Information (17:00), September 1, 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 July

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 July at Fukushima Daiichi Nuclear Power Station (NPS).

1. Summary of decommissioning and contaminated water management

In July, 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/mp202107.pdf

2. Sub-drain and Groundwater Drain Systems

In July, 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 July 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 July, 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 July 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

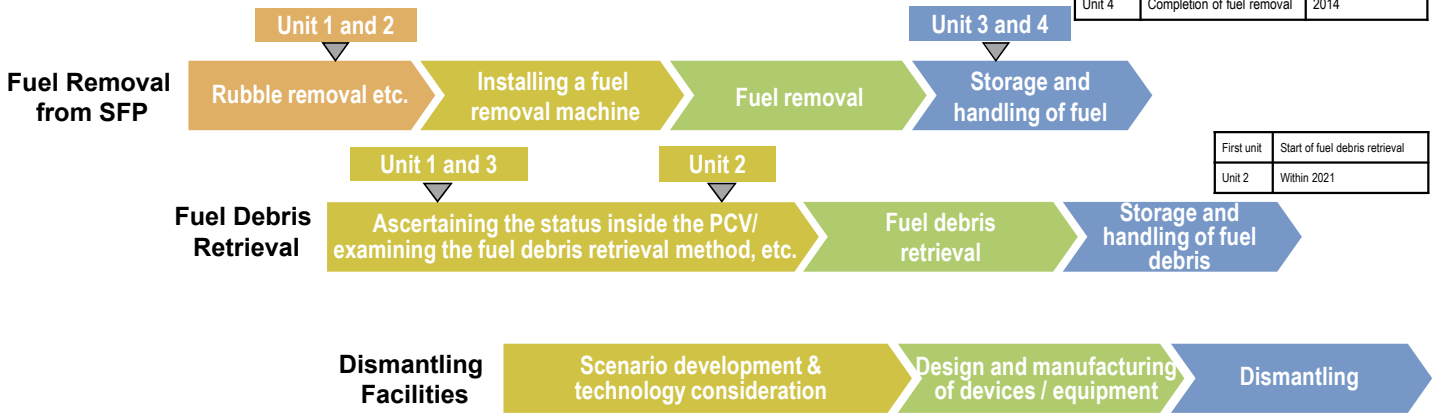
July 29, 2021
Secretariat of the Team for Countermeasures for Decommissioning and Contaminated Water Treatment

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



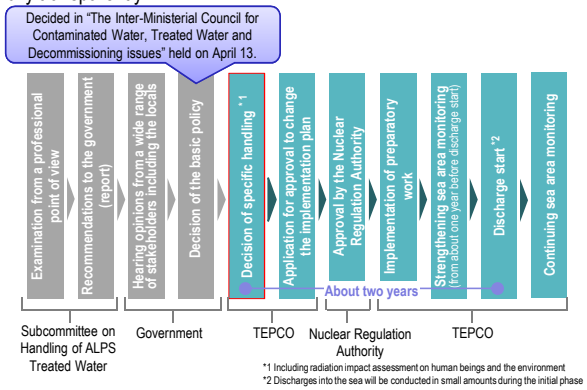
First unit	Start of fuel debris retrieval
Unit 2	Within 2021

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, objectivity and transparency ensured by engaging with third-party experts and 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

