

## **Situation of Storage and Treatment of Accumulated Water including Highly Concentrated Radioactive Materials at Fukushima Daiichi Nuclear Power Station (75<sup>th</sup> Release)**

November 28, 2012

Tokyo Electric Power Company

### **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 future forecast based upon the current situation have 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 amount in the Accumulated Water Storing Facility (including underpass area close to the High Temperature Incinerator Building), and other related data, as of November 27, are shown in the Attachment -1.

### **3. Forecast of storing and treatment**

#### **(1) Short term forecast**

Water transfer is planned so that the levels of the accumulated water in Units 1&2 and Units 3&4 building will be maintained around at the level of OP. 3,000, based on the stored amount in the Accumulated Water Storing Facilities and the operating situation of the radioactive material treatment equipment. Water is transferred to the Process Main Building and/or High Temperature Incinerator Building as Accumulated Water Storing Facilities.

Treatment is implemented considering the situation 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 amount in the Accumulated Water Storing Facilities (including underpass area close to the High Temperature Incinerator Building), and other related data as of December 4, as shown in Attachment -2.

## **(2) Middle term forecast**

Regarding accumulated water in Unit 1&2 building and Unit 3&4 building, 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 OP. 4,000 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 its level in the building around OP. 3,000 considering water tank capacity.

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 (Unit 1 to 4 (including condensers and trenches)), and storing and treatment situations in the Accumulated Water Storing Facilities (including underpass areas close to the High Temperature Incinerator Building) for 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

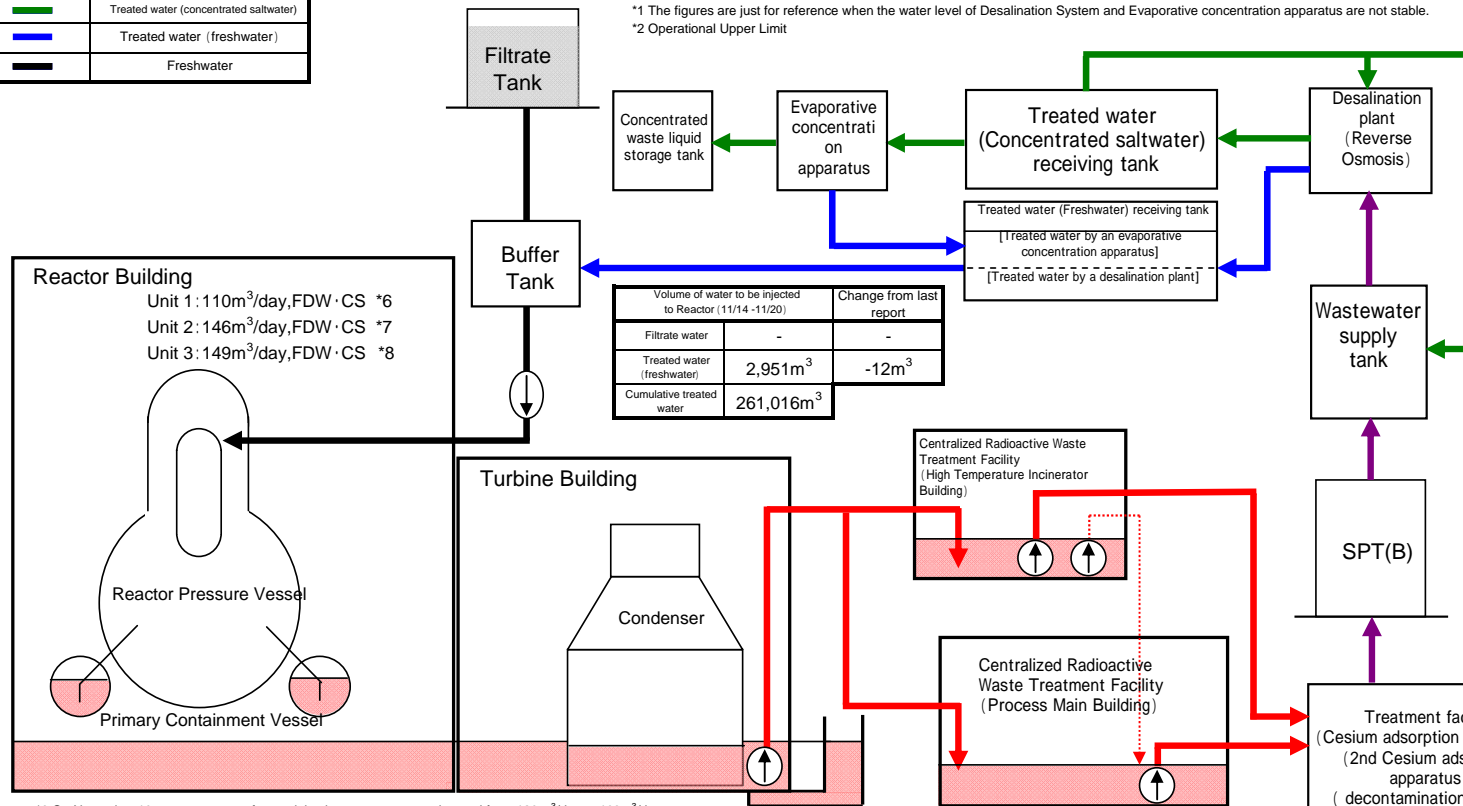
# Storage and treatment of high level radioactive accumulated water (as of November 20, 2012)

