Situation of Storage and Treatment of Accumulated Water including Highly Concentrated Radioactive Materials at Fukushima Daiichi Nuclear Power Station (181th Release)

December 17, 2014
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 December 16, 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 23 and 25, 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.

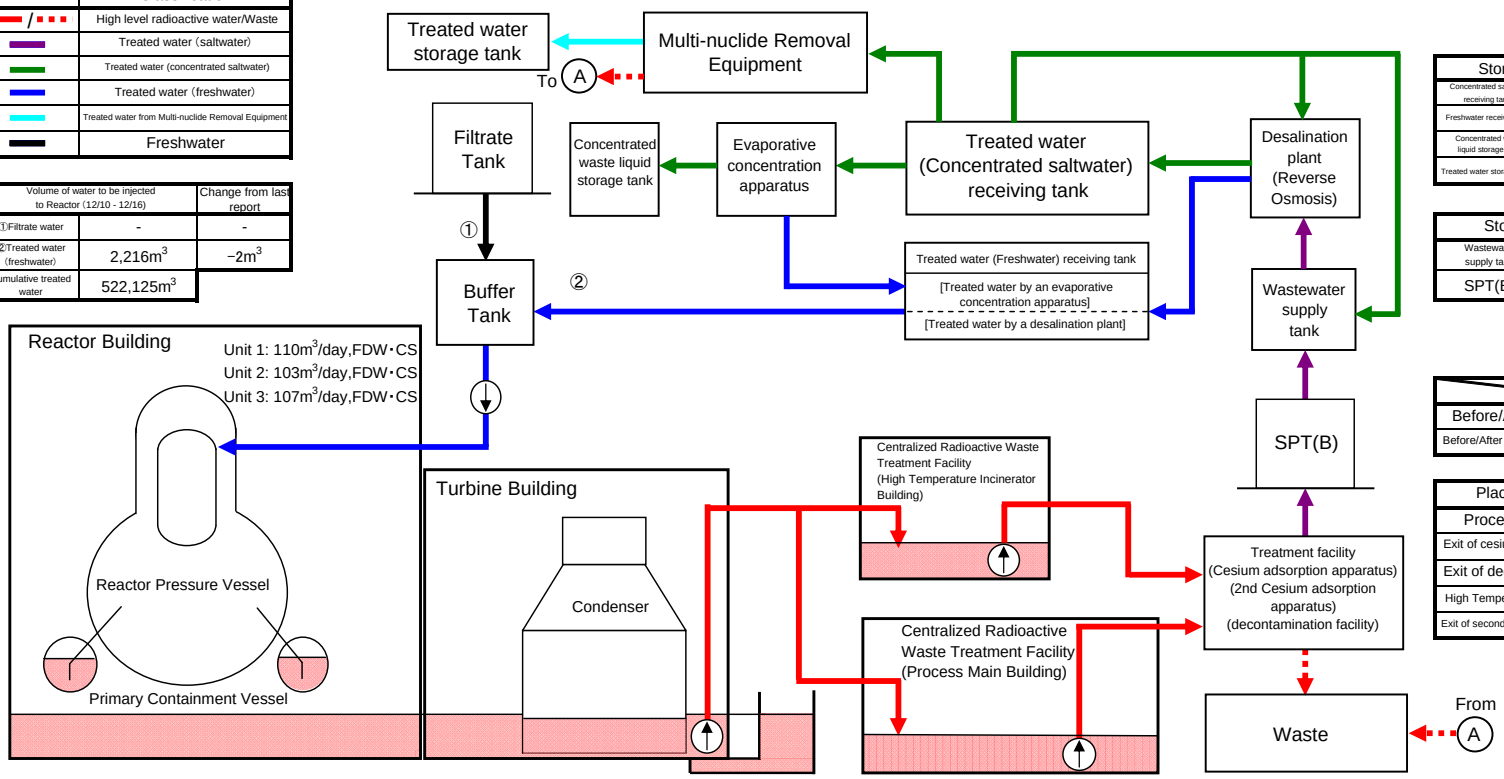
END

Attachment-1

Storage and treatment of high level radioactive accumulated water (as of December 16, 2014)

