Information (17:00), January 31, 2022

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

Report on the discharge record and the seawater monitoring results at Fukushima Daiichi Nuclear Power Station during 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/mp202112.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.

3. 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 Energy Cooperation Division,
Ministry of Foreign Affairs, Tel 03-5501-8227

Outline of Decommissioning, Contaminated Water and Treated Water Management

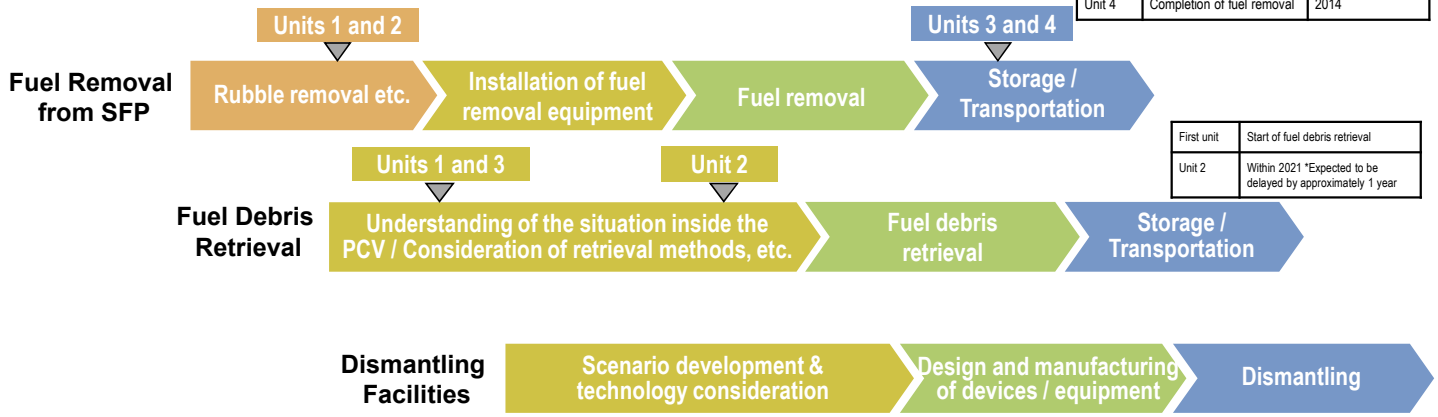
December 23, 2021
Secretariat of the Team for Countermeasures for Decommissioning, Contaminated Water and Treated Water

Main decommissioning work and steps

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

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

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

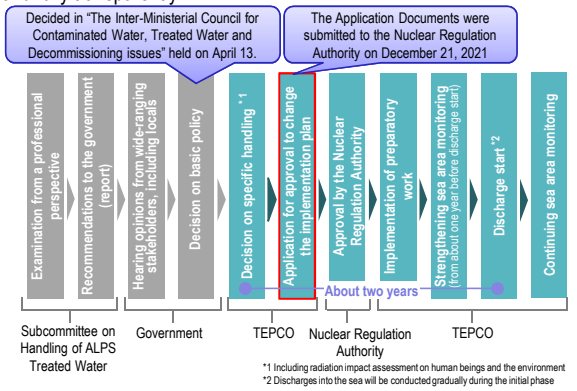


First unit	Start of fuel debris retrieval
Unit 2	Within 2021 *Expected to be delayed by approximately 1 year

