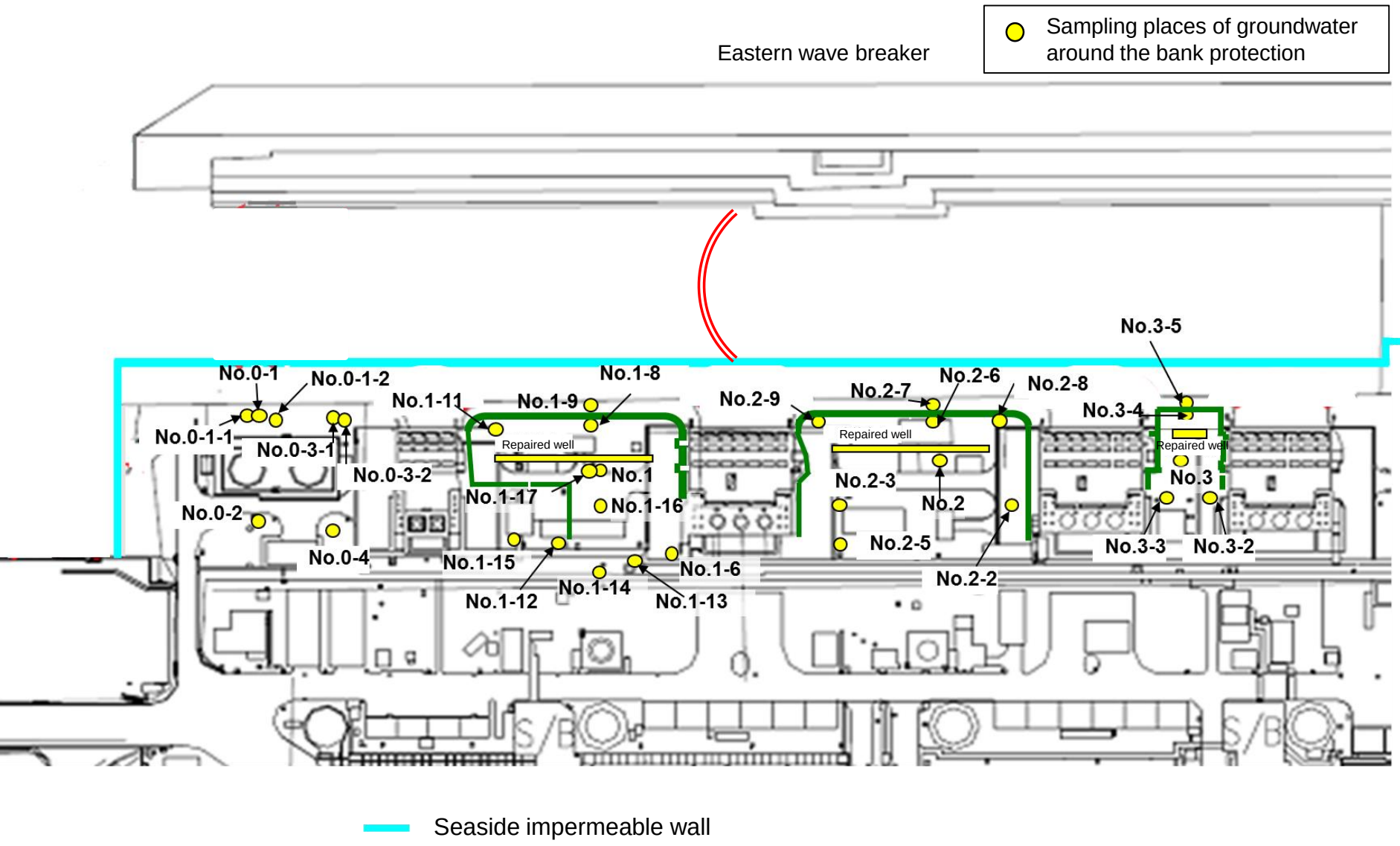
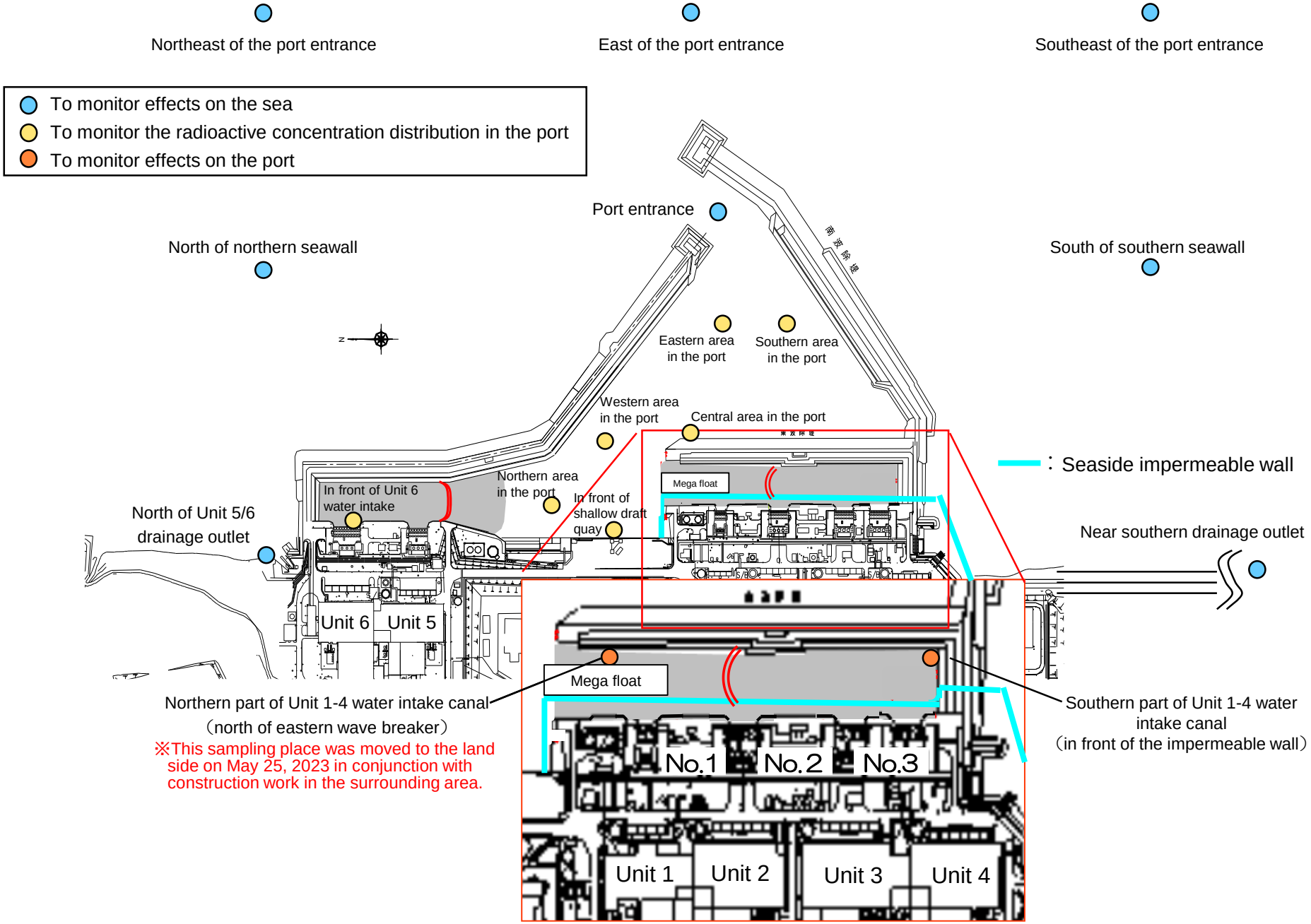
Sampling places of groundwater around the bank protection at the Fukushima Daiichi Nuclear Power Station



