025)

【 Marine Organisms Rearing Tests facility (off-site) 】

There has been no remarkable change in the growth of flounder or abalone after putting them in tanks filled with water that has been discharged in the environment. (as of March 20, 2025)

Size of flounder *1 (at December 2024): 【 Tanks of normal seawater】 Length: 42±3cm, Weight: 739±177
【 Tanks of ALPS treated water diluted with seawater 】 Length: 44±3cm, Weight: 815±152g

Size of abalone *1,2 (at December 2022): 【 Tanks of normal seawater 】 Shell length: 5.8±0.3cm
【 Tanks of ALPS treated water diluted with seawater 】 Shell length: 5.8±0.3cm

Location	Series	Category	Number of Marine organisms in each tank (as of March 20, 2025)		
			Flounder	Abalone	Seaweed (Gulfweed)
Marine Organisms Rearing Tests facilities (on-site)	Series 1	Seawater	88	-	-
	Series 2	Seawater (OBT concentration tests implemented on flounder)	18	-	-
	Series 3	Less than 1,500Bq/L	85	-	-
	Series 4	Less than 1,500Bq/L	72	-	-
	Series 5	Approx. 30Bq/L	9	21*3	-
Marine Organisms Rearing Tests facilities (off-site)	-	Water to be discharged in the environment (Approx. 260Bq/L)	121	52	-

*1 Measurement values for flounder and abalone at the Marine Organisms Rearing Tests facilities (on-site)
*2 Abalone need to be peeled off the sides of the tanks to be measured, so this is not been implemented since December 2022 for fear of injuring the abalone.
*3 When commencing the OBT concentration tests on flounder, the flounder were transferred to a different tank, and ultimately all abalone were relocated to system 5 tanks in order to ensure tank facility operational margins.

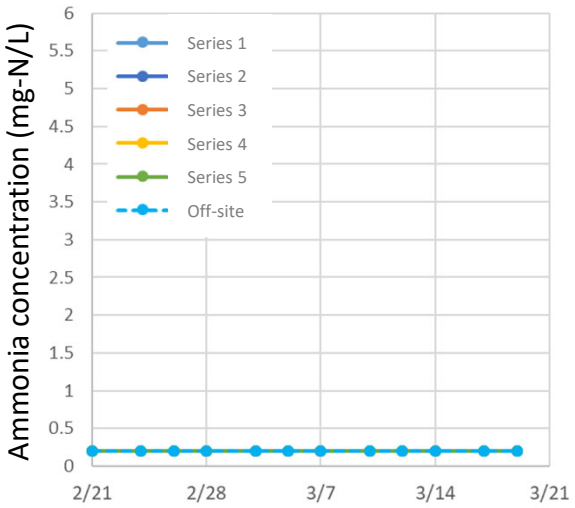
1. Marine Organisms Rearing Tests report as of March (2/2)

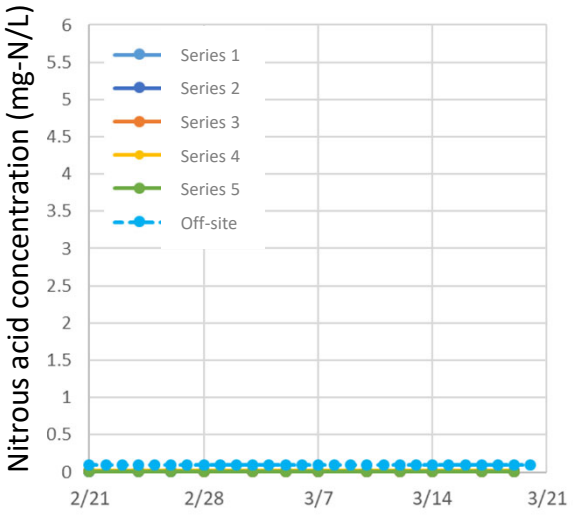
Water quality in the rearing tanks

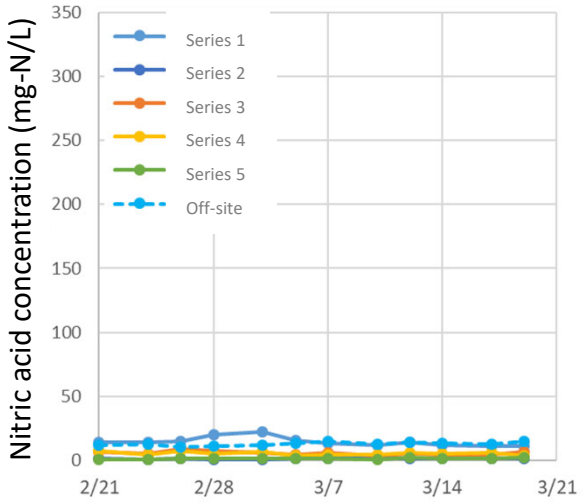
- While there have been some fluctuations in figures, water quality has been kept generally in the range suited to rearing marine organisms.

Item	Marine Organisms Rearing Tests facility (on-site) Minimum to maximum in series 1 through 5 (February 21, 2025 to March 20, 2025)	Marine Organisms Rearing Tests facility (off-site) Minimum to maximum in series 1 through 5 (February 21, 2025 to March 20, 2025)	Explanation for the measurement values
Water temperature (℃)	17.0～18.7	17.7～18.6	Kept around 18.0℃
Ammonia (mg-N/L)	0.2	0.2	Kept below 0.5mg-N/L, in a range that doesn't impact most marine organisms
Nitrous acid (mg-N/L)	0.01～0.02	0.1	Kept below 0.5mg-N/L, in a range that doesn't impact most marine organisms
Nitric acid (mg-N/L)	0.38～22	11～15	Kept below 0.5mg-N/L, in a range that doesn't impact most marine organisms

* Series 1,2: Normal seawater
Series 3,4: Tritium concentration: Less than 1,500Bq/L
Series 5: Tritium concentration: Approximately 30Bq/L







2. Summarized report of Marine Organisms Rearing Tests

2-1. Overview

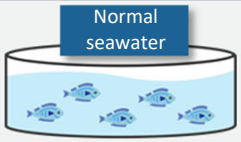
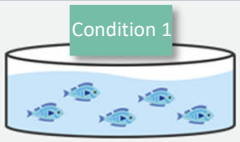
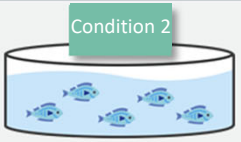
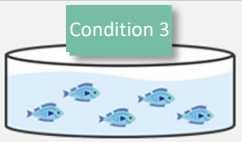
In order to alleviate people's concerns and to cultivate peace of mind for discharging ALPS treated water into the sea, we had been rearing marine organisms with using ALPS treated water diluted with seawater since September, 2022. Now that all planned marine organisms rearing tests have been completed, we have summarized the report on the findings.

What We Hope to Prove with the Marine Organisms Rearing Tests

- Marine organisms rearing tests will be conducted both in "normal seawater" and in "ALPS treated water diluted with seawater". The marine organisms in these two environments will be compared via rearing data to confirm there are no significant differences between the two populations.
  - Changes in the number of reared specimens (survival rate), differences in growth, etc.
- Confirm that "tritium is not concentrated in the living bodies and that the concentration of tritium in living bodies does not exceed that of the rearing environment" as demonstrated in previous knowledge.
  - Analysis/assessment of the tritium concentrations in the bodies of living organisms

2-2. Organisms to be reared/test details

- The organisms to be reared for Marine Organisms Rearing Tests and the test details are as shown in the chart below

commencement period		Before the discharge into the sea			After the discharge into the sea
Rearing environment		 Normal seawater	 ALPS treated water diluted with seawater	 ALPS treated water diluted with seawater	 Water to be discharged into the environment
Tritium concentrations		—	Less than 1,500Bq/L	Approx. 30Bq/L	Approx. 260Bq/L
Rearing location		Marine Organisms Rearing Tests facility (on-site)			Marine Organisms Rearing Tests facility (off-site)
Series of tanks		Series 1, 2	Series 3, 4	Series 5	—
Targeted organisms/test details	**Flounder**	Comparison target	・Compare the growth conditions ・FWT[*1] concentration test ・OBT[*2] concentration test	・Compare the growth conditions ・FWT[*1] concentration test	Check the growth conditions[*3]
	Abalone	Comparison target	・Compare the growth conditions ・FWT[*1] concentration test	(Not applicable)	Check the growth conditions[*3]
	Seaweed (Sargassum)	Comparison target	・Compare the growth conditions ・FWT[*1] concentration test	(Not applicable)	(Not applicable)