Measures of treated water Appendix1

Handling of ALPS treated water

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



Contaminated water management – triple-pronged efforts -

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

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

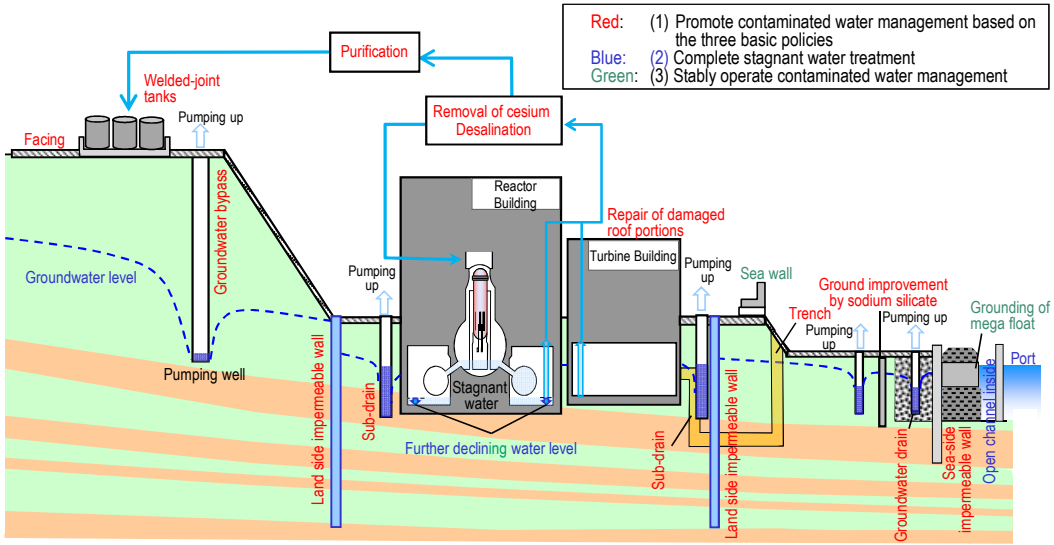
- Strontium-reduced water from other equipment is being re-treated in the multi-nuclide removal equipment (ALPS) and stored in welded-joint tanks.
- Multi-layered contaminated water management measures, including land-side impermeable walls and sub-drains, have stabilized the groundwater at a low level 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 m^3/day or less within 2025.

(2) Efforts to complete stagnant water treatment

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

(3) Efforts to stably operate contaminated water management

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



Progress status

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

Submission of the "Application Documents for Approval to Amend the Implementation Plan" regarding ALPS treated water

Regarding the handling of ALPS treated water, considering the Basic Policy decided by the Japanese government in April 2021, TEPCO has been reviewing facility design to secure safety and proceed with preliminary preparation, while also explaining the review status to those in the region and other relevant parties and listening to their opinions.

On December 21, we submitted the "Application Documents for Approval to Amend the Implementation Plan" for the basic design of the ALPS treated water dilution/discharge facility and related facilities to the Nuclear Regulation Authority(NRA).

The NRA will review this application.

Geological survey and others in the sea area needed for examination of facilities regarding ALPS treated water

To review the details of the design of facilities for securing safety regarding the handling of ALPS treated water and ensure safety of the work, geological data is being surveyed on the area offshore of the power station.

On November 27, a prior magnetic survey of the seabed was conducted and it was confirmed that there was no hindrance to the forthcoming geological survey and others.

The geological survey was scheduled to start from December 1. However, due to unfavorable marine weather, the survey was delayed about two weeks and started from December 14.

In parallel, work to improve the environment, such as installing steel pipes around the water release shaft has been underway since December 10.

<Geological survey>

Test to verify the stirring effect of tanks for measurement and verification of ALPS treated water

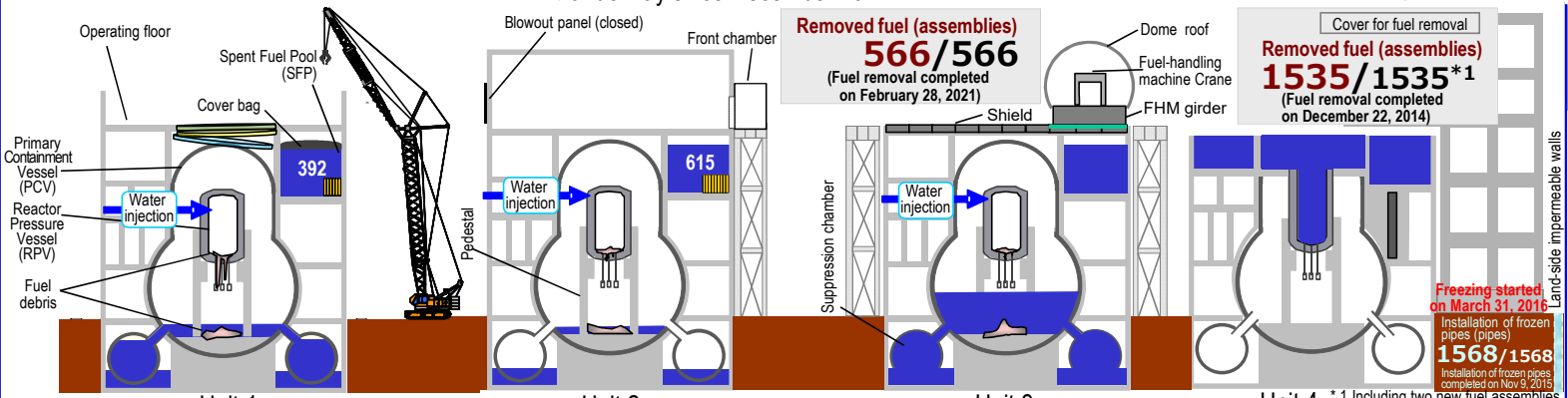
To measure the radioactivity concentration of ALPS treated water more precisely, a stirrer will be installed for each sample tank. On November 23, the operation and effects of the stirrer were verified using reagent.