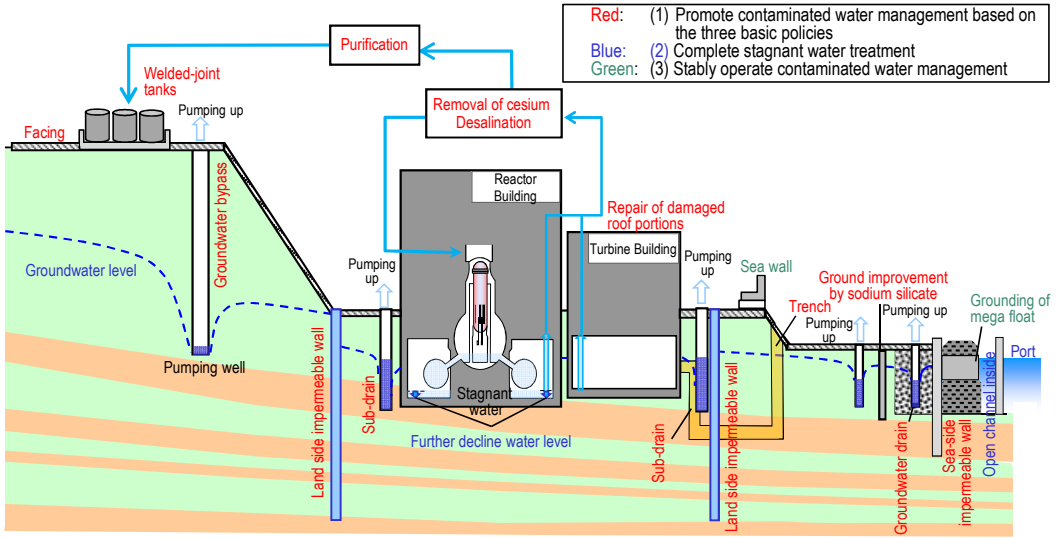
- Strontium-reduced water from other equipment is being re-treated in the multi-nuclide removal equipment (ALPS) and stored in welded-joint tanks.
- Multi-layered contaminated water management measures, including land-side impermeable walls and sub-drains, have stabilized the groundwater at a low level 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 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. 20-35°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 June 2021, the radiation exposure dose due to the release of radioactive materials from the Unit 1-4 Reactor Buildings was evaluated at less than 0.00003 mSv/year at the site boundary.
The annual radiation dose from natural radiation is approx. 2.1 mSv/year (average in Japan).

Mockup for decontamination completed toward Unit 2 fuel removal

Regarding the top floor of the Reactor Building, the dose evaluation showed a reduction of about 20% compared to the results in FY2018 due to containment of remaining objects which had been implemented previously.

To further reduce the dose, mockup of decontamination was conducted in the Remote Technology Development Center (in Naraha town). Subsequently, decontamination on the top floor will start.

Based on the effect of dose reduction by decontamination and shielding, efforts to reduce the dose will continue to approach the target level of 1 mSv/h.

Regarding the work prior to installing the gantry for fuel removal, trial ground improvement will be implemented in early August.

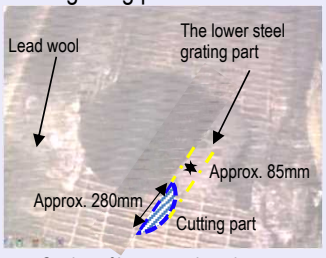
<Decontamination of mockup high-place wall>

Prior to the Unit 1 PCV internal investigation, construction of the access route steadily progressing

An access route will be created before investigating inside the Unit 1 Primary Containment Vessel (PCV). Before the construction, work to cut obstacles is being implemented in three steps. On July 15, Step 2 comprising cutting the lower steel grating part and the handrail (side part) was completed.

Step 3 comprising cutting of conduits will be implemented in mid-September.

The work proceeds carefully, with safety first and the surrounding environment unaffected.



<Cutting of lower steel grating part>

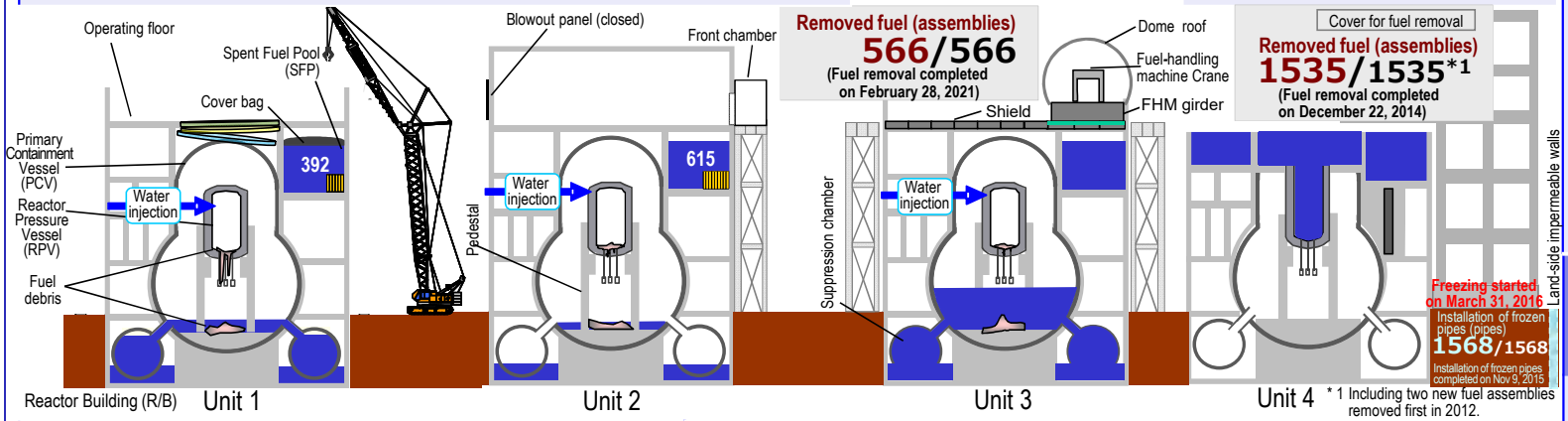
Equipment for Unit 2 trial fuel debris retrieval arrived in Japan