	Classification
	High level radioactive water/Waste
	Treated water (saltwater)
	Treated water (concentrated saltwater)
	Treated water (freshwater)
	Treated water from Multi-nuclide Removal Equipment
	Freshwater

Volume of water to be injected to Reactor (12/10 - 12/16)		Change from last report
①Filtrate water	-	-
②Treated water (freshwater)	2,216m³	−2m³
Cumulative treated water	522,125m³	



Storage volume*1		Change from last report	Storage capacity*2,3
Concentrated saltwater receiving tank*4	321,284m³	-964m³	395,500m³
Freshwater receiving tank	23,566m³	−26m³	27,500m³
Concentrated waste liquid storage tank	8,817m³	No Change	20,000m³
Treated water storage tank*5	231,329m³	+5,758m³	250,100m³

Storage volume		Change from last report	Storage volume*2
Wastewater supply tank	779m³	+105m³	1,200m³
SPT(B)	806m³	+282m³	3,100m³

	Chloride concentration
Before/After Desalination	750ppm /1ppm（Sampled on Dec. 9）
Before/After Evaporative Concentration	6,900ppm/2ppm（Sampled on Dec. 20, 2011）

Place of Sampling	Radioactivity density*6
Process Main Building	3.1E+04 Bq/cm^3（Sampled on Dec. 9）
Exit of cesium adsorption apparatus	4.4E+00 Bq/cm^3（Sampled on Dec. 9）
Exit of decontamination facility	—
High Temperature Incinerator Building	2.8E+04 Bq/cm^3（Sampled on Dec. 9）
Exit of second cesium adsorption apparatus	1.7E+00 Bq/cm^3（Sampled on Dec. 9）

Facility	Storage volume	Change from last	Water level in T/B
Unit 1	Approx. 13,600m³	−100m³	OP.2,927
Unit 2	Approx. 15,000m³	−700m³	OP.2,432
Unit 3	Approx. 19,400m³	−100m³	OP.2,517
Unit 4	Approx. 14,700m³	+100m³	OP.2,520
Total	Approx. 62,700m³		

Storage Facility	Storage volume	Change from last report	Water level	Treated volume (12/10 -12/16)	Cumulative treated volume	Waste produced		Change from last report	Storage capacity
Process Main Building	Approx. 13,910m³	−1,390m³	OP.3,787	Approx.7,590m³ *7	Approx. 1,121,400m³ *7	Sludge	597m³	No Change	700m³ *2
High Temperature Incinerator Building	Approx. 2,510m³	-570m³	OP.1,498			Used vessels	1,373*8	+36	3,317
Total	Approx. 16,420m³								

