Information(16:00), December 27, 2023

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 sub-drain 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 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/mp202311.pdf

2. Sub-drain and Groundwater Drain Systems

In November 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 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 Energy Cooperation Division,
Ministry of Foreign Affairs, Tel 03-5501-8227

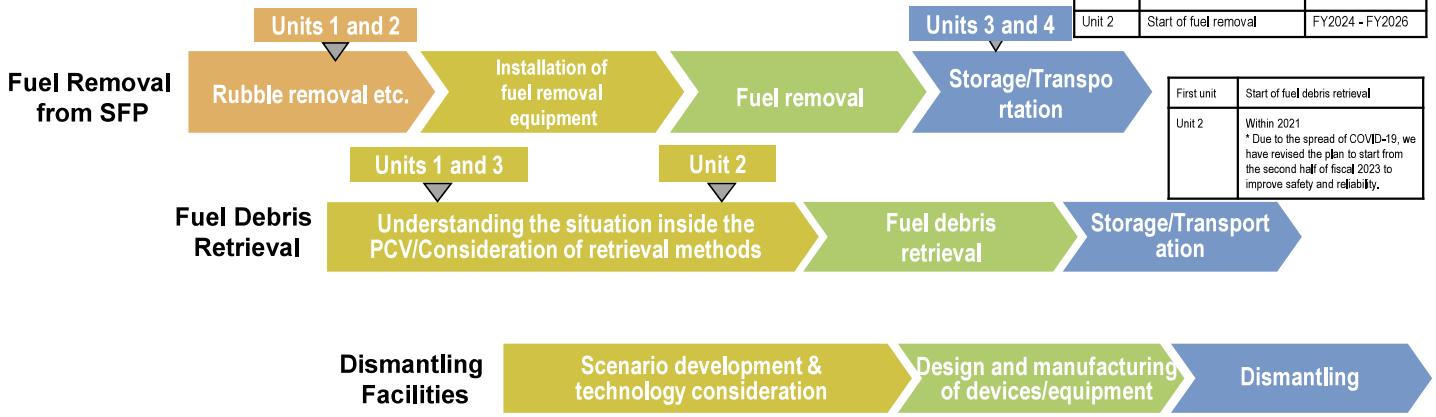
Outline of Decommissioning, Contaminated Water and Treated Water Management

November 30, 2023
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 with nearby metal materials etc.



<Milestones in the Mid- and Long-Term Roadmap>

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

First unit	Start of fuel debris retrieval
Unit 2	Within 2021 * Due to the spread of COVID-19, we have revised the plan to start from the second half of fiscal 2023 to improve safety and reliability.

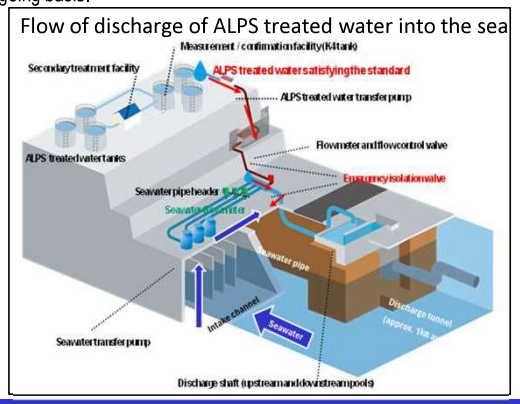
Measures for treated water

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 and objectivity and transparency ensured by engaging with third-party experts and having safety checked by the IAEA. Moreover, accurate information will be disseminated with full transparency on an ongoing basis.