Equipment for the Unit 2 trial fuel debris retrieval, which had been developed in the UK, arrived in Japan on July 10 and a domestic factory (in Kobe) on July 12.

Subsequently, performance verification tests in Japan will be conducted.

At the same time, operation training started. To learn the skills required to remotely operate the robot, nine staff members of the Fukushima Daiichi NPS were dispatched to Mitsubishi Heavy Industries, Ltd. from July 1.

<Arrival in Japan (July 10, 2021)>



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

In the P catch basin in the temporary storage area, a temporary rise in gross-β value detected

On July 5, the gross-β radioactivity value in P catch basin in the temporary storage area rose temporarily and contamination was detected on the ground surface around the notch tanks there.

This was considered attributable to the top board hatch lids and the top boards of two notch tanks becoming misaligned and rainfall meaning rainwater carrying radioactive materials flowed outside. The monitoring results did not reveal any environmental influence. For those notch tanks, the top board hatch lids were recovered and sheet covers were installed to prevent rainwater inflow.

Management will also be enhanced by installing Zeolite sandbags and removing contaminated soil. Moreover, to inspect the top of notch tanks, regular drone patrols will be introduced.

To formulate a plan of investigations inside the buildings as part of efforts to clarify the accident progress, prior investigations of Unit 1 and 2 Reactor Buildings planned

To "assume the conditions of the Unit 1-3 cores and PCVs in the Fukushima Daiichi NPS and examine the unresolved issues," efforts to clarify the accident progress continue.

In FY 2021, using a γ-imager and 3D image acquisition device, information useful to formulate a plan of investigations inside the Reactor Buildings will be collected, including information on space and dose inside the Unit 1 and 2 Reactor Buildings.

<Measurement equipment (γ-imager *)>

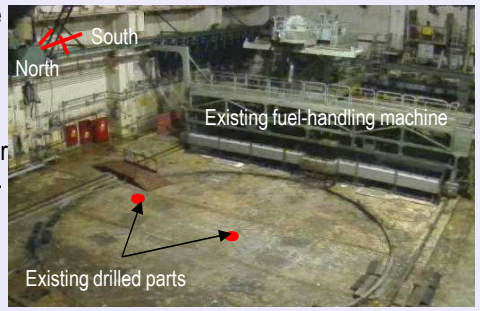
* By combining the γ-ray measurement results and 3D scan information, a 3D distribution of γ-rays is acquired

Investigation into the drilled part of the shield plug planned on the top floor of the Unit 2 Reactor Building

In April 2021, in collaboration with the Secretariat of the Nuclear Regulation Authority, the surface contamination density was assessed on the top floor of the Unit 2 Reactor Building and a significant influence from the part under the shield plug and gaps was detected.

Aiming at increasing the accuracy of the evaluation, a dose investigation using the existing drilled parts will be implemented in late August.

Results of the investigation will be utilized as input information for the accident analysis and decommissioning.



