**Situation of Storage and Treatment of Accumulated Water including Highly Concentrated Radioactive Materials at Fukushima Daiichi Nuclear Power Station (418th Release)**

September 17, 2019
Tokyo Electric Power Company Holdings, Inc.

## 1. Introduction

This document is to report the following matters in accordance with the instruction of “Installment of treatment facility and storing facility of water including highly concentrated radioactive materials at Fukushima Daiichi Nuclear Power Station of the Tokyo Electric Power Company (Instruction) “(NISA No. 6, June 8, 2011), dated on June 9, 2011.

<Instruction>

TEPCO should report to NISA the situation of storing and treatment of the contaminated water in the Power Station and the future forecast based upon the current situation has to be reported to NISA as soon as the treatment facility starts its operation. Also, subsequently, continued report has to be submitted to NISA once a week until the treatment of the accumulated water in the Central Radioactive Waste Treatment Facility is completed.

## 2. Situation of storing and treatment of accumulated water in the building (actual record)

Stored amounts in each unit building (Units 1 to 4 (including condensers and trenches)) and stored and treated amounts, and other related data in the Accumulated Water Storing Facility as of September 12, 2019 are shown in the Attachment -1.

## 3. Forecast of storing and treatment

### (1) Short term forecast

Water transfer in Units 1 and 2 and Units 3 and 4 is planned based on the stored amount in the Accumulated Water Storing Facilities and the operating situation of the radioactive material treatment equipment and the subdrain catchment facility. Water is transferred to the Process Main Building and/or High Temperature Incinerator Building as Accumulated Water Storing Facilities.

Treatment is implemented considering the state of storage and transfer of Accumulated Water Storing Facilities.

We assume stored amounts in each unit building (Units 1 to 4 (including condenser and trench)), and stored and treated amounts, and other related data in the Accumulated Water Storing Facilities as of September 19, 2019, are shown in Attachment -2.

**(2) Middle term forecast**

Regarding accumulated water in Units 1 and 2 buildings and Units 3 and 4 buildings, from the viewpoint of reducing the risks of discharging to the ocean and leaking into the groundwater, it is necessary to keep enough capacity for the accumulated water in the building until its level reaches TP. 2,564 and to keep the accumulated water level lower than the groundwater level.

On the other hand, based on the view of limiting inflow of underwater to buildings and reducing the amount of emerged accumulated water, we are planning to transfer accumulated water keeping specific water-level difference between accumulated water in the building around and subdrain water and making the lowest floor surface of buildings other than Units 1 to 3 reactor buildings where circulating water is injected into exposed by 2020.

As for accumulated water of the Process Main Building and the High Temperature Incinerator Building, we are planning to treat the accumulated water considering the situation of construction of middle and low level waste water tanks, the operation factor of the radioactive material treatment instruments and duration for maintenance.

We forecast stored amounts in each unit building (Units 1 to 4 (including condensers and trenches)), and storing and treatment situations in the Accumulated Water Storing Facilities for the next 3 months, as shown in Attachment -3.

Stored amounts in each building and the water storage equipment are forecasted to be unchanged in case transfer and treatment were implemented as scheduled without rain. However, it would be subject to change depending on the operation factor of the radioactive material treatment instruments and so on.

Also, the water treated at the radioactive material treatment equipment (fresh water and condensed salt water) can be stored in the middle and low level waste water tanks.