| Classification                        |  |
|---------------------------------------|--|
| <span style="color: red;">█</span>    | High level radioactive water           |
| <span style="color: purple;">█</span> | Treated water (saltwater)              |
| <span style="color: green;">█</span>  | Treated water (concentrated saltwater) |
| <span style="color: blue;">█</span>   | Treated water (freshwater)             |
| <span style="color: black;">█</span>  | Freshwater                             |

|  | Storage volume *1     | Change from last report | Storage capacity *2   |
|--|-----------------------|-------------------------|-----------------------|
| Concentrated saltwater receiving tank  | 200,530m <sup>3</sup> | + 3,112m <sup>3</sup>   | 213,100m <sup>3</sup> |
| Freshwater receiving tank              | 25,716m <sup>3</sup>  | + 826m <sup>3</sup>     | 31,400m <sup>3</sup>  |
| Concentrated waste liquid storage tank | 5,524m <sup>3</sup>   | -4m <sup>3</sup>        | 9,500m <sup>3</sup>   |

\*1 The figures are just for reference when the water level of Desalination System and Evaporative concentration apparatus are not stable.  
 \*2 Operational Upper Limit

|  | Chloride concentration                   |
|--|--|
| Before/After Desalination              | 400ppm / 7ppm (Sampled on 10/16)         |
| Before/After Evaporative Concentration | 6,900ppm / 2ppm (Sampled on 12/20, 2011) |



|                            | Volume of water to be injected to Reactor (11/14 -11/20) | Change from last report |
|----------------------------|--|-------------------------|
| Filtrate water             | -  | -                       |
| Treated water (freshwater) | 2,951m <sup>3</sup>                                      | -12m <sup>3</sup>       |
| Cumulative treated water   | 261,016m <sup>3</sup>                                    |                         |

|                          | Storage volume      | Change from last report | Storage volume *2   |
|--------------------------|---------------------|-------------------------|---------------------|
| Waste liquid supply tank | 1,094m <sup>3</sup> | + 97m <sup>3</sup>      | 1,200m <sup>3</sup> |
| SPT(B)                   | 608m <sup>3</sup>   | -571m <sup>3</sup>      | 3,100m <sup>3</sup> |

\*2 Shows the operational limit.

| Place of Sampling                          | Radioactivity density *3                      |
|--|---|
| Process Main Building                      | 1.1E+05 Bq/cm <sup>3</sup> (Sampled on 6/19)  |
| Exit of cesium adsorption apparatus        | 3.4E-01 Bq/cm <sup>3</sup> (Sampled on 6/19)  |
| Exit of decontamination facility           | -   |
| High Temperature Incinerator Building      | 4.1E+04 Bq/cm <sup>3</sup> (Sampled on 10/16) |
| Exit of second cesium adsorption apparatus | 2.4E+00 Bq/cm <sup>3</sup> (Sampled on 10/16) |

\*3 Data of Cs-137 are described above.