<Location of existing drilled parts>

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
July 26th, 2021 *Discharged on July 31st	Cs-134	ND (0.70)	ND (0.45)
	Cs-137	ND (0.47)	ND (0.96)
	Gross β	ND (1.7)	0.47
	H-3	950	980
July 25th, 2021 *Discharged on July 30th	Cs-134	ND (0.79)	ND (0.58)
	Cs-137	ND (0.73)	ND (0.51)
	Gross β	ND (1.8)	ND (0.39)
	H-3	970	980
July 24th, 2021 *Discharged on July 29th	Cs-134	ND (0.64)	ND (0.55)
	Cs-137	ND (0.60)	ND (0.54)
	Gross β	ND (1.8)	ND (0.41)
	H-3	950	1,000
July 23rd, 2021 *Discharged on July 28th	Cs-134	ND (0.66)	ND (0.55)
	Cs-137	ND (0.54)	ND (0.54)
	Gross β	ND (1.9)	0.42
	H-3	990	1,000
July 22nd, 2021 *Discharged on July 27th	Cs-134	ND (0.76)	ND (0.62)
	Cs-137	ND (0.77)	ND (0.54)
	Gross β	ND (2.0)	ND (0.32)
	H-3	940	990
July 21st, 2021 *Discharged on July 26th	Cs-134	ND (0.44)	ND (0.62)
	Cs-137	ND (0.65)	ND (0.63)
	Gross β	ND (1.9)	ND (0.34)
	H-3	940	960
July 20th, 2021 *Discharged on July 25th	Cs-134	ND (0.75)	ND (0.69)
	Cs-137	ND (0.69)	ND (0.58)
	Gross β	ND (1.9)	ND (0.35)
	H-3	930	950
July 19th, 2021 *Discharged on July 24th	Cs-134	ND (0.79)	ND (0.62)
	Cs-137	ND (0.73)	ND (0.51)
	Gross β	ND (0.65)	ND (0.33)
	H-3	920	940

July 17th, 2021 *Discharged on July 22nd	Cs-134	ND (0.55)	ND (0.62)
	Cs-137	ND (0.73)	ND (0.63)
	Gross β	ND (1.6)	ND (0.37)
	H-3	870	880
July 16th, 2021 *Discharged on July 21st	Cs-134	ND (0.67)	ND (0.65)
	Cs-137	ND (0.54)	ND (0.58)
	Gross β	ND (1.6)	ND (0.36)
	H-3	830	860
July 15th, 2021 *Discharged on July 20th	Cs-134	ND (0.70)	ND (0.65)
	Cs-137	ND (0.47)	ND (0.63)
	Gross β	ND (1.9)	ND (0.42)
	H-3	830	860
July 14th, 2021 *Discharged on July 19th	Cs-134	ND (0.55)	ND (0.60)
	Cs-137	ND (0.54)	ND (0.63)
	Gross β	ND (1.8)	ND (0.39)
	H-3	850	870
July 13th, 2021 *Discharged on July 18th	Cs-134	ND (0.53)	ND (0.65)
	Cs-137	ND (0.65)	ND (0.61)
	Gross β	ND (1.9)	ND (0.36)
	H-3	800	840
July 12th, 2021 *Discharged on July 17th	Cs-134	ND (0.76)	ND (0.69)
	Cs-137	ND (0.73)	ND (0.72)
	Gross β	ND (1.8)	ND (0.39)
	H-3	820	850
July 11th, 2021 *Discharged on July 16th	Cs-134	ND (0.79)	ND (0.67)
	Cs-137	ND (0.65)	ND (0.66)
	Gross β	ND (1.9)	ND (0.36)
	H-3	830	840
July 10th, 2021 *Discharged on July 15th	Cs-134	ND (0.85)	ND (0.55)
	Cs-137	ND (0.80)	ND (0.61)
	Gross β	ND (0.61)	0.56
	H-3	840	850
July 9th, 2021 *Discharged on July 14th	Cs-134	ND (0.76)	ND (0.57)
	Cs-137	ND (0.54)	ND (0.69)
	Gross β	ND (1.8)	ND (0.35)
	H-3	800	820
July 8th, 2021 *Discharged on July 13th	Cs-134	ND (0.67)	ND (0.55)
	Cs-137	ND (0.73)	ND (0.58)
	Gross β	ND (1.6)	ND (0.34)
	H-3	830	840