※1 FWT(Free water tritium): Tritium that exists in the form of water in living bodies

※2 OBT (Organically Bound Tritium): Tritium that is organically bound with carbon and other molecules in living bodies

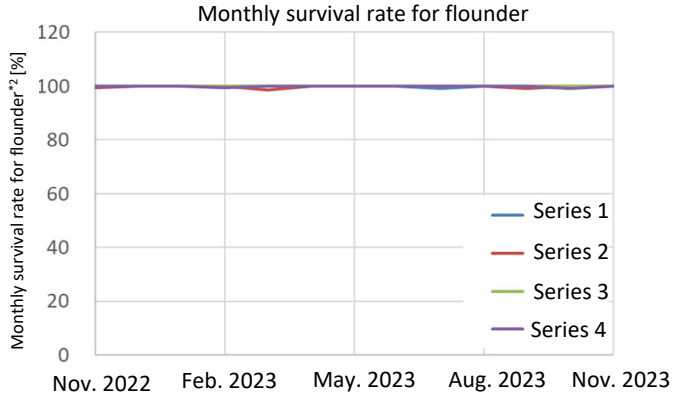
※3 There is only one water tank series at the marine organisms training facility, so organisms cannot be reared in normal seawater for comparison purposes. Therefore, only growth status was recorded.

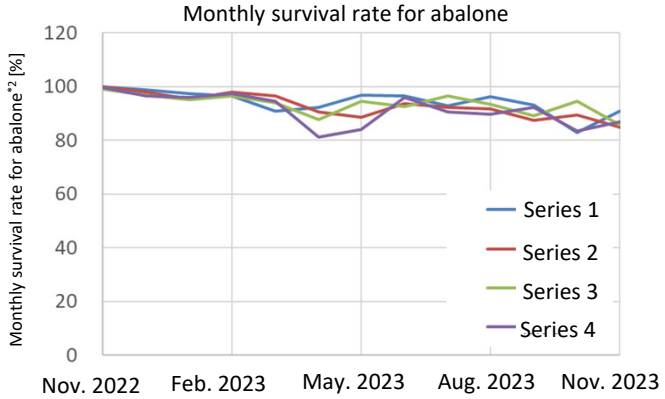
2-3. Marine organisms growth status

- We confirmed that there is no significant difference between marine organisms (flounder, abalone, seaweed (Sargassum)) reared in “normal seawater” and marine organisms reared in “ALPS treated water diluted with seawater” by comparing rearing data for both environments.

  - External experts have commended us for the fact that there was no significant difference in the survival rates of organisms reared in "normal seawater" and "ALPS treated water diluted with seawater.“[*1]
    - ✓ The monthly survival rate of abalone is lower than flounder, but the survival rate of abalone exceeded the expectations of experts prior to the beginning of the rearing tests. (Experts had commented that if raised in TEPCO’s closed circulation system water tanks, it would be difficult to continually raise abalone for one year.)

Survival rate comparison





Flounder growth comparison

	Measurement period	Normal seawater	Water tank with a tritium concentration less than 1,500Bq/liter
Length	December 2022	22±2cm	22±2cm
	December 2024	42±3cm	44±3cm
Weight	December 2022	116±31g	121±31g
	December 2024	739±177g	815±152g

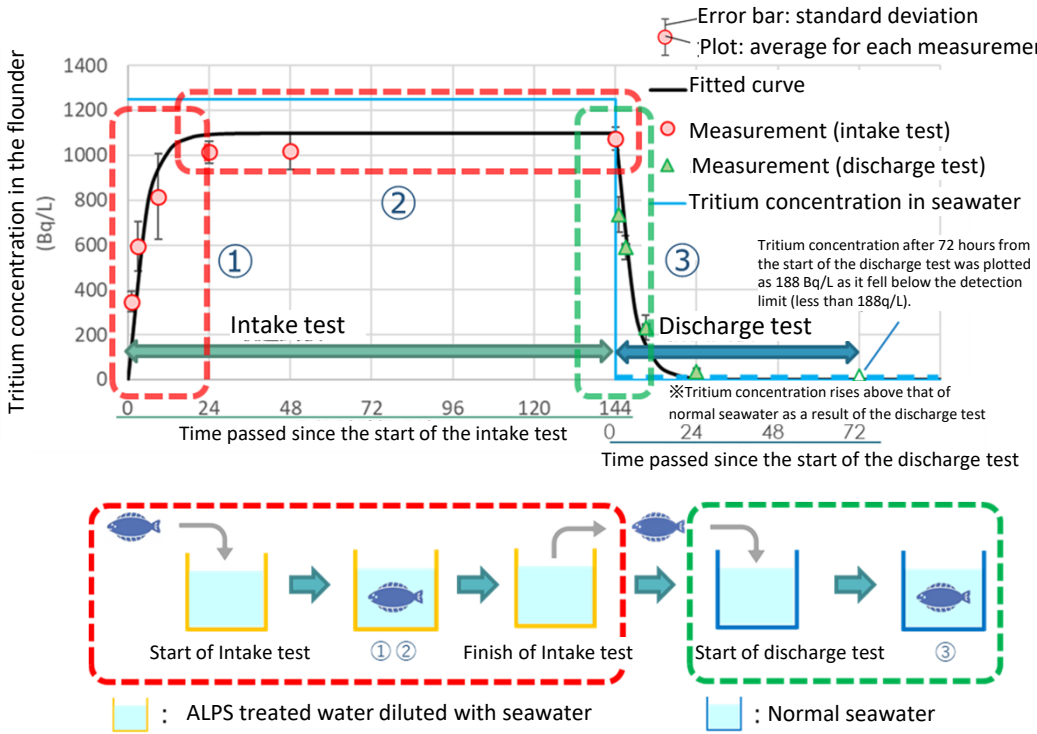
※1 Excerpt from the reference materials (Announced May, 25 2023)
※2 Monthly survival rate: Survival rate calculated by the number of organisms still live at the end of the month assuming that the survival rate at the beginning of each month was 100%
(Monthly survival rate) = (Number of organisms alive at the end of the month)/(Number of organisms alive at the beginning of the month)

2-4. Behavior of tritium ingested by marine organisms (1/11)

- We confirmed that “tritium is not concentrated in the living bodies and that the concentration of tritium in living bodies does not exceed that of the rearing environment” as demonstrated in previous knowledge.
  - The details of tritium concentration tests performed on each marine organism can be found on the following slides

Summary of tritium concentration tests

- ①～③ below were examined as part of tritium concentration tests to confirm that, "tritium is not concentrated in the living bodies and that the concentration of tritium in living bodies does not exceed that of the rearing environment."