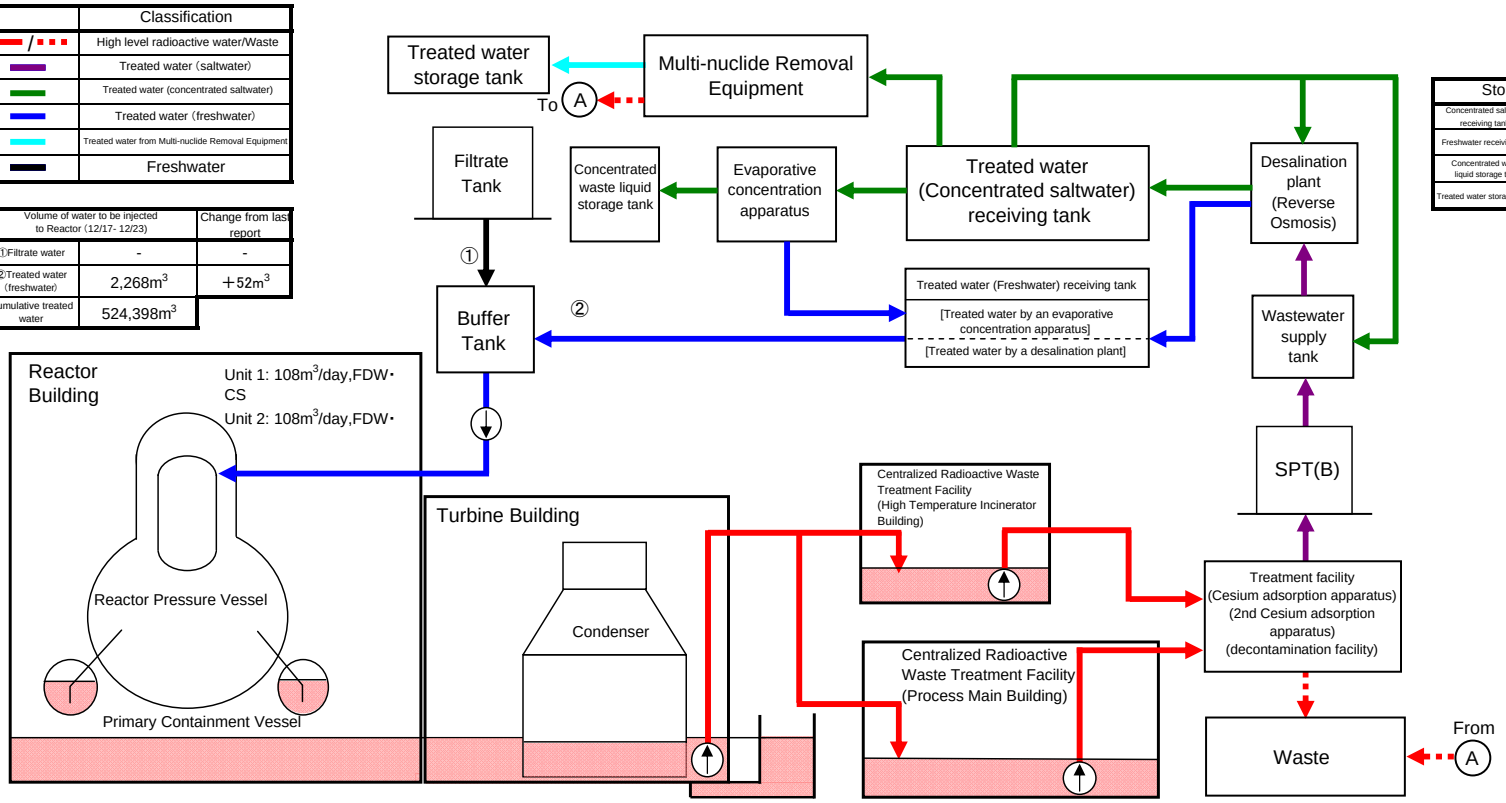
[Main operations that have been conducted since December 9, 2014 (the previous announcement data) up to the present]
- Water transfer from Unit 2 to Unit 3 Turbine Building has been conducted.
- On Dec. 14, water accumulated in Unit 3 was transferred to the Process Main Building instead of the High Temperature Incinerator Building; since then, the transfer has continued.
- Water transfer from Unit 4 has been stopped since Nov. 29, 2012.
- Cesium Absorption Apparatus and 2nd Cesium Absorption Apparatus have been in operation.
  The availability factor of the former is 38.0% (previously assumed: 70%) and that of the latter is 52.4% (previously assumed: 60%)
- On Dec. 12, the operation of Cesium Absorption Apparatus was suspended. On Dec. 15, the operation of Cesium Absorption Apparatus resumed.
- On Dec. 15, the operation of 2nd Cesium Absorption Apparatus was suspended.
- With the closure works of the connecting trench of the High Temperature Incinerator Building, water transfer to the Process Main Building has been conducted since Oct. 22.
- Storage capacity of the Treated Water Storage Tank was increased by adding tanks.

