Information (10:00), March 28, 2022

To All Missions (Embassies, Consular posts and International Organizations in Japan)

Report on the discharge record and the seawater monitoring results at Fukushima Daiichi Nuclear Power Station during February

The Ministry of Foreign Affairs wishes to provide all international Missions in Japan with a report on the discharge record and seawater monitoring results with regard to groundwater pumped from the sub-drain and groundwater drain systems, as well as, bypassing groundwater pumped during the month of February at Fukushima Daiichi Nuclear Power Station (NPS).

1. Summary of decommissioning and contaminated water management

In February, the summary of monthly progress on decommissioning and contaminated water management of Fukushima Daiichi NPS was issued shown in Appendix 1. For more information, please see the following URL:
https://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/mp202202.pdf

2. Sub-drain and Groundwater Drain Systems

In February purified groundwater pumped from the sub-drain and groundwater drain systems was discharged on the dates shown in Appendix 2. Prior to every discharge, an analysis on the quality of the purified groundwater to be discharged was conducted by Tokyo Electric Power Company (TEPCO) and the results were announced.

All the test results during the month of February have confirmed that the radiation levels of sampled water were substantially below the operational targets set by TEPCO (these operational targets are well below the density limit specified by the Reactor Regulation). The results of these analyses were also confirmed by third-party organization (Tohoku Ryokka Kankyohozen Co.).

In addition, TEPCO and Japan Atomic Energy Agency (JAEA), at the request of the Government of Japan, regularly conduct more detailed analyses on the purified groundwater. The results of JAEA's latest analyses confirmed that TEPCO's analyses were accurate and verified that the radiation levels of sampled groundwater was substantially below the operational target (see Appendix 3).

Moreover, TEPCO publishes the results of analyses conducted on seawater sampled during the discharge operation at the nearest seawater sampling post from the discharge point (see Appendix 4). The results show that the radiation levels of seawater remain lower than the density limit specified by the Reactor Regulation and significant change in the radioactivity has not been observed.

3. Groundwater Bypassing

In February, the pumped bypassing groundwater was discharged on the dates shown in Appendix 5. Prior to every discharge, an analysis on the quality of the groundwater to be discharged was conducted by TEPCO and the results were announced.

All the test results during the month of February have confirmed that the radiation levels of sampled water were substantially below the operational targets set by TEPCO (these operational targets are well below the density limit specified by the Reactor Regulation). The results of these analyses were also confirmed by Japan Chemical Analysis Center.

In addition, TEPCO and JAEA, at the request of the Government of Japan, regularly conduct more detailed analyses on the groundwater. The results of JAEA's latest analyses confirmed that TEPCO's analyses were accurate and verified that the radiation levels of the sampled groundwater were substantially below the operational target (see Appendix 6).

Moreover, TEPCO publishes analysis results on seawater sampled during the discharge operation at the nearest seawater sampling post from the discharge point (see Appendix 7). The result shows that the radiation levels in seawater remain lower than the density limit specified by the Reactor Regulation and significant change in the radioactivity has not been observed. The analysis had been conducted once a month until March 2017. Since April 2017, it is conducted four times a year because there has been no significant fluctuation in the concentration of radioactive materials in the sea water, and no influence on the surrounding environment has been confirmed.

The sampling process for analyses conducted this month is the same as the one conducted in the information disseminated last month. Results of the analyses are shown in the attached appendices:

(For further information, please contact TEPCO at (Tel: 03-6373-1111) or refer to the TEPCO's website:
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/index-e.html)

Contact: International Nuclear Cooperation Division,
Ministry of Foreign Affairs, Tel 03-5501-8227

Outline of Decommissioning, Contaminated Water and Treated Water Management

February 24, 2022
Secretariat of the Team for Countermeasures for Decommissioning, Contaminated Water and Treated Water

Main decommissioning work and steps

Fuel removal from the spent fuel pool was completed in December 2014 at Unit 4 and on February 28, 2021 at Unit 3.
Work continues sequentially toward the start of fuel removal from Units 1 and 2 and debris (Note 1) retrieval from Units 1-3.

(Note 1) Fuel assemblies having melted through in the accident.