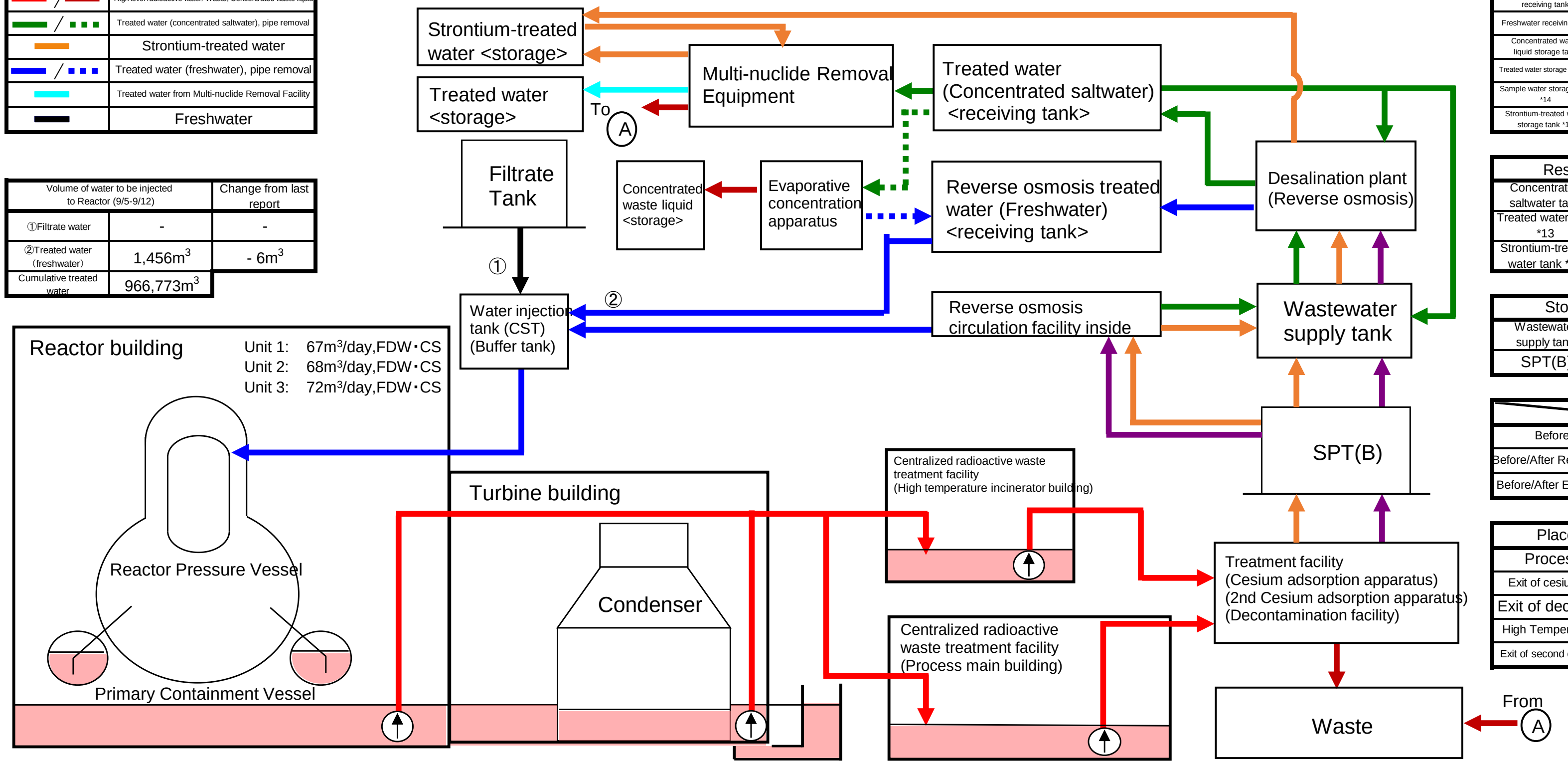
END

Attachment-1

# Storage and treatment of high level radioactive accumulated water (as of September 12, 2019)

| | Classification |
|---|---|
| red / dark red line | High level radioactive water/ Waste, Concentrated waste liquid |
| green / green dotted line | Treated water (concentrated saltwater), pipe removal |
| orange line | Strontium-treated water |
| blue / blue dotted line | Treated water (freshwater), pipe removal |
| cyan line | Treated water from Multi-nuclide Removal Facility |
| black line | Freshwater |

| Volume of water to be injected to Reactor (9/5-9/12) | | Change from last report |
|---|---|---|
| ①Filtrate water | - | - |
| ②Treated water (freshwater) | 1,456m³ | - 6m³ |
| Cumulative treated water | 966,773m³ | |




| Storage volume[*1,2] | | Change from last report | Storage capacity[*3,4] |
|---|---|---|---|
| Concentrated saltwater receiving tank | 0m³ | - | - |
| Freshwater receiving tank | 8,179m³ | + 301m³ | 12,600m³ |
| Concentrated waste liquid storage tank | 9,291m³ | No Change | 10,300m³ |
| Treated water storage tank *12 | 1,058,840m³ | + 75m³ | 1,103,800m³ |
| Sample water storage tank *14 | 6,474m³ | + 1,353m³ | 11,600m³ |
| Strontium-treated water storage tank *10 | 91,293m³ | + 1,090m³ | 132,500m³ |