① The tritium concentration reaches after a certain period of time【Intake test】

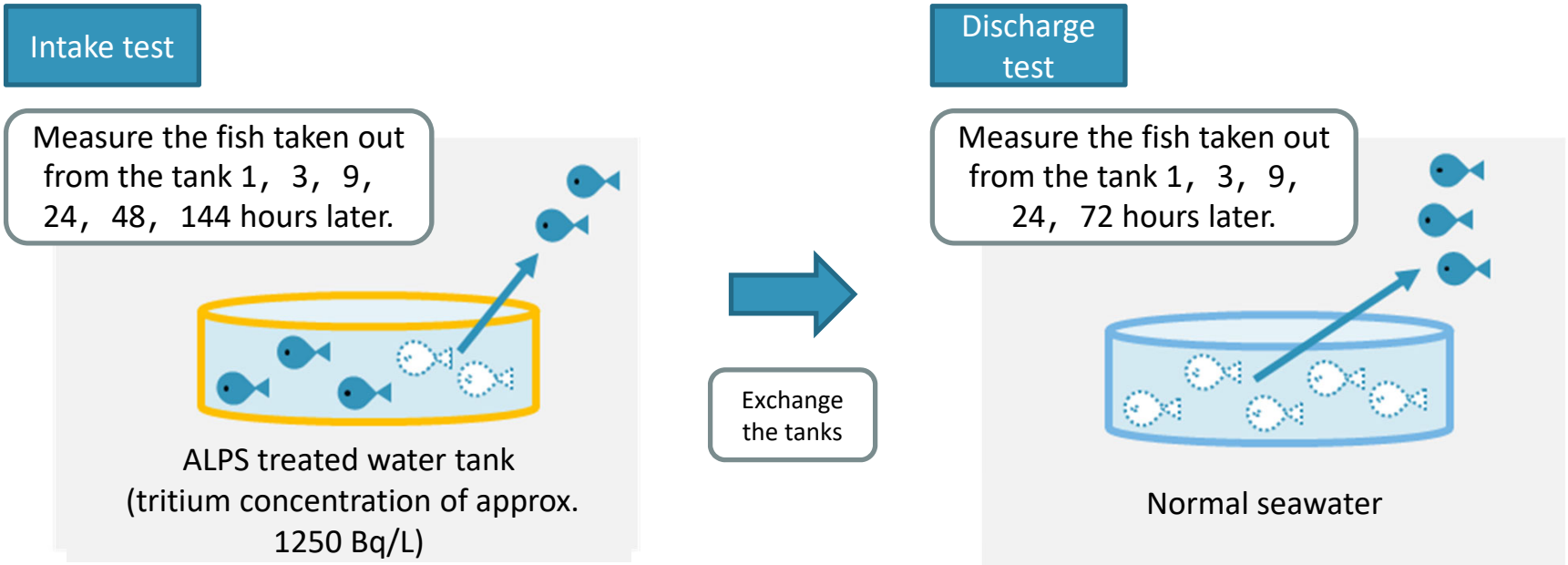
② Once tritium concentrations reached am equilibrium they does not exceed that of the environment which marine organisms was reared in. 【Intake test】

③ The tritium concentration in the flounder will be reduced as time passes after the flounder, which has reached equilibrium in higher tritium concentrations than that of normal seawater, is returned to normal seawater. 【Discharge test】

2-4. Behavior of tritium ingested by marine organisms (2/11)

Measuring the FWT concentration in flounder (tritium concentration of less than 1,500Bq/L)

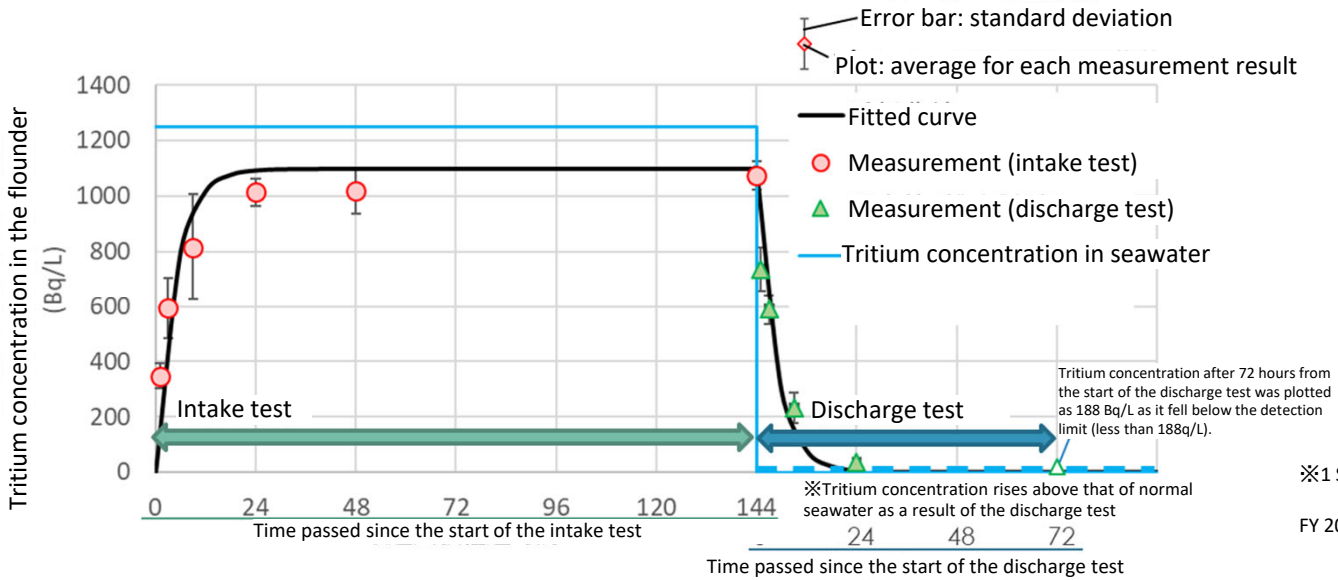
- The result of FWT concentration measurements taken on October 2022 from flounder reared in diluted ALPS treated water (less than 1,500Bq/L) was disclosed (the part analyzed by TEPCO).
  - Number of flounder measured
    - 33 flounder for the intake test
    - 25 flounder for the discharge test
- To verify that after a certain period of time the tritium in flounder reaches equilibrium at a lower concentration than the rearing environment, an *intake test* was conducted measuring FWT concentrations in flounder at 1, 3, 9, 24, 48 and 144 hours after the flounder is brought into the ALPS treated water.
- Afterward, to verify that the tritium concentration in the flounder will be reduced by discharging the tritium from the flounder that had been moved from ALPS treated water tanks to normal seawater tanks, a *dschiarge test* was conducted measuring FWT concentrations in flounder at 1, 3, 9, 24, 72 hours after the flounder is placed in the normal seawater tank.



2-4. Behavior of tritium ingested by marine organisms (3/11)

Results of FWT concentrations in flounder (tritium concentration of less than 1,500Bq/L) and insights

- FWT concentrations changed with time in both intake and discharge tests. The relationship between the measurement values and the fitted curve for the data drawn based on the approach to fitted curve developed based on previous knowledge is as follows.



※ In graphing the measurements, points below the detection limit and suspected adulteration were removed

（Reference） On the fitted curve:
Based on previous findings, the changes in FWT concentration within marine organisms were represented by the following formula.

$$dC_A(t) = A\{-C_A(t) + C_B(t)\}$$

A : constant t : time
$C_A(t)$: FWT concentration
$C_B(t)$: tritium concentration in seawater

※1 Similar analysis results have been reported in the following literature in the past.
FY 2009 Experimental Study on Carbon Transfer in Land and Aquatic Ecosystems, Research Institute of Environmental Science and Technology

