

## **Situation of Storage and Treatment of Accumulated Water including Highly Concentrated Radioactive Materials at Fukushima Daiichi Nuclear Power Station (86<sup>th</sup> Release)**

February 13, 2013  
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 February 12, 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 February 19, 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 February 12, 2013)

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	230,206m <sup>3</sup>	+ 2,745m <sup>3</sup>	245,200m <sup>3</sup>
Freshwater receiving tank	21,421m <sup>3</sup>	+ 808m <sup>3</sup>	31,400m <sup>3</sup>
Concentrated waste liquid storage tank	5,515m <sup>3</sup>	+ 17m <sup>3</sup>	9,500m <sup>3</sup>
Treated water storage tank *3	-	-	28,700m <sup>3</sup> *4

\*1 The figures are just for reference when the water level of Desalination System and Evaporative concentration apparatus are not stable.  
 \*2 Shows the operational limit.  
 \*3 The treated water from Multi-nuclide Removal Equipment will be stored.  
 \*4 The figure is subtracted approx. 3,400m<sup>3</sup> since the accumulated water of Unit 5-6 has been stored in the water storage tank in basement already.

	Chloride concentration
Before/After Desalination	2,000ppm / 3ppm (Sampled on Jan. 15)
Before/After Evaporative Concentration	6,900ppm / 2ppm (Sampled on Dec. 20, 2011)

	Storage volume	Change from last report	Storage volume *2
Waste liquid supply tank	1,117m <sup>3</sup>	+ 72m <sup>3</sup>	1,200m <sup>3</sup>
SPT(B)	1,378m <sup>3</sup>	-453m <sup>3</sup>	3,100m <sup>3</sup>

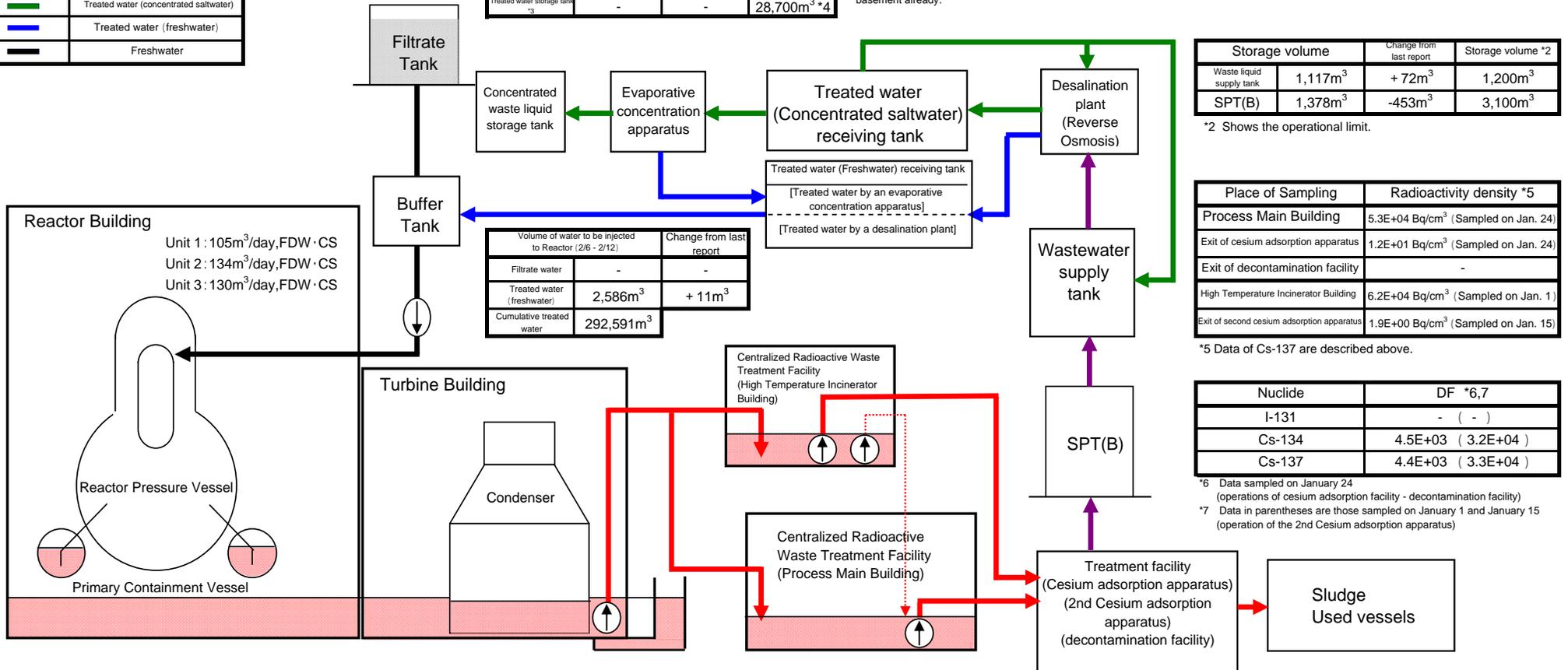
\*2 Shows the operational limit.