| Residual water[*5] | | Change from last report | Storage capacity*[3,4] |
|---|---|---|---|
| Concentrated saltwater tank | Approx. 500m³ | No Change | Approx. 2,100m³ |
| Treated water tank *13 | Approx. 100m³ | No Change | Approx. 1,100m³ |
| Strontium-treated water tank *11 | 0m³ | No Change | 0m³ |

| Storage volume | | Change from last report | Storage volume*3 |
|---|---|---|---|
| Wastewater supply tank | 754m³ | - 29m³ | 1,200m³ |
| SPT(B) | 1,021m³ | - 1,516m³ | 3,100m³ |

| | Chloride concentration |
|---|---|
| Before/After Desalination | 600ppm/5ppm (Sampled on July 2, 2019) |
| Before/After Reverse Osmosis Circulation | 420ppm/2ppm (Sampled on August 7, 2019) |
| Before/After Evaporative Concentration | – |

| Place of Sampling | Radioactivity concentration[*6] |
|---|---|
| Process Main Building | 3.3E+07 Bq/L (Sampled on June 4, 2019) |
| Exit of cesium adsorption apparatus | 3.8E+03 Bq/L (Sampled on March 22, 2019) |
| Exit of decontamination facility | – |
| High Temperature Incinerator Building | 5.9E+07 Bq/L (Sampled on April 10, 2019) |
| Exit of second cesium adsorption apparatus | 4.0E+02 Bq/L (Sampled on June 4, 2019) |

| Facility | Storage volume | Change from last report | Water level in T/B *[8] |
|---|---|---|---|
| Unit 1 | Approx. 1,760m³ | + 30m³ | – |
| Unit 2 | Approx. 4,360m³ | + 50m³ | T.P. - 1,192 |
| Unit 3 | Approx. 4,910m³ | + 250m³ | T.P. - 1,244 |
| Unit 4 | Approx. 3,970m³ | + 20m³ | 1T.P. - 1,242 |
| Total | Approx. 15,000m³ | | |

| Storage facility | Storage volume | Change from last report | Water level *[8] | Treated volume (9/5-9/12) | Cumulative treated volume | Waste produced | | Change from last report | Storage capacity |
|---|---|---|---|---|---|---|---|---|---|
| Process Main Building | Approx. 11,700m³ | + 70m³ | T.P. 1,673 | Approx. 2,670m³ *7 | Approx. 2,151,190m³ *7 | Sludge | 597m³ | No Change | 700m³ *3 |
| High Temperature Incinerator Building | Approx. 3,230m³ | - 90m³ | T.P. 423 | | | Used vessels | 4,474[*9] | +3 | 6,372 |
| Total | Approx. 14,930m³ | | | | | | | | |

[Main operations that have been conducted during the period from September 5, 2019 (the previous announcement data) to September 12, 2019.]
- Water transfer from the Units 1-4 to the buildings (Units 1-4, Centralized radioactive waste treatment facility) and to the treatment facility was conducted whenever necessary.
- Due to other work, water transfer to the buildings (Units 1-4, Centralized radioactive waste treatment facility) was conducted whenever necessary.
- Operations of the Cesium Adsorption Apparatus have been suspended.
- Operations of the 2nd Cesium Adsorption Apparatus have been conducted; the availability factor is 32% (previous simulated :35%).
- Operations of the 3rd Cesium Adsorption Apparatus have been suspended.

