Information (17:00), January 29, 2021

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 December

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 December at Fukushima Daiichi Nuclear Power Station (NPS).

1. Summary of decommissioning and contaminated water management

In December, 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/mp202012.pdf

2. Sub-drain and Groundwater Drain Systems

In December, 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 December 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.

2. Groundwater Bypassing

In December, 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 December 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 and Contaminated Water Management

December 24, 2020
Secretariat of the Team for Countermeasures for Decommissioning and Contaminated Water Treatment

Main decommissioning work and steps

Appendix 1

Fuel removal from the spent fuel pool was completed in December 2014 at Unit 4 and started from April 15, 2019 at Unit 3. Dust concentration in the surrounding environment is being monitored and work is being implemented with safety first. 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.

Fuel Removal from SFP

Units 1 & 2: Rubble removal etc. → Installing fuel removal machine → Unit 3: Fuel removal → Unit 4: Storage and handling of fuel

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 Debris Retrieval

Units 1 & 3 / Unit 2: Ascertaining the status inside the PCV/examining the fuel debris retrieval method, etc. → Fuel debris retrieval → Storage and handling of fuel debris

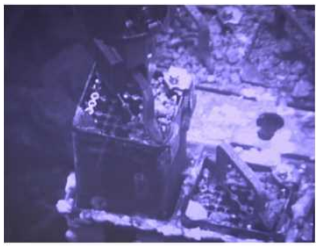
First unit	Start of fuel debris retrieval
Unit 2	Within 2021

Dismantling Facilities

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

Fuel removal from the spent fuel pool

Fuel removal from the spent fuel pool started from April 15, 2019 at Unit 3. Rubble and fuel are being removed, aiming to complete fuel removal by the end of FY2020.



Fuel removal (April 15, 2019)

Removed fuel (assemblies)

441/566

(As of December 24, 2020)

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

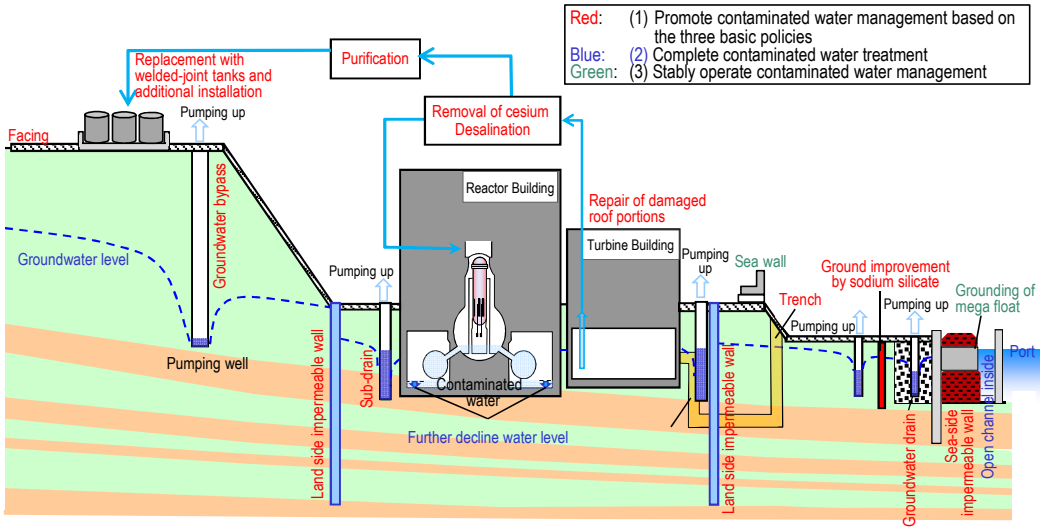
- Strontium-reduced water from other equipment is being re-treated in the multi-nuclide removal equipment (ALPS) and stored in welded-joint tanks.
- Multi-layered contaminated water management measures, including land-side impermeable walls and sub-drains, have stabilized the groundwater at a low level 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 FY2014) to approx. 180 m^3/day (in FY2019).
- Measures continue to further suppress the generation of contaminated water to approx. 150 m^3/day within FY2020 and 100 m^3/day or less within 2025.