Sampling places of seawater in the port and near drainage outlets at the Fukushima Daiichi Nuclear Power Station



[Date]

Tokyo Electric Power Company Holdings, Inc.
Fukushima Daiichi D&D Engineering Company

Analysis Results of Groundwater Observation Holes Around the Bank Protection
(Gross β[・H-3]・γ・Chlorine)

Place of sampling	Date and Time of Sampling	Analysis Item								
				Other γ nuclides						
		Gross β (Bq/L)	[H-3] [(Bq/L)]	Mn-54 (Bq/L)	Co-60 (Bq/L)	Ru-106 (Bq/L)	Sb-125 (Bq/L)	Cs-134 (Bq/L)	Cs-137 (Bq/L)	Chlorine (ppm)
No. 0-1										
No. 0-1-2										
No. 0-2										
No. 0-3-1										
No. 0-3-2										
No. 0-4										
No. 1										
No. 1-6										
No. 1-8										
No. 1-9 ※1										
No. 1-11										
No. 1-12										
No. 1-14										
No. 1-16										
No. 1-17										

・Half life of each nuclide: [H-3 (Approx. 12 years),] Mn-54 (Approx. 310 days), Co-60 (Approx. 5 years), Ru-106 (Approx. 370 days), Sb-125 (Approx. 3 years), Cs-134 (Approx. 2 years), Cs-137 (Approx. 30 years)

・Inequality sign (<: less than) indicates that measurement result is less than the detection limit (ND).

・"-" indicates that the item was not included in the measurement or the sampling was stopped.

・Values are expressed in exponential notation. For example, "3.1E+01" means "3.1×10^{1}" and equals 31.
Similarly, "3.1E+00" means "3.1×10^{0}" and equals 3.1, and "3.1E-01" means "3.1×10^{-1}" and equals 0.31.

[・Analysis results except for H-3 have already been released.]

※1　As for No. 1-9, γ values were not measured because the water was sampled using a water sampler. Gross β was measured after filtration as a reference.

Analysis Results of Groundwater Observation Holes Around the Bank Protection
(Gross β[・H-3] ・γ ・Chlorine)

Place of Sampling	Date and Time of Sampling	Analysis Item								
				Other γ nuclides						
		Gross β (Bq/L)	[H-3] [(Bq/L)]	Mn-54 (Bq/L)	Co-60 (Bq/L)	Ru-106 (Bq/L)	Sb-125 (Bq/L)	Cs-134 (Bq/L)	Cs-137 (Bq/L)	Chlorine (ppm)
Water pumped up from Unit 1/2 well point										
No. 2										
No. 2-2										
No. 2-3										
No. 2-5 ※2										
No. 2-6										
No. 2-7										
No. 2-8										
Water pumped up from Unit 2/3 repaired well										
No. 3										
No. 3-2										
No. 3-3										
No. 3-4										
No. 3-5 ※2										
Water pumped up from Unit 3/4 repaired well										

・Half life of each nuclide: [H-3 (Approx. 12 years),] Mn-54 (Approx. 310 days), Co-60 (Approx. 5 years), Ru-106 (Approx. 370 days), Sb-125 (Approx. 3 years), Cs-134 (Approx. 2 years), Cs-137 (Approx. 30 years)

・Inequality sign (<: less than) indicates that measurement result is less than the detection limit.

・"-" indicates that the item was not included in the measurement or the sampling was stopped.

・Values are expressed in exponential notation. For example, "3.1E+01" means "3.1×10^{1}" and equals 31.
Similarly, "3.1E+00" means "3.1×10^{0}" and equals 3.1, and "3.1E-01" means "3.1×10^{-1}" and equals 0.31.

[・Analysis results except for H-3 have already been released.]

※2　As for No. 2-5 and No. 3-5, γ values were not measured because the water was sampled using a water sampler. Gross β was measured after filtration as a reference.