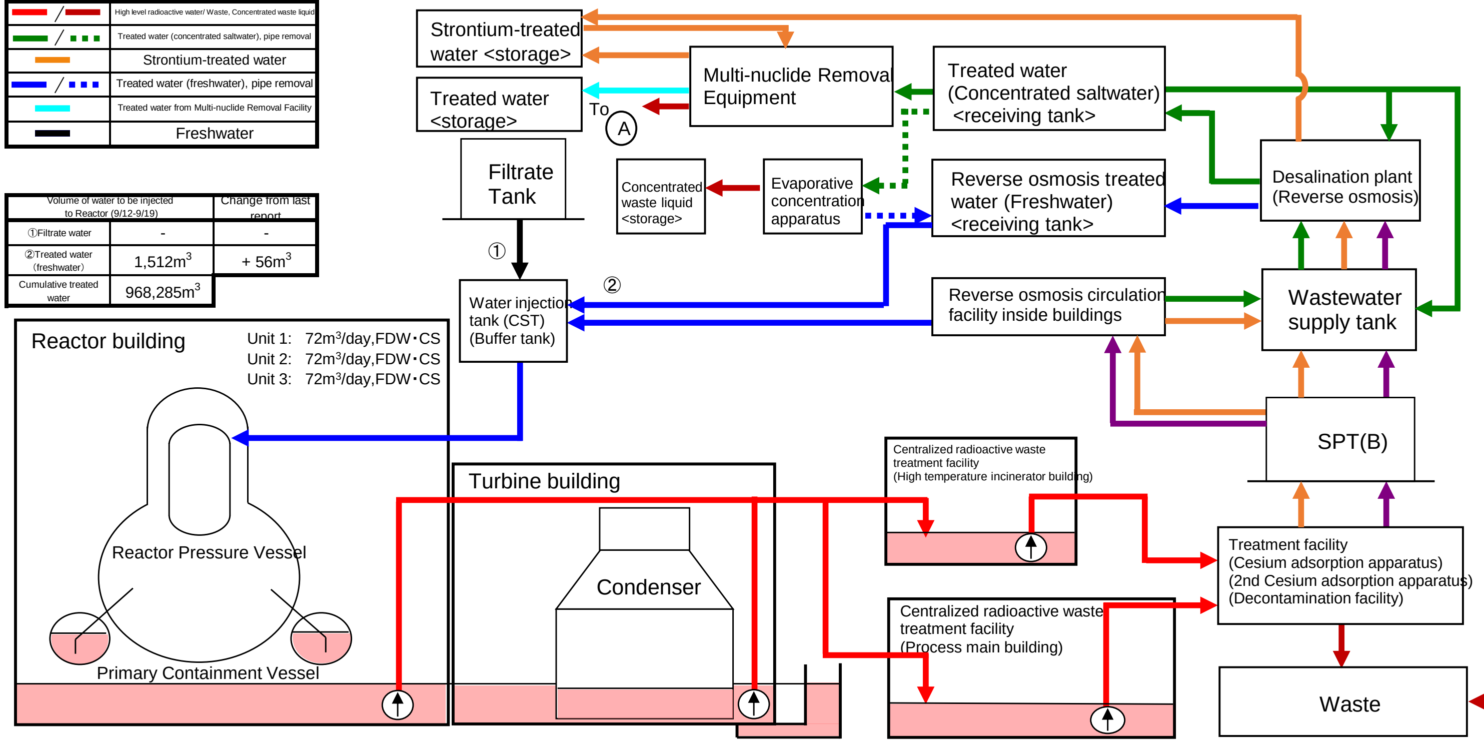
*1 The figures of the data are treated as a reference, because water levels during water transfer are not stable.
*2 The figures of the storage volume do not include those of the following volumes that have accumulated from the bottom of the tanks to the height of so-called "down scale (DS)," where water gauges show 0%:
Freshwater receiving tank (approx. 900m³), Concentrated waste liquid storage tank (approx.100m³),
Treated water storage tank (approx. 2,000m³), Strontium-treated water storage tank (approx. 600m³).
*3 The figures of the data show the operational limits.
*4 The figures of "Storage capacity" do not include those of the volumes that have accumulated from the bottom of the tanks to the height of so-called "down scale (DS)," where water gauges show 0%. However, each tank has the capacity that accomodates more than the storage volume that accumulates up to the height of "DS."
*5 The figure of "Residual water" includes the one of the volumes that have accumulated from the bottom of the tanks to the height of so-called "down scale (DS)," where water gauges show 0%. The amount of the residual water of concentrated saltwater is calculated based on that of the water treated through the ALPS and other facilities.
*6 The data shown here are those of Cs-137.
*7 Total treated amount of Cesium adsorption apparatus and 2nd Cesium adsorption apparatus and 3rd Cesium adsorption apparatus.
Breakdown of the treated amount: Cesium adsorption apparatus (0m³)
2nd Cesium adsorption apparatus (2,670m³)
3rd Cesium adsorption apparatus (0m³)
Breakdown of the cumulative treated amount: Cesium adsorption apparatus (394,720m³)
2nd Cesium adsorption apparatus (1,745,450m³)
3rd Cesium adsorption apparatus (11,020 m³)
*8 The data of the water levels in the Reactor Buildings are the data as of 5 a.m., September 12.
*9 Breakdown of the used vessels: Cesium adsorption apparatus ( 779), 2nd Cesium adsorption apparatus (222), 3rd Cesium adsorption apparatus (0)
Others: Storage container (3,181), Treated column (11), Used vessel (216), Filiters and so forth (65)
*10 Volume of the Strontium-treated water stored in the welded-type tanks
*11 Volume of the Strontium-treated water remaining in the frange-type tanks
*12 Volume of the treated water stored in the welded-type tanks
*13 Volume of the treated water remaining in the frange-type tanks
*14 Volume of the treated water stored in the ALPS sample tanks (frange-type), the additional ALPS temporary storage tanks (welded-type) and the high performance ALPS temporary storage tanks (welded-type)