| Nuclide | DF *4,5             |
|---------|---------------------|
| I-131   | - ( - )             |
| Cs-134  | 1.2E+05 ( 1.6E+04 ) |
| Cs-137  | 3.2E+05 ( 1.7E+04 ) |

\*4 Data sampled on June 19 (operations of cesium adsorption facility - decontamination facility)

\*5 Data in parentheses are those sampled on October 16 (operation of the 2nd Cesium adsorption apparatus)

\*6 On November 19, target amount of water injection to reactor was changed from 120m<sup>3</sup>/day to 108m<sup>3</sup>/day.  
 \*7 On November 19, target amount of water injection to reactor was changed from 156m<sup>3</sup>/day to 144m<sup>3</sup>/day.  
 \*8 On November 19, target amount of water injection to reactor was changed from 156m<sup>3</sup>/day to 144m<sup>3</sup>/day.

| Facility | Storage volume              | Change from last report | Water level in T/B |
|----------|-----------------------------|-------------------------|--------------------|
| Unit 1   | Approx.14,200m <sup>3</sup> | -100m <sup>3</sup>      | OP.3,017           |
| Unit 2   | Approx.22,200m <sup>3</sup> | -900m <sup>3</sup>      | OP.3,084           |
| Unit 3   | Approx.23,400m <sup>3</sup> | + 200m <sup>3</sup>     | OP.3,014           |
| Unit 4   | Approx.17,500m <sup>3</sup> | -200m <sup>3</sup>      | OP.2,926           |
| Total    | Approx.77,300m <sup>3</sup> |                         |                    |

| Storage Facility                      | Storage volume              | Change from last report | Water level | Treated volume (11/14 -11/20)            | Cumulative treated                         | Waste produced           | Change from last report | Storage capacity     |
|---------------------------------------|-----------------------------|-------------------------|-------------|--|--|--------------------------|-------------------------|----------------------|
| Process Main Building                 | Approx.15,100m <sup>3</sup> | -840m <sup>3</sup>      | OP.4,267    | Approx.6,680m <sup>3</sup> <sup>*9</sup> | Approx.505,990m <sup>3</sup> <sup>*9</sup> | Sludge 597m <sup>3</sup> | No change               | 700m <sup>3</sup> *2 |
| High Temperature Incinerator Building | Approx.3,630m <sup>3</sup>  | -200m <sup>3</sup>      | OP.2,424    |  |  | Used vessels 460 *10     | No change               | 1,137 *11            |
| Total                                 | Approx.18,730m <sup>3</sup> |                         |             |  |  |                          |                         |                      |

\*2 Shows the operational limit.

\*6 Including approx. 6,680m<sup>3</sup> (cumulative treated volume: approx. 337,820m<sup>3</sup>) of treated volume by the 2nd Cesium adsorption apparatus.

\*7 Including 62 used vessels of 2nd Cesium adsorption apparatus.

\*8 Storage capacity will vary according to stored used vessels of 2nd Cesium adsorption apparatus.

Note:

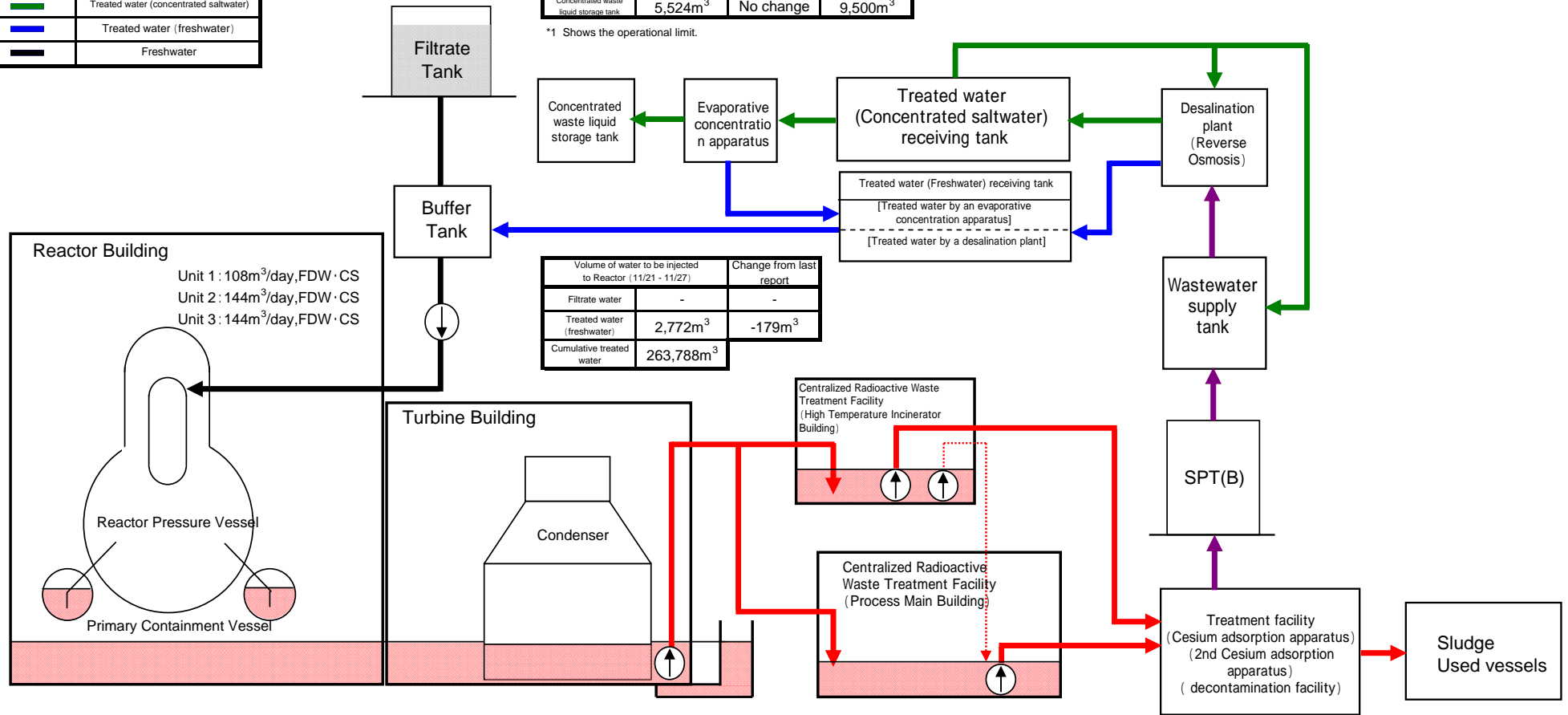
- The previous update: November 13, 2012
- On November 16, water transfer from Unit 2 to Unit 3 Turbine Building was stopped. On November 18, water transfer from Unit 2 to Unit 3 Turbine Building was restarted, and water transfer is in progress.
- On November 15, destination of water transfer from Unit 3 to the Process Main Building was switched to the High Temperature Incinerator Building, and water transfer is in progress.
- On November 19, water transfer from Unit 4 to the High Temperature Incinerator Building was restarted, and water transfer is in progress.
- 2nd Cesium Adsorption Apparatus is under operation: Availability factor 79.5% (Projected: 75%)
- Since October 3, Cesium Adsorption Apparatus was stopped continuously.
- On November 15, water transfer source of the 2nd Cesium Adsorption Apparatus was switched from the Process Main Building to the High Temperature Incinerator Building.
- From November 15 to November 16, water transfer from the trench between the Process Main Building and the High Temperature Incinerator Building to the High Temperature Incinerator Building was conducted.
- Storage capacity of the concentrated saltwater receiving tank is increased by adding tanks.

# Storage and treatment of high level radioactive accumulated water (November 27, 2012)

| Classification                        |  |
|---------------------------------------|--|
| <span style="color: red;">█</span>    | High level radioactive water           |
| <span style="color: purple;">█</span> | Treated water (saltwater)              |
| <span style="color: green;">█</span>  | Treated water (concentrated saltwater) |
| <span style="color: blue;">█</span>   | Treated water (freshwater)             |
| <span style="color: black;">█</span>  | Freshwater                             |

| Storage volume                         |                       |                      | Change from last report | Storage capacity *1 |
|--|-----------------------|----------------------|-------------------------|---------------------|
| Concentrated saltwater receiving tank  | 200,530m <sup>3</sup> | No change            | 213,100m <sup>3</sup>   |                     |
| Freshwater receiving tank              | 22,944m <sup>3</sup>  | -2,772m <sup>3</sup> | 31,400m <sup>3</sup>    |                     |
| Concentrated waste liquid storage tank | 5,524m <sup>3</sup>   | No change            | 9,500m <sup>3</sup>     |                     |

