Information (10:00), December 25, 2020

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 November

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 subdrain and groundwater drain systems, as well as, bypassing groundwater pumped during the month of November at Fukushima Daiichi Nuclear Power Station (NPS).

1. Summary of decommissioning and contaminated water management

In November, the summary of monthly progress on decommissioning and contaminated water management of TEPCO's 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/mp202011.pdf

2. Subdrain and Groundwater Drain Systems

In November, purified groundwater pumped from the subdrain 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 November 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 November, 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 November 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

November 26, 2020
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 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

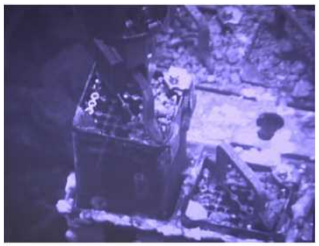
First unit	Start of fuel debris retrieval
Unit 2	Within 2021

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, with the aim of completing fuel removal by the end of FY2020.



Fuel removal (April 15, 2019)

Removed fuel (assemblies)

434/566

(As of November 26, 2020)

Contaminated water management - three 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

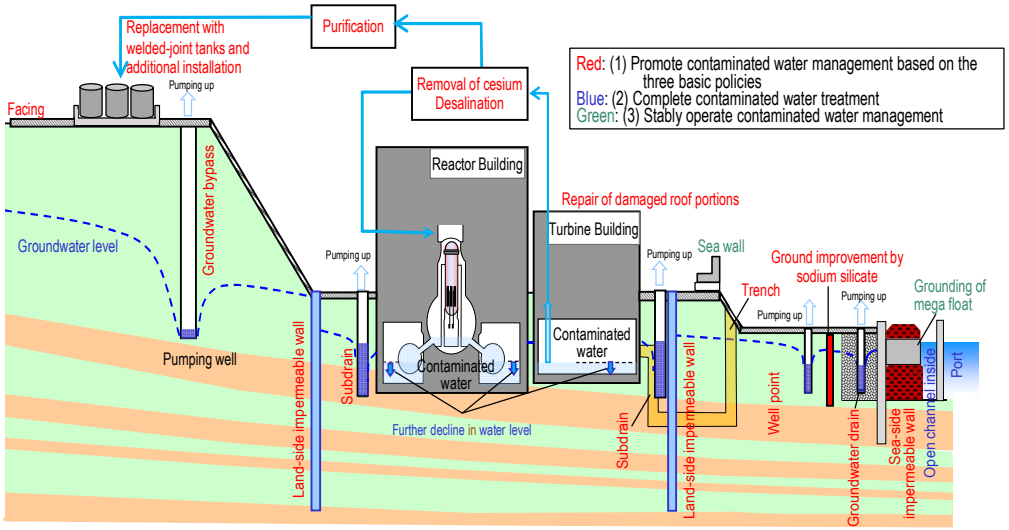
- Strontium-reduced water from other equipment is being re-treated in the multi-nuclide removal equipment (ALPS) and stored in welded-joint tanks.
- Multi-layered contaminated water management measures, including land-side impermeable walls and subdrains, have stabilized the groundwater at a low level 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 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 including closing building openings and installing sea walls are being implemented. For heavy rain, sandbags are being installed to suppress direct inflow into buildings while work 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

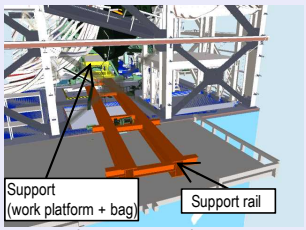
◆ The temperatures of the Reactor Pressure Vessel (RPV) and Primary Containment Vessel (PCV) of Units 1-3 have been maintained within the range of approx. 20-30°C*1 over the past month.
There was no significant change in the concentration of radioactive materials newly released from Reactor Buildings 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 October 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).