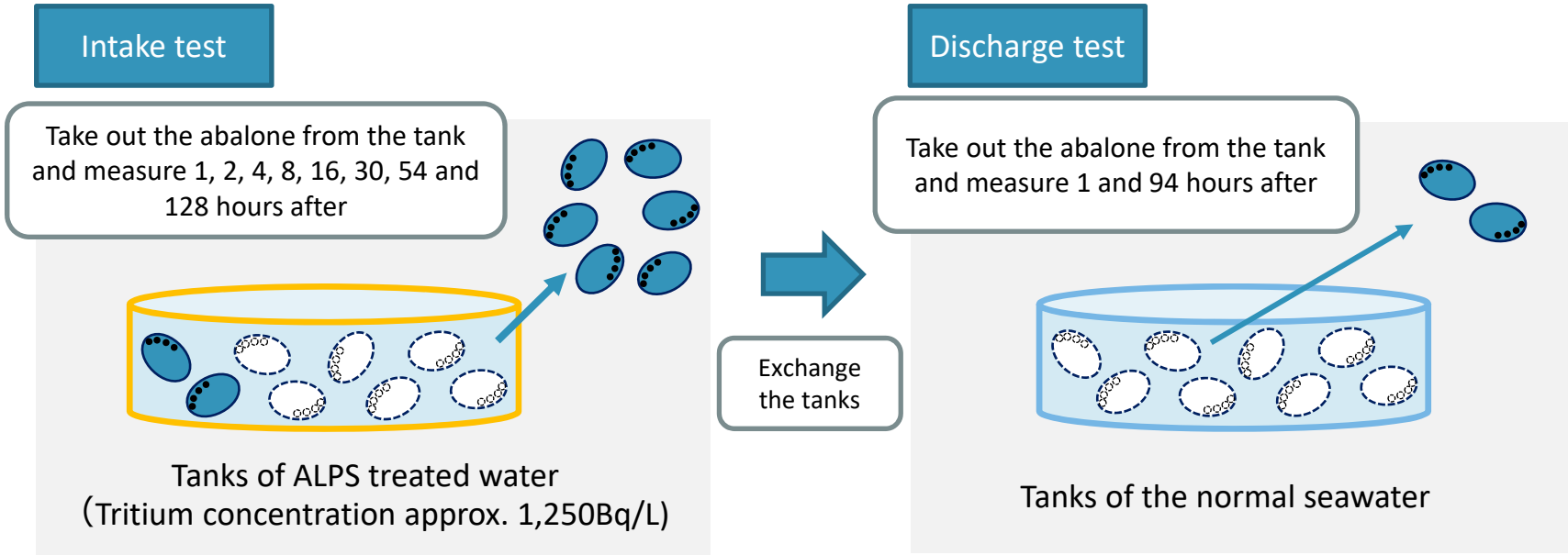
・Referring the data from graph above, the following results are confirmed same as previous findings.*1
【Intake test】
- The FWT concentration in living bodies does not exceed that of the environment which it was reared in (i.e., does not exceed the tritium concentration in ALPS treated water diluted with seawater in this test).
- The FWT concentration reaches an equilibrium after a certain period of time.

【Discharge test】
- The tritium concentration in the flounder will be reduced as time passes after the flounder, which has reached equilibrium in higher FWT concentrations than that of normal seawater, is returned to normal seawater.

2-4. Behavior of tritium ingested by marine organisms (4/11)

Measurement of FWT concentrations in abalone (tritium concentration of less than 1,500Bq/L)

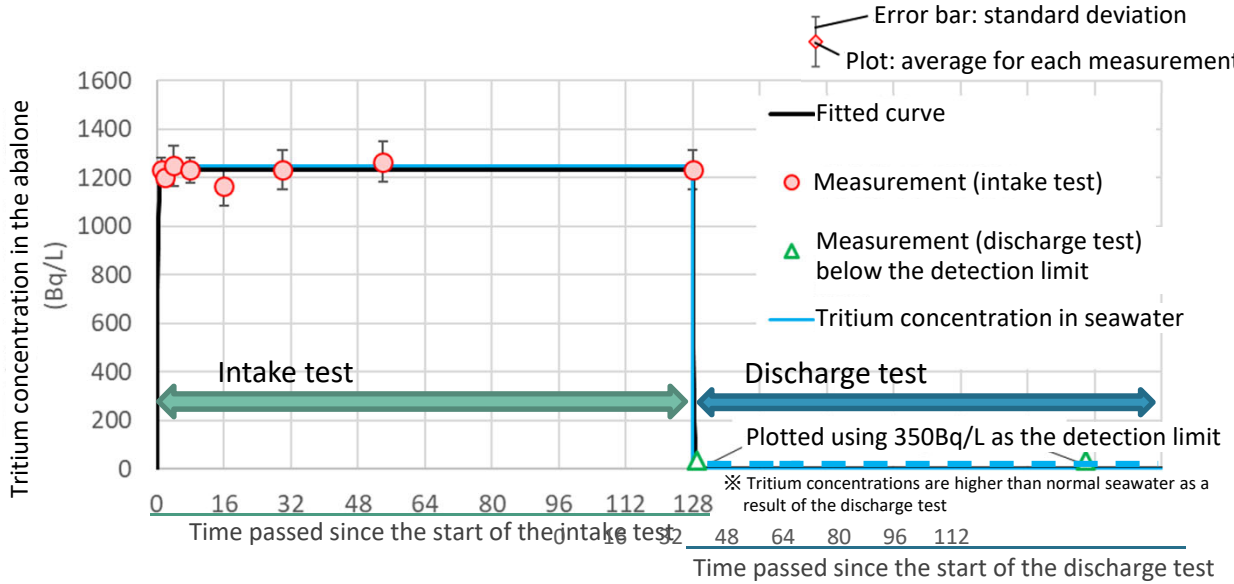
- We have obtained the FWT concentration measurement results for abalone reared in ALPS treated water diluted with seawater (less than 1,500Bq/L) since October 26, 2022.
  - The number of abalones used for measurements: 48 for intake test, 12 for discharge test
- In order to demonstrate that the tritium concentration in the abalones does not exceed the tritium concentration of the environment where they are living after a certain period of time during which the abalones ingest the tritium, an *intake test* was conducted by measuring the FWT concentration of the abalones 1, 2, 4, 8, 16, 30, 54 and 128 hours after the abalones were put in the tanks of ALPS treated water.
- Subsequently, in order to demonstrate that the FWT concentration in the abalones decreases as the abalones excrete the tritium after moving the abalones from tanks of ALPS treated water to the tanks of normal seawater, a *discharge test* was conducted by measuring the FWT concentration of the abalones 1 and 94 hours after the abalones were moved.



2-4. Behavior of tritium ingested by marine organisms (5/11)

Results and insights of FWT concentrations in abalone (tritium concentration of less than 1,500Bq/L)

- In both tests, changes were seen in tritium concentrations over time. The relationship between the fitted curve from this data drawn based on the comparison with the fitted curve drawn based on previous knowledge, and the measurement values is as follows:



(Reference) Fitted curve:
Based on previous knowledge, it was hypothesized that the following equation can be used to express an fitted curve that shows the time dependent FWT concentration in the bodies of living organisms.

$$dC_A(t) = A\{-C_A(t) + C_B(t)\}$$

A : constant t : time
$C_A(t)$: FWT concentration
$C_B(t)$: tritium concentration in seawater

- Referring the data from the graph above, we have been able to observe the following, which are consistent with previous knowledge and FWT concentration measurements for flounders (tritium concentration: less than 1,500Bq/L).

【Intake test】

- The FWT concentration in the organisms does not exceed the tritium concentration in the environment where the organisms are living (for this test, this means that the tritium concentration in the organisms does not exceed the tritium concentration in ALPS treated water diluted with seawater)
- FWT concentrations reach equilibrium after a certain period of time