(2) Efforts to complete contaminated water treatment

- To lower the contaminated water levels in buildings as planned, work to install an additional contaminated 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.
- Treatment of contaminated water in buildings will be completed within 2020, excluding the Unit 1-3 Reactor Buildings, Process Main Building and High-Temperature Incinerator Building. For Reactor Buildings, the amount of contaminated water there will be reduced from the level 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, measures includingare underway. For heavy rain, sandbags are being installed to suppress direct inflow into buildings while work closing building openings and installing sea walls to enhance drainage channels and other measures are being implemented as planned.



Progress Status and Future Challenges of the Mid-and-Long-Term Roadmap toward Decommissioning of TEPCO Holdings Fukushima Daiichi Nuclear Power Station (Outline)

Progress status

◆ The temperatures of the Reactor Pressure Vessel (RPV) and Primary Containment Vessel (PCV) of Units 1-3 have been maintained within the range of approx. 15-25°C*1 over the past month.
There was no significant change in the concentration of radioactive materials newly released from Reactor Buildings into the air*2. It was concluded that the comprehensive cold shutdown condition had been maintained.

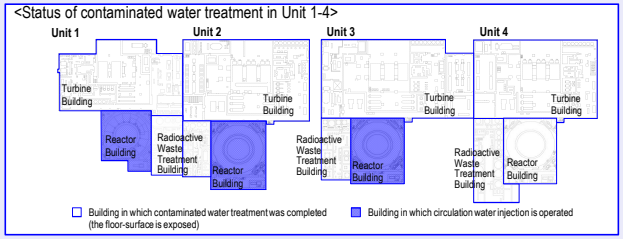
* 1 The values varied somewhat, depending on the unit and location of the thermometer.
* 2 In November 2020, the radiation exposure dose due to the release of radioactive materials from the Unit 1-4 Reactor Buildings was evaluated at less than 0.00007 mSv/year at the site boundary.
The annual radiation dose from natural radiation is approx. 2.1 mSv/year (average in Japan).

The target of contaminated water treatment in buildings completed

For the floor-surface exposure of buildings, except for the Unit 1-3 Reactor Buildings, Process Main Building and the High Temperature Incinerator Building within 2020, which is a milestone (main target process) of the Mid-and-Long-Term Roadmap, levels of contaminated water in buildings were reduced. On December 24, the achievement of the target was confirmed.

With the aim of halving the volume of contaminated water in R/B by the end of 2020 (FY2022-2024), ongoing efforts to manage contaminated water will continue.

<Status of contaminated water treatment in Unit 1-4>



Analysis of secondary treatment performance confirmation tests completed and concentration reduction confirmed

As a secondary treatment performance confirmation tests, analysis of the high-concentration area (J1-C) and the low concentration area (J1-G) was completed.

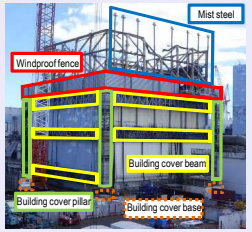
The sum of ratios of legally required concentrations for nuclides targeted for removal (62 nuclides) + Carbon-14 was as follows:

・High concentration area (J1-C)
[before] 2,406 → [after] 0.35
・Low concentration area (J1-G)
[before] 387 → [after] 0.22

In both areas, it was confirmed that the sum of ratios of legally required concentrations excluding tritium is reduced to less than 1. Work continues to check the procedures and processes for the nuclide analysis and conduct others.