[Date]

Tokyo Electric Power Company Holdings, Inc.
Fukushima Daiichi D&D Engineering Company

Analysis Results of Groundwater Observation Holes Around the Bank Protection
(Gross β・H-3・Sr・γ・Chlorine)

Place of Sampling	Date and Time of Sampling	Analysis Item									
					Other γ nuclides						
		Gross β (Bq/L)	H-3 (Bq/L)	Sr-90 (Bq/L)	Mn-54 (Bq/L)	Co-60 (Bq/L)	Ru-106 (Bq/L)	Sb-125 (Bq/L)	Cs-134 (Bq/L)	Cs-137 (Bq/L)	Chlorine (ppm)
No. 1											
No. 1-6											
No. 1-8											
No. 1-9 ※1											
No. 1-11											
No. 1-12											
No. 1-14											
No. 1-16											
No. 1-17											

・Half life of each nuclide: H-3 (Approx. 12 years), Sr-90 (Approx. 29 years), Mn-54 (Approx. 310 days), Co-60 (Approx. 5 years), Ru-106 (Approx. 370 days), Sb-125 (Approx. 3 years), Cs-134 (Approx. 2 years), Cs-137 (Approx. 30 years)

・Inequality sign (<: less than) indicates that measurement result is less than the detection limit (ND).

・"-" indicates that the item was not included in the measurement or the sampling was stopped.

・Values are expressed in exponential notation. For example, "3.1E+01" means "3.1×10^{1}" and equals 31.
Similarly, "3.1E+00" means "3.1×10^{0}" and equals 3.1, and "3.1E-01" means "3.1×10^{-1}" and equals 0.31.

・Analysis results except for Sr-90 have already been released.

※1　As for No. 1-9, γ values were not measured because the water was sampled using a water sampler. Gross β was measured after filtration as a reference.

[Date]

Tokyo Electric Power Company Holdings, Inc.
Fukushima Daiichi D&D Engineering Company

Analysis Results of Seawater

<In the Port, near Drainage Outlets> (Gross β[・H-3]・γ)

Place of Sampling	Date and Time of Sampling	Analysis Item			
		Gross β (Bq/L)	[H-3] [(Bq/L)]	Cs-134 (Bq/L)	Cs-137 (Bq/L)
North of Unit 5/6 Drainage Outlet (T-1), 1F					
In front of Unit 6 Water Intake, 1F					
In front of Shallow Draft Quay, 1F					
Northern Part of Unit 1-4 Water Intake Canal (North of Eastern Wave Breaker), 1F					
Southern Part of Unit 1-4 Water Intake Canal (In front of the Impermeable Wall), 1F					
Near Southern Drainage Outlet (T-2), 1F					
Port Entrance (T-0), 1F					
Central Area in the Port, 1F					
Eastern Area in the Port, 1F					
Western Area in the Port, 1F					
Northern Area in the Port, 1F					
Southern Area in the Port, 1F					
North of Northern Seawall (T-0-1), 1F					
Northeast of the Port Entrance (T-0-1A), 1F					
East of the Port Entrance (T-0-2), 1F					
Southeast of the Port Entrance (T-0-3A), 1F					
South of Southern Seawall (T-0-3), 1F					
WHO Guidelines for Drinking-water Quality※1			1.0E+04	1.0E+01	1.0E+01

・Half life of each nuclide: [H-3 (Approx. 12 years),] Cs-134 (Approx. 2 years), Cs-137 (Approx. 30 years)

・Inequality sign (<: less than) indicates that measurement result is less than the detection limit (ND).

・"-" indicates that the item was not included in the measurement or the sampling was stopped.

・Values are expressed in exponential notation. For example, "3.1E+01" means "3.1×10^{1}" and equals 31.
Similarly, "3.1E+00" means "3.1×10^{0}" and equals 3.1, and "3.1E-01" means "3.1×10^{-1}" and equals 0.31.

・On such a day when silt fence is opened/closed, sampling in front of shallow draft quay is conducted also after the opening/closing.

[・Analysis results except for H-3 have already been released.]