Flow of discharge of ALPS treated water into the sea



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

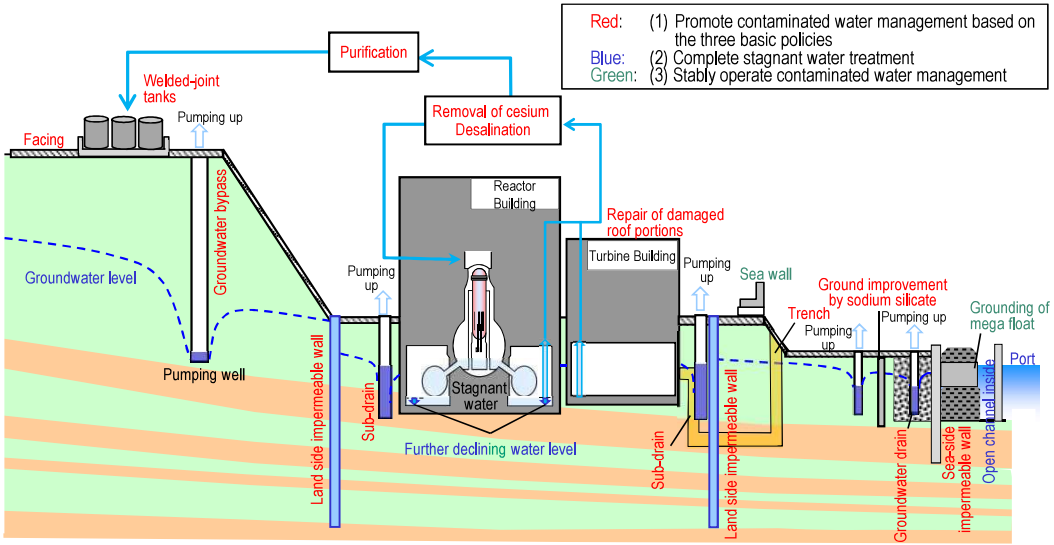
- Strontium-reduced water from other equipment is being re-treated in the Advanced Liquid Processing System (ALPS: multi-nuclide removal equipment) and stored in welded-joint tanks.
- Multi-layered contaminated water management measures, including land-side impermeable walls and sub-drains, have stabilized 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. Through these measures, the generation of contaminated water was reduced from approx. 540 m^3/day (in May 2014) to approx. 90 m^3/day (in FY2022).
- 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 reduce the stagnant water levels in buildings as planned, work to install additional stagnant water transfer equipment is underway.
- 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.
- While conducting the dust impact assessment, measures to reduce the stagnant water level were implemented. In March 2023, the target water level in each building was achieved. For the Units 1-3 Reactor Buildings, "reducing stagnant water in the Reactor Buildings to about half the amount at the end of 2020 during the period FY2022-2024" was achieved.
- 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

- Various measures were carried out to prepare for tsunamis. As countermeasures for heavy rain, sandbags are being installed to suppress direct inflow into buildings while work to close openings in buildings and install 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.

Status of discharge of ALPS treated water into the sea

From November 2, 2023, discharge of ALPS treated water from Tank Group A of the measurement / confirmation facility into the sea (3rd) commenced. Since the commencement of discharge, it has been confirmed that the discharge was conducted safely as planned based on the results of quick analysis conducted daily by TEPCO on tritium in seawater.

The 3rd discharge was conducted safely as planned while confirming that the discharge satisfied the national government's requirement and was completed on November 20. During the discharge period, no abnormality was detected by the sea area monitoring conducted by the national government, Fukushima Prefecture and TEPCO. (Discharge amount 7,753 m^3)

In the next phase, after draining water in the upstream pool to the downstream pool, inspections related to the facilities and operation will be conducted.

< Measurement status for the 3rd discharge of ALPS treated water >
(* Detailed information described on the right on Page 5 >