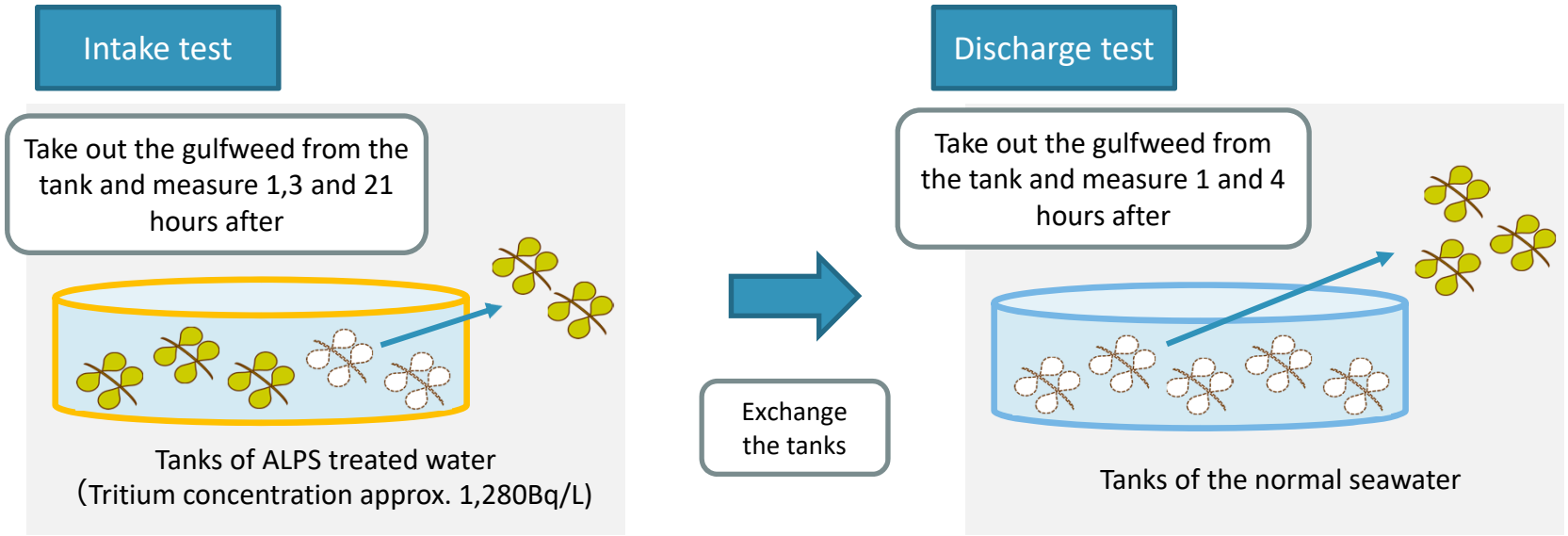
【Discharge test】

- The FWT concentration in the abalones decreases over time when the abalones, the tritium concentration has reached equilibrium in higher than that of normal seawater, are returned to normal seawater.

2-4. Behavior of tritium ingested by marine organisms (6/11)

Measurement of FWT concentrations in gulfweed (tritium concentration of less than 1,500Bq/L)

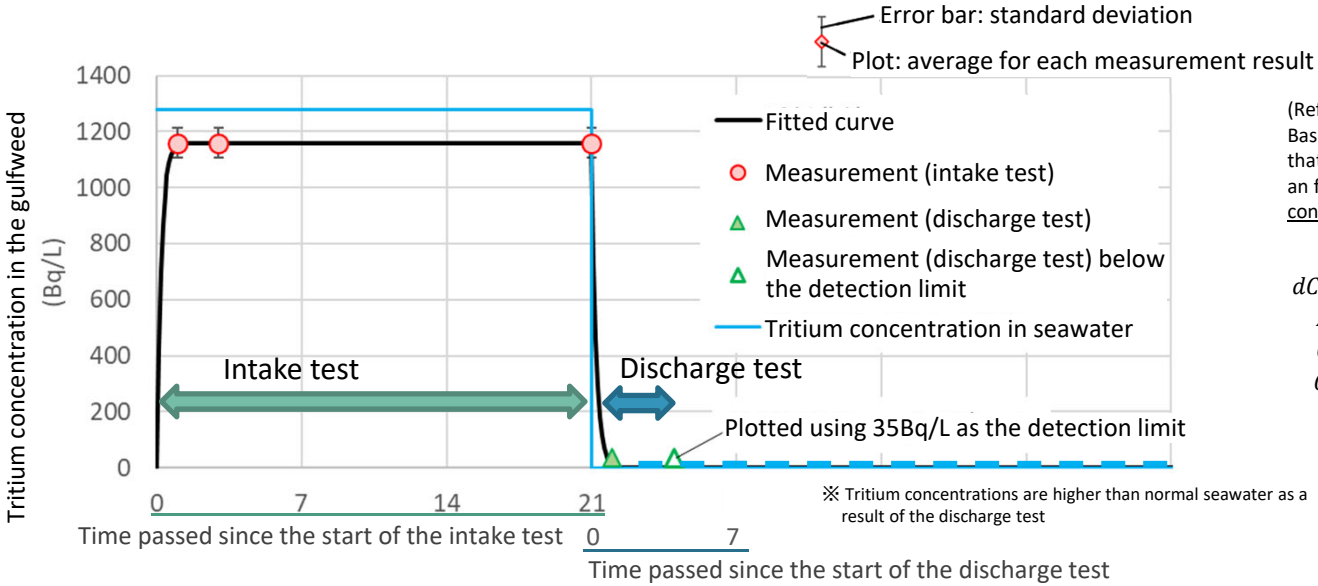
- We have obtained the FWT concentration measurement results for gulfweed reared in ALPS treated water diluted with seawater (less than 1,500Bq/L) in May, 2023.
  - The amount of gulfweed used for measurements: about 3 kilogram
- In order to demonstrate that the tritium concentration in the gulfweeds reaches equilibrium at the concentration lower than the environment where they are living after a certain period of time during which the gulfweeds ingest the tritium, an <*intake* test> was conducted measuring the FWT concentration in the gulfweeds 1, 3 and 21 hours after the gulfweeds were put into ALPS treated water.
- Subsequently, in order to demonstrate that the FWT concentration in the gulfweeds decreases as the gulfweeds excrete the tritium after moving the gulfweeds from tanks of ALPS treated water to the tanks of normal seawater, a <*discharge test*> was conducted by measuring the FWT concentration in the gulfweeds 1 and 4 hours after the gulfweeds were moved.



2-4. Behavior of tritium ingested by marine organisms (7/11)

Results and insights of FWT concentrations in gulfweed (tritium concentration of less than 1,500Bq/L)

- In both tests, changes were seen in FWT concentrations over time. The relationship between the fitted curve from this data drawn based on the comparison with the fitted curve drawn based on previous knowledge, and the measurement values is as follows:



※ Tritium concentrations are higher than normal seawater as a result of the discharge test

(Reference) Fitted curve:
Based on previous knowledge, it was hypothesized that the following equation can be used to express an fitted curve that shows the changes in FWT concentration.

$$dC_A(t) = A\{-C_A(t) + C_B(t)\}$$

A : constant t : time
$C_A(t)$: FWT concentration
$C_B(t)$: tritium concentration in seawater

- Referring the data from the graph above, we have been able to observe the following, which are consistent with previous knowledge and FWT concentration measurements for flounders and abalones (tritium concentration: less than 1,500Bq/L).

【Intake test】

- The FWT concentration does not exceed the tritium concentration in the environment where the organisms are living (for this test, this means that the tritium concentration in the organisms does not exceed the tritium concentration in ALPS treated water diluted with seawater)
- FWT concentration reaches equilibrium after a certain period of time

【Discharge test】

- The tritium concentration in gulfweed decreases over time when the gulfweeds, which the FWT concentration has reached equilibrium in higher than that of normal seawater, are returned to normal seawater

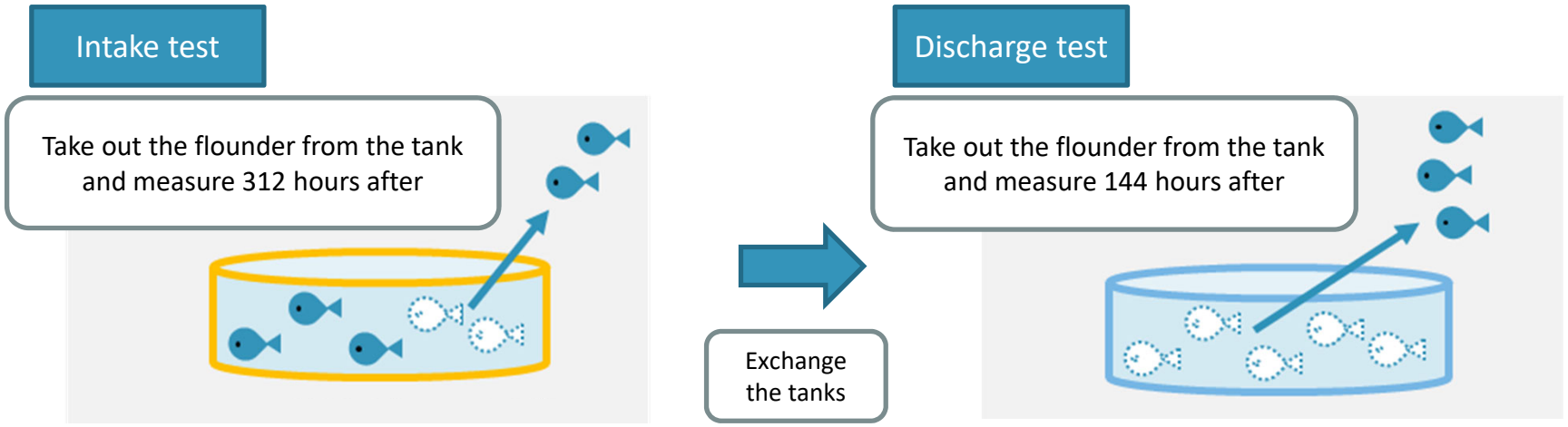
Excerpt from the reference materials (Announced on May 25, 2023)
Underlined sections have been updated.