Place of Sampling	Radioactivity density *5
Process Main Building	5.3E+04 Bq/cm <sup>3</sup> (Sampled on Jan. 24)
Exit of cesium adsorption apparatus	1.2E+01 Bq/cm <sup>3</sup> (Sampled on Jan. 24)
Exit of decontamination facility	-
High Temperature Incinerator Building	6.2E+04 Bq/cm <sup>3</sup> (Sampled on Jan. 1)
Exit of second cesium adsorption apparatus	1.9E+00 Bq/cm <sup>3</sup> (Sampled on Jan. 15)

\*5 Data of Cs-137 are described above.

Nuclide	DF *6,7
I-131	- ( - )
Cs-134	4.5E+03 ( 3.2E+04 )
Cs-137	4.4E+03 ( 3.3E+04 )

\*6 Data sampled on January 24 (operations of cesium adsorption facility - decontamination facility)  
 \*7 Data in parentheses are those sampled on January 1 and January 15 (operation of the 2nd Cesium adsorption apparatus)



	Volume of water to be injected to Reactor (2/6 - 2/12)	Change from last report
Filtrate water	-	-
Treated water (freshwater)	2,586m <sup>3</sup>	+ 11m <sup>3</sup>
Cumulative treated water	292,591m <sup>3</sup>	

Facility	Storage volume	Change from last report	Water level in T/B
Unit 1	Approx.13,800m <sup>3</sup>	-100m <sup>3</sup>	OP.2,715
Unit 2	Approx.22,000m <sup>3</sup>	-1,500m <sup>3</sup>	OP.3,040
Unit 3	Approx.23,200m <sup>3</sup>	+ 600m <sup>3</sup>	OP.2,986
Unit 4	Approx.17,800m <sup>3</sup>	+ 300m <sup>3</sup>	OP.2,965
Total	Approx.76,800m <sup>3</sup>		

Storage Facility	Storage volume	Change from last report	Water level	Treated volume (2/6-2/12)	Cumulative treated	Waste produced	Change from last report	Storage capacity
Process Main Building	Approx.16,600m <sup>3</sup>	+ 70m <sup>3</sup>	OP.4,692	Approx.6,390m <sup>3</sup>	Approx.568,150m <sup>3</sup>	Sludge 597m <sup>3</sup>	No change	700m <sup>3</sup> *2
High Temperature Incinerator Building	Approx.3,680m <sup>3</sup>	-380m <sup>3</sup>	OP.2,468			Used vessels 474 *9	No change	1,137 *10
Total	Approx.20,280m <sup>3</sup>							

\*2 Shows the operational limit.  
 \*8 Including approx. 6,390m<sup>3</sup> (cumulative treated volume: approx.395,410m<sup>3</sup>) of treated volume by the 2nd Cesium adsorption apparatus.  
 \*9 Including 68 used vessels of 2nd Cesium adsorption apparatus.  
 \*10 Storage capacity will vary according to stored used vessels of 2nd Cesium adsorption apparatus.