Attachment-2

# Storage and treatment of high level radioactive accumulated water (as of September 19, 2019)

| | Classification |
|---|---|
| red / dark red line | High level radioactive water/ Waste, Concentrated waste liquid |
| green line / green dotted line | Treated water (concentrated saltwater), pipe removal |
| orange line | Strontium-treated water |
| blue line / blue dotted line | Treated water (freshwater), pipe removal |
| cyan line | Treated water from Multi-nuclide Removal Facility |
| black line | Freshwater |

| Volume of water to be injected to Reactor (9/12-9/19) | | Change from last report |
|---|---|---|
| ①Filtrate water | - | - |
| ②Treated water (freshwater) | 1,512m³ | + 56m³ |
| Cumulative treated water | 968,285m³ | |




| Storage volume*1 | | Change from last report | Storage capacity*2,3 |
|---|---|---|---|
| Concentrated saltwater receiving tank | 0m³ | - | - |
| Freshwater receiving tank | 8,123m³ | - 56m³ | 12,600m³ |
| Concentrated waste liquid storage tank | 9,291m³ | No Change | 10,300m³ |
| Treated water storage tank *9 | 1,058,946m³ | + 106m³ | 1,103,800m³ |
| Sample water storage tank *11 | 8,600m³ | + 2,126m³ | 11,600m³ |
| Strontium-treated water storage tank *7 | 90,651m³ | - 642m³ | 132,500m³ |

| Residual water*4 | | Change from last report | Storage capacity*2,3 |
|---|---|---|---|
| Concentrated saltwater receiving tank | Approx.500m³ | No Change | Approx. 2,100m³ |
| Treated water tank *10 | Approx.100m³ | No Change | Approx. 1,100m³ |
| Strontium-treated water tank *8 | 0m³ | No Change | 0m³ |

| Facility | Storage volume | Change from last report | Water level in T/B |
|---|---|---|---|
| Unit 1 | Approx. 1,770m³ | + 10m³ | T.P. -1,198 (Unit 2 T/B) |
| Unit 2 | Approx. 4,130m³ | - 230m³ | |
| Unit 3 | Approx. 4,680m³ | - 230m³ | T.P. -1,210 (Unit 3 T/B) |
| Unit 4 | Approx. 3,650m³ | - 320m³ | |
| Total | Approx. 14,230m³ | | |

| Storage Facility | Storage volume | Change from last report | Water level | Treated volume (9/12-9/19) | Cumulative treated volume |
|---|---|---|---|---|---|
| Process Main Building | Approx. 11,610m³ | - 90m³ | T.P. 1,634 | Approx. 2,940m³ *5 | Approx. 2,154,130m³ *5 |
| High Temperature Incinerator Building | Approx. 3,010m³ | - 220m³ | T.P. 238 | | |
| Total | Approx. 14,620m³ | | | | |