\*1 Shows the operational limit.



| Volume of water to be injected to Reactor (11/21 - 11/27) |                       |                    | Change from last report |
|---|-----------------------|--------------------|-------------------------|
| Filtrate water  | -                     | -                  | -                       |
| Treated water (freshwater)                                | 2,772m <sup>3</sup>   | -179m <sup>3</sup> |                         |
| Cumulative treated water                                  | 263,788m <sup>3</sup> |                    |                         |

| Facility     | Storage volume                    | Change from last report | Water level in T/B    |
|--------------|-----------------------------------|-------------------------|-----------------------|
| Unit 1       | Approx.14,100m <sup>3</sup>       | -100m <sup>3</sup>      | OP.3,216 (Unit 2 T/B) |
| Unit 2       | Approx.23,100m <sup>3</sup>       | +900m <sup>3</sup>      |                       |
| Unit 3       | Approx.23,800m <sup>3</sup>       | +400m <sup>3</sup>      | OP.3,058 (Unit 3 T/B) |
| Unit 4       | Approx.18,300m <sup>3</sup>       | +800m <sup>3</sup>      |                       |
| <b>Total</b> | <b>Approx.79,300m<sup>3</sup></b> |                         |                       |

| Storage Facility                      | Storage volume                    | Change from last report | Water level | Treated volume (11/21 - 11/27) | Cumulative treated           | Waste produced |                   | Change from last report | Storage capacity     |
|---------------------------------------|-----------------------------------|-------------------------|-------------|--------------------------------|------------------------------|----------------|-------------------|-------------------------|----------------------|
| Process Main Building                 | Approx.16,080m <sup>3</sup>       | +980m <sup>3</sup>      | OP.4,544    | Approx.0m <sup>3</sup>         | Approx.505,990m <sup>3</sup> | Sludge         | 597m <sup>3</sup> | No change               | 700m <sup>3</sup> *1 |
| High Temperature Incinerator Building | Approx.4,420m <sup>3</sup>        | +790m <sup>3</sup>      | OP.3,080    |                                |                              | Used vessels   | 460 *3            | No change               | 1,137 *4             |
| <b>Total</b>                          | <b>Approx.20,500m<sup>3</sup></b> |                         |             |                                |                              |                |                   |                         |                      |

\*1 Shows the operational limit.

\*2 Including approx. 0m<sup>3</sup> (cumulative treated volume: approx. 337,820m<sup>3</sup>) of treated volume by the 2nd Cesium adsorption apparatus.