※1 Guideline levels for [H-3,]Cs-134 and Cs-137 in WHO Guidelines for Drinking-water Quality

・For the evaluation of the analyis results, please refer to the "Status of the Fukushima Daiichi NPS (Daily Report)" *(in Japanese only)*.
https://www.tepco.co.jp/press/report/

Analysis Results of Seawater
<In the Port, near Drainage Outlets> (Gross β・γ)

Place of Sampling	Date and Time of Sampling	Analysis Item		
		Gross β (Bq/L)	Cs-134 (Bq/L)	Cs-137 (Bq/L)
In front of Shallow Draft Quay, 1F (after opening/closing silt fence)				
Concentration Limit Required by Law ※1			6.0E+01	9.0E+01
WHO Guidelines for Drinking-water Quality			1.0E+01	1.0E+01

・Half life of each nuclide: Cs-134 (Approx. 2 years), Cs-137 (Approx. 30 years)

・Inequality sign (<: less than) indicates that measurement result is less than the detection limit (ND).

・"-" indicates that the item was not included in the measurement or the sampling was stopped.

・Values are expressed in exponential notation. For example, "3.1E-01" means "3.1×10^{-1}" and equals 0.31.
Similarly, "3.1E+00" means "$3.1x10^{0}$" and equals 3.1, and "3.1E-01" means "$3.1x10^{-1}$" and equals 0.31.

・On such a day when silt fence is opened/closed, sampling in front of shallow draft quay is conducted also after the opening/closing.

※1 Concentration limit specified by the Regulation Concerning the Security of the Reactor Facilities at the Fukushima Daiichi Nuclear Power Station and the Protection of Specific Nuclear Fuel Material
(the concentration limit in the water outside of surrounding monitored areas in the section 6 of the appendix 1:
Limit specified by the Regulation is converted from Bq/cm^3 to Bq/L in the table.)

[Date]

Tokyo Electric Power Company Holdings, Inc.
Fukushima Daiichi D&D Engineering Company

Analysis Results of Seawater

<In the Port, near Drainage Outlets> (Gross β・H-3・Sr・γ)

Place of Sampling	Date and Time of Sampling	Analysis Item				
		Gross β (Bq/L)	H-3 (Bq/L)	Sr-90 (Bq/L)	Cs-134 (Bq/L)	Cs-137 (Bq/L)
North of Unit 5/6 Drainage Outlet (T-1), 1F						
In front of Shallow Draft Quay, 1F						
Northern Part of Unit 1-4 Water Intake Canal (North of Eastern Wave Breaker), 1F						
Southern Part of Unit 1-4 Water Intake Canal (In front of the Impermeable Wall), 1F						
Near Southern Drainage Outlet (T-2), 1F						
Port Entrance (T-0), 1F						
Central Area in the Port, 1F						
Nothern Area in the Port, 1F						
WHO Guidelines for Drinking-water Quality※1			1.0E+04	1.0E+01	1.0E+01	1.0E+01

・Half life of each nuclide: H-3 (Approx. 12 years), Sr-90 (Approx. 29 years), Cs-134 (Approx. 2 years), Cs-137 (Approx. 30 years)
・Inequality sign (<: less than) indicates that measurement result is less than the detection limit (ND).
・ "-" indicates that the item was not included in the measurement or the sampling was stopped.
・Values are expressed in exponential notation. For example, "3.1E+01" means "3.1×10^{1}" and equals 31.
Similarly, "3.1E+00" means "$3.1x10^{0}$" and equals 3.1, and "3.1E-01" means "$3.1x10^{-1}$" and equals 0.31.
・On such a day when silt fence is opened/closed, sampling in front of shallow draft quay is conducted also before the opening/closing.
・Nuclides analysis results except for Sr-90 have already been released.
※1 Guideline levels for H-3, Sr-90, Cs-134 and Cs-137 in WHO Guidelines for Drinking-water Quality
・For the evaluation of the analyis results, please refer to the "Status of the Fukushima Daiichi NPS (Daily Report)" *(in Japanese only)* .
https://www.tepco.co.jp/press/report/