Units 1-6	Completion of fuel removal	Within 2031
Unit 1	Start of fuel removal	FY2027 - FY2028
Unit 2	Start of fuel removal	FY2024 - FY2026
Unit 3	Completion of fuel removal	Within FY2020
Unit 4	Completion of fuel removal	2014

Fuel Removal from SFP: Rubble removal etc. (Units 1 and 2) → Installation of fuel removal equipment → Fuel removal → Storage / Transportation (Units 3 and 4)

Fuel Debris Retrieval: Understanding of the situation inside the PCV / Consideration of retrieval methods, etc. (Units 1 and 3; Unit 2) → Fuel debris retrieval → Storage / Transportation

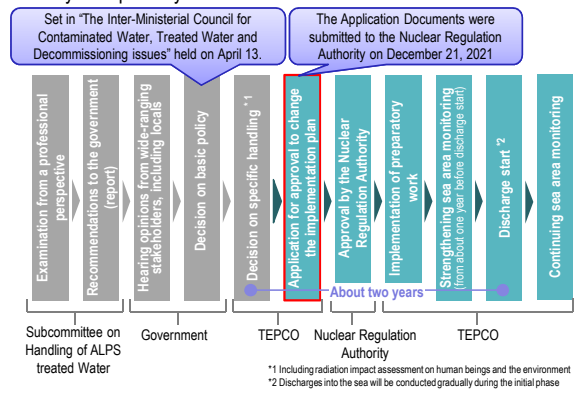
First unit	Start of fuel debris retrieval
Unit 2	Within 2021 *Expected to be delayed by approximately 1 year

Dismantling Facilities: Scenario development & technology consideration → Design and manufacturing of devices / equipment → Dismantling

Measures of treated water Appendix 1

Handling of ALPS treated water

Regarding the discharge of ALPS treated water into the sea, TEPCO must comply with regulatory and other safety standards to safeguard the public, the surrounding environment and agricultural, forestry and fishery products. To minimize adverse impacts on reputation, monitoring will be further enhanced and objectivity and transparency ensured by engaging with third-party experts and having safety checked by the IAEA. Moreover, accurate information will be disseminated continuously and fully transparently.



Contaminated water management – triple-pronged efforts -

(1) Efforts to promote contaminated water management based on the three basic policies

① "Remove" the source of water contamination ② "Redirect" fresh water from contaminated areas
③ "Retain" contaminated water from leakage

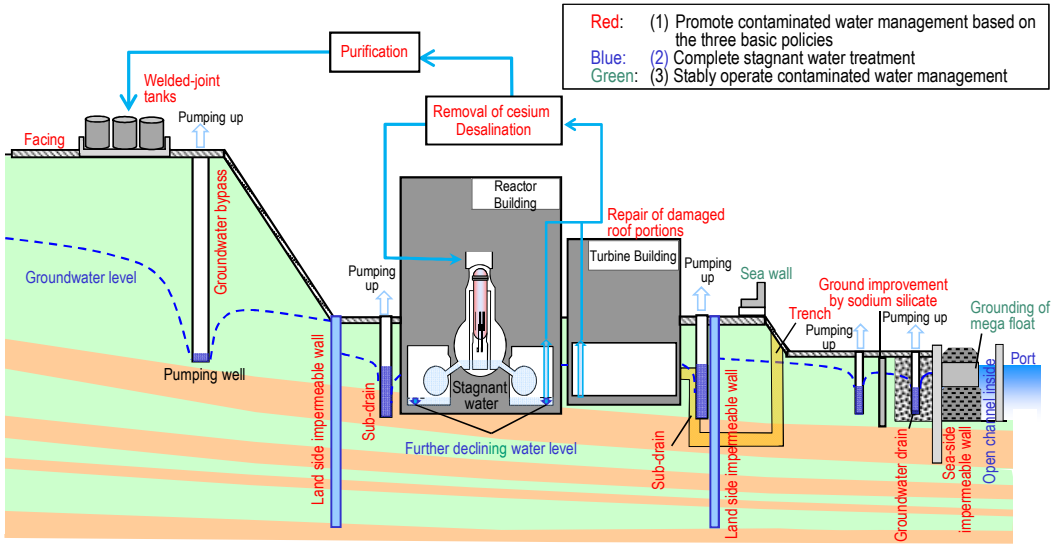
- Strontium-reduced water from other equipment is being re-treated in the Advanced Liquid Processing System (ALPS: multi-nuclide removal equipment) and stored in welded-joint tanks.
- Multi-layered contaminated water management measures, including land-side impermeable walls and sub-drains, have stabilized the groundwater at a low level and the increased contaminated water generated during rainfall is being suppressed by repairing damaged portions of building roofs, facing onsite, etc. Through these measures, the generation of contaminated water was reduced from approx. 540 m^3/day (in May 2014) to approx. 180 m^3/day (in FY2019) and approx. 140 m^3/day (in 2020).
- Measures continue to further suppress the generation of contaminated water to 100 m^3/day or less within 2025.