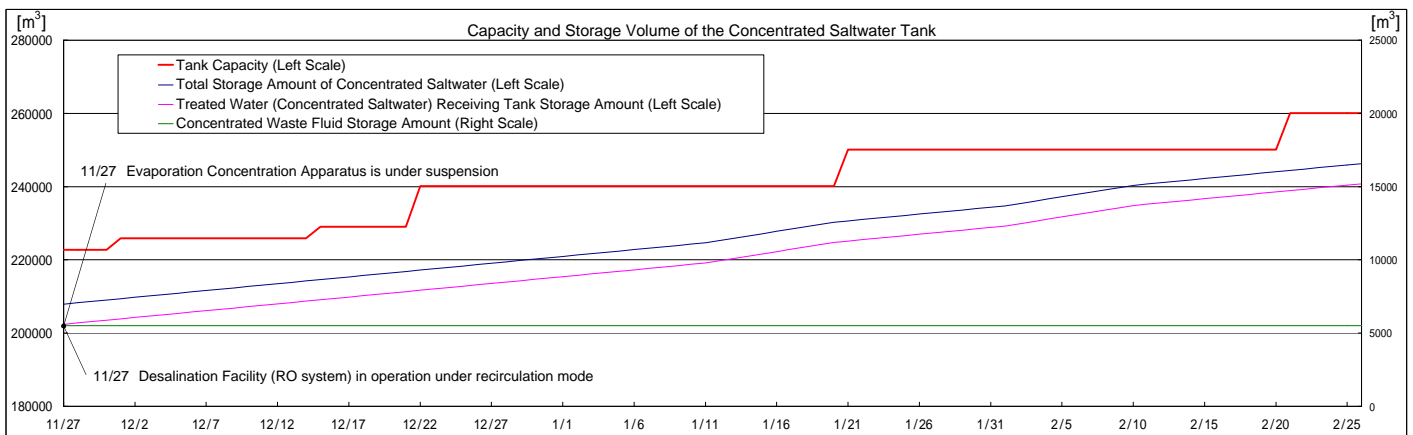
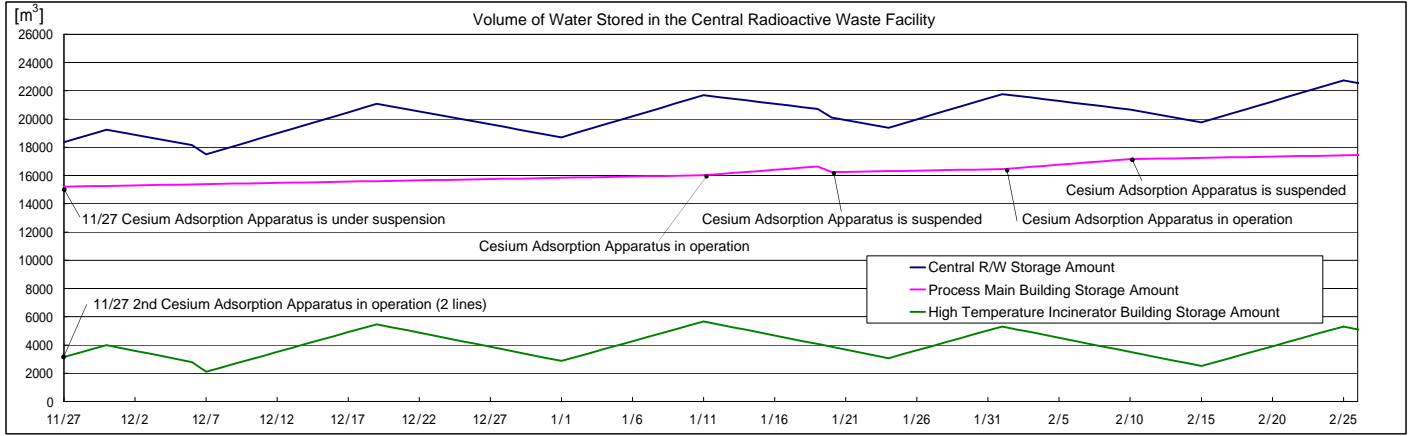
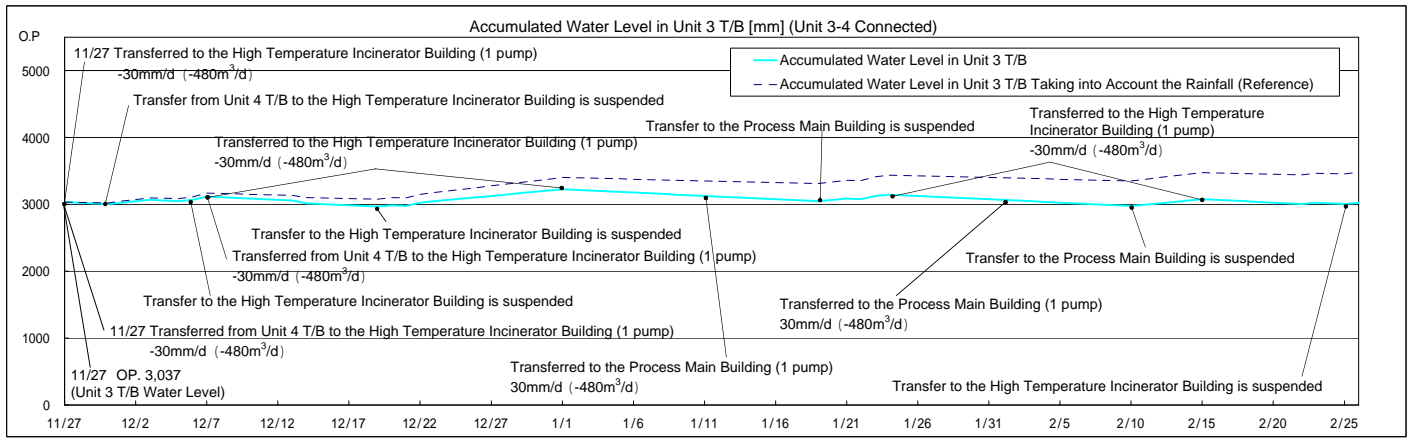
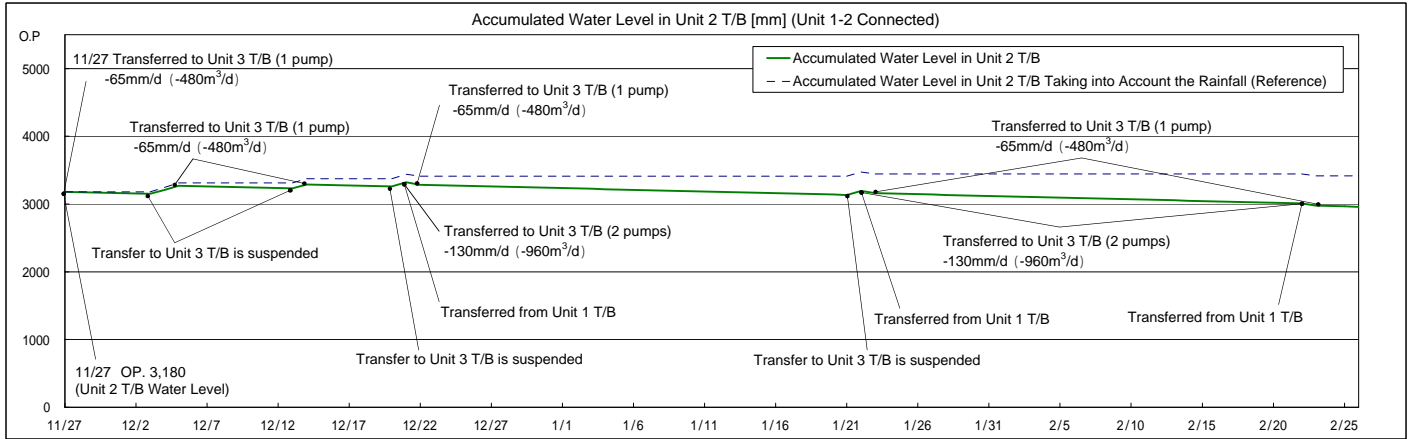
\*3 Including 62 used vessels of 2nd Cesium adsorption apparatus.