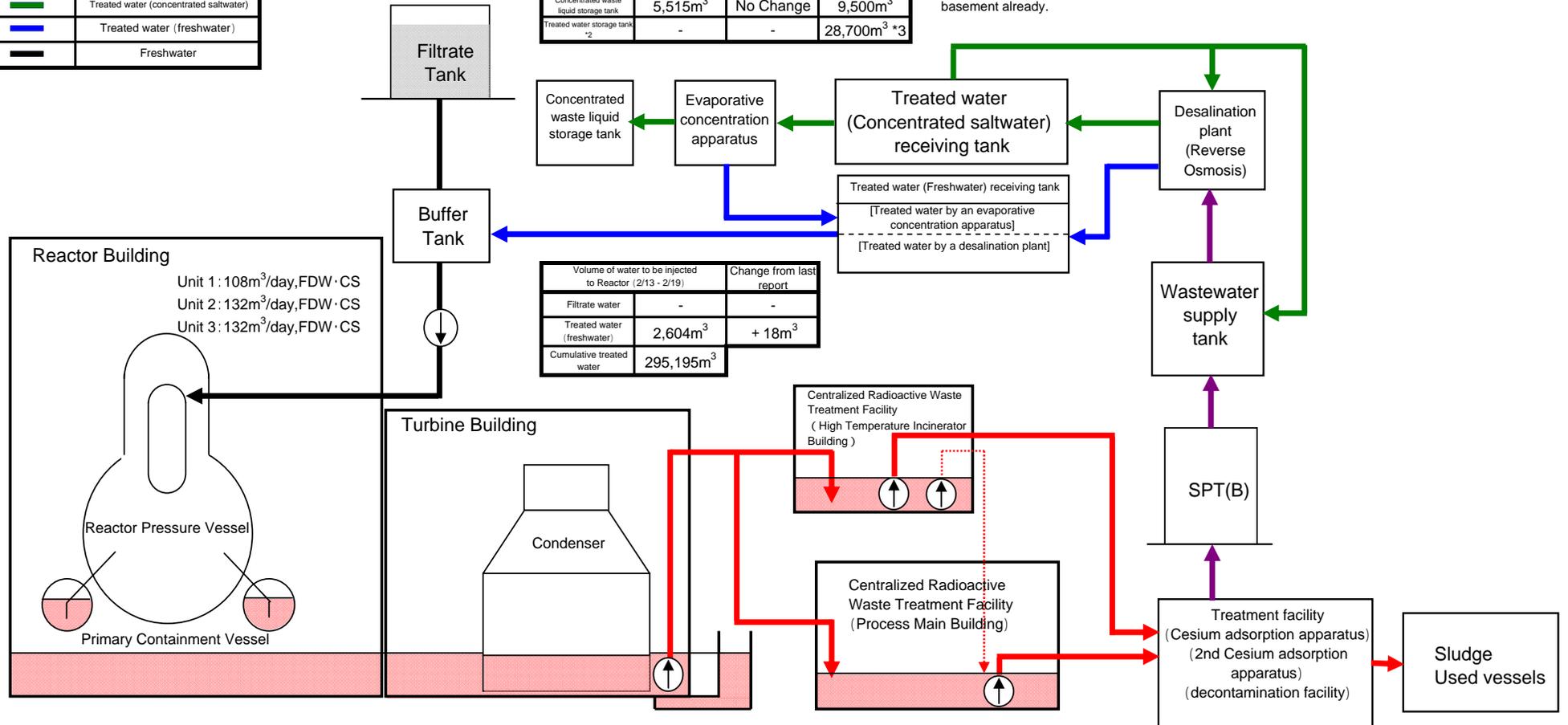
Note:  
 - The previous update: February 5, 2013  
 - On February 6, water transfer from Unit 2 to Unit 3 Turbine Building was restarted, and water transfer is in progress.  
 - Water transfer from Unit 3 to the High Temperature Incinerator Building is in progress.  
 - Since November 29, water transfer from Unit 4 has been under suspension.  
 - 2nd Cesium Adsorption Apparatus are under operation (Availability factor 76.1% (Projected: 75%)).  
 - Since January 24, Cesium Adsorption Apparatus was stopped continuously.  
 - From February 4 to 5 and from 7 to 8, 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 and treatment of high level radioactive accumulated water (February 19, 2013)

