# Water Discharge Criteria for Groundwater Bypass

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# List of water discharge criteria for groundwater bypass water

| | | Cs-134 | Cs-137 | Gross beta (Sr-90) | H-3 | Ratio to the density limits by the announcement |
|---|---|---|---|---|---|---|
| **Permissible limits for water discharge** (based on the density limits by the announcement) | | 1 Bq/L | 1 Bq/L | Gross beta: 10 Bq/L | 30,000 Bq/L | 0.86 |
| **Operational targets** | | 1 Bq/L | 1 Bq/L | Gross beta: 5 Bq/L | 1,500 Bq/L | 0.22 |
| | | When the density is not less than the operational target, we temporarily stop discharging water, take action to make it below the operational target (gross beta: 1 Bq/L), and then restart the discharging. Meanwhile, we take action, such as cleaning, on water contained in a storage tank where such a density value has been detected, and discharge water after confirming that the density has fallen below the operational target (gross beta: 1 Bq/L). | | | | |
| **Regular monitoring** | Storage tank | — | — | Gross beta (Once in 10 days) :ND < 1 Bq/L | — | |
| | | When gross beta is not less than 1 Bq/L, we temporarily stop discharging water, take action to make it below 1 Bq/L, and then restart the discharging. | | | | |
| | | Once a month, detailed analysis is conducted (Cs, Sr-90, H-3, gross alpha, and gross beta) | | | | |
| | Pump well | — | — | Gross beta (Once a week) No.7, 12: ND < 5 Bq/L Others: ND < 15 Bq/L | · Once a week | |

(Reference) Density limits by the announcement Cs-134: 60 Bq/L, Cs-137: 90 Bq/L, Sr-90: 30 Bq/L, H-3: 60,000 Bq/L

WHO drinking water quality guideline Cs-134: 10 Bq/L, Cs-137: 10 Bq/L, Sr-90: 10 Bq/L, H-3: 10,000 Bq/L

# Permissible limits for water discharge from the groundwater bypass

We establish permissible limits for water discharge from the groundwater bypass as follows, based on the density limits by the announcement.

Separately from these permissible limits, we are to establish operational targets to be used in practical operation, taking into consideration opinions from concerned parties including the fishery industry.

Further, we will make necessary revisions in the future in accordance with “Issues concerning Appropriate Regulation toward Achieving the Effective Dose Limit at the Boundary of TEPCO’s Fukushima Daiichi Nuclear Power Station” released by the Nuclear Regulation Authority.

[Permissible limits for water discharge]

Water to be discharged must satisfy the following criteria (1) to (6):

(1) Cs-134 is below 1 Bq/L

(2) Cs-137 is below 1 Bq/L

(3) None of the other gamma nuclides (except natural nuclides) are detected*

(4) Gross beta is below 10 Bq/L

(5) H-3 is below 30,000 Bq/L

(6) The density limits by the announcement are satisfied for nuclides including those not mentioned above, with reference to the past detailed analysis results on water from the pump wells.

* None of them are detected as a result of measurement of (1) and (2) using a Ge semiconductor detector.

<Reference> Allowance against the density limits by the announcement (the sum of the ratios to the density limit by the announcement)

1/60 + 1/90 + 10/30 + 30,000/60,000 = 0.86 (Allowance of approx. 10%)

# Reasons behind the permissible limits for water discharge from the groundwater bypass

- As for cesium, the limit was set to the same level as the one applied to the surrounding rivers (1 Bq/L).
- As for strontium (Sr), we decided to measure gross beta as an alternative indicator because analysis for strontium takes a substantial time when the density is low. The value used as one of the water discharge criteria for rainwater accumulated inside the tank area dikes was adopted.
- As for Tritium (H-3), we decided to numerically measure the density because this substance is thought to be most easily mixed into groundwater under conditions affected by the power station accident etc. Specifically, the limit was set to a value such that the sum of the ratios to the density limits by the announcement provides an allowance of approx. 10%.

# Operational targets for water discharge from the groundwater bypass

[Reference] Operational targets (our proposal)

Water to be discharged must satisfy the following criteria (1) to (6):

(1) Cs-134 is below 1 Bq/L

(2) Cs-137 is below 1 Bq/L

(3) None of the other gamma nuclides (except natural nuclides) are detected*

(4) Gross beta is below 5 Bq/L

(5) H-3 is below 1,500 Bq/L

(6) The density limits by the announcement are satisfied for nuclides including those not mentioned above, with reference to the past detailed analysis results on water from the pump wells.

* None of them are detected as a result of measurement of (1) and (2) using a Ge semiconductor detector.

<Reference> Allowance against the density limits by the announcement (the sum of the ratios to the density limits by the announcement)

1/60 + 1/90 + 5/30 + 1,500/60,000 = 0.22 (Allowance of approx. 80%)

# [Reference] Water discharge criteria for rainwater accumulated inside the tank area dikes

Water to be discharged must satisfy the following criteria (1) to (5):

- (1) Cs-134 is below 15 Bq/L
- (2) Cs-137 is below 25 Bq/L
- (3) None of the other gamma nuclides (except natural nuclides) are detected*
- (4) Sr-90 is below 10 Bq/L
- (5) The density limits by the announcement are satisfied for nuclides including those not mentioned above, with reference to the water quality inside tanks, etc.

* None of them are detected as a result of measurement of (1) and (2) using a Ge semiconductor detector.

Allowance against the density limits by the announcement (the sum of the ratios to the density limits by the announcement)

15/60 + 25/90 + 10/30 = 0.86 (Allowance of approx. 10%)