Situation of Storage and Treatment of Accumulated Water containing Highly Concentrated Radioactive Materials at Fukushima Daiichi Nuclear Power Station (467th Release)

September 7, 2020
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 containing 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 3, 2020 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 10, 2020 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
### Storage and treatment of high level radioactive accumulated water (as of September 3, 2020)

<table>
<thead>
<tr>
<th>Facility</th>
<th>Storage volume [m³]</th>
<th>Change from last report [m³]</th>
<th>Water level in T.P.</th>
<th>Treated volume [m³]</th>
<th>Cumulative treated volume [m³]</th>
<th>Waste produced</th>
<th>Change from last report [m³]</th>
<th>Storage capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 1</td>
<td>Approx. 1,310</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit 2</td>
<td>Approx. 3,400</td>
<td>30</td>
<td>T.P. − 1,256</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit 3</td>
<td>Approx. 2,040</td>
<td>40</td>
<td>T.P. − 1,618</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit 4</td>
<td>Approx. 10</td>
<td>370</td>
<td>T.P. − 1,479</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>Approx. 6,760</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Water transfer from the Units 1-4 to the buildings (Units 1-4, Centralized radioactive waste treatment facilities) and to the treatment facilities was conducted whenever necessary.
- Due to other works, water transfer to the buildings (Units 1-4, Centralized radioactive waste treatment facilities) was conducted whenever necessary.
- Operations of the Cesium Adsorption Apparatus have been suspended.
- Operations of the 2nd Cesium Adsorption Apparatus have continued to be conducted, the availability factor is 43% (previous updated: 45%).
- Operations of the 3rd Cesium Adsorption Apparatus have been suspended.
- Storage capacity of treated water was changed as operations of new tanks started.

### Chloride concentration

| Chloride concentration | Unit 1 (Treated water) | | Unit 2 (Treated water) | | Unit 3 (Treated water) | |
|------------------------|------------------------|-----------------------|------------------------|-----------------------|------------------------|
| CBC | 3,617 Bq/L | | CBC | 9,302 Bq/L | | CBC | 1,175 Bq/L |
| ASCE | 1,057 Bq/L | | ASCE | 1,935 Bq/L | | ASCE | 1,179 Bq/L |
| Amount of treated water | 10,330 m³ | | 11,894 m³ | | 11,979 m³ |
| Water volume | 6,200 m³ | | 11,979 m³ | | 11,979 m³ |
| Water level | 24,061 m³ | | 22,173 m³ | | 74,200 m³ |

- Due to other works, water transfer to the buildings (Units 1-4, Centralized radioactive waste treatment facilities) was conducted whenever necessary.
- Operations of the 3rd Cesium Adsorption Apparatus have been suspended.
- Storage capacity of treated water was changed as operations of new tanks started.

### Water injection tank (CST) (Buffer tank)

1. Water injection tank (CST) (Buffer tank)
2. Reverse osmosis circulation facility
3. Desalination plant (Reverse osmosis)
4. Wastewater supply tank
5. Treated water (Concentrated saltwater) <storage>
6. Reverse osmosis treated water (Freshwater) <storage>
7. Strontium-treated water <storage>
8. Treated water (Concentrated saltwater) <storage>
9. Treated water (Freshwater) <storage>
10. Strontium-treated water <storage>
11. Multinuclide Removal (Concentrated saltwater)
12. Treated water storage tank
13. Reverse osmosis treated water (Freshwater) <storage>
14. Treated water storage tank
15. Strontium-treated water storage tank
16. Sludge storage tank
17. Used vessels storage tank
18. Filled water tank (2nd Cesium adsorption apparatus) (Decontamination facility)
19. Filled water tank
20. Strontium-treated water storage tank (reuse)
Storage and treatment of high level radioactive accumulated water (as of September 10, 2020)