2-4. Behavior of tritium ingested by marine organisms (8/11)

Measurement of FWT concentrations in flounder (tritium concentration of approx. 30Bq/L)

- We have obtained the FWT concentration measurement results for flounder reared in ALPS treated water diluted with seawater (of approx. 30Bq/L) since November, 2022.
  - The number of flounders used for measurements: 4 for intake test, 6 for discharge test
- In order to demonstrate that the tritium concentration in the flounders reach equilibrium at the concentration lower than the environment where they are living after a certain period of time during which the flounders ingest the tritium, an <*intake* test> was conducted measuring the FWT concentration in the flounders 312 hours after the flounders were put into ALPS treated water.
- Subsequently, in order to demonstrate that the FWT concentration in the flounders decreases as the flounders excrete the tritium after moving the flounders from tanks of ALPS treated water to the tanks of normal seawater, a <*discharge test*> was conducted by measuring the FWT concentration in the flounders 144 hours※ after the flounders were moved.

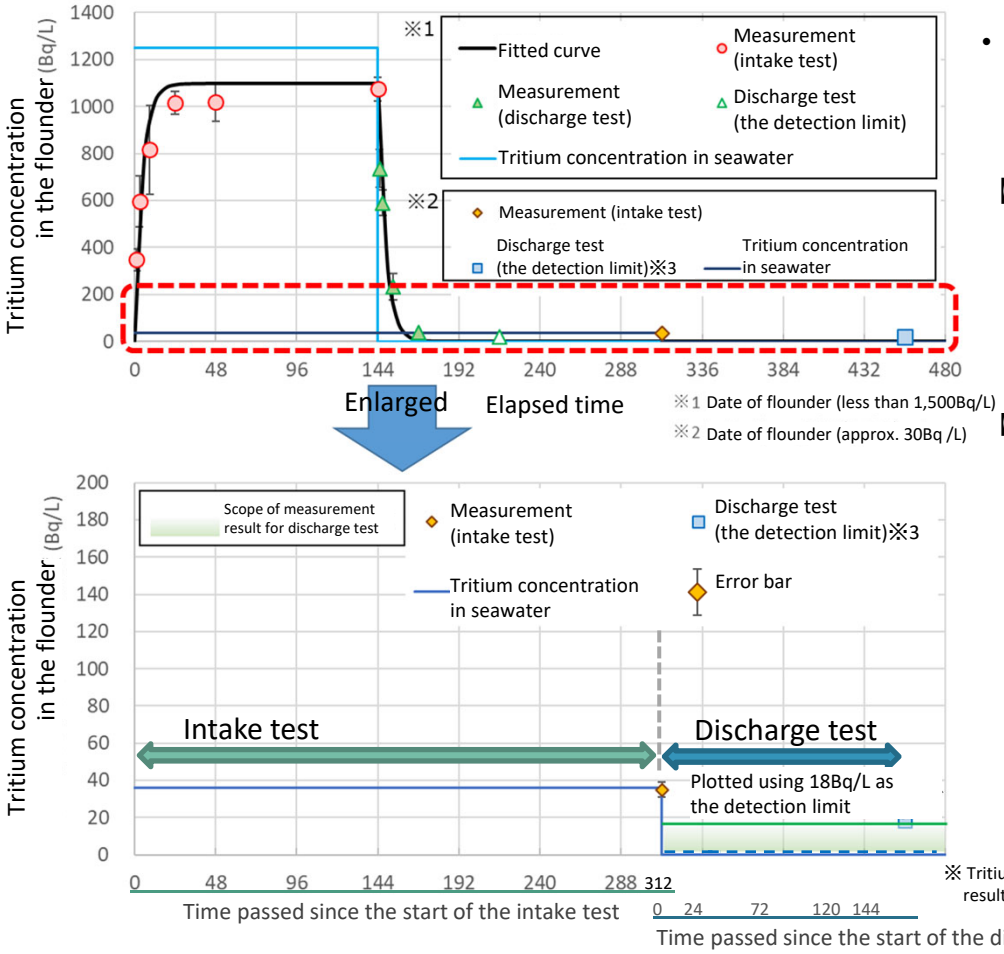
※ Based on previous knowledge and flounder tests (less than 1,500Bq/L), we have been able to observe that the FWT concentration in flounders reach equilibrium approximately 24 hours during intake tests, and decrease and stabilize approximately 24 hours during discharge tests. Therefore, for the other tests, samples were taken after more than 24 hours had passed in consideration of this fact.



2-4. Behavior of tritium ingested by marine organisms (9/11)

Results and insights of FWT concentrations in flounder (tritium concentration of approx. 30Bq /L)

- During each of intake and discharge tests, the tritium concentration in the flounders was measured more than 24 hours※ after the start of the tests.
- As a result, the FWT concentration changed in both test.



- We have been able to observe the following, which are consistent with previous knowledge and FWT concentration measurements for flounders (tritium concentration: less than 1,500Bq/L).

【Intake test】

  - The FWT concentration in the organisms does not exceed the concentration in the environment where the organisms are living (for this test, this means that the tritium concentration in the organisms does not exceed the tritium concentration in ALPS treated water diluted with seawater)

【Discharge test】

  - The FWT concentration in the flounders decreases over time when the flounders, the tritium concentration has reached equilibrium in higher than that of normal seawater, are returned to normal seawater.

※"More than 24 hours"
Based on previous knowledge and flounder tests (less than 1,500Bq/L), we have been able to observe that the FWT concentration in flounders reach equilibrium approximately 24 hours during intake tests, and decrease and stabilize approximately 24 hours during discharge tests. Therefore, for the other tests, samples were taken after more than 24 hours had passed in consideration of this fact.

※ Tritium concentrations are higher than normal seawater as a result of the discharge test

※3 Analysis results for the discharge test were all below the detection limits

Excerpt from the reference materials (Announced on May 25, 2023)
Underlined sections have been updated.