*1 As for the desalination plant (reverse osmosis) or the evaporative concentration apparatus, the data is treated as a reference, because the water levels are not stable during the operation.
*2 Shows the operational limit.
*3 The underground reservoirs are not included in the figure.
*4 Storage capacity of the filtrate water tank (4,600m³) is included in the figure.
*5 The treated water from the Multi-nuclide Removal Equipment (under hot test) is stored. Freshwater and concentrated saltwater will be stored depending on the operation status.
*6 The data shown here is that of Cs-137.
*7 Total treated amount of Cesium adsorption apparatus and 2nd Cesium adsorption apparatus
Breakdown of the treated amount: Cesium adsorption apparatus (3,190m³)
2nd Cesium adsorption apparatus (4,400m³)
Breakdown of the cumulative treated amount: Cesium adsorption apparatus (241,470m³)
2nd Cesium adsorption apparatus (879,930m³)
*8 Breakdown of the used vessels: Cesium adsorption apparatus (532)
2nd cesium Cesium adsorption apparatus (119),
Storage container of the Multi-nuclide Removal Equipment (683), treated column (3) and a used vessel (1)
Used vessels of mobile type treatment apparatus (26, including 11 vessels used for purification of spent fuel pool) and filiters (9).

Storage and treatment of high level radioactive accumulated water (as of December 23, 2014)

Classification
High level radioactive water/Waste
Treated water（saltwater）
Treated water (concentrated saltwater)
Treated water（freshwater）
Treated water from Multi-nuclide Removal Equipment
Freshwater

Volume of water to be injected to Reactor (12/17- 12/23)		Change from last report
①Filtrate water	-	-
②Treated water (freshwater)	2,268m^3	＋52m^3
Cumulative treated water	524,398m^3	



Storage volume		Change from last report	Storage capacity*1*2
Concentrated saltwater receiving tank*3	313,448m^3	-7,837m^3	395,500m^3
Freshwater receiving tank	23,482m^3	−84m^3	27,500m^3
Concentrated waste liquid storage tank	8,817m^3	No change	20,000m^3
Treated water storage tank*4	243,308m^3	＋11,979m^3	250,100m^3

Facility	Storage volume	Change from last	Water level in T/B
Unit 1	Approx. 13,300m^3	-300m^3	OP.2,461
Unit 2	Approx. 15,200m^3	+200m^3	(Unit 2 T/B)
Unit 3	Approx. 19,800m^3	+400m^3	OP.2,564
Unit 4	Approx. 15,100m^3	+400m^3	(Unit 3 T/B)
Total	Approx. 63,400m^3		

Storage Facility	Storage volume	Change from last report	Water level	Treated volume (12/17 - 12/23)	Cumulative treated volume	Waste produced		Change from last report	Storage capacity
Process Main Building	Approx. 13,100m^3	−810m^3	OP.3,436	Approx.5,460m^3 *5	Approx. 1,126,860m^3 *5	Sludge	597m^3	No Change	700m^3 *1
High Temperature Incinerator Building	Approx. 3,110m^3	+600m^3	OP.1,998			Used vessels	1,411*6	+38	3,317
Total	Approx. 16,210m^3								