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	232,306m <sup>3</sup>	+ 2,100m <sup>3</sup>	245,200m <sup>3</sup>	
Freshwater receiving tank	22,177m <sup>3</sup>	+ 756m <sup>3</sup>	31,400m <sup>3</sup>	
Concentrated waste liquid storage tank	5,515m <sup>3</sup>	No Change	9,500m <sup>3</sup>	
Treated water storage tank *2	-	-	28,700m <sup>3</sup> *3	

- \*1 Shows the operational limit.
- \*2 The treated water from Multi-nuclide Removal Equipment will be stored
- \*3 The figure is subtracted approx. 3,400m<sup>3</sup> since the accumulated water of Unit 5-6 has been stored in the water storage tank in basement already.



Volume of water to be injected to Reactor (2/13 - 2/19)			Change from last report
Filtrate water	-	-	-
Treated water (freshwater)	2,604m <sup>3</sup>	+ 18m <sup>3</sup>	
Cumulative treated water	295,195m <sup>3</sup>		

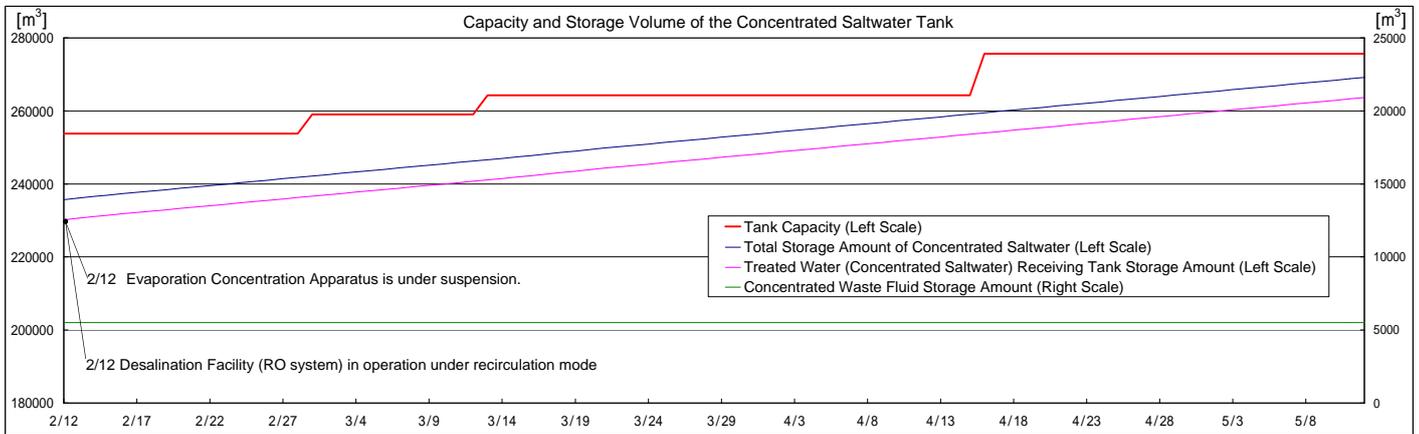
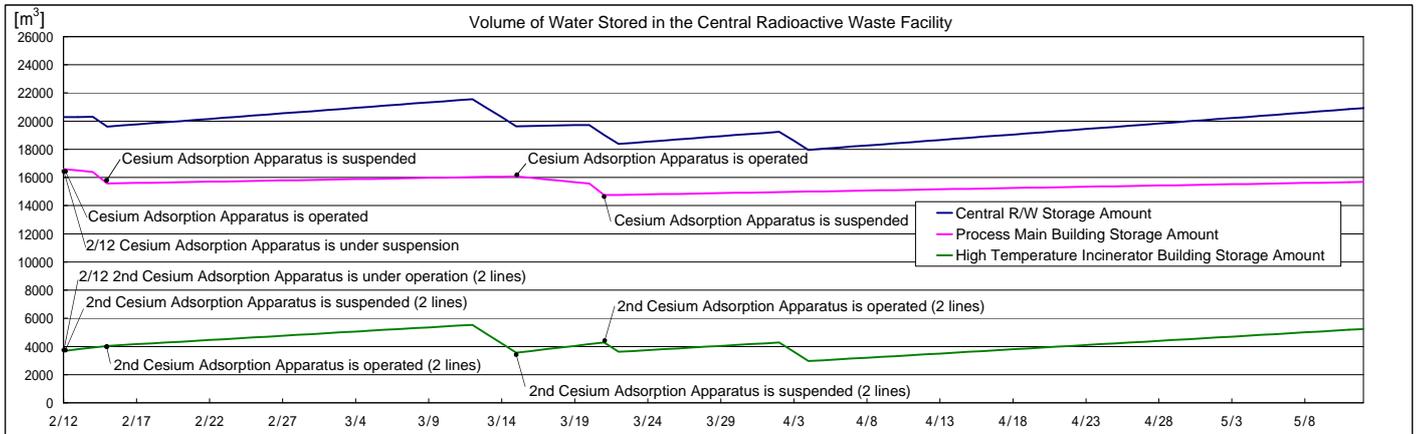
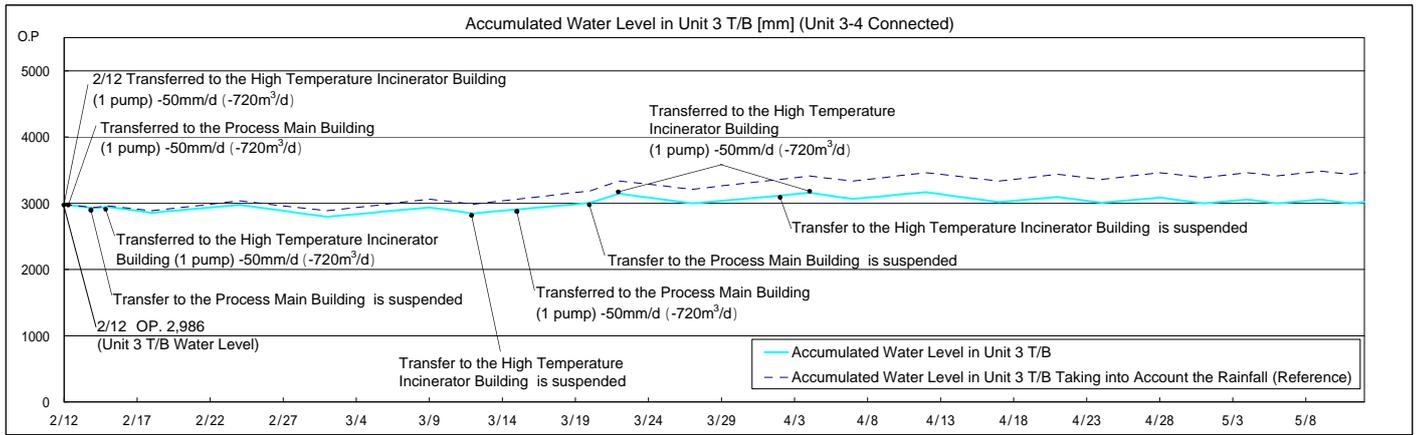
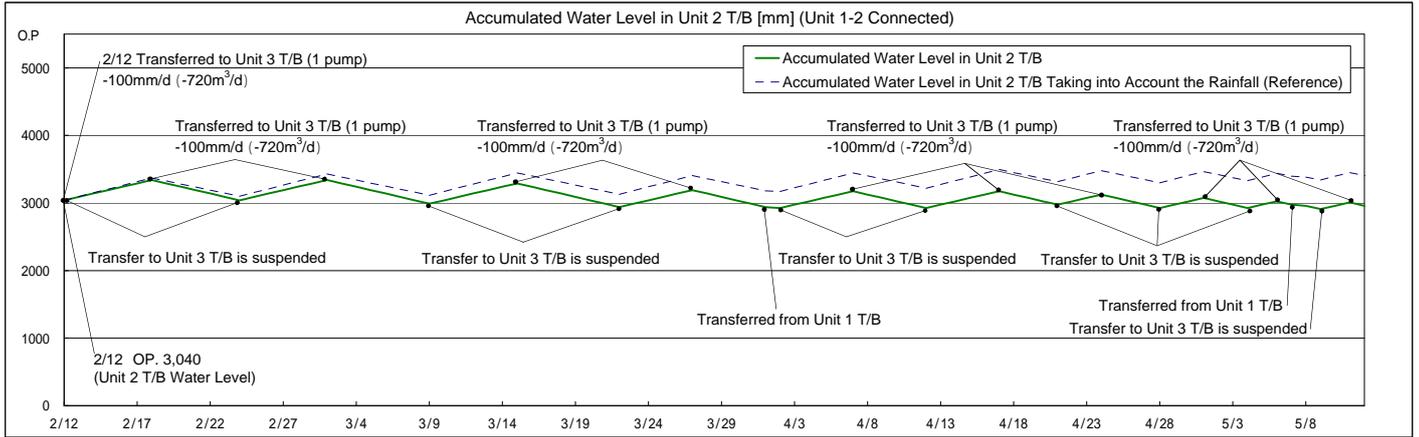
Facility	Storage volume	Change from last report	Water level in T/B
Unit 1	Approx.14,000m <sup>3</sup>	+ 200m <sup>3</sup>	OP.3,302 (Unit 2 T/B)
Unit 2	Approx.23,800m <sup>3</sup>	+ 1,800m <sup>3</sup>	
Unit 3	Approx.22,500m <sup>3</sup>	-700m <sup>3</sup>	OP.2,896 (Unit 3 T/B)
Unit 4	Approx.17,200m <sup>3</sup>	-600m <sup>3</sup>	
<b>Total</b>	<b>Approx.77,500m<sup>3</sup></b>		