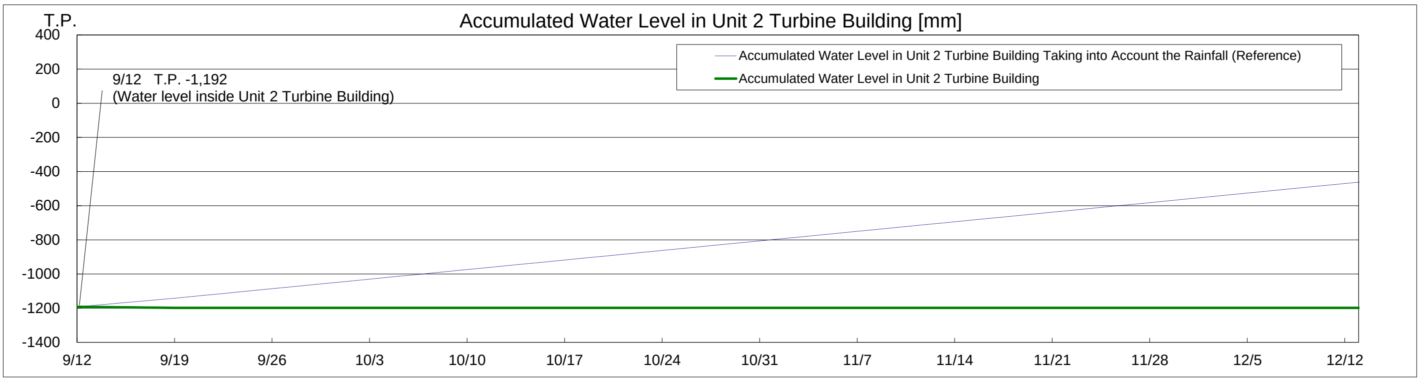
| Waste produced | | Change from last report | Storage capacity |
|---|---|---|---|
| Sludge | 597m³ | No Change | 700m³ *2 |
| Used vessels | 4,479*6 | +5 | 6,372 |

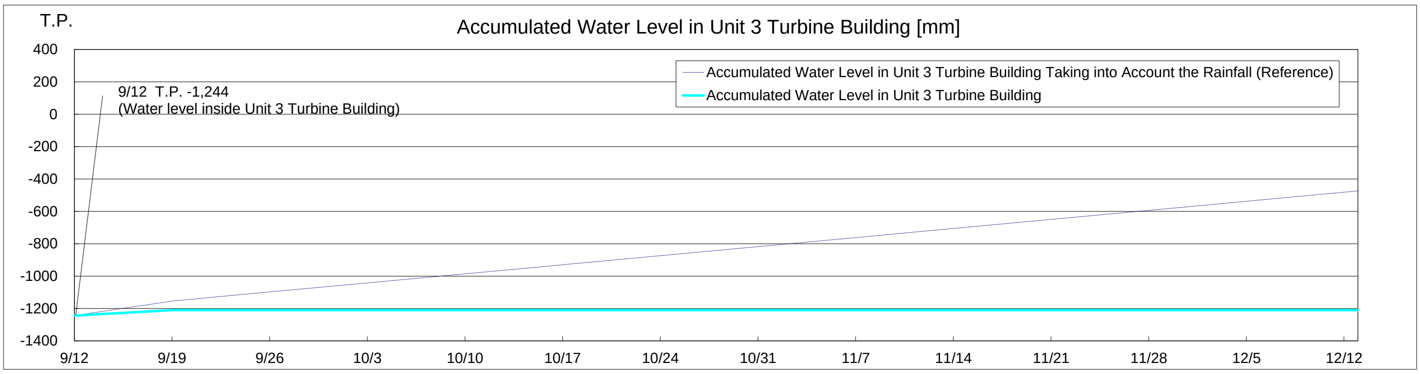
[Main operations that are planned to be conducted during the period from September 12, 2019 to September 19, 2019.]
- Water transfer from the Units 1-4 to the buildings (Units 1-4, Centralized radioactive waste treatment facility) and to the treatment facility will be conducted whenever necessary.
- Due to other work, water transfer to the buildings (Units 1-4, Centralized radioactive waste treatment facility) will be conducted whenever necessary.
- Operations of the Cesium Adsorption Apparatus will continue to be suspended.
- Operations of the 2nd Cesium Adsorption Apparatus will be suspended (assumed availability factor: 35%).
- Operations of the 3rd Cesium Adsorption Apparatus will continue to be suspended.