As the concentration of reagent in the sample tank reached the assumed level, stirring by the stirrer was evaluated as effective.

From February 2022, a circulation verification test will be conducted using ten connected sample tanks.


<Tank surface during stirring>


<Stirrer>



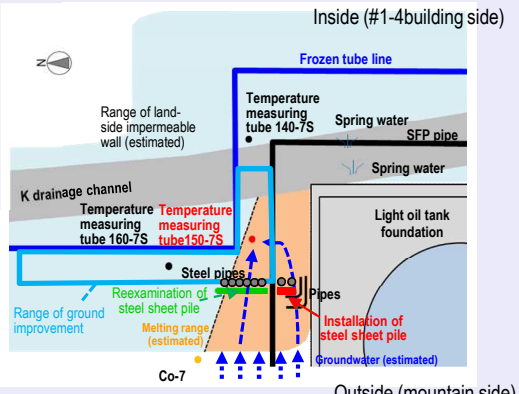
*1 Including two new fuel assemblies removed first in 2012.

Trial water stoppage in response to the temporary temperature increase of the land-side impermeable wall temperature measuring tubes

For trial water stoppage in response to the temporary temperature increase of the land-side impermeable wall temperature measuring tubes, work to install steel pipes started from December 6 and was completed on December 13.

On December 10, the temperature of the temperature measuring tubes declined to 0°C. However, no significant change was detected in temperature of the tubes, spring water volume of K drainage channel and others by installing steel pipes. To further increase the water stoppage effects, additional steel sheet piles are being installed from December 18.

Performance of impermeable wall is evaluated as being sustained based on the monitoring results showing a sufficient difference maintained between water levels inside and outside the land-side impermeable walls and no significant variation detected in the trend of pumping volume from the sub-drain.



<Sectional view>

Toward starting the Unit 1 PCV internal investigation in mid-January 2022, pre-work is underway

Toward the PCV internal investigation, installation of equipment and materials in the remote-control room was completed on December 14.

On December 16, work to install a cable drum which mounted the underwater investigative robot was also completed.

Toward starting the Unit 1 PCV internal investigation in mid-January 2022, work will continue including verification of the equipment.

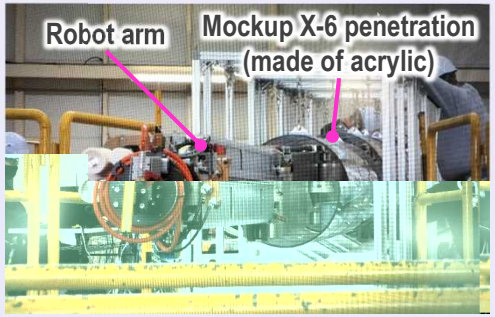
<Installation of equipment>

Toward the Unit 2 PCV internal investigation, performance tests of the trial retrieval equipment and training are underway

Performance tests of the trial retrieval equipment and training have been underway from August in a domestic factory (in Kobe). At present, tests to pass through the mockup X-6 penetration or others are being conducted.