(2) Efforts to complete stagnant water treatment

- To lower the stagnant water levels in buildings as planned, work to install additional stagnant water transfer equipment is underway. At present, the floor surface exposure condition can be maintained except for the Unit 1-3 Reactor Buildings, Process Main Building and the High Temperature Incinerator Building.
- In 2020, treatment of stagnant water in buildings was completed, except for the Unit 1-3 Reactor Buildings, Process Main Building and High-Temperature Incinerator Building. For Reactor Buildings, the amount of stagnant water there will be reduced to about half the amount at the end of 2020 during the period FY2022-2024.
- For Zeolite sandbags on the basement floors of the Process Main Building and High-Temperature Incinerator Building, measures to reduce the radiation dose are being examined with stabilization in mind.

(3) Efforts to stably operate contaminated water management

- To prepare for tsunamis, various measures are underway. For heavy rain, sandbags are being installed to suppress direct inflow into buildings while work sealing off openings in buildings and installing sea walls to enhance drainage channels and other measures are being implemented as planned.



Progress status

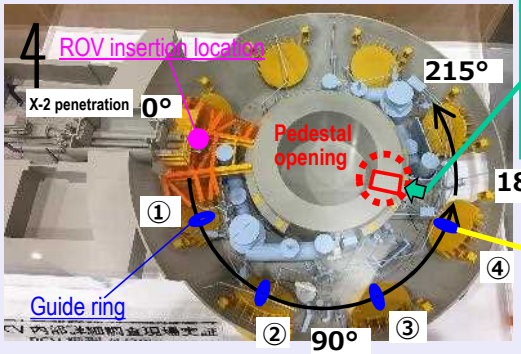
◆ The temperatures of the Reactor and the Primary Containment Vessel of Units 1-3 have been maintained stable.
There was no significant change in the concentration of radioactive materials newly released from Reactor Buildings into the air. It was concluded that the comprehensive cold shutdown condition had been maintained.

Unit 1 A submersible vehicle was inserted into the Primary Containment Vessel(PCV)

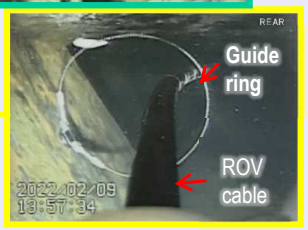
Toward internal investigation of the Unit 1 PCV, the first remotely operated underwater vehicle (ROV-A) was inserted on February 8 to install "guide rings" which will facilitate the investigation. On February 9, installation of four guide rings has been completed.

The investigation detected deposits at the PCV bottom, pedestal opening, pieces of the grating and steel materials, which were likely to be cut during work to create an opening an access route, and pipes of the Primary Loop Recirculation system.

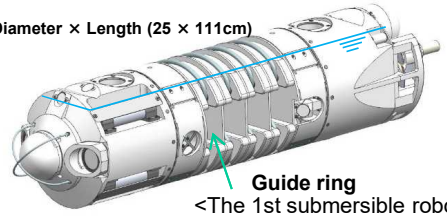
After completing preparation, a detailed investigation by the ROV-A2 will be implemented.



