Records after January 1, 2012

※ As of 3:00 pm on April 16, 2012

Fukushima Daiichi Nuclear Power Station

Units 1 to 3: Shutdown due to the earthquake
(Units 4 to 6: Outage due to regular inspections)

- The national government has declared the area within 20km radius of the site as a “no-go zone” and between 20km and 30km radius of the site as a “stay-indoors zone.”
- On December 16, 2011 , Confirmation of the completion of the Step 2 target "Rerease of radioactive materials from PCV is under control and radiation doses are being significantly held down" of "Roadmap towards Settlement of the Accident at Fukushima Daiichi Nuclear Power Station, TEPCO"

【Unit 1】

<Water injection to the reactor>

- As it was confirmed that there was fluctuation in the amount of water injection for the reactor at 10:57 am on January 1, 2012, we adjusted the rate of water injection from piping of core spray system from 1.8 m^3/h to approx. 2.0 m^3/h. (Water injection is continuously implemented at the rate of 4.5 m^3/h from water feeding system)
- At 10:12 am on January 5 2012, there was a fluctuation in the injection amount to the reactor of Unit 1. Therefore we adjusted the injection through the reactor feed water system from 4.8m^3/h to 4.5m^3/h and injection through the reactor spray system from 1.8m^3/h to 2.0m^3/h.
- At 11:07 am on January 12, 2012, we adjusted the amount of the water injection from approx. 4.6 m^3/h to approx. 4.5 m^3/h (the reactor feed water system), from approx. 1.6 m^3/h to approx. 2 m^3/h (the core spray system) since we confirmed fluctuation of the amount of the water injection into the reactor.
- At 5:26 pm on January 15, the decrease of injection water flow to Reactor was found so that water injection from Core Spray System was adjusted from approx. 1.8 m^3/h to 2.0 m^3/h (water injection from feed water system was remained unchanged as approx. 4.5 m3/h).
- At 9:53 am on January 18, 2012, because the change of the water amount injected to the reactor, we adjusted the amount of the water injectionfrom approx. 4.8 m3/h to approx. 4.5 m3/h through the reactor feed water system, from approx. 1.8 m3/h to approx. 2.0 m3/h through the core spray system.
- Since the decrease of water injection rate was confirmed at 10:22 on January 23, we adjusted water injection through core spray system from approx.1.8 m^3/h to approx.2.0 m^3/h (Continuing water injection from feeding water system at approx.4.6 m^3/h.
- At 9:37 am on January 29, due to switching in the water piping system of the reactor water injection pump on the hill, we adjusted water injection from the feed water system to the reactor of Unit 1 from approx. 4.5 m^3/h to approx. 5.5 m^3/h, and the injection from the reactor core spray system from approx. 2.0 m^3/h to 1.0m^3/h.
- We plan to conduct replacing the water injection line of the reactor water injection pump on the hill from pressure proof hose to polyethylene pipe in order to improve the reliability of water injection to the reactor. Since we have to temporally suspend the water injection to achieve this work, on January 30, regarding the water injection to the reactor of Unit 1through the water feeding system, we switched from the reactor water injection