Before opening the X-6 penetration hatch, work to install an isolation room started from November.

Work will continue according to the plan toward the internal investigation and trial retrieval.



<X-6 penetration pass test>

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 26th, 2021 *Discharged on December 31st	Cs-134	ND (0.76)	ND (0.63)
	Cs-137	ND (0.60)	ND (0.69)
	Gross β	ND (1.9)	ND (0.33)
	H-3	900	960
December 25th, 2021 *Discharged on December 30th	Cs-134	ND (0.57)	ND (0.74)
	Cs-137	ND (0.69)	ND (0.58)
	Gross β	ND (1.6)	ND (0.36)
	H-3	950	1,000
December 24th, 2021 *Discharged on December 29th	Cs-134	ND (0.48)	ND (0.65)
	Cs-137	ND (0.65)	ND (0.63)
	Gross β	ND (1.9)	ND (0.35)
	H-3	990	1,000
December 22nd, 2021 *Discharged on December 27th	Cs-134	ND (0.64)	ND (0.62)
	Cs-137	ND (0.47)	ND (0.53)
	Gross β	ND (1.9)	ND (0.30)
	H-3	930	1,000
December 21st, 2021 *Discharged on December 26th	Cs-134	ND (0.58)	ND (0.78)
	Cs-137	ND (0.54)	ND (0.63)
	Gross β	ND (1.9)	ND (0.33)
	H-3	880	930
December 20th, 2021 *Discharged on December 25th	Cs-134	ND (0.53)	ND (0.61)
	Cs-137	ND (0.69)	ND (0.63)
	Gross β	ND (0.65)	ND (0.34)
	H-3	820	870
December 19th, 2021 *Discharged on December 24th	Cs-134	ND (0.66)	ND (0.71)
	Cs-137	ND (0.60)	ND (0.57)
	Gross β	ND (1.9)	ND (0.38)
	H-3	800	840
December 18th, 2021 *Discharged on December 23rd	Cs-134	ND (0.45)	ND (0.68)
	Cs-137	ND (0.60)	ND (0.63)
	Gross β	ND (1.9)	ND (0.34)

	H-3	720	770
December 16th, 2021 *Discharged on December 21st	Cs-134	ND (0.48)	ND (0.59)
	Cs-137	ND (0.69)	ND (0.63)
	Gross β	ND (1.9)	ND (0.33)
	H-3	750	790
December 15th, 2021 *Discharged on December 20th	Cs-134	ND (0.78)	ND (0.64)
	Cs-137	ND (0.65)	ND (0.63)
	Gross β	ND (1.5)	ND (0.36)
	H-3	630	670
December 14th, 2021 *Discharged on December 19th	Cs-134	ND (0.57)	ND (0.72)
	Cs-137	ND (0.59)	ND (0.57)
	Gross β	ND (1.7)	ND (0.35)
	H-3	600	610
December 13th, 2021 *Discharged on December 18th	Cs-134	ND (0.67)	ND (0.64)
	Cs-137	ND (0.47)	ND (0.53)
	Gross β	ND (1.8)	ND (0.32)
	H-3	630	660
December 12th, 2021 *Discharged on December 17th	Cs-134	ND (0.49)	ND (0.67)
	Cs-137	ND (0.69)	ND (0.57)
	Gross β	ND (1.9)	ND (0.35)
	H-3	720	780
December 10th, 2021 *Discharged on December 15th	Cs-134	ND (0.41)	ND (0.67)
	Cs-137	ND (0.69)	ND (0.58)
	Gross β	ND (0.64)	ND (0.38)
	H-3	730	790
December 8th, 2021 *Discharged on December 13th	Cs-134	ND (0.50)	ND (0.67)
	Cs-137	ND (0.65)	ND (0.63)
	Gross β	ND (2.1)	ND (0.30)
	H-3	690	750
December 7th, 2021 *Discharged on December 12th	Cs-134	ND (0.53)	ND (0.69)
	Cs-137	ND (0.60)	ND (0.60)
	Gross β	ND (2.1)	0.37
	H-3	690	730
December 6th, 2021 *Discharged on December 11th	Cs-134	ND (0.78)	ND (0.78)
	Cs-137	ND (0.77)	ND (0.60)
	Gross β	ND (2.0)	ND (0.37)
	H-3	830	880
December 5th, 2021 *Discharged on December 10th	Cs-134	ND (0.96)	ND (0.69)
	Cs-137	ND (0.47)	ND (0.66)
	Gross β	ND (1.8)	0.42
	H-3	970	1,000