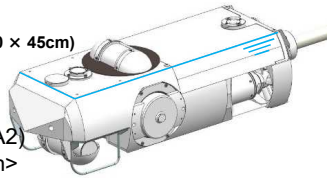
Massive deposits



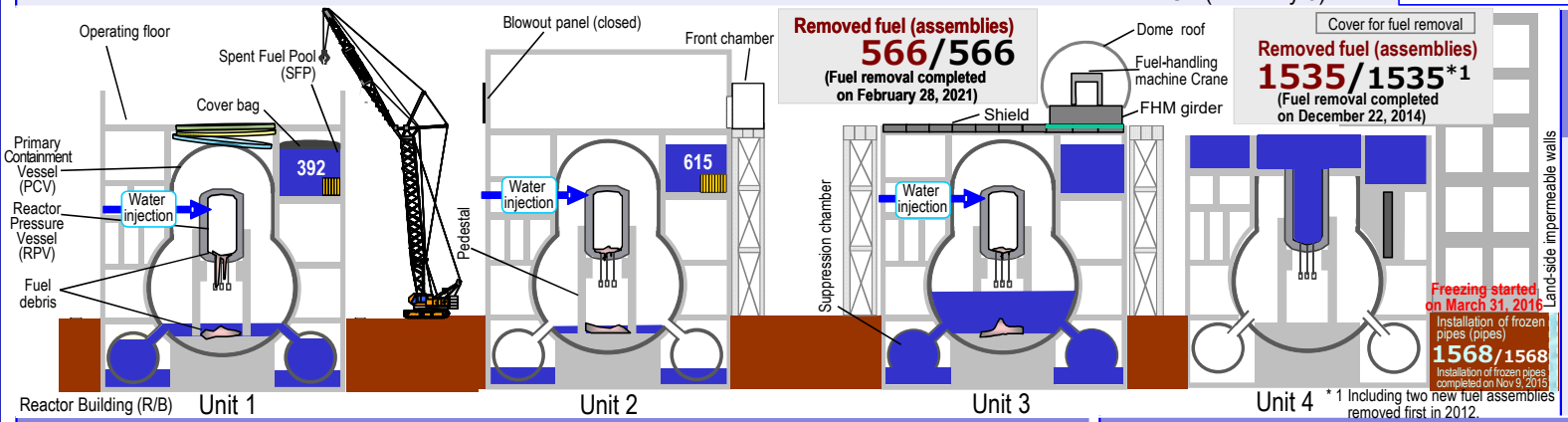
<Status inside the PCV (February 9)>



<The 1st submersible robot (ROV-A)>



<The 2nd submersible robot (ROV-A2) for detailed visual investigation>



*1 Including two new fuel assemblies removed first in 2012.

Circulation stirring verification tests were conducted for ten connected tanks of the dilution and discharge facility for ALPS treated water

The dilution and discharge facility for ALPS treated water will use a group of ten tanks for discharge. In sampling before discharge, water within the whole tank group will be circulated to homogenize the concentration.

To verify the concentration homogenization across ten tanks, a circulation stirring verification test was conducted over the period February 7-13.

The stirring effect was confirmed by comparing the theoretical average and actually measuring the concentrations of the reagent injected into the tanks.

Unit 2 The trial retrieval equipment arrived at Naraha, the operation verification test started

Toward the trial retrieval of Unit 2 fuel debris, a performance verification test and operational training of the robot arm in the domestic facility (Kobe) was finished on January 21. The equipment was transported to Naraha Center for Remote Control Technology Development of the Japan Atomic Energy Agency (JAEA),where the test to verify the operation of the robot arm started from February 14.

As a preliminary step for the PCV internal investigation and trial retrieval, work to install an isolated working room started from February 14. Work continues while prioritizing safety.

<Arrival of the robot arm>

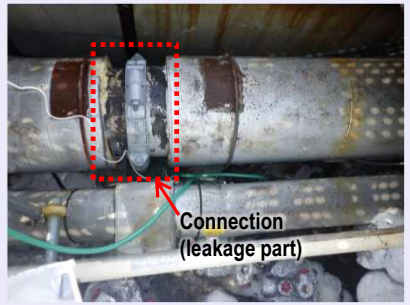
Status of refrigerant leakage at the land-side impermeable walls

On February 15, when the brine supply pump was stopped for the test to reduce the risk of refrigerant (brine*) leakage at the land-side impermeable walls in the event of the Chishima-Trench tsunami arrival, the liquid level decline in the brine tank was detected. The valve was closed as an emergency measure, and the liquid level decline was stopped.

Later, leakage from the brine pipe connection was detected. The rubber ring of that connection was replaced and brine supply resumed in all areas on February 21.

The cause of the leakage will be investigated and efforts to maintain the land-side impermeable walls will continue.

As of February 22, the temperature of the temperature measuring tubes has remained below 0℃.