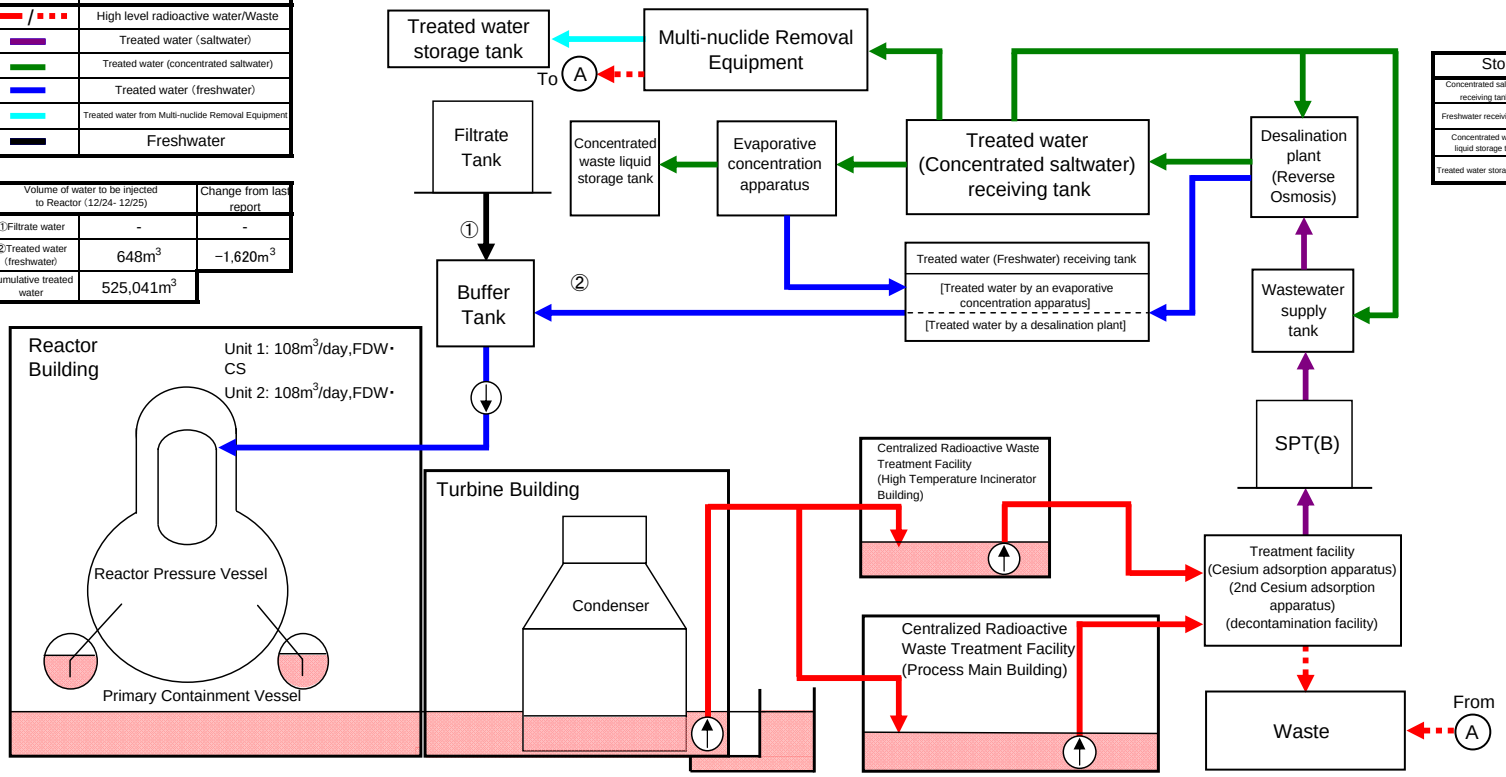
[Main operations that are planned to be conducted during the period from December 16, 2014 to December 23, 2014.]
- Water accumulated in Unit 2 will be transferred to the High Temperature Incinerator Building instead of Unit 3 Turbine Building.
- Water transfer from Unit 3 to the Process Main Building will be conducted.
- Water transfer from Unit 4 will continue to be suspended.
- The operation of Cesium Absorption Apparatus is scheduled: Availability Factor 65%
- The operation of 2nd Cesium Absorption Apparatus will continue to be suspended.
- Water transfer from Unit 1 Turbine Building to the Waste Treatment Facility will be conducted.
- To carry out the closure works of the connecting trench of the High Temperature Incinerator Building, water transfer to the Process Main Building is scheduled to be conducted.
- Water pumping will be carried out to inject some grout into the underground tunnels at Unit 2 whenever it is necessary.

*1 Shows the operational limit. *2 The underground reservoirs are not included in the figure.
*3 Storage capacity of the filtrate water tank (4,600m^3) is included in the figure.
*4 The treated water from the Multi-nuclide Removal Equipment (under hot test) is stored.
Freshwater and concentrated saltwater will be stored depending on the operation status.
*5 The data shown here is that of Cs-137
Total treated amount of Cesium adsorption apparatus and 2nd Cesium adsorption apparatus
Breakdown of the treated amount: Cesium adsorption apparatus (5,460m^3)
2nd Cesium adsorption apparatus (0m^3)
Breakdown of the cumulative treated amount: Cesium adsorption apparatus (246,930m^3)
2nd Cesium adsorption apparatus (879,930m^3)
*6 Breakdown of the used vessels: Cesium adsorption apparatus (539)
2nd cesium Cesium adsorption apparatus (120),
Storage container of the Multi-nuclide Removal Equipment (709), treated column (3) and used vessels (2)
Used vessels of mobile type treatment apparatus (27, including 11 vessels used for purification of spent fuel pool) and filters (11)

