Information (17:00), April 27, 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 March

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 March at Fukushima Daiichi Nuclear Power Station (NPS).

1. Summary of decommissioning and contaminated water management

In March, 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/mp202103.pdf

2. Sub-drain and Groundwater Drain Systems

In March, 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 March 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 March, 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 March 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

March 25, 2021
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 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.

Fuel Removal from SFP

Units 1 & 2 → Rubble removal etc. → Installing fuel removal machine → Fuel removal → Unit 3 and 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 and the removal of all fuel assemblies was completed on February 28, 2021.

Fuel removal (566th assembly)
(February 26, 2021)

Removed fuel (assemblies)
566/566
(Fuel removal completed on February 28, 2021)

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

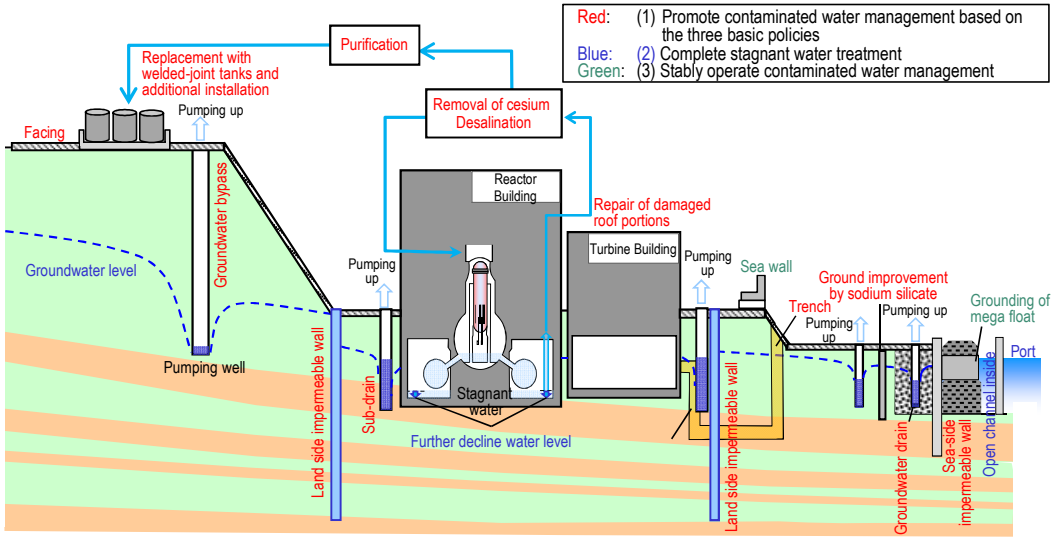
- Strontium-reduced water from other equipment is being re-treated in the multi-nuclide removal equipment (ALPS) and stored in welded-joint tanks.
- Multi-layered contaminated water management measures, including land-side impermeable walls and sub-drains, have stabilized the groundwater at a low level 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 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 m3/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 of 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 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. 15-20°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 February 2021, the radiation exposure dose due to the release of radioactive materials from the Unit 1-4 Reactor Buildings was evaluated at less than 0.00004 mSv/year at the site boundary.
The annual radiation dose from natural radiation is approx. 2.1 mSv/year (average in Japan).

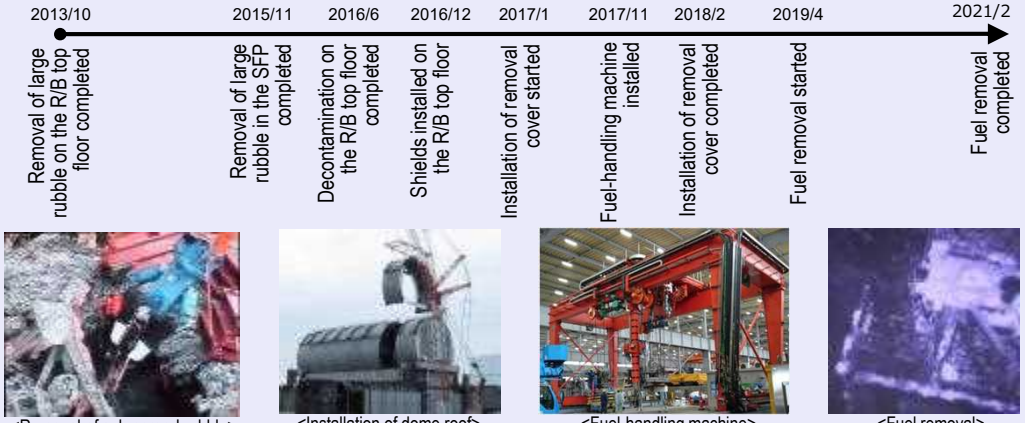
Unit 3 Removal of all fuel assemblies from the Unit 3 spent fuel pool completed (February 28, 2021)

Removal of 566 fuel assemblies remaining in the Unit 3 spent fuel pool was completed. This is the first among the meltdown units.