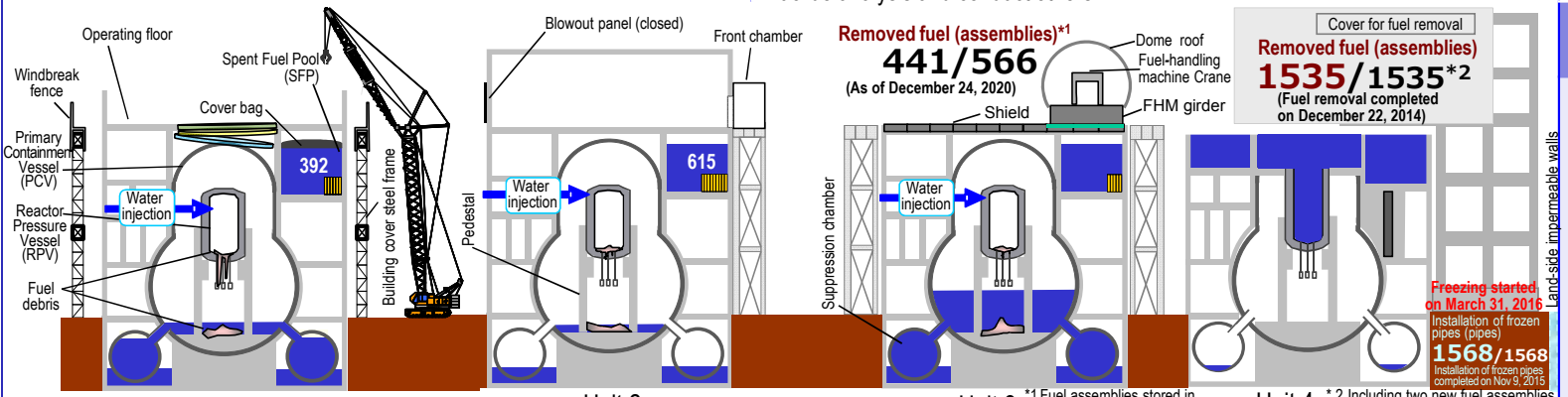
Unit 1 Before starting to install a large cover, work to dismantle the building cover (remaining part) commenced

Before starting to install a large cover over the Unit 1 Rector Building, work to dismantle the interfering building cover (remaining part) commenced from December 19, 2020. After completing the dismantling in June 2021, installation of a large cover will start from the first half of FY2021.



Full view of Unit 1 Reactor Building (as of March 2020)


Dismantling of the windproof fences (as of December 19, 2020)



*1 Fuel assemblies stored in the rack of the common pool

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

Survey for workers toward creating a safe and comfortable work environment

With the aim of improving the work environment in the Fukushima Daiichi Nuclear Power Station, the 11th questionnaire survey was conducted, to which 4,227 workers responded.

Positive responses increased regarding concerns about working, rewarding and the intention to work. In response to the answer concerning places where workers felt unsafe within and outside the site, these places will be investigated and lighting and safe passages will be installed as necessary. Based on workers' feedback, efforts for improvement will continue.

Unit 1 PCV internal investigation New camera being developed toward obstacle investigation

During preparatory work toward the PCV internal investigation by an underwater ROV, it was confirmed that there were instrumentation pipes for the Primary Loop Recirculation System under the cutting scope. To check the insertion route of the underwater ROV, an obstacle investigation will be conducted using a new camera.

The new camera will be mounted on suspension equipment and take images downward and laterally. Work to investigate obstacles using this new camera equipment will be conducted in late January 2021.

Future processes will be reviewed based on the investigative results of the new camera equipment.