Storage Facility	Storage volume	Change from last report	Water level	Treated volume (2/13 - 2/19)	Cumulative treated	Waste produced	Change from last report	Storage capacity
Process Main Building	Approx.15,880m <sup>3</sup>	-720m <sup>3</sup>	OP.4,487	Approx.5,460m <sup>3</sup>	Approx.573,610m <sup>3</sup>	Sludge 597m <sup>3</sup>	No Change	700m <sup>3</sup> *1
High Temperature Incinerator Building	Approx.4,150m <sup>3</sup>	+ 470m <sup>3</sup>	OP.2,858			Used vessels 480 *5	+ 6	1,137 *6
<b>Total</b>	<b>Approx.20,030m<sup>3</sup></b>							

- \*1 Shows the operational limit.
- \*4 Including approx.2,940m<sup>3</sup> (cumulative treated volume:approx.398,350m<sup>3</sup>) of treated volume by the 2nd Cesium adsorption apparatus.
- \*5 Including 70 used vessels of 2nd Cesium adsorption apparatus.
- \*6 Storage capacity will vary according to stored vessels of 2nd Cesium adsorption apparatus.

Note:  
 - On February 12, water transfer from Unit 2 to Unit 3 Turbine Building was stopped. Water transfer from Unit 2 to Unit 3 Turbin Building will be restarted.  
 - On February 12, destination of water transfer from Unit 3 will be switched from the High Temperature Incinerator Building to the Process Main Building, and water transfer will be stopped. Water transfer from Unit 3 will be restarted, and the destination of water transfer will be switched to the High Temperature Incinerator Building.  
 - Water transfer from Unit 4 will be stopped continuously.  
 - On February 12, Cesium Adsorption Apparatus will be restarted: Availability Factor 30% (Projected)  
 - Operation of 2nd Cesium Adsorption Apparatus is scheduled: Availability Factor 35% (Projected)  
 - On February 12, Suspension of 2nd Cesium Adsorption Apparatus is scheduled due to the accumulated water transferring pump installation at High Temperature Incinerator Building.

## 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).