As the top floor of the Unit 3 Reactor Building, where the spent fuel pool was located, was in a high-dose environment, rubble and fuel were removed by remote operation.

Despite various problems encountered during work, partner companies and TEPCO collaborated on an ongoing basis to improve matters and subsequently finished the planned work.

Lessons and insights acquired from this work will be utilized in fuel removal at Units 1 and 2.

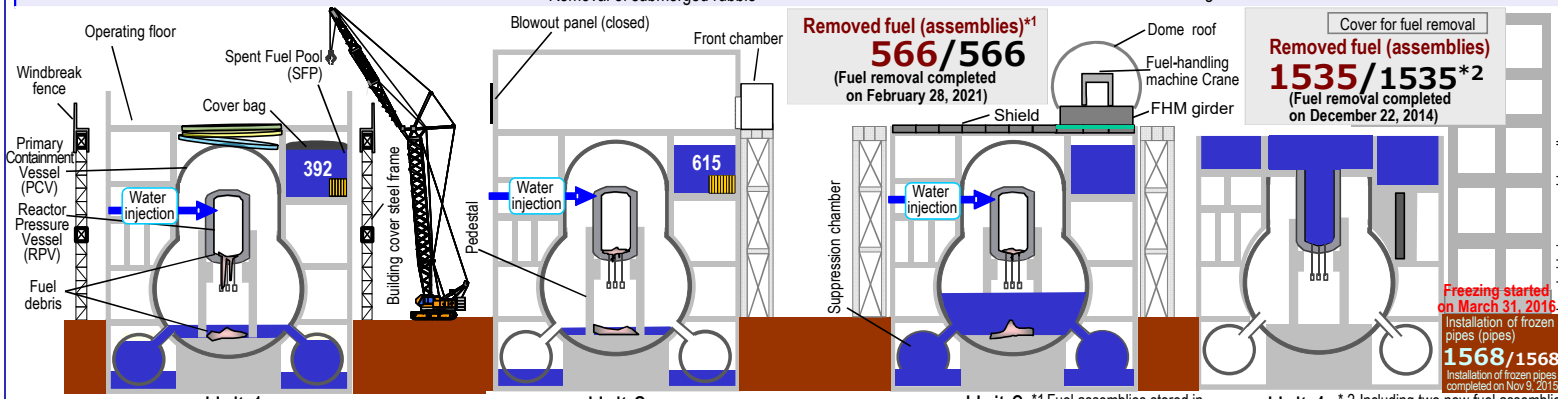


<Removal of submerged rubble>

<Installation of dome roof>

<Fuel-handling machine>

<Fuel removal>



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

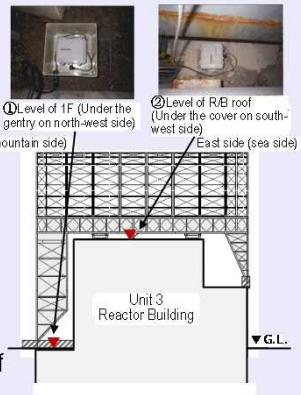
* 2 Including two new fuel assemblies removed first in 2012.

Operation of seismometers in Unit 3 resumed on March 19

Regarding seismometers, which were installed in the Unit 3 Reactor Building for trial operation, observation was suspended after they malfunctioned due to being immersed in rainwater and noise generation. Work is underway to investigate the cause of the noise.

These seismometers were replaced with new ones and trial operation resumed temporarily on March 19. Subsequently, the record of the Miyagi Prefecture Offshore Earthquake, which occurred the following day, was acquired.

By utilizing the acquired observation record, methods to identify the aging trend of the building and installation in Units 1 and 2 will continue to be examined.