Unit 1 Installation of supports for the overhead crane completed

Among the measures to prevent and alleviate rubble falling, work to install supports to the Unit 1 overhead crane started from November 11 and was completed by November 24. This will minimize the risk of the overhead crane/fuel-handling machine shifting its position, becoming imbalanced and subsequently falling, as well as reducing the risk of affecting the soundness of fuel and others.

Work continues in preparation for installing the large cover over the Reactor Building.



<Image of support insertion for the overhead crane>

<Completed installation of supports for the overhead crane>

Unit 1 Progress toward PCV internal investigation and implementation of a test to suspend water injection into the reactor

As part of efforts toward the internal investigation of the Unit 1 Primary Containment Vessel (PCV), work to cut obstacles inside the PCV on the route for the investigation equipment is underway from May 26.

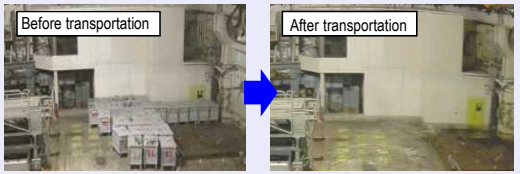
Preparation for cutting steel materials under the grating started from September 29. However, it was confirmed that there were instrumentation pipes for the Primary Loop Recirculation System under the cutting scope. After manufacturing a new camera to decide the exact cutting location, an investigation for the obstacles will be conducted.

During the period until the obstacle investigation, a test to suspend water injection into the reactor will be implemented from November 26 to December 16. (Water injection suspension period: for about five days from November 26 to December 1)

Unit 2 Removal of remaining objects on the operating floor to be completed toward fuel removal

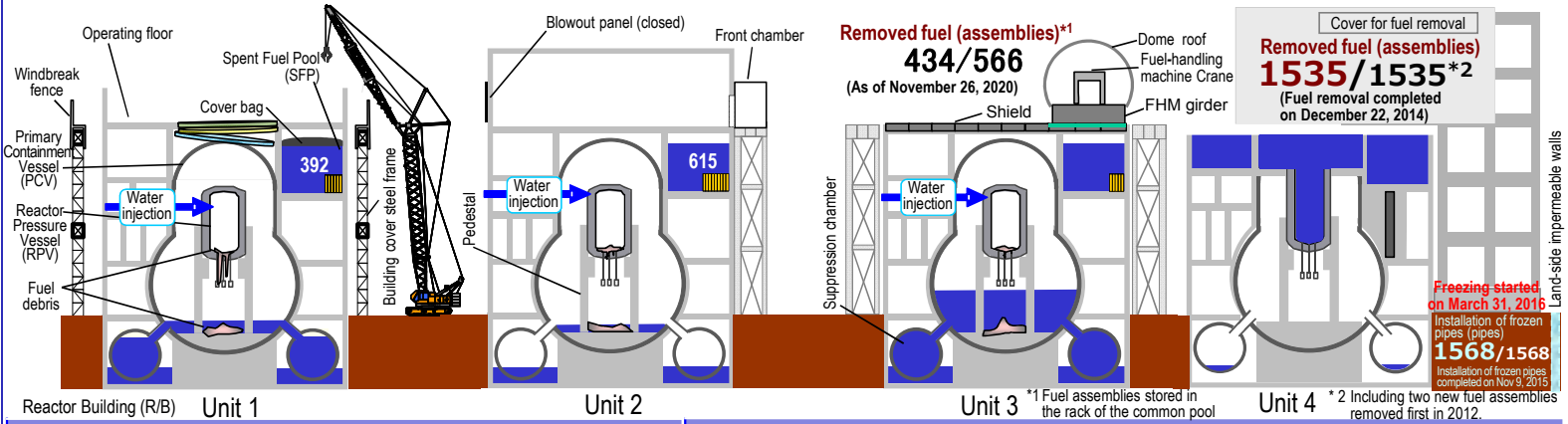
Transportation of remaining objects inside the operating floor of the Unit 2 Reactor Building started from August and will be completed by early December.