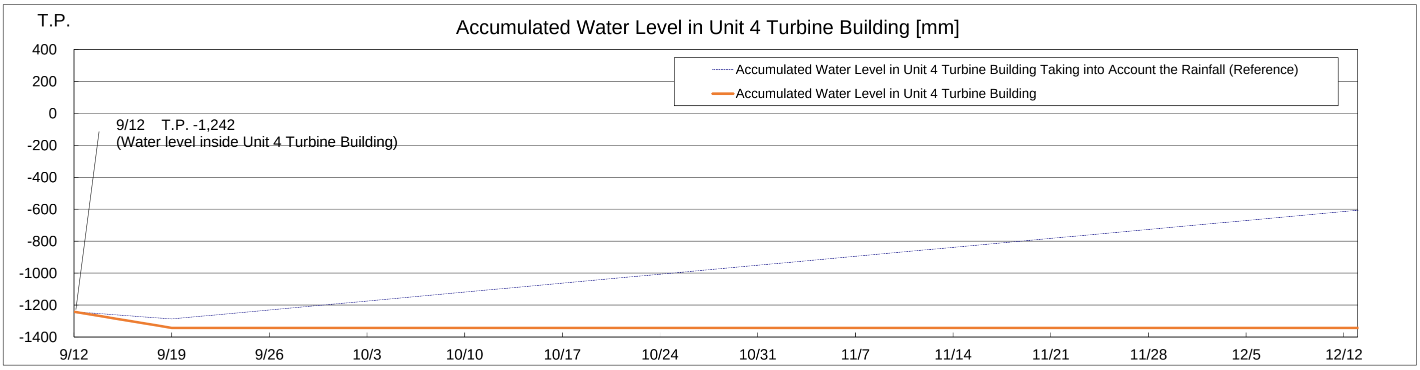
*1 The figures of "Storage volume" do not include those of the volumes that have accumulated from the bottom of the tanks to the height of so-called "down scale (DS)," where water gauges show 0%.
*2 The figures of the data show the operational limits.
*3 The figures of "Storage capacity" do not include those of the volumes that have accumulated from the bottom of the tanks t o the height of so-called "down scale (DS)," where water gauges show 0%. However, each tank has the capacity that accomodates more than the storage volume that accumulates up to the height of "DS."
*4 The figure of "Residual water" includes the one of the volumes that have accumulated from the bottom of the tanks to the height of so-called "down scale (DS)," where water gauges show 0%. The amount of the residual water of concentrated saltwater is calculated based on that of the water treated through the ALPS and other facilities.
*5 Total treated amount of Cesium adsorption apparatus and 2nd Cesium adsorption apparatusand 3rd Cesium adsorprion apparatus
Breakdown of the treated amount: Cesium adsorption apparatus (0m³)
2nd Cesium adsorption apparatus (2,940m³)
3rd Cesium adsorption apparatus (0m³)
Breakdown of the cumulative treated amount: Cesium adsorption apparatus (394,720m³)
2nd Cesium adsorption apparatus (1,748,390m³)
3rd Cesium adsorption apparatus (11,020m³)
*6 Breakdown of the used vessels: Cesium adsorption apparatus (779)
2nd Cesium adsorption apparatus (222)
3rd Cesium adsorption apparatus (0)
Others: Storage container (3,186), Treated column (11), Used vessels (216), Filters and so forth (65)
*7 Volume of the Strontium-treated water stored in the welded-type tanks
*8 Volume of the Strontium-treated water remaining in the frange-type tanks
*9 Volume of the treated water stored in the welded-type tanks
*10 Volume of the treated water remaining in the frange-type tanks
*11 Volume of the treated water stored in the ALPS sample tanks (frange-type), the additional ALPS temporary storage tanks (welded-type)