＜Reference＞ The Highest Dose Until the Previous Release ※3 (Groundwater Around the Bank Protection)

Unit：Bq/L

		Groundwater Observation Hole No. 0-1	Groundwater Observation Hole No. 0-1-1	Groundwater Observation Hole No. 0-1-2	Groundwater Observation Hole No. 0-2	Groundwater Observation Hole No. 0-3-1	Groundwater Observation Hole No. 0-3-2	Groundwater Observation Hole No. 0-4	Groundwater Observation Hole No. 1	Groundwater Observation Hole No. 1-1 ※	Groundwater Observation Hole No. 1-2 ※	Groundwater Observation Hole No. 1-3 ※	Groundwater Observation Hole No. 1-4 ※	Groundwater Observation Hole No. 1-5 ※	Groundwater Observation Hole No. 1-6
Cs-134（Approx. 2 years）															
Cs-137（Approx. 30 years）															
The other γ	Ru-106（Approx. 370 days）														
	Mn-54（Approx. 310 days）														
	Co-60（Approx. 5 years）														
	Sb-125（Approx. 3 years）														
Gross β															
H-3（Approx. 12 years）															
Sr-90（Approx. 29 years）															

Unit：Bq/L

		Groundwater Observation Hole No. 1-8	Groundwater Observation Hole No. 1-9	Groundwater Observation Hole No. 1-10	Groundwater Observation Hole No. 1-11	Groundwater Observation Hole No. 1-12	Groundwater Observation Hole No. 1-13	Groundwater Observation Hole No. 1-14	Groundwater Observation Hole No. 1-15	Groundwater Observation Hole No. 1-16	Groundwater Observation Hole No. 1-17	Water pumped up from Unit 1/2 well point	Groundwater Observation Hole No. 2	Groundwater Observation Hole No. 2-1 ※	Groundwater Observation Hole No. 2-2
Cs-134（Approx. 2 years）															
Cs-137（Approx. 30 years）															
The other γ	Ru-106（Approx. 370 days）														
	Mn-54（Approx. 310 days）														
	Co-60（Approx. 5 years）														
	Sb-125（Approx. 3 years）														
Gross β															
H-3（Approx. 12 years）															
Sr-90（Approx. 29 years）															

Unit：Bq/L

		Groundwater Observation Hole No. 2-3	Groundwater Observation Hole No. 2-5	Groundwater Observation Hole No. 2-6	Groundwater Observation Hole No. 2-7	Groundwater Observation Hole No. 2-8	Groundwater Observation Hole No. 2-9	Water pumped up from Unit 2/3 repaired well ※1	Groundwater Observation Hole No. 3	Groundwater Observation Hole No. 3-1 ※	Groundwater Observation Hole No. 3-2	Groundwater Observation Hole No. 3-3	Groundwater Observation Hole No. 3-4	Groundwater Observation Hole No. 3-5	Water pumped up from Unit 3/4 repaired well ※1
Cs-134（Approx. 2 years）															
Cs-137（Approx. 30 years）															
The other γ	Ru-106（Approx. 370 days）														
	Mn-54（Approx. 310 days）														
	Co-60（Approx. 5 years）														
	Sb-125（Approx. 3 years）														
Gross β															
H-3（Approx. 12 years）															
Sr-90（Approx. 29 years）															

● The highest dose among the data that have been released is shown for Strontium-90, since some samples are still under anaysis.
＊1 Analysis results of pumped up water
＊2 Reference value because of high turbidity（Measurement was conducted after filtration.）

※Observation holes where sampling cannot be conducted currently due to effects of chemical injection in conjunction with soil improvement

(Note) As for No. 1-9, 2-5 and 3-5, γ values were not measured because the water was sampled using a water sampler. Gross β was measured after filtration as a reference.