December 3rd, 2021 *Discharged on December 8th	Cs-134	ND (0.70)	ND (0.65)
	Cs-137	ND (0.65)	ND (0.73)
	Gross β	ND (1.8)	ND (0.34)
	H-3	880	950
December 2nd, 2021 *Discharged on December 7th	Cs-134	ND (0.72)	ND (0.76)
	Cs-137	ND (0.54)	ND (0.69)
	Gross β	ND (0.63)	ND (0.36)
	H-3	820	890
November 29th, 2021 *Discharged on December 4th	Cs-134	ND (0.52)	ND (0.67)
	Cs-137	ND (0.67)	ND (0.58)
	Gross β	ND (1.7)	ND (0.36)
	H-3	800	850
November 28th, 2021 *Discharged on December 3rd	Cs-134	ND (0.75)	ND (0.74)
	Cs-137	ND (0.62)	ND (0.53)
	Gross β	ND (1.9)	ND (0.37)
	H-3	870	900
November 27th, 2021 *Discharged on December 2nd	Cs-134	ND (0.50)	ND (0.56)
	Cs-137	ND (0.54)	ND (0.60)
	Gross β	ND (0.69)	ND (0.36)
	H-3	820	870

* * 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
November 1st,2021	Cs-134	ND (0.0030)	ND (0.0043)	ND (0.0059)
	Cs-137	0.0085	0.011	0.0076
	Gross α	ND (0.50)	ND (3.6)	ND (1.9)
	Gross β	ND (0.47)	ND (0.63)	ND (0.62)
	H-3	740	720	760
	Sr-90	0.0084	0.0063	0.015

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

(Reference)

(Unit: Bq/L)

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

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

Appendix 4

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

(Unit: Bq/L)

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

Appendix 5

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

(Unit: Bq/L)

Date of sampling *Date of discharge	Detected nuclides	Analytical body	
		TEPCO	Japan Chemical Analysis Center
December 22nd, 2021 *Discharged on December 30th	Cs-134	ND (0.53)	ND (0.73)
	Cs-137	ND (0.74)	ND (0.53)
	Gross β	ND (0.67)	ND (0.29)
	H-3	68	74
December 15th, 2021 *Discharged on December 23rd	Cs-134	ND (0.48)	ND (0.37)
	Cs-137	ND (0.60)	ND (0.43)
	Gross β	ND (0.73)	ND (0.70)
	H-3	72	72
December 9th, 2021 *Discharged on December 17th	Cs-134	ND (0.44)	ND (0.51)
	Cs-137	ND (0.69)	ND (0.49)
	Gross β	ND (0.67)	ND (0.68)
	H-3	83	84
December 2nd, 2021 *Discharged on December 10th	Cs-134	ND (0.57)	ND (0.48)
	Cs-137	ND (0.65)	ND (0.43)
	Gross β	ND (0.69)	ND (0.67)
	H-3	67	69
November 27th, 2021 *Discharged on December 6th	Cs-134	ND (0.81)	ND (0.58)
	Cs-137	ND (0.83)	ND (0.45)
	Gross β	ND (0.65)	ND (0.60)
	H-3	49	54

* * 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 3rd, 2021	Cs-134	ND (0.0032)	ND (0.0043)	ND (0.0055)
	Cs-137	ND (0.0022)	ND (0.0040)	ND (0.0044)
	Gross α	ND (0.52)	ND (3.2)	ND (1.9)
	Gross β	ND (0.47)	ND (0.66)	ND (0.63)
	H-3	64	63	65
	Sr-90	0.0015	ND (0.0014)	ND (0.0052)

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

(Reference) (Unit: Bq/L)

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

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

Appendix 7

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

(Unit: Bq/L)

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