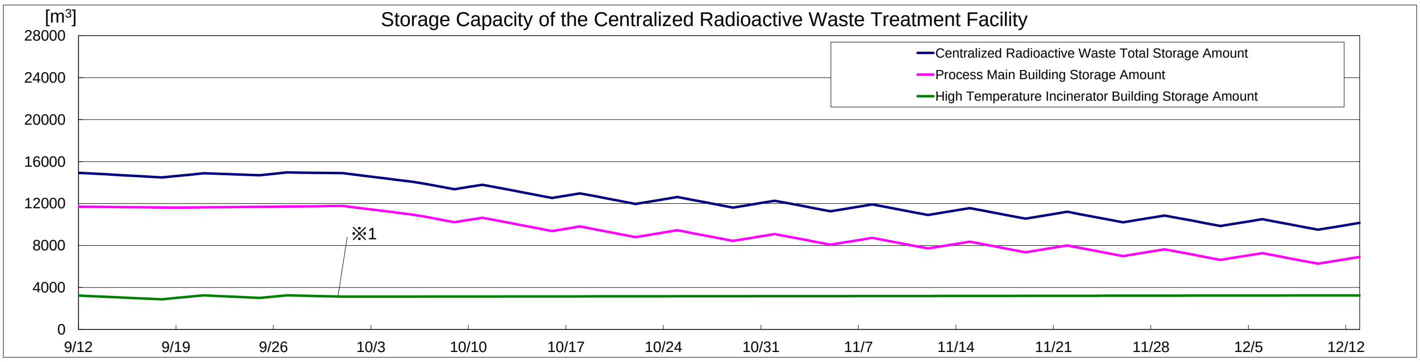
Attachment-3

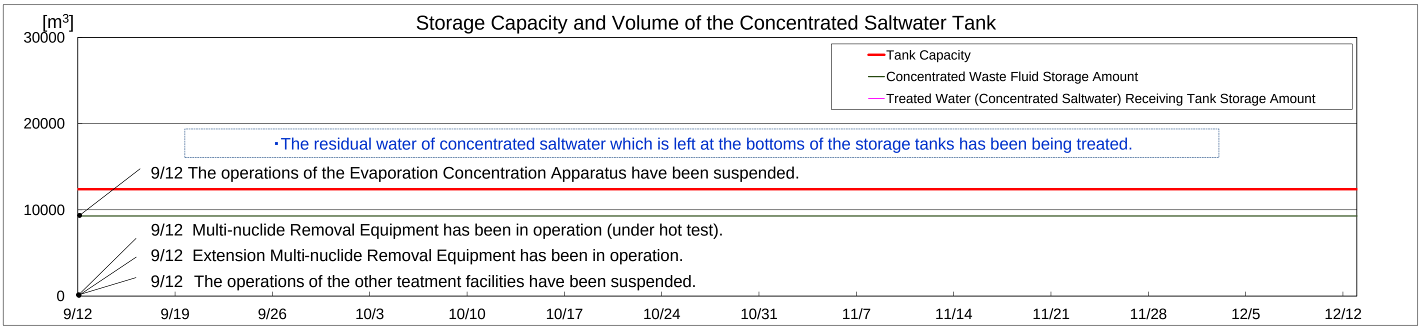
# Simulation Results of Accumulated Water Treatment in Units 1-4 Turbine Buildings




Note
- The amount of water treated through the 2nd Cesium Adsorption Apparatus is estimated to be 780m³/d (Subject to change depending on the factors such as the levels of water accumulated in T/Bs.)
- "Accumulated Water Levels in Unit 2, 3 and 4 T/Bs" are simulated water levels in consideration of the change of the water levels caused by recent rainfall, inflow of groundwater, etc. in the surrounding areas of the Fukushima Daiichi Nuclear Power Station.
- "Accumulated Water Levels in Unit 2, 3 and 4 T/Bs Taking into Account the Rainfall" are simulated water levels which are calculated by adding to the accumulated water amounts which are assumed to increase at the rate of 8mm a day when the surrounding areas of the Fukushima Daiichi Nuclear Power Station have the rainfall equal to the average amount of rain which fell for three months from August to October in 2015 to 2017.
- Unit 2 Turbine Building water level is controled by retained water transfer pumps in the Unit 2 reactor building.
- Unit 3 Turbine Building water level is controled by retained water transfer pumps in the Unit 3 turbine building.
- Unit 4 Turbine Building water level is controled by retained water transfer pumps in the Unit 4 turbine building.

※1 Storage place of water transported from the Units 1-4 will be changed over from the high temperature incinerator building to the process main building.