<table>
<thead>
<tr>
<th>Classification</th>
<th>Storage capacity [m³]</th>
<th>Change from last report [m³]</th>
<th>Water level T/P.</th>
<th>Storage capacity [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reactor Pressure Vessel</td>
<td>6,672</td>
<td>+537</td>
<td>No Change</td>
<td>10,300</td>
</tr>
<tr>
<td>Unit 1</td>
<td>72 m³/day FDW-CS</td>
<td>-83</td>
<td>T.P. - 1,256</td>
<td>36.7%</td>
</tr>
<tr>
<td>Unit 2</td>
<td>72 m³/day FDW-CS</td>
<td>+60</td>
<td>Under T.P. - 1,479</td>
<td>36.7%</td>
</tr>
<tr>
<td>Unit 3</td>
<td>72 m³/day FDW-CS</td>
<td>+70</td>
<td>Under T.P. - 1,479</td>
<td>36.7%</td>
</tr>
<tr>
<td>Unit 4</td>
<td>Approx. 10</td>
<td>No Change</td>
<td>Under T.P. - 1,479</td>
<td>0%</td>
</tr>
<tr>
<td>Total</td>
<td>Approx. 8,900</td>
<td>-</td>
<td>-</td>
<td>36.7%</td>
</tr>
</tbody>
</table>

*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%. However, each tank has the capacity that accommodates more than the storage volume that accumulates up to the height of "DS."

*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 to the height of so-called "down scale (DS)," where water gauges show 0%. However, each tank has the capacity that accommodates more than the storage volume that accumulates up to the height of "DS."

*4 The water level in the storage tank is measured up to the height of "DS.

*5 Total treated amount of Cesium adsorption apparatus and 2nd Cesium adsorption apparatus and 3rd Cesium adsorption apparatus iscalculated based on that of the water treated through the ALPS and other facilities.

*6 Breakdown of the used vessels: Cesium adsorption apparatus (463, 724m³)

*7 Volume of the Strontium-treated water stored in the welded-type tanks

*8 Volume of the volumetrically treated water remaining in the forage-type tanks

*9 Volume of the volumetrically treated water stored in the tank-type tanks

*10 Volume of the volumetrically treated water stored in the sample-type tanks

*11 Volume of the volumetrically treated water stored in the ALPS temporary storage tanks (welded-type) and the high-performance ALPS temporary storage tanks (welded-type)

*12 Volume of the volumetrically treated water stored in the re-use welded-type tanks which stored strontium-treated water before. (These welded-type tanks have been reused from 2019.)

Major operations that are planned to be conducted during the period from September 3, 2020 to September 10, 2020:

- Water transfer from the Units 1-4 to the buildings (Units 1-4, Centralized radioactive waste treatment facilities) and to the treatment facilities will be conducted whenever necessary.
- Due to other works, water transfer to the buildings (Units 1-4, Centralized radioactive waste treatment facilities) 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: 45%).
- Operations of the 3rd Cesium Adsorption Apparatus will continue to be suspended.
Simulation Results of Accumulated Water Treatment in Units 1-4 Turbine

Accumulated Water Level in Unit 2 Turbine Building [mm]

Accumulated Water Level in Unit 3 Turbine Building [mm]

Accumulated Water Level in Unit 4 Turbine Building [mm]

Storage Capacity of the Centralized Radioactive Waste Treatment Facility

Storage Capacity and Volume of the Concentrated Saltwater Tank

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 controlled by retained water transfer pumps in the Unit 2 reactor building.
- Unit 3 Turbine Building water level is controlled by retained water transfer pumps in the Unit 3 turbine building.
- Unit 4 Turbine Building water level is controlled by retained water transfer pumps in the Unit 4 turbine building.

The operations of the Evaporation Concentration Apparatus have been suspended.

The residual water of concentrated saltwater which is left at the bottoms of the storage tanks has been being treated.

The operations of Multi-nuclide Removal Equipment has been in operation (under hot test).

The operations of the other treatment facilities have been suspended.

The operations of Multi-nuclide Removal Equipment has been in operation.

The operations of the other treatment facilities have been suspended.