Progress Status of Groundwater Bypass Construction and Future Schedule

January 28, 2013
Tokyo Electric Power Company
1. Groundwater Bypass

- Groundwater usually flows through the permeable layer from the mountain side to the sea side.
- Part of groundwater flows into the buildings in the process of flowing towards the sea, causing the accumulated water in the buildings to increase.
- The sub-drain is being restored in order to reduce the amount of groundwater flowing into the buildings.

- Groundwater flowing from the mountain side is pumped up in the upstream of the buildings and change the groundwater flow channel (Groundwater bypass)
- With the groundwater bypass, the groundwater level around the buildings (mainly in the mountain side) will be reduced and the amount of groundwater flowing into the buildings will also be reduced.
- The restoration of the sub-drain will be continued.
2. Progress Status of the Groundwater Bypass Construction

Work currently ongoing (as of January 28)
- Drilling for the pump well (Completed in 6 out of 12 locations)
- Tree trimming, yard development
- Installation of discharge facilities such as piping
3. Groundwater Bypass Construction

[Yard development]

Yard is being developed after tree trimming and weeding.

[Pump well construction]

- Drilling utilizing rotary all casing method
- Hammer grab (Drills soil out of the steel pipe inserted into the ground)
- All-round rotation jack (Inserts the steel pipe into the ground as it rotates)
4. Groundwater Bypass Verification Test

Drilling for the pilot pump wells (2 pump wells constructed first) of the groundwater bypass was completed in early December 2012. Verification test was performed from December 14-25, 2012.

Method and purpose of the verification test

The verification test was performed by putting groundwater pumped up from No.3 pump well into No.1 pump well. Pumping test and water quality test were performed.

1. Pumping test
   Evaluate if a certain amount of water can be continuously pumped up while keeping the pump well water level constant by continuously operating the pump.

2. Water quality test
   The quality of groundwater sampled from the pilot pump wells is evaluated through radioactivity analysis.
5. Pumping Test Results

It was confirmed that approx. 40m³ groundwater (per day) can be continuously and stably pumped up while maintaining the pump well water level at O.P. +8.5m.

Since the test results indicate no problem with the pump well specifications, the construction of the remaining pump wells has been commenced.

Pumped-up water amount: Approx. 40m³ per day (Stable)

No.3 pump well

- Ground surface: OP+34.5m
- Water level before the test: OP+12.2m
- Water level after the test: OP+8.5m
- Bottom of the permeable layer: OP+5.1m
- Permeable layer

Pumping test

Water level reduced
6. Water Quality Test Results (Progress Report)

The quality of the groundwater sampled from No.3 pilot well is currently being examined by TEPCO (at Fukushima Daiichi Nuclear Power Station and Kashiwazaki-Kariwa Nuclear Power Station) and a third party organization (Planned to be completed by the end of February).

Internal analysis results of groundwater sampled from No.3 pump well (Preliminary report) (Bq/L)

<table>
<thead>
<tr>
<th>Sampling point</th>
<th>Cesium -134</th>
<th>Cesium-137</th>
<th>Strontium 89</th>
<th>Strontium 90</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.3 pump well</td>
<td>0.011</td>
<td>0.012</td>
<td>(Under analysis)</td>
<td>(Under analysis)</td>
</tr>
<tr>
<td>&lt; Reference &gt; Deep well No.3</td>
<td>0.010 - 0.015</td>
<td>0.012 - 0.027</td>
<td>ND (&lt;0.017)</td>
<td>ND (&lt;0.0067)</td>
</tr>
</tbody>
</table>

Density limits specified in the law (Reactor Regulation): Cs-134: 60Bq/L, Cs-137: 90Bq/L, Sr-89: 300Bq/L, Sr-90: 30Bq/L
* ND indicates that the result is below the detection limit (the value in the parenthesis)
* Sample of deep well No.3 was obtained on May 6, 2012.

All Ѕ and Ѕ analysis results
The results of all Ѕ and Ѕ nuclides were below the detection limits.
*Detection limits: All Ѕ: 1.0Bq/L, all Ѕ: 2.7Bq/L

Detection of tritium
Low density (10Bq/L) of tritium was detected. The detected density is less than one several thousandth of the density limit specified by the reactor regulation (60,000Bq/L).

The impact on the surrounding environment is considered to be fairly low.
1. Fish and shellfish: Even if fish and shellfish who live in the seawater of the radioactivity density equivalent to that of the groundwater of concern concentrated cesium density to 100 times more* within their bodies, the cesium level would be only about one fortieth of the food standard value (100Bq/kg). (*IAEA technical report No.422)
2. Human body: The cesium 134+137 densities of the sampled groundwater is one four thousandth of the standard value for drinking water (10Bq/L).
7. Overall Schedule

Milestone schedule
- October 2, 2012: Construction commencement
- December 14-25, 2012: Verification test using the pilot pump wells
- Current status (as of January 28): Drilling completed for 6 pump wells, installation of the remaining 6 pump wells and discharge facilities such as piping is ongoing.

<table>
<thead>
<tr>
<th>Work item</th>
<th>FY 2012</th>
<th>FY 2013</th>
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<tbody>
<tr>
<td></td>
<td>May-Jul</td>
<td>Aug</td>
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<tr>
<td>Prior quality evaluation of groundwater</td>
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<tr>
<td>Evaluation of the current water quality</td>
<td>Present</td>
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<tr>
<td>Water quality investigation</td>
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<tr>
<td>Design in detail</td>
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<td>Monitoring</td>
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<td>Water gauge inside the sub-drain pit</td>
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<td>New observation hole</td>
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<td>Tank installation</td>
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<tr>
<td>Groundwater bypass construction</td>
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<tr>
<td>Preparatory work (Tree trimming, etc.)</td>
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<tr>
<td>Pilot pump well installation</td>
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<tr>
<td>- Verification test (including water quality test)</td>
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<td>Pump well installation (including water quality test)</td>
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<td>Installation of discharge facilities</td>
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<td>Operation commencement of the groundwater bypass</td>
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* Start operation upon gaining understanding from parties involved