Storage and treatment of high level radioactive accumulated water (as of December 25, 2014)

Classification
High level radioactive water/Waste
Treated water（saltwater）
Treated water (concentrated saltwater)
Treated water（freshwater）
Treated water from Multi-nuclide Removal Equipment
Freshwater

Volume of water to be injected to Reactor (12/24- 12/25)		Change from last report
①Filtrate water	-	-
②Treated water (freshwater)	648m³	−1,620m³
Cumulative treated water	525,041m³	



Storage volume		Change from last report	Storage capacity*1*2
Concentrated saltwater receiving tank*3	311,209m³	-2,239m³	395,500m³
Freshwater receiving tank	23,458m³	−24m³	27,500m³
Concentrated waste liquid storage tank	8,817m³	No change	20,000m³
Treated water storage tank*4	246,731m³	+3,423m³	250,100m³

Facility	Storage volume	Change from last	Water level in T/B
Unit 1	Approx. 13,500m³	+200m³	OP.2,461
Unit 2	Approx. 15,200m³	No Change	(Unit 2 T/B)
Unit 3	Approx. 19,400m³	-400m³	OP.2,522
Unit 4	Approx. 14,800m³	-300m³	(Unit 3 T/B)
Total	Approx. 62,900m³		

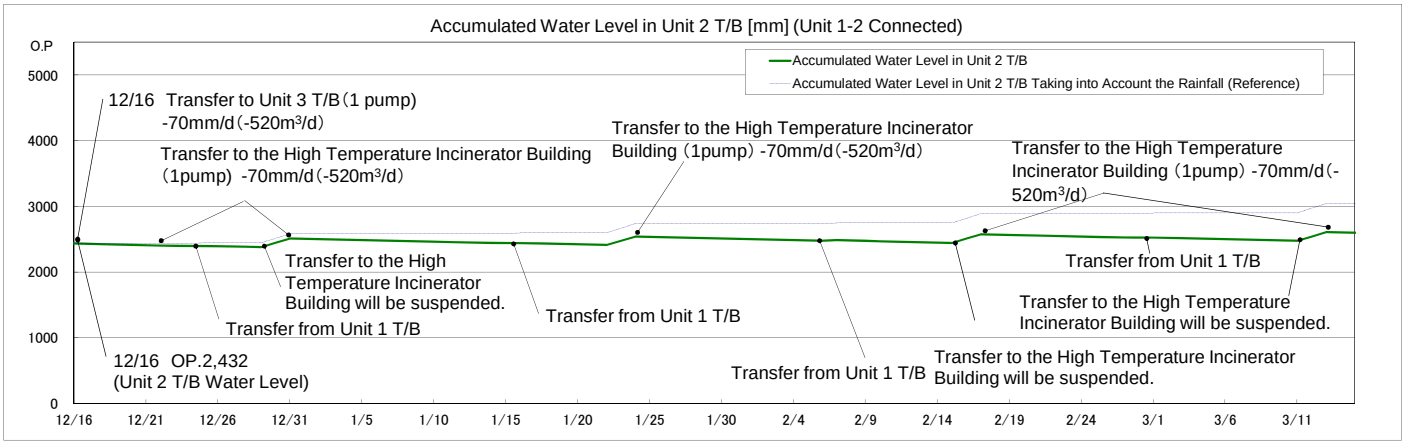
Storage Facility	Storage volume	Change from last report	Water level	Treated volume (12/24 - 12/25)	Cumulative treated volume
Process Main Building	Approx. 12,670m³	−430m³	OP.3,252	Approx.1,560m³ *5	Approx. 1,128,420m³ *5
High Temperature Incinerator Building	Approx. 4,210m³	+1,100m³	OP.2,905		
Total	Approx. 16,880m³				