2-4. Behavior of tritium ingested by marine organisms (10/11)

Measurement of the OBT concentration in flounder (tritium concentration of less than 1,500Bq/L)

- We have been analyzing the OBT concentration in flounder that have been reared in ALPS treated water (less than 1,500Bq/L) since October 2022. As follows, from previous knowledge, we have learned that OBT behaves the same as FWT.
  - The number of flounders used for measurements: 23 for intake test

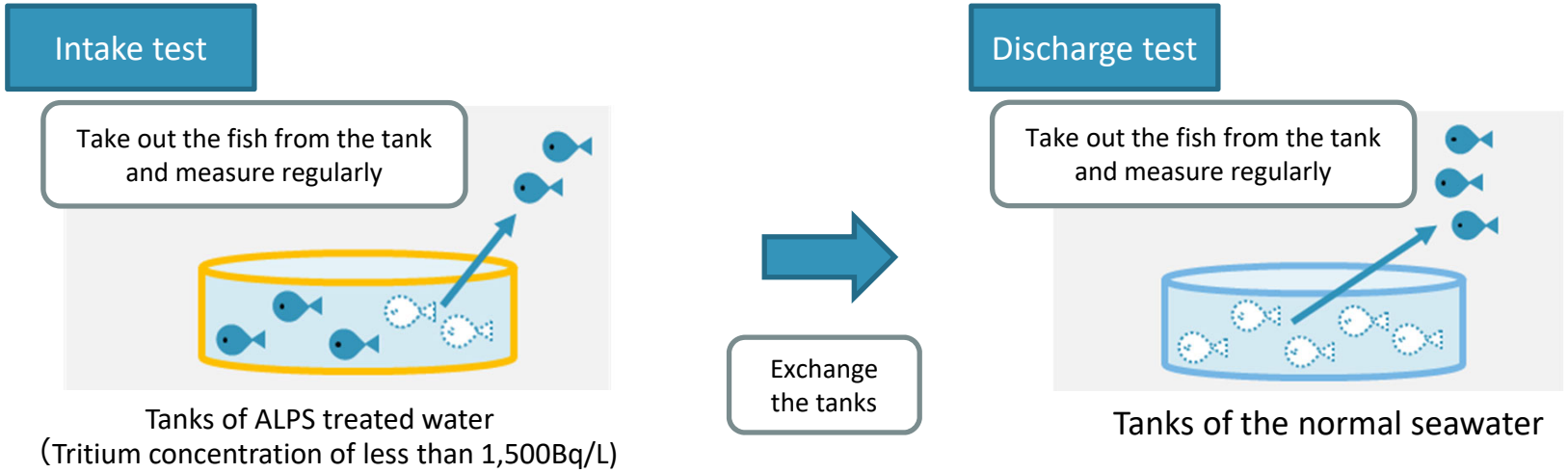
【Intake test】

- OBT concentration does not exceed the tritium concentration in the environment where the organisms are living (for this test, this means that the tritium concentration in the organisms does not exceed the tritium concentration in ALPS treated water diluted with seawater)
- OBT concentration reaches equilibrium after a certain period of time※

【Discharge test】

- OBT concentration decreases over time when the flounders, which the OBT concentration has reached equilibrium in higher than that of normal seawater, are returned to normal seawater

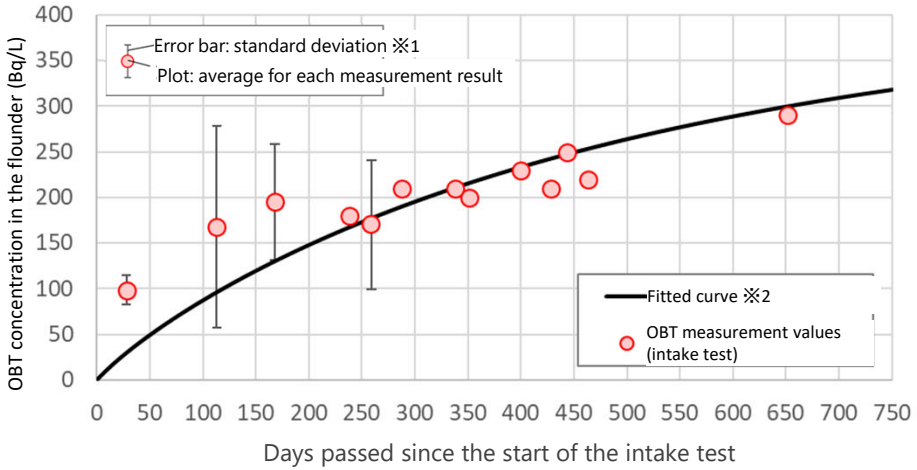
※Based on previous knowledge we have learned that compared to FWT, more time is required for this to happen

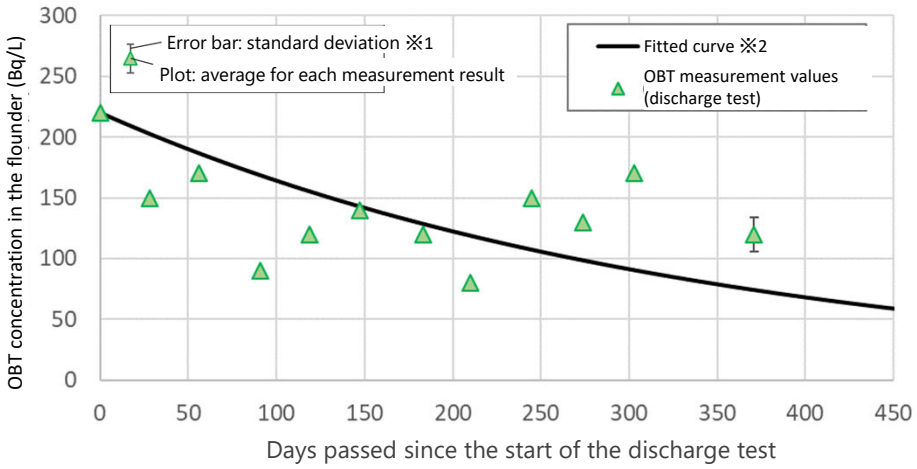


2-4. Behavior of tritium ingested by marine organisms (11/11)

Results and insights of OBT concentrations in flounder (tritium concentration less than 1500Bq/L)

- There was a change in OBT concentrations over time. The relationship between measurements and the fitted curve drawn using data from this experiment after comparing with a fitted curve based on previous knowledge is shown below.





※1 There is no error bar for one point data
※2 Fitted curve:
Based on previous knowledge, a concentration curve that represents the changes in OBT concentrations in the muscle tissue of a living organism can be expressed by the equation on the right. Fitted curve in the graph have been generated based on the assumption that tritium concentrations in the seawater are 1,250Bq/liter.

$$\frac{dC_1(t)}{dt} = \left(\frac{E_1 \cdot m_0(t) \cdot C_0(t) \cdot dt + M_1 \cdot C_1(t)}{E_1 \cdot m_0(t) \cdot dt + M_1} - C_1(t) \right) / dt + k_{31} \cdot C_w - k_{13} \cdot C_1(t)$$

E1、M1、k13、k31、Cw：Constant　t：Time
$C_0(t)$：OBT concentrations in fish food (“0” on the graph)
$C_1(t)$：OBT concentrations in the body of the flounder (muscle tissue)
$m_0(t)$：Hydrogen ingestion from food over a period of time

- From the above graph, the measured values match the calculated values obtained from the previous knowledge in the graph, confirming the following:
  - OBT concentration reached an equilibrium after a certain period of time and, as with the concentration of OBT at equilibrium under the rearing test conditions in this time, which were foreseen from existing research, the concentrations of OBT are less than approximately 20% of the concentrations of tritium in the seawater. ※3

※3 Similar analysis results have been reported in the following literature in the past. The General Experiments on the Transference of Excreted Tritium to Living Organisms in FY2014

2-5. Rearing test conclusions

All planned Marine Organisms Rearing Tests have completed.
These tests confirmed the following:

- We have found that there is no significant difference between marine organisms reared in “normal seawater” and marine organisms reared in “ALPS treated water diluted with seawater” *1 by comparing rearing data for both environments.

  Data that serves as the basis for this conclusion and assessment
  - Assessment by external experts
  - No difference in survival rates
  - No difference in the length or weight of flounder

- We have confirmed that "tritium does not accumulate inside the bodies of living organisms and the concentration of tritium in the bodies of reared marine organisms does not exceed that of the environment which it was reared in" as already proven in previous knowledge.

  Data that serves as the basis for this conclusion and assessment
  - FWT concentration test results
  - OBT concentration test results (flounders only)

- Flounders and abalones that were being raised in normal seawater were put in "water discharged into the environment" *2 and we confirmed that there was no remarkable change *3 in the growth of the flounders or abalones around this time. Flounder and abalone were reared in water discharged into the environment for approximately six months and we confirmed *3 that there is no change in the growth of them.