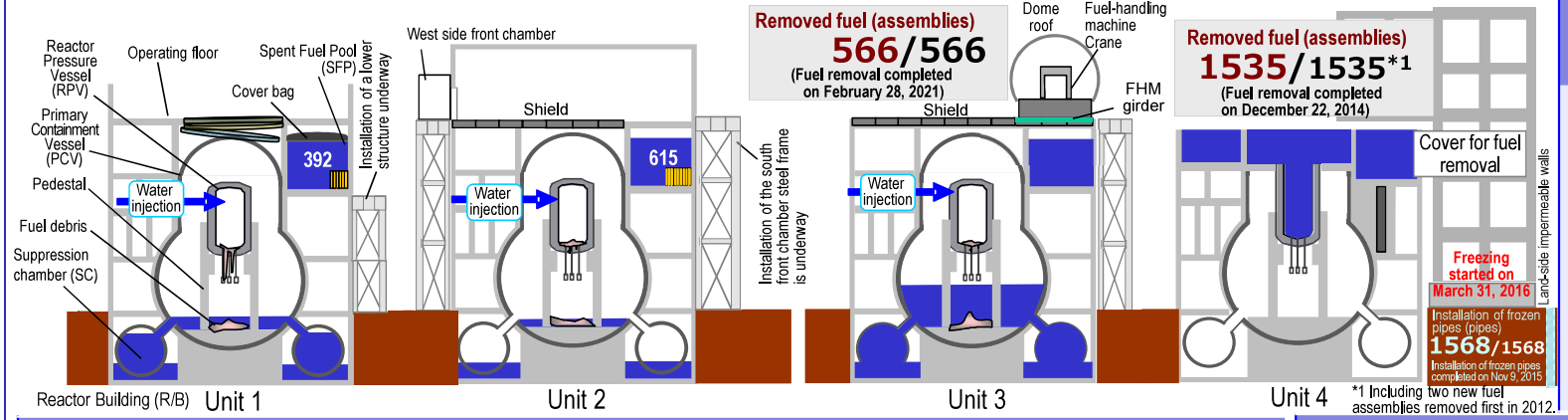
Measurement status	Requirement satisfaction
Attributes of the treated water from Tank Group A (Concentration of the 29 types of radionuclides within the measurement / evaluation scope and regulatory requirements) [TEPCO] (Sampled on July 30)	○
IAEA (ALPS treated water after dilution, published on November 2)	○
Downstream of discharge shaft and seawater pipe header [TEPCO] (As of November 1)	○
Results of sea area monitoring at 10 points within 3km of the Power Station [TEPCO] (Sampled on November 28)	○
Ministry of the Environment (11 points off the coast of Fukushima Prefecture, sampled on November 21 and 23)	○
Fisheries Agency (Flounder and others, sampled on November 28)	○
Fukushima Prefecture (9 points off the coast of Fukushima Prefecture, sampled on November 22)	○

Status of measures to prevent groundwater inflow from around the buildings

Between external walls of each building, gaps were generated when the buildings were constructed adjacently around the Reactor Buildings. There are many penetration pipes in the gaps between the buildings and groundwater may infiltrate from external walls. In response, the method to stop infiltration by boring the external wall ends and placing mortar is being examined.

Based on the results of the mockup test last year, actual-scale level test construction is being conducted this fiscal year between the Units 5/6 Turbine Buildings and Reactor Buildings to verify the boring method and the water stoppage performance.

In the succeeding phases, the inflow amount to the buildings suppressed by the test construction will be confirmed. Moreover, the same method will also be implemented to Unit 3 by FY2025 and subsequently, water stoppage work for gap ends will be conducted in other units.



Unit 1 Progress status of work toward fuel removal

Toward installing the large cover, installation of a lower structure has been underway on the west and north sides of the Unit 1 Reactor Building.

On the east side, following the completion of anchor drilling, installation of base plates has been underway.

On the south side, after preparation for installing the temporary gantry (installing the shielings and others) was completed, anchor drilling has been underway since November 20.

Unit 2 Progress status toward PCV internal investigation and trial retrieval

Toward internal investigation and trial debris retrieval of the Unit 2 Primary Containment Vessel (PCV), the arm-type equipment will be inserted from X-6 penetration into the PCV to remove obstacles inside the PCV and conduct the internal investigation.

Regarding the arm-type equipment, a mockup test simulating the site continues. It was confirmed that the equipment could cut and remove obstacles, but to increase the accuracy assuming multiple kinds and times of accesses, improvement of necessary control program is underway.