After the transportation, in response to the altered environment, an investigation into measures to evaluate the dose more precisely and reduce the dose will start from December. The investigation will use remotely operated equipment to measure the air dose rate and surface contamination and take photos of the entire operating floor by a γ-camera.



<Unit 2 R/B operating floor southwest Condition of remaining objects>

Remotely controlled equipment used in the investigation			
Remotely controlled equipment	 BROKK400D	 Kobra	 Packbot
Role	γ-camera measurement	・Air dose rate measurement, surface contamination measurement ・Assistance to the investigation	

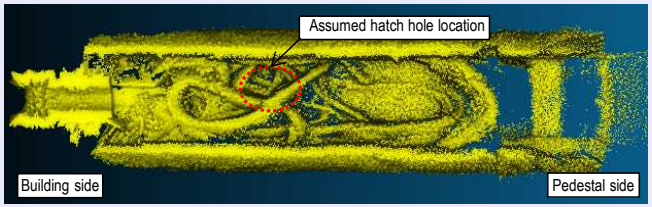


*1 Fuel assemblies stored in the rack of the common pool
* 2 Including two new fuel assemblies removed first in 2012.

Unit 2 Investigation into deposits inside the PCV penetration

As a preparatory stage for the PCV internal investigation and the trial retrieval, a 3D scan investigation inside the penetration (X-6 penetration) was conducted on October 30, whereby information about the deposit distribution and others was obtained.

Alongside the results of the deposit contact investigation on October 28 and using information on deposit distribution obtained in this investigation, procedures to remove deposits in the penetration will be examined.



<3D scan image of deposit seen from above the X-6 penetration>

Test to verify the secondary treatment performance of the ALPS-treated water follow-up report

For the high- and low-concentration areas (J1-C and -G), measurement of (1) 60 nuclides among those that must be removed except for Ni-63 and Cd-113m, (2) Carbon-14 and (3) tritium was completed. The results showed that the concentration of radioactive materials was reduced after the secondary treatment (sample tank).

The sum of the concentration required by law of 60 nuclides among those that must be removed except for Ni-63 and Cd-113m + Carbon-14

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

Work continues to analyze and assessment each area, verify that the sum of the ratios of the concentrations required by law except for tritium is reduced below 1 by treatment, check the procedures and processes for the nuclide analysis and conduct others.


<Operation before the test to verify the secondary treatment performance>


<Pretreatment before tritium analysis>

Test operation of the additional Radioactive Waste Incinerator started

The outdoor storage of rubble and others (except for those to be recycled or reused) will be eliminated by within FY2028. For this purpose, after reducing the volume by incineration or other method, rubble and others will be stored in the solid waste storage facility. To incinerate combustible rubble (trees, packing materials, paper and others), work to install an additional Radioactive Waste Incinerator is underway.

Installation of the building and main equipment was completed, the initial burning ceremony was held on November 12 and the system test is currently being conducted.

After the cold test and the subsequent hot test, the installation will be completed by March 2021.