<Leakage part of the connection after moving insulator>

* Refrigerant (brine): Liquid calcium chloride (the same ingredients as the snow melting agent sprayed on roads during snow fall)

Appendix 2

Results of analyses on the quality of the purified groundwater pumped from the sub-drain and groundwater drain systems at Fukushima Daiichi NPS (made available by TEPCO prior to discharge)

(Unit: Bq/L)

Date of sampling *Date of discharge	Detected nuclides	Analytical body	
		TEPCO	Third-party organization
February 22nd, 2022 *Discharged on February 27th	Cs-134	ND (0.57)	ND (0.60)
	Cs-137	ND (0.67)	ND (0.69)
	Gross β	ND (1.9)	0.42
	H-3	890	960
February 20th, 2022 *Discharged on February 25th	Cs-134	ND (0.75)	ND (0.59)
	Cs-137	ND (0.72)	ND (0.71)
	Gross β	ND (1.9)	0.48
	H-3	920	1,000
February 14th, 2022 *Discharged on February 24th	Cs-134	ND (0.55)	ND (0.51)
	Cs-137	ND (0.69)	ND (0.53)
	Gross β	ND (1.9)	ND (0.38)
	H-3	960	1,000
February 16th, 2022 *Discharged on February 23rd	Cs-134	ND (0.70)	ND (0.56)
	Cs-137	ND (0.47)	ND (0.86)
	Gross β	ND (2.0)	ND (0.36)
	H-3	810	850
February 12th, 2022 *Discharged on February 17th	Cs-134	ND (0.45)	ND (0.74)
	Cs-137	ND (0.65)	ND (0.53)
	Gross β	ND (1.8)	ND (0.35)
	H-3	1,000	1,100
February 11th, 2022 *Discharged on February 16th	Cs-134	ND (0.76)	ND (0.76)
	Cs-137	ND (0.67)	ND (0.49)
	Gross β	ND (1.9)	ND (0.34)
	H-3	890	940
February 10th, 2022 *Discharged on February 15th	Cs-134	ND (0.50)	ND (0.78)
	Cs-137	ND (0.76)	ND (0.63)
	Gross β	ND (0.64)	ND (0.34)
	H-3	920	1,000
February 6th, 2022 *Discharged on February 11th	Cs-134	ND (0.62)	ND (0.61)
	Cs-137	ND (0.76)	ND (0.53)
	Gross β	ND (1.8)	ND (0.36)
	H-3	950	980

February 4th, 2022 *Discharged on February 9th	Cs-134	ND (0.53)	ND (0.60)
	Cs-137	ND (0.60)	ND (0.61)
	Gross β	ND (1.8)	ND (0.38)
	H-3	860	910
February 3rd, 2022 *Discharged on February 8th	Cs-134	ND (0.66)	ND (0.69)
	Cs-137	ND (0.54)	ND (0.66)
	Gross β	ND (0.63)	ND (0.38)
	H-3	870	910
January 31st, 2022 *Discharged on February 5th	Cs-134	ND (0.83)	ND (0.76)
	Cs-137	ND (0.60)	ND (0.74)
	Gross β	ND (1.9)	ND (0.35)
	H-3	910	950
January 29th, 2022 *Discharged on February 3rd	Cs-134	ND (0.79)	ND (0.62)
	Cs-137	ND (0.69)	ND (0.54)
	Gross β	ND (1.7)	ND (0.33)
	H-3	960	1,000
January 27th, 2022 *Discharged on February 1st	Cs-134	ND (0.72)	ND (0.73)
	Cs-137	ND (0.69)	ND (0.60)
	Gross β	ND (1.7)	ND (0.34)
	H-3	900	970

* * ND: represents a value below the detection limit; values in ( ) represent the detection limit.
* In order to ensure the results, third-party organizations have also conducted an analysis and verified the radiation level of the sampled water.
* Third-party organization : Tohoku Ryokka Kankyohozen Co., Ltd

Result of detailed analyses conducted by TEPCO, JAEA, and Japan Chemical Analysis Center (In order to confirm the validity of analysis, the Government of Japan also requests JAEA; and TEPCO requests Japan Chemical Analysis Center to conduct independent analyses)

(Unit: Bq/L)

Date of sampling	Detected nuclides	Analytical body		
		JAEA	TEPCO	Japan Chemical Analysis Center
January 1st,2022	Cs-134	ND (0.0031)	ND (0.0050)	ND (0.0061)
	Cs-137	0.0049	0.0053	ND (0.0052)
	Gross α	ND (0.49)	ND (3.0)	ND (1.9)
	Gross β	ND (0.47)	ND (0.72)	ND (0.59)
	H-3	940	930	950
	Sr-90	0.0031	ND (0.0022)	ND (0.0068)

* ND: represents a value below the detection limit; values in ( ) represent the detection limit.