Regarding X-6 penetration, cleaning of the X-6 penetration flange surface was completed before removing deposit. Toward future deposit removal inside X-6 penetration, installation of the equipment and other related work is underway.

Before commencing trial retrieval in around the 2nd half of FY2023, based on the status of deposit removal inside the X-6 penetration and the test of the robot arm, work will proceed appropriately.

< Cleaning of X-6 penetration flange surface >

Revision of the Solid Waste Storage Management Plan (FY2023 version)

Regarding the Solid Waste Storage Management Plan, which was formulated based on the Mid-and-Long-Term Roadmap, the seventh revision was issued, in which for "rubble and others" and "water treatment secondary waste," amount to be generated in about next ten years was estimated based on the actual generation result.

For solid waste such as rubble, amount after volume reduction by incineration and others was also calculated (amount to be generated: approx. 760,000m^3, after volume reduction: approx. 290,000m^3).

Regarding the Large Waste Storage-1 and the Additional Solid Waste Storage-11, the completion date was reviewed based on the review of the seismic resistant assessment. However, this review will not affect the achievement of the milestone target in the Mid-and-Long-Term Roadmap "transferring solid waste such as rubble to indoor storage within FY2028."

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
November 25th, 2023 *Discharged on November30th	Cs-134	ND (0.53)	ND (0.54)
	Cs-137	ND (0.61)	ND (0.61)
	Gross β	ND (0.65)	ND (0.38)
	H-3	610	650
November 23th, 2023 *Discharged on November 28th	Cs-134	ND (0.75)	ND (0.65)
	Cs-137	ND (0.72)	ND (0.64)
	Gross β	ND (1.8)	ND (0.35)
	H-3	610	660
November 21th, 2023 *Discharged on November 26th	Cs-134	ND (0.53)	ND (0.62)
	Cs-137	ND (0.51)	ND (0.51)
	Gross β	ND (1.9)	ND (0.40)
	H-3	670	710
November 19th, 2023 *Discharged on November 24th	Cs-134	ND (0.96)	ND (0.64)
	Cs-137	ND (0.61)	ND (0.51)
	Gross β	ND (1.8)	ND (0.49)
	H-3	730	780
November 17th, 2023 *Discharged on November 22nd	Cs-134	ND (0.69)	ND (0.75)
	Cs-137	ND (0.51)	ND (0.67)
	Gross β	ND (0.65)	ND (0.38)
	H-3	710	760
November 15th, 2023 *Discharged on November 20th	Cs-134	ND (0.64)	ND (0.70)
	Cs-137	ND (0.68)	ND (0.82)
	Gross β	ND (2.0)	ND (0.36)
	H-3	670	680
November 13th, 2023 *Discharged on November 18th	Cs-134	ND (0.84)	ND (0.50)
	Cs-137	ND (0.76)	ND (0.70)
	Gross β	ND (1.7)	ND (0.38)
	H-3	620	650
November 11th, 2023 *Discharged on	Cs-134	ND (0.62)	ND (0.65)
	Cs-137	ND (0.45)	ND (0.61)