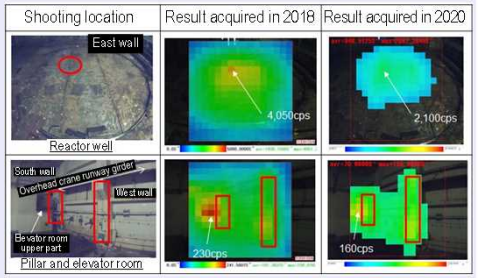
<Location of seismometer installation>

Declining trend confirmed in the air dose rate and the surface contamination density on the Unit 2 Reactor Building top floor

Before installing a fuel-handling facility in Unit 2, the air dose rate and surface contamination density were measured and an overall decline in these values of about 20% compared to the previous results (2018) was confirmed.

Measures to further reduce the dose rate will be prepared and work will continue.

To acquire further insights into decommissioning, the inside of the Unit 2 reactor well will be investigated.



<Results acquired by the gamma camera>

In response to Unit 1 and 3 PCV drops in water levels, monitoring enhanced and further insights collected

In response to the drops in water levels in the Unit 1 and 3 Primary Containment Vessel (PCV), monitoring of plant parameters are enhanced at Unit 1-3. As no significant variation was detected, it was evaluated that there was no immediate influence on nuclear safety.

Regarding Unit 1, the PCV water level had been declining gradually. To monitor the PCV water level stably, the reactor water injection rate was increased on March 22 and an increase in water level was confirmed.

Before investigating the PCV, further insights will be collected by checking the PCV water levels and others.

As part of efforts to clarify the progression of the accident, the insides of the Units 1-4 SGTS rooms were investigated

Toward clarifying the accident progression, the equipment and piping in the Units 1-4 Standby Gas Treatment System (SGTS) rooms were investigated sequentially.

The results of this investigation using a γ-imager indicated contamination around/inside the SGTS filter trains of all Units, which is considered to be a result of backflow of vent gas. Also, accumulated water inside the SGTS filter trains was detected at Unit 3 and 4, which is considered to be condensed water of vent gas.

Efforts to clarify the accident progression will continue.

Mid-and-Long-Term Decommissioning Action Plan 2021 revised

In March 2020, the “Mid-and-Long-Term Decommissioning Action Plan 2020” was published for indicating the main work processes involved in decommissioning as a whole, to achieve the goals laid out in the Mid-and-Long-Term Roadmap and the Nuclear Regulatory Authority (NRA) Risk Map.

Based on the progress of the decommissioning and challenges newly identified in FY2020, the plan was revised as the “Mid-and-Long-Term Decommissioning Action Plan 2021.”

The initiatives undertaken during the decommissioning work are continuously unprecedented in the world. Accordingly, TEPCO will revise this plan regularly in accordance with the progress made and the challenges faced, as TEPCO systematically proceeds with safe and stable decommissioning.

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
March 26th, 2021 *Discharged on March 31st	Cs-134	ND (0.82)	ND (0.70)
	Cs-137	ND (0.60)	ND (0.63)
	Gross β	ND (1.8)	ND (0.36)
	H-3	920	970
March 25th, 2021 *Discharged on March 30th	Cs-134	ND (0.56)	ND (0.59)
	Cs-137	ND (0.60)	ND (0.63)
	Gross β	ND (1.7)	ND (0.33)
	H-3	740	760
March 24th, 2021 *Discharged on March 29th	Cs-134	ND (0.61)	ND (0.69)
	Cs-137	ND (0.69)	ND (0.58)
	Gross β	ND (2.0)	ND (0.35)
	H-3	750	770
March 23rd, 2021 *Discharged on March 28th	Cs-134	ND (0.81)	ND (0.65)
	Cs-137	ND (0.54)	ND (0.67)
	Gross β	ND (0.71)	ND (0.33)
	H-3	650	670
March 20th, 2021 *Discharged on March 25th	Cs-134	ND (0.83)	ND (0.74)
	Cs-137	ND (0.69)	ND (0.96)
	Gross β	ND (2.0)	ND (0.34)
	H-3	710	730
March 18th, 2021 *Discharged on March 24th	Cs-134	ND (0.57)	ND (0.84)
	Cs-137	ND (0.69)	ND (0.81)
	Gross β	ND (1.9)	ND (0.28)
	H-3	850	870
March 15th, 2021 *Discharged on March 23rd	Cs-134	ND (0.56)	ND (0.67)
	Cs-137	ND (0.54)	ND (0.73)
	Gross β	ND (1.8)	ND (0.37)
	H-3	780	800
March 13th, 2021 *Discharged on March 22nd	Cs-134	ND (0.47)	ND (0.48)
	Cs-137	ND (0.65)	ND (0.61)
	Gross β	ND (1.8)	ND (0.36)
	H-3	970	1,000