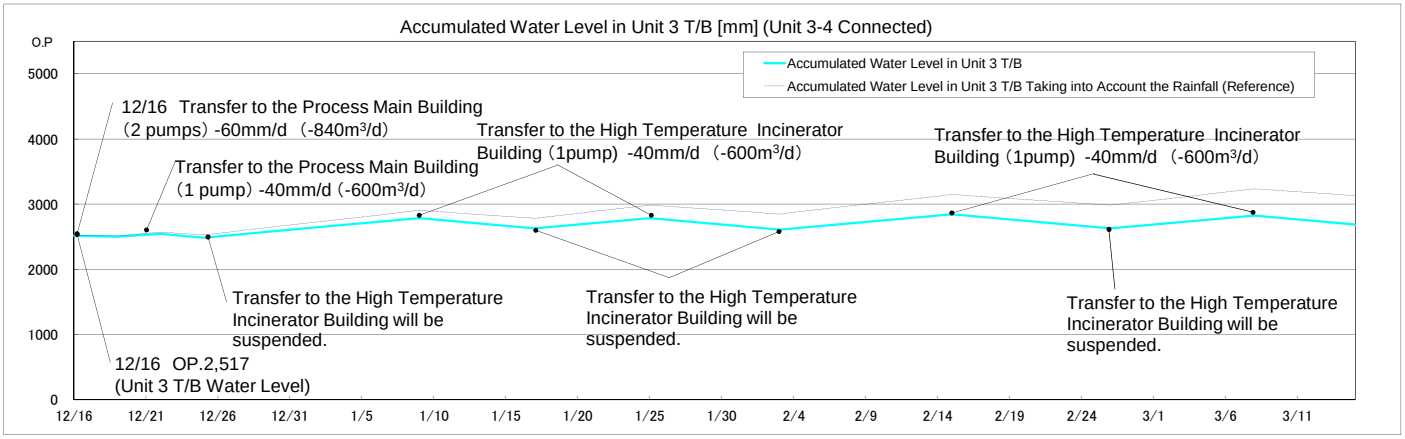
Waste produced		Change from last report	Storage capacity
Sludge	597m³	No Change	700m³ *1
Used vessels	1,418*6	+7	3,317

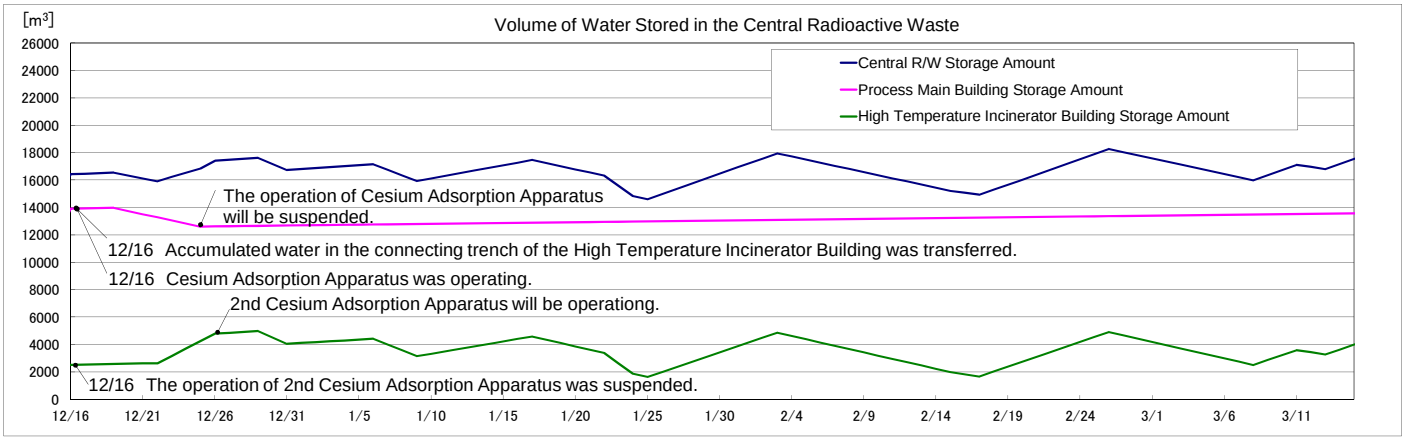
[Main operations that are planned to be conducted during the period from December 23, 2014 to December 25, 2014.]
- Water transfer from Unit 2 to the High Temperature Incinerator Building will be conducted.
- Water transfer from Unit 3 to the Process Main Building will be conducted.
- Water transfer from Unit 4 will continue to be suspended.
- The operation of Cesium Absorption Apparatus is scheduled: Availability Factor 65%
- The operation of 2nd Cesium Absorption Apparatus will continue to be suspended.
- Water pumping will be carried out to inject some grout into the underground tunnels at Unit 2 whenever it is necessary.