*1： Normal seawater was added to ALPS treated water and the tritium concentrations were adjusted for test purposes.
*2： Seawater was retrieved from the vertical discharge shaft (down-stream storage) when ALPS treated water was actually discharged into the sea
*3： Flounder and abalone activity confirmed by keepers

2-6. Future rearing tests

- Since all planned Marine Organisms Rearing Tests have completed, the rearing tests to have been finished as of March 31, 2025.
- In conjunction with the completion of rearing tests the rearing log and YouTube live stream will be stopped update on March 31, 2025, however the rearing test records will remain available on TEPCO's website and X in the form of the rearing log, and the live stream videos will remain in the YouTube archive for access and viewing.

[Reference] What We Hope to Prove with the Rearing Test (1/2)

TEPCO

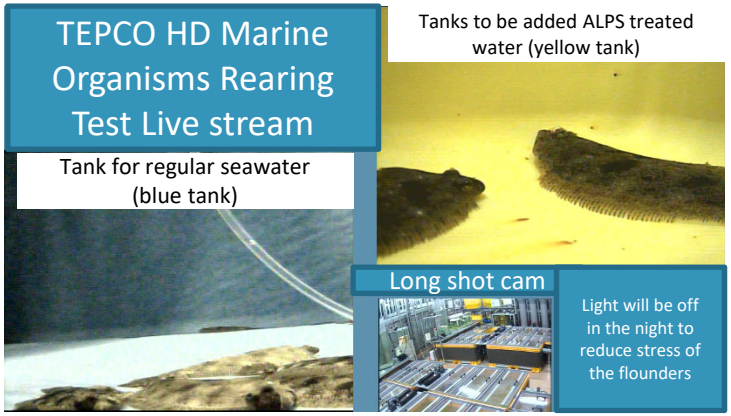
① In order to alleviate people's concerns and to cultivate peace of mind, we will rear marine organisms in tanks of seawater containing ALPS treated water and compare them with organism reared in normal seawater and report the results carefully in an easy-to-understand manner.

To be confirmed in the test

- Marine organisms rearing tests will be conducted both in seawater and in ALPS treated water diluted with seawater. The marine organisms in these two environments will be compared via rearing data to confirm there are no significant differences between the two populations.

Information disclosure policy

- For ①, we will provide a live stream of the rearing tank and write about how the rearing test is going on in the observation diary on our website and on Japanese Twitter. The rearing environment (e.g., water quality, temperature of the water), state of organisms (e.g., changes in the number of organisms), analysis results (e.g., comparisons of the tritium concentration in the live organisms and in seawater) of the marine organisms reared in ALPS treated water diluted with seawater and organisms reared in normal seawater will be summarized and disclosed every month.
- In addition to having people from the local community and parties concerned visit the test site, we will also have biology experts check on the test as it is ongoing.



◀ Live stream of the seawater rearing test (for illustration purposes only)

- The normal seawater is in the blue tanks and the ALPS treated water diluted with sweater is in the yellow tanks.
- The layout of the tanks will be changed as needed based on feedback from relevant parties to ensure optimal visibility.

[Reference] What We Hope to Prove with the Rearing Test (2/2)

TEPCO

② Based on the results of many studies domestic and abroad on the behavior of tritium, data for this test will first be gathered for 6 months to show that “tritium is not concentrated in the living bodies and that the concentration of tritium in living bodies does not exceed that of the rearing environment” as demonstrated in past tests results.

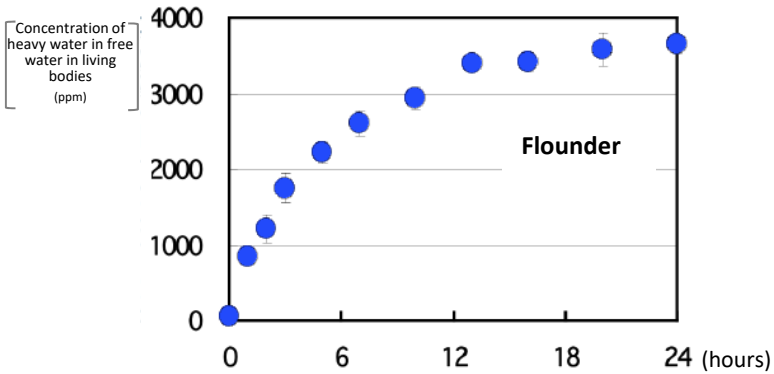
Results of experiments domestic and abroad※1

– The tritium concentration in a living bodies does not exceed that of the environment which it was reared in.
– The tritium concentration reached an equilibrium after a certain period of time.

※1 Tritium in living bodies is either free water tritium (FWT) or organically bound tritium (OBT). Studies have been conducted domestically and abroad for both.
※2 This experiment was conducted using heavy hydrogen (H-2) which has the same properties as tritium (H3) (The heavy hydrogen concentration in seawater is about 4,000 ppm.)

- Free water tritium (FWT): Tritium that exists in the form of water in living bodies
- Organically bound tritium (OBT): Tritium that is organically bound with carbon and other molecules in living bodies

■ Experiment on flounder in heavy water※2



Excerpt from “FY2009 Report on a Study of Carbon Transfer in Terrestrial and Aquatic Ecosystems” by the Institute for Environmental Sciences

To be confirmed in the rearing test

- The tritium levels in the flounder, abalone and seaweed reared in the ALPS treated water diluted with seawater (tritium concentration of approx. 1,500 Bq/L) will be analyzed and assessed※3 to confirm that tritium levels will reach equilibrium after a certain amount of time, and that the tritium concentration at equilibrium doesn’t exceed that of the rearing environment.
  – It will also be confirmed that the tritium levels of marine organisms that have reached the tritium equilibrium will fall once they are moved to seawater only tanks .

※3 OBT data will be collected over 6 months and assessed for conformity with previous knowledge to confirm that OBT levels do not exceed that of the rearing environment.

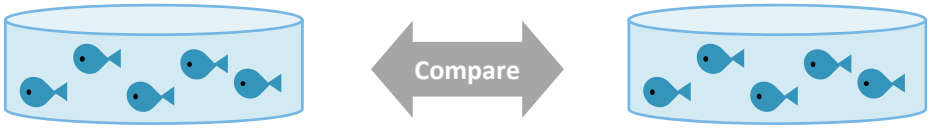
[Reference] Marine Organisms Rearing Test

Excerpt from the Status of Deliberation of the Handling of ALPS-treated water [summary] (disclosed on August 25, 2021) (underlined portions have been partially edited)

- By rearing marine organisms in a seawater environment that contains ALPS treated water and demonstrating that the concentrations of tritium in these marine organisms do not differ from the concentrations of tritium in the seawater (in other words, that the tritium does not accumulate in the body) we aim to cultivate understanding about discharging ALPS treated water into the sea and reducing the adverse impact on reputation.
- Through activities to promote dialogue with as many stakeholders as possible, such as the local community, we shall elicit opinions and reflect them in our plans as necessary. Rearing test conditions and status will be disclosed accordingly.

Prior to discharge of ALPS treated water into the sea

Confirm the status of its development in seawater (test tank 1) and ALPS treated water diluted using seawater (test tank 2)



Test tank 1: Seawater around the power station

(Tritium concentration approx. 1Bq/liter)

Organisms to be reared:

Flounder, Abalone, Seaweed (Gulfweed)

Test tank 2: ALPS treated water diluted using seawater around the power station

(Tritium concentration less than 1,500Bq/liter)

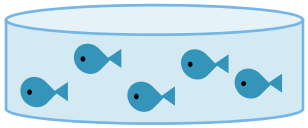
(Tritium concentration approx. 30Bq/liter)

Organisms to be reared:

- Tritium concentration less than 1,500Bq/liter:
  Flounder, Abalone, Seaweed (Gulfweed)
- Tritium concentration approx. 30Bq/liter:
  Flounder

After initiating the discharge of ALPS treated water into the sea

Confirm the status of their development under an environment where water is diluted with seawater and actually discharged into the environment.



Test tank: water discharged into the environment

(Tritium concentration < 1,500Bq/liter)

Organisms to be reared:

Flounder, Abalone,