March 12th, 2021 *Discharged on March 17th	Cs-134	ND (0.69)	ND (0.57)
	Cs-137	ND (0.65)	ND (0.61)
	Gross β	ND (0.62)	ND (0.36)
	H-3	900	920
March 11th, 2021 *Discharged on March 16th	Cs-134	ND (0.61)	ND (0.55)
	Cs-137	ND (0.60)	ND (0.61)
	Gross β	ND (1.9)	ND (0.33)
	H-3	1,000	1,100
March 5th, 2021 *Discharged on March 10th	Cs-134	ND (0.93)	ND (0.67)
	Cs-137	ND (0.74)	ND (0.63)
	Gross β	ND (1.9)	ND (0.31)
	H-3	1,100	1,100
March 4th, 2021 *Discharged on March 9th	Cs-134	ND (0.75)	ND (0.58)
	Cs-137	ND (0.69)	ND (0.51)
	Gross β	ND (1.8)	ND (0.35)
	H-3	940	1,000
March 2nd, 2021 *Discharged on March 7th	Cs-134	ND (0.64)	ND (0.72)
	Cs-137	ND (0.60)	ND (0.57)
	Gross β	ND (0.63)	ND (0.29)
	H-3	870	920
February 27th, 2021 *Discharged on March 4th	Cs-134	ND (0.70)	ND (0.81)
	Cs-137	ND (0.60)	ND (0.81)
	Gross β	ND (1.8)	ND (0.35)
	H-3	920	990
February 26th, 2021 *Discharged on March 3rd	Cs-134	ND (0.71)	ND (0.78)
	Cs-137	ND (0.65)	ND (0.81)
	Gross β	ND (1.7)	ND (0.33)
	H-3	1,100	1,100

- * 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
February 1st,2021	Cs-134	ND (0.0032)	ND (0.0044)	ND (0.0064)
	Cs-137	0.0041	ND (0.0047)	ND (0.0051)
	Gross α	ND (0.70)	ND (3.4)	ND (1.8)
	Gross β	ND (0.48)	ND (0.61)	ND (0.52)
	H-3	1,100	1,100	1,100
	Sr-90	0.0024	ND (0.0013)	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)
March 8th, 2021 *Sampled before discharge of purified groundwater.	Cs-134	ND (0.79)
	Cs-137	ND (0.90)
	Gross β	14
	H-3	ND (0.79)

(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
March 17th, 2021 *Discharged on March 25th	Cs-134	ND (0.85)	ND (0.56)
	Cs-137	ND (0.65)	ND (0.53)
	Gross β	ND (0.59)	ND (0.59)
	H-3	95	95
March 10th, 2021 *Discharged on March 18th	Cs-134	ND (0.79)	ND (0.53)
	Cs-137	ND (0.80)	ND (0.43)
	Gross β	ND (0.62)	ND (0.58)
	H-3	92	91
March 3rd, 2021 *Discharged on March 11th	Cs-134	ND (0.41)	ND (0.58)
	Cs-137	ND (0.54)	ND (0.54)
	Gross β	ND (0.73)	ND (0.59)
	H-3	100	98
February 26th, 2021 *Discharged on March 8th	Cs-134	ND (0.59)	ND (0.66)
	Cs-137	ND (0.65)	ND (0.57)
	Gross β	ND (0.68)	ND (0.57)
	H-3	88	91
February 19th, 2021 *Discharged on March 1st	Cs-134	ND (0.68)	ND (0.72)
	Cs-137	ND (0.65)	ND (0.56)
	Gross β	ND (0.69)	ND (0.61)
	H-3	100	100

∗ * 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
February 4th, 2021	Cs-134	ND (0.0024)	ND (0.0047)	ND (0.0069)
	Cs-137	ND (0.0020)	0.0045	ND (0.0052)
	Gross α	ND (0.50)	ND (3.6)	ND (1.8)
	Gross β	ND (0.49)	ND (0.66)	ND (0.65)
	H-3	120	110	110
	Sr-90	ND (0.0011)	ND (0.0013)	ND (0.0062)

* 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)
March 8th, 2021	Cs-134	ND (0.73)
	Cs-137	ND (0.65)
	Gross β	12
	H-3	2.8

(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.