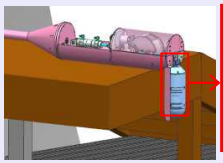
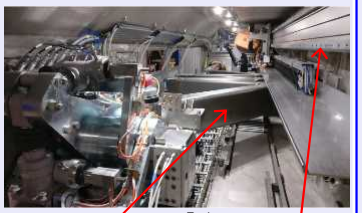


Image of the new camera equipment


Appearance of the camera

Unit 2 Development of the equipment for trial fuel debris retrieval delayed by the spreading COVID-19 infection in the UK

Regarding the equipment for trial fuel debris retrieval in Unit 2, development in the UK has been delayed due to the spreading COVID-19 infection and transporting to Japan scheduled for January 2021 will be difficult. If the work continues in the UK, a significant delay to the process is expected. In response, it was decided that among the performance verification test and others planned in the UK, those that may be conducted in Japan will be relocated to Japan. Toward the trial retrieval, efforts will continue with safety first to minimize the process delay within almost one year.



Unit 3 Fuel removal resumed

On November 18, the main hoisting of the crane malfunctioned and fuel removal was suspended. Disassembling the main hoisting components involved allowed the problematic part to be identified. On December 16, the power cable of the main hoisting motor was replaced and the main hoisting was confirmed as working.

After confirming the soundness of the crane and completing a series of operation verification, work resumed from December 20. At present, 441 fuel assemblies have been removed. On December 24, a lifting test was conducted using a new gripper for four fuel assemblies with significantly deformed handles.

Work will continue with safety first toward completing fuel removal within FY2020.

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
December 25th, 2020 *Discharged on December 30th	Cs-134	ND (0.70)	ND (0.52)
	Cs-137	ND (0.47)	ND (0.63)
	Gross β	ND (0.70)	ND (0.34)
	H-3	1,100	1,100
December 23rd, 2020 *Discharged on December 28th	Cs-134	ND (0.72)	ND (0.69)
	Cs-137	ND (0.65)	ND (0.58)
	Gross β	ND (1.7)	ND (0.39)
	H-3	1,100	1,100
December 5th, 2020 *Discharged on December 27th	Cs-134	ND (0.76)	ND (0.69)
	Cs-137	ND (0.80)	ND (0.51)
	Gross β	ND (1.9)	ND (0.57)
	H-3	880	940
December 21st, 2020 *Discharged on December 26th	Cs-134	ND (0.72)	ND (0.61)
	Cs-137	ND (0.69)	ND (0.69)
	Gross β	ND (1.6)	0.39
	H-3	990	1,100
December 13th, 2020 *Discharged on December 25th	Cs-134	ND (0.74)	ND (0.78)
	Cs-137	ND (0.69)	ND (0.63)
	Gross β	ND (2.0)	ND (0.42)
	H-3	900	950
December 19th, 2020 *Discharged on December 24th	Cs-134	ND (0.70)	ND (0.84)
	Cs-137	ND (0.69)	ND (0.55)
	Gross β	ND (1.7)	ND (0.36)
	H-3	970	1,000
December 11th, 2020 *Discharged on December 23rd	Cs-134	ND (0.59)	ND (0.67)
	Cs-137	ND (0.60)	ND (0.61)
	Gross β	ND (1.8)	ND (0.33)
	H-3	870	940
December 17th, 2020 *Discharged on December 22nd	Cs-134	ND (0.76)	ND (0.59)
	Cs-137	ND (0.60)	ND (0.69)
	Gross β	ND (0.57)	ND (0.33)
	H-3	910	960