(Reference)

(Unit: Bq/L)

Radionuclides	Operational Targets	Density Limit specified by the Reactor Regulation	World Health Organization (WHO) Guidelines for Drinking Water Quality
Cs-134	1	60	10
Cs-137	1	90	10
Gross α	—	—	—
Gross β	3 (1) ※	—	—
H-3	1,500	60,000	10,000
Sr-90	—	30	10

※ The operational target of Gross β is 1 Bq/L in the survey which is conducted once every ten days.

Appendix 4

Results of analysis on the seawater sampled near the discharge point (North side of Units 5 and 6 discharge channel)

(Unit: Bq/L)

Date of sampling	Detected nuclides	Sampling point (South discharge channel)
December 17th, 2021 *Sampled before discharge of purified groundwater.	Cs-134	ND (0.85)
	Cs-137	ND (0.59)
	Gross β	11
	H-3	ND (1.7)

Appendix 5

Results of analyses on the water quality of the groundwater pumped up for bypassing at Fukushima Daiichi NPS (made available by TEPCO prior to discharge)

(Unit: Bq/L)

Date of sampling *Date of discharge	Detected nuclides	Analytical body	
		TEPCO	Japan Chemical Analysis Center
February 19th, 2022 *Discharged on February 28th	Cs-134	ND (0.53)	ND (0.45)
	Cs-137	ND (0.76)	ND (0.53)
	Gross β	ND (0.67)	ND (0.63)
	H-3	75	73
February 11th, 2022 *Discharged on February 17th	Cs-134	ND (0.67)	ND (0.85)
	Cs-137	ND (0.67)	ND (0.69)
	Gross β	ND (0.61)	ND (0.30)
	H-3	67	70
February 6th, 2022 *Discharged on February 13th	Cs-134	ND (0.67)	ND (0.58)
	Cs-137	ND (0.55)	ND (0.38)
	Gross β	ND (0.59)	ND (0.68)
	H-3	72	73
January 27th, 2022 *Discharged on February 4th	Cs-134	ND (0.71)	ND (0.51)
	Cs-137	ND (0.62)	ND (0.56)
	Gross β	ND (0.68)	ND (0.47)
	H-3	43	41

∗ * ND: represents a value below the detection limit; values in ( ) represent the detection limit

∗ In order to ensure the results, Japan Chemical Analysis Center, a third-party organization, has also conducted an analysis and verified the radiation level of the sampled water.

Appendix 6

Result of detailed analyses conducted by TEPCO, JAEA, and Japan Chemical Analysis Center (In order to confirm the validity of analysis, the Government of Japan also requests JAEA; and TEPCO requests Japan Chemical Analysis Center to conduct independent analyses)

(Unit: Bq/L)

Date of sampling	Detected nuclides	Analytical body		
		JAEA	TEPCO	Japan Chemical Analysis Center
January 5th, 2022	Cs-134	ND (0.0026)	ND (0.0046)	ND (0.0070)
	Cs-137	ND (0.0019)	ND (0.0040)	ND (0.0041)
	Gross α	ND (0.45)	ND (3.0)	ND (1.9)
	Gross β	ND (0.47)	ND (0.68)	ND (0.45)
	H-3	71	69	71
	Sr-90	ND (0.0012)	ND (0.0014)	ND (0.0066)

* ND: represents a value below the detection limit; values in ( ) represent the detection limit.

(Reference) (Unit: Bq/L)

Radionuclides	Operational Targets	Density Limit specified by the Reactor Regulation	World Health Organization (WHO) Guidelines for Drinking Water Quality
Cs-134	1	60	10
Cs-137	1	90	10
Gross α	—	—	—
Gross β	5 (1) ※	—	—
H-3	1,500	60,000	10,000
Sr-90	—	30	10

※ The operational target of Gross β is 1 Bq/L in the survey which is conducted once every ten days.

Appendix 7

Results of analyses on the seawater sampled near the discharge point (Around South Discharge Channel)

(Unit: Bq/L)

Date of sampling ※conducted four times a year	Detected nuclides	Sampling point (South discharge channel)
December 17th, 2021	Cs-134	ND (0.53)
	Cs-137	ND (0.80)
	Gross β	11
	H-3	ND (1.7)