\*4 Storage capacity will vary according to stored used vessels of 2nd Cesium adsorption apparatus.

**Note:**

- Water transfer from Unit 2 to Unit 3 Turbine Building will be temporarily suspended.
- Water transfer from Unit 3 to the High Temperature Incinerator Building was stopped, and the destination of water transfer will be switched to the Process Main Building after water transfer restarting.
- Water transfer from Unit 4 to the High Temperature Incinerator Building will be stopped.
- Operation of 2nd Cesium Adsorption Apparatus is scheduled: Availability Factor 0% (Projected)
- The 2nd Cesium Adsorption Apparatus was stopped due to the water leakage from the 2nd Cesium Adsorption Apparatus vent line. (Restarting: To be determined.)
- Cesium Adsorption Apparatus will be stopped continuously.
- Water transfer from Unit 1 Turbine Building to Unit 2 Turbine Building will be conducted.

# Simulation Results of Accumulated Water Treatment in Unit 1-4 T/B



**Note**

- The treated water volume is assumed to be 780m<sup>3</sup>/d (Subject to change depending on the level of water accumulated in T/B).
- The accumulated water level in T/B is a simulation result in consideration of fluctuation of water level such as recent rainfall, inflow of groundwater, and etc.
- The accumulated water level in T/B is assumed to increase by 5mm daily, taking into consideration the average rain fall in the surrounding area of Fukushima Daiichi Nuclear Power Station (August-October in the past 3 years).