November 16h	Gross β	ND (1.9)	ND (0.35)
	H-3	630	680
November 9th, 2023 *Discharged on November 14th	Cs-134	ND (0.75)	ND (0.66)
	Cs-137	ND (0.51)	ND (0.51)
	Gross β	ND (0.69)	ND (0.34)
	H-3	770	790
November 7th, 2023 *Discharged on November 11th	Cs-134	ND (0.75)	ND (0.64)
	Cs-137	ND (0.61)	ND (0.70)
	Gross β	ND (1.8)	ND (0.34)
	H-3	790	850
November 6th, 2023 *Discharged on November 11th	Cs-134	ND (0.69)	ND (0.60)
	Cs-137	ND (0.72)	ND (0.59)
	Gross β	ND (1.5)	ND (0.33)
	H-3	820	890
November 5th, 2023 *Discharged on November 10th	Cs-134	ND (0.84)	ND (0.69)
	Cs-137	ND (0.67)	ND (0.57)
	Gross β	ND (1.6)	ND (0.31)
	H-3	770	810
November 3rd, 2023 *Discharged on November 8th	Cs-134	ND(0.89)	ND(0.74)
	Cs-137	ND(0.72)	ND(0.64)
	Gross β	ND(1.8)	ND(0.32)
	H-3	840	920
November 1st, 2023 *Discharged on November6th	Cs-134	ND (0.84)	ND (0.64)
	Cs-137	ND (0.80)	ND (0.54)
	Gross β	ND (0.64)	ND (0.36)
	H-3	820	860
October 31st, 2023 *Discharged on November 5th	Cs-134	ND (0.74)	ND (0.56)
	Cs-137	ND (0.55)	ND (0.48)
	Gross β	ND (1.8)	ND(0.32)
	H-3	780	820
October 30th, 2023 *Discharged on November 4th	Cs-134	ND (0.75)	ND (0.53)
	Cs-137	ND (0.72)	ND (0.64)
	Gross β	ND (2.0)	ND (0.30)
	H-3	780	810
October 29th, 2023 *Discharged on November 3rd	Cs-134	ND (0.62)	ND (0.70)
	Cs-137	ND (0.75)	ND (0.64)
	Gross β	ND (1.7)	ND (0.33)
	H-3	750	790
October 28th, 2023 *Discharged on November 2nd	Cs-134	ND (0.80)	ND (0.63)
	Cs-137	ND (0.72)	ND (0.70)
	Gross β	ND (1.9)	ND (0.40)

	H-3	720	780

* * 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
October 1st,2023	Cs-134	ND (0.0024)	ND (0.0050)	ND (0.0065)
	Cs-137	0.0021	ND(0.0041)	ND (0.0049)
	Gross α	ND (0.40)	ND (2.4)	ND (1.8)
	Gross β	ND (0.56)	ND (0.64)	ND (0.62)
	H-3	680	700	690
	Sr-90	0.0028	ND (0.0025)	ND(0.0056)

* 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.

※ The reference table shows the values of operational targets before discharge. Since the values after discharge contain natural radioactive materials in seawater, there will be differences between the values and the operational targets values.

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 12th, 2023 *Sampled before discharge of purified groundwater.	Cs-134	ND (0.71)
	Cs-137	ND (0.72)
	Gross β	9.4
	H-3	ND (0.33)

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	Third-party organization
November 22th, 2023 *Discharged on November27th	Cs-134	ND (0.69)	ND (0.56)
	Cs-137	ND (0.76)	ND (0.68)
	Gross β	ND (0.62)	ND (0.31)
	H-3	48	52
November 14th, 2023 *Discharged on November 19th	Cs-134	ND (0.91)	ND (0.65)
	Cs-137	ND (0.60)	ND (0.64)
	Gross β	ND (0.63)	ND (0.33)
	H-3	45	49
November 2nd, 2023 *Discharged on November 7th	Cs-134	ND (0.69)	ND (0.68)
	Cs-137	ND (0.84)	ND (0.67)
	Gross β	ND (0.67)	ND (0.34)
	H-3	53	53

* * 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 5th, 2023	Cs-134	ND (0.0034)	ND (0.0051)	ND (0.0057)
	Cs-137	ND (0.0029)	ND (0.0038)	ND (0.0044)
	Gross α	ND (0.32)	ND (2.3)	ND (1.8)
	Gross β	ND (0.47)	ND (0.66)	ND (0.61)
	H-3	50	50	50
	Sr-90	ND(0.0012)	ND (0.0012)	ND (0.0054)

* 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.

※ The reference table shows the values of operational targets before discharge. Since the values after discharge contain natural radioactive materials in seawater, there will be differences between the values and the operational targets values.

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)
September 12th, 2023	Cs-134	ND (0.85)
	Cs-137	ND (0.68)
	Gross β	12
	H-3	ND (0.33)