July 7th, 2021 *Discharged on July 12th	Cs-134	ND (0.61)	ND (0.55)
	Cs-137	ND (0.60)	ND (0.63)
	Gross β	ND (1.8)	ND (0.36)
	H-3	830	870
July 6th, 2021 *Discharged on July 11th	Cs-134	ND (0.73)	ND (0.60)
	Cs-137	ND (0.47)	ND (0.54)
	Gross β	ND (2.0)	0.43
	H-3	880	920
July 5th, 2021 *Discharged on July 10th	Cs-134	ND (0.49)	ND (0.55)
	Cs-137	ND (0.69)	ND (0.73)
	Gross β	ND (1.6)	ND (0.33)
	H-3	820	860
July 4th, 2021 *Discharged on July 9th	Cs-134	ND (0.60)	ND (0.55)
	Cs-137	ND (0.54)	ND (0.61)
	Gross β	ND (2.0)	ND (0.33)
	H-3	840	880
July 3rd, 2021 *Discharged on July 8th	Cs-134	ND (0.60)	ND (0.62)
	Cs-137	ND (0.65)	ND (0.47)
	Gross β	ND (1.8)	ND (0.37)
	H-3	870	910
July 2nd, 2021 *Discharged on July 7th	Cs-134	ND (0.78)	ND (0.50)
	Cs-137	ND (0.54)	ND (0.54)
	Gross β	ND (1.6)	ND (0.36)
	H-3	880	950
July 1st, 2021 *Discharged on July 6th	Cs-134	ND (0.55)	ND (0.66)
	Cs-137	ND (0.69)	ND (0.85)
	Gross β	ND (0.67)	0.40
	H-3	900	940
June 30th, 2021 *Discharged on July 5th	Cs-134	ND (0.50)	ND (0.65)
	Cs-137	ND (0.65)	ND (0.58)
	Gross β	ND (1.9)	ND (0.37)
	H-3	910	930
June 28th, 2021 *Discharged on July 3rd	Cs-134	ND (0.79)	ND (0.60)
	Cs-137	ND (0.57)	ND (0.63)
	Gross β	ND (0.66)	ND (0.33)
	H-3	930	970
June 27th, 2021 *Discharged on July 2nd	Cs-134	ND (0.88)	ND (0.58)
	Cs-137	ND (0.54)	ND (0.63)
	Gross β	ND (1.7)	0.41
	H-3	860	890

June 26th, 2021 *Discharged on July 1st	Cs-134	ND (0.56)	ND (0.65)
	Cs-137	ND (0.54)	ND (0.58)
	Gross β	ND (1.8)	ND (0.36)
	H-3	780	840

* * 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
June 1st,2021	Cs-134	ND (0.0030)	ND (0.0045)	ND (0.0052)
	Cs-137	0.011	0.0080	0.0073
	Gross α	ND (0.50)	ND (3.6)	ND (2.2)
	Gross β	ND (0.38)	ND (0.65)	ND (0.59)
	H-3	920	890	910
	Sr-90	0.0036	ND (0.0029)	ND (0.0058)

* 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)
June 17th, 2021 *Sampled before discharge of purified groundwater.	Cs-134	ND (0.78)
	Cs-137	ND (0.60)
	Gross β	11
	H-3	ND (1.5)

(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
July 21st, 2021 *Discharged on July 29th	Cs-134	ND (0.59)	ND (0.57)
	Cs-137	ND (0.59)	ND (0.63)
	Gross β	ND (0.63)	ND (0.33)
	H-3	55	60
July 14th, 2021 *Discharged on July 22nd	Cs-134	ND (0.78)	ND (0.51)
	Cs-137	ND (0.75)	ND (0.41)
	Gross β	ND (0.61)	ND (0.59)
	H-3	57	59
July 7th, 2021 *Discharged on July 15th	Cs-134	ND (0.60)	ND (0.41)
	Cs-137	ND (0.65)	ND (0.54)
	Gross β	ND (0.71)	ND (0.46)
	H-3	61	59
June 30th, 2021 *Discharged on July 8th	Cs-134	ND (0.55)	ND (0.56)
	Cs-137	ND (0.65)	ND (0.53)
	Gross β	ND (0.72)	ND (0.47)
	H-3	63	60

∗ * 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
June 2nd, 2021	Cs-134	ND (0.0030)	ND (0.0046)	ND (0.0051)
	Cs-137	ND (0.0020)	0.0039	ND (0.0051)
	Gross α	ND (0.38)	ND (3.8)	ND (2.2)
	Gross β	ND (0.38)	ND (0.64)	ND (0.53)
	H-3	68	67	68
	Sr-90	ND (0.0010)	ND (0.0013)	ND (0.0059)

* 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)
June 24th, 2021	Cs-134	ND (0.85)
	Cs-137	ND (0.70)
	Gross β	12
	H-3	5.9

(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.