December 15th, 2020 *Discharged on December 20th	Cs-134	ND (0.68)	ND (0.63)
	Cs-137	ND (0.54)	ND (0.66)
	Gross β	ND (1.8)	ND (0.38)
	H-3	900	960
December 9th, 2020 *Discharged on December 14th	Cs-134	ND (0.67)	ND (0.64)
	Cs-137	ND (0.83)	ND (0.60)
	Gross β	ND (0.65)	ND (0.39)
	H-3	810	850
December 7th, 2020 *Discharged on December 12th	Cs-134	ND (0.70)	ND (0.72)
	Cs-137	ND (0.73)	ND (0.73)
	Gross β	ND (1.6)	ND (0.33)
	H-3	760	800
December 3rd, 2020 *Discharged on December 8th	Cs-134	ND (0.61)	ND (0.47)
	Cs-137	ND (0.62)	ND (0.47)
	Gross β	ND (2.1)	ND (0.48)
	H-3	960	1,000
December 2nd, 2020 *Discharged on December 7th	Cs-134	ND (0.78)	ND (0.57)
	Cs-137	ND (0.54)	ND (0.61)
	Gross β	ND (1.7)	ND (0.67)
	H-3	920	980
December 1st, 2020 *Discharged on December 6th	Cs-134	ND (0.65)	ND (0.69)
	Cs-137	ND (0.65)	ND (0.66)
	Gross β	ND (0.65)	ND (0.50)
	H-3	910	960
November 30th, 2020 *Discharged on December 5th	Cs-134	ND (0.63)	ND (0.52)
	Cs-137	ND (0.73)	ND (0.66)
	Gross β	ND (1.9)	ND (0.60)
	H-3	940	990
November 29th, 2020 *Discharged on December 4th	Cs-134	ND (0.55)	ND (0.63)
	Cs-137	ND (0.65)	ND (0.69)
	Gross β	ND (2.0)	ND (0.40)
	H-3	880	940
November 28th, 2020 *Discharged on December 3rd	Cs-134	ND (0.82)	ND (0.59)
	Cs-137	ND (0.65)	ND (0.47)
	Gross β	ND (2.1)	0.57
	H-3	880	950
November 26th, 2020 *Discharged on December 1st	Cs-134	ND (0.55)	ND (0.59)
	Cs-137	ND (0.73)	ND (0.61)
	Gross β	ND (0.65)	ND (0.39)
	H-3	890	920

* * 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

Appendix 3

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
November 1st,2020	Cs-134	ND (0.0030)	ND (0.0046)	ND (0.0054)
	Cs-137	0.0085	0.00086	0.0069
	Gross α	ND (0.65)	ND (3.6)	ND (2.0)
	Gross β	ND (0.49)	ND (0.65)	ND (0.63)
	H-3	1,100	1,100	1,100
	Sr-90	0.0012	0.0016	ND (0.0063)

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

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 3rd, 2020 *Sampled before discharge of purified groundwater.	Cs-134	ND (0.44)
	Cs-137	ND (0.78)
	Gross β	11
	H-3	ND (1.9)

(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 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
December 19th, 2020 *Discharged on December 27th	Cs-134	ND (0.78)	ND (0.56)
	Cs-137	ND (0.54)	ND (0.59)
	Gross β	ND (0.63)	ND (0.55)
	H-3	110	100
December 11th, 2020 *Discharged on December 19th	Cs-134	ND (0.65)	ND (0.45)
	Cs-137	ND (0.65)	ND (0.54)
	Gross β	ND (0.61)	ND (0.58)
	H-3	97	94
December 3rd, 2020 *Discharged on December 11th	Cs-134	ND (0.45)	ND (0.56)
	Cs-137	ND (0.76)	ND (0.43)
	Gross β	ND (0.67)	ND (0.57)
	H-3	95	98
November 25th, 2020 *Discharged on December 3rd	Cs-134	ND (0.63)	ND (0.53)
	Cs-137	ND (0.65)	ND (0.45)
	Gross β	ND (0.63)	ND (0.54)
	H-3	100	110

- * 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
November 4th, 2020	Cs-134	ND (0.0024)	ND (0.0041)	ND (0.0066)
	Cs-137	ND (0.0022)	0.0039	ND (0.0048)
	Gross α	ND (0.39)	ND (3.0)	ND (2.0)
	Gross β	ND (0.48)	ND (0.75)	ND (0.56)
	H-3	140	130	140
	Sr-90	0.0011	ND (0.0014)	ND (0.0063)

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

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 3rd, 2020	Cs-134	ND (0.72)
	Cs-137	ND (0.72)
	Gross β	11
	H-3	ND (1.9)

(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.