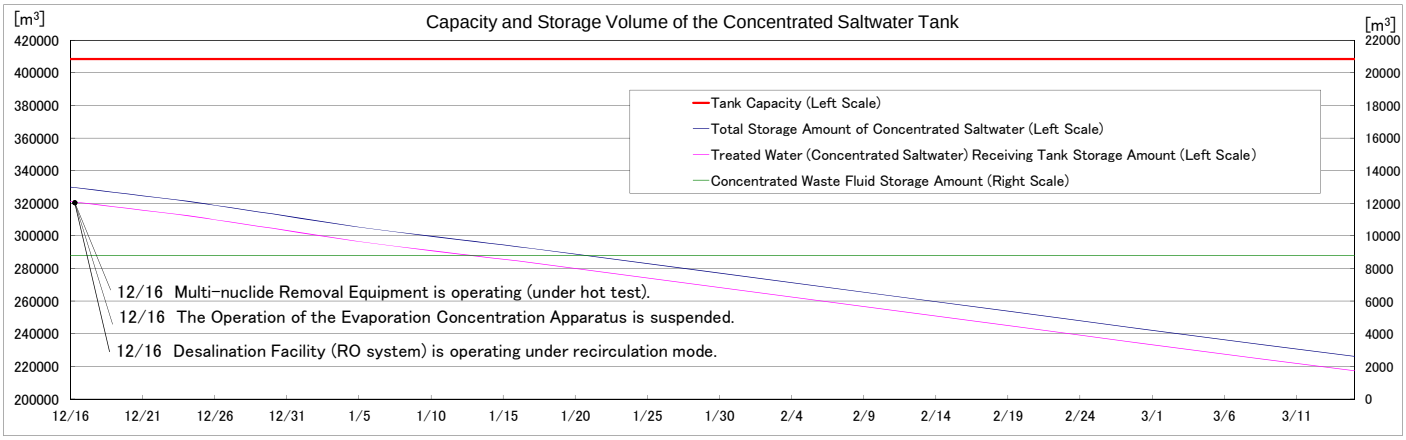
*1 Shows the operational limit. *2 The underground reservoirs are not included in the figure.
*3 Storage capacity of the filtrate water tank (4,600m³) is included in the figure.
*4 The treated water from the Multi-nuclide Removal Equipment (under hot test) is stored.
Freshwater and concentrated saltwater will be stored depending on the operation status.
*5 The data shown here is that of Cs-137
Total treated amount of Cesium adsorption apparatus and 2nd Cesium adsorption apparatus
Breakdown of the treated amount: Cesium adsorption apparatus (1,560m³)
2nd Cesium adsorption apparatus (0m³)
Breakdown of the cumulative treated amount: Cesium adsorption apparatus (248,490m³)
2nd Cesium adsorption apparatus (879,930m³)
*6 Breakdown of the used vessels: Cesium adsorption apparatus (539)
2nd cesium Cesium adsorption apparatus (120),
Storage container of the Multi-nuclide Removal Equipment (716), treated column (3) and used vessels (2)
Used vessels of mobile type treatment apparatus (27, including 11 vessels used for purification of spent fuel pool) and filters (11)

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









Note
- The treated water volume is assumed to be 780m³/d (Subject to change depending on the level of water accumulated in T/B).
- The accumulated water level in T/B is a simulated water level in consideration of flactuation of water level such as recent rainfall, inflow of groundwater, 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 areas of the Fukushima Daiichi Nuclear Power Station (August-October in 2008 to 2010).