<Full view of the building>

Appendix 2

Results of analyses on the quality of the purified groundwater pumped from the subdrain 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
November 25th, 2020 *Discharged on November 30th	Cs-134	ND (0.45)	ND (0.72)
	Cs-137	ND (0.69)	ND (0.51)
	Gross β	ND (1.8)	0.61
	H-3	880	930
November 24th, 2020 *Discharged on November 29th	Cs-134	ND (0.49)	ND (0.89)
	Cs-137	ND (0.69)	ND (0.85)
	Gross β	ND (1.8)	0.52
	H-3	890	940
November 23rd, 2020 *Discharged on November 28th	Cs-134	ND (0.41)	ND (0.61)
	Cs-137	ND (0.60)	ND (0.58)
	Gross β	ND (1.9)	0.45
	H-3	830	890
November 22nd, 2020 *Discharged on November 27th	Cs-134	ND (0.55)	ND (0.44)
	Cs-137	ND (0.60)	ND (0.58)
	Gross β	ND (2.2)	0.42
	H-3	860	920
November 21st, 2020 *Discharged on November 26th	Cs-134	ND (0.57)	ND (0.78)
	Cs-137	ND (0.73)	ND (0.71)
	Gross β	ND (1.9)	0.49
	H-3	860	930
November 19th, 2020 *Discharged on November 24th	Cs-134	ND (0.68)	ND (0.76)
	Cs-137	ND (0.69)	ND (0.77)
	Gross β	ND (0.65)	0.47
	H-3	850	920
November 18th, 2020 *Discharged on November 23rd	Cs-134	ND (0.64)	ND (0.59)
	Cs-137	ND (0.65)	ND (0.51)
	Gross β	ND (1.8)	0.59
	H-3	870	940
November 17th, 2020 *Discharged on November 22nd	Cs-134	ND (0.50)	ND (0.61)
	Cs-137	ND (0.54)	ND (0.78)
	Gross β	ND (1.9)	0.48
	H-3	920	980

November 16th, 2020 *Discharged on November 21st	Cs-134	ND (0.53)	ND (0.69)
	Cs-137	ND (0.80)	ND (0.58)
	Gross β	ND (1.8)	ND (0.35)
	H-3	960	1,000
November 15th, 2020 *Discharged on November 20th	Cs-134	ND (0.68)	ND (0.41)
	Cs-137	ND (0.77)	ND (0.51)
	Gross β	ND (2.0)	ND (0.36)
	H-3	960	1,000
November 14th, 2020 *Discharged on November 19th	Cs-134	ND (0.76)	ND (0.57)
	Cs-137	ND (0.77)	ND (0.47)
	Gross β	ND (1.7)	ND (0.37)
	H-3	960	1,000
November 13th, 2020 *Discharged on November 18th	Cs-134	ND (0.65)	ND (0.57)
	Cs-137	ND (0.77)	ND (0.47)
	Gross β	ND (2.0)	ND (0.37)
	H-3	930	980
November 11th, 2020 *Discharged on November 16th	Cs-134	ND (0.63)	ND (0.63)
	Cs-137	ND (0.80)	ND (0.61)
	Gross β	ND (0.69)	0.42
	H-3	1,100	1,100
November 9th, 2020 *Discharged on November 14th	Cs-134	ND (0.76)	ND (0.61)
	Cs-137	ND (0.73)	ND (0.71)
	Gross β	ND (1.8)	ND (0.33)
	H-3	1,100	1,200
November 8th, 2020 *Discharged on November 13th	Cs-134	ND (0.61)	ND (0.63)
	Cs-137	ND (0.69)	ND (0.54)
	Gross β	ND (1.9)	ND (0.38)
	H-3	1,100	1,100
November 7th, 2020 *Discharged on November 12th	Cs-134	ND (0.63)	ND (0.63)
	Cs-137	ND (0.60)	ND (0.58)
	Gross β	ND (1.6)	ND (0.38)
	H-3	1,100	1,200
November 6th, 2020 *Discharged on November 11th	Cs-134	ND (0.76)	ND (0.54)
	Cs-137	ND (0.69)	ND (0.61)
	Gross β	ND (2.0)	ND (0.38)
	H-3	1,100	1,100
November 5th, 2020 *Discharged on November 10th	Cs-134	ND (0.50)	ND (0.59)
	Cs-137	ND (0.65)	ND (0.69)
	Gross β	ND (2.0)	ND (0.36)
	H-3	1,000	1,100