＊ ND indicates that measurement result is less than the detection limit.
＊ The sampling date is provided in parenthesis.
※1 Sample name was changed as the pumping method was altered.
※2 The highest dose and the sampling date were corrected on December 26, 2018 as they contained errors.
※3 The highest dose among the analysis results released in "Analysis Results of Groundwater Observation Holes Around the Bank Protection" and "Detailed Analysis Results in the Port of Fukushima Daiichi NPS, around Discharge Channel and Bank Protection Underground Water Obtained at Bank Protection" (published before September 1, 2020) is shown.

・Values are expressed in exponential notation. For example, "3.1E+01" means "3.1×10^{1}" and equals 31.
Similarly, “3.1E+00” means “$3.1x10^{0}$” and equals 3.1, and “3.1E-01” means “$3.1x10^{-1}$” and equals 0.31.

<Reference> The Highest Dose Until the Previous Release ※1（Seawater）

Unit：Bq/L

	North of Unit 5/6 Drainage Outlet, 1F	In front of Unit 6 Water Intake, 1F	In front of Shallow Draft Quay, F1	Northern part of Unit 1-4 Water Intake Canal (North of Eastern Wave Breaker), 1F	In front of Unit 1 Water Intake (In front of the Impermeable wall), 1F	In front of Unit 2 Water Intake (In front of the Impermeable wall), 1F	In front of Unit 3/4 Water Intake, 1F	Unit 4 Screen (Inside the silt fence), 1F	Southern Part of Unit 1-4 Intake Canal (In front of the impermeable wall), 1F	Near Southern Drainage Outlet, 1F	Port Entrance, 1F
Cs-134 （Approx. 2 years）											
Cs-137 （Approx. 30 years）											
Gross β											
H-3 （Approx. 12 years）											
Sr-90 （Approx. 29 years）											

Unit：Bq/L

	Eastern Area in the Port, 1F	Western Area in the Port, 1F	Northern Area in the Port, 1F	Southern Area in the Port, 1F	Central Area in the Port, 1F	North of Northern Seawall, 1F	Northeast of the Port Entrance, 1F	East of the Port Entrance, 1F	Southeast of the Port Entrance, 1F	South of Southern Seawall, 1F
Cs-134 （Approx. 2 years）										
Cs-137 （Approx. 30 years）										
Gross β										
H-3 （Approx. 12 years）										
Sr-90 （Approx. 29 years）										

※1 The highest dose among the analysis results released in "Analysis Results of Seawater" and "Detailed Analysis Results in the Port of Fukushima Daiichi NPS, around Discharge Channel and Bank Protection Seawater (published before September 1, 2020) is shown.

Sampling at "Northern part of Unit 1-4 water intake canal" has been conducted since January 14, 2013. Sampling at the other locations has been conducted since June 14, 2013.

● The highest dose among the data that have been released is shown for Strontium-90, since some samples are still under anaysis.

※2 Sampling date was corrected on December 26, 2018 as it contained an error.

・Values are expressed in exponential notation. For example, "3.1E+01" means "3.1×10^{1}" and equals 31. Similarly, “3.1E+00” means “3.1×10^{0}” and equals 3.1, and “3.1E-01” means “3.1×10^{-1}” and equals 0.31.

＊ ND indicates that measurement result is less than the detection limit.

＊ The sampling date is provided in parenthesis.

＊ “-“ indicates that the item was not included in the measurement.

【Reference】Concentration limit

Unit：Bq/L

	Cs-134	Cs-137	H-3	Sr-90
Concentration limit specified by the Regulation Concerning the Security of the Reactor Facilities at the Fukushima Daiichi Nuclear Power Station and the Protection of Specific Nuclear Fuel Material (the concentration limit in the water outside of surrounding monitored areas in the section 6 of the appendix 1: Limit specified by the Regulation is converted from Bq/cm3 to Bq/L in this table.)	6.0E+01	9.0E+01	6.0E+04	3.0E+01
WHO Guidelines for Drinking-water Quality	1.0E+01	1.0E+01	1.0E+04	1.0E+01