November 4th, 2020 *Discharged on November 9th	Cs-134	ND (0.79)	ND (0.57)
	Cs-137	ND (0.54)	ND (0.58)
	Gross β	ND (2.0)	ND (0.34)
	H-3	1,000	1,100
November 3rd, 2020 *Discharged on November 8th	Cs-134	ND (0.74)	ND (0.69)
	Cs-137	ND (0.60)	ND (0.69)
	Gross β	ND (1.9)	ND (0.32)
	H-3	980	1,000
November 2nd, 2020 *Discharged on November 7th	Cs-134	ND (0.61)	ND (0.55)
	Cs-137	ND (0.65)	ND (0.61)
	Gross β	ND (1.8)	ND (0.35)
	H-3	1,000	1,100
November 1st, 2020 *Discharged on November 6th	Cs-134	ND (0.63)	ND (0.59)
	Cs-137	ND (0.65)	ND (0.51)
	Gross β	ND (0.65)	ND (0.39)
	H-3	1,100	1,100
October 31st, 2020 *Discharged on November 5th	Cs-134	ND (0.53)	ND (0.41)
	Cs-137	ND (0.54)	ND (0.76)
	Gross β	ND (2.0)	ND (0.34)
	H-3	1,100	1,100
October 30th, 2020 *Discharged on November 4th	Cs-134	ND (0.68)	ND (0.61)
	Cs-137	ND (0.60)	ND (0.54)
	Gross β	ND (1.7)	ND (0.37)
	H-3	1,100	1,100
October 29th, 2020 *Discharged on November 3rd	Cs-134	ND (0.58)	ND (0.59)
	Cs-137	ND (0.65)	ND (0.54)
	Gross β	ND (0.65)	ND (0.40)
	H-3	1,100	1,100
October 28th, 2020 *Discharged on November 2nd	Cs-134	ND (0.43)	ND (0.59)
	Cs-137	ND (0.46)	ND (0.73)
	Gross β	ND (2.0)	0.41
	H-3	900	960
October 27th, 2020 *Discharged on November 1st	Cs-134	ND (0.91)	ND (0.65)
	Cs-137	ND (0.54)	ND (0.66)
	Gross β	ND (2.0)	ND (0.39)
	H-3	1,000	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

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
October 1st,2020	Cs-134	ND (0.0028)	ND (0.0047)	ND (0.0056)
	Cs-137	0.017	0.013	0.018
	Gross α	ND (0.58)	ND (3.0)	ND (1.9)
	Gross β	ND (0.48)	ND (0.64)	ND (0.69)
	H-3	780	750	770
	Sr-90	0.0037	0.0039	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)
September 3rd, 2020 *Sampled before discharge of purified groundwater.	Cs-134	ND (0.73)
	Cs-137	ND (0.50)
	Gross β	10
	H-3	ND (0.82)

(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
November 18th, 2020 *Discharged on November 26th	Cs-134	ND (0.78)	ND (0.51)
	Cs-137	ND (0.54)	ND (0.49)
	Gross β	ND (0.64)	ND (0.61)
	H-3	100	99
November 11th, 2020 *Discharged on November 19th	Cs-134	ND (0.66)	ND (0.51)
	Cs-137	ND (0.83)	ND (0.53)
	Gross β	ND (0.72)	ND (0.65)
	H-3	100	96
November 4th, 2020 *Discharged on November 12th	Cs-134	ND (0.45)	ND (0.53)
	Cs-137	ND (0.69)	ND (0.51)
	Gross β	ND (0.75)	ND (0.55)
	H-3	130	140
October 30th, 2020 *Discharged on November 7th	Cs-134	ND (0.65)	ND (0.56)
	Cs-137	ND (0.60)	ND (0.43)
	Gross β	ND (0.59)	ND (0.58)
	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
October 7th, 2020	Cs-134	ND (0.0027)	ND (0.0046)	ND (0.0068)
	Cs-137	ND (0.0019)	0.0037	ND (0.0046)
	Gross α	ND (0.65)	ND (3.2)	ND (1.9)
	Gross β	ND (0.49)	ND (0.76)	ND (0.57)
	H-3	140	140	140
	Sr-90	0.0025	ND (0.0014)	ND (0.0065)

* 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)
September 3rd, 2020	Cs-134	ND (0.85)
	Cs-137	ND (0.65)
	Gross β	13
	H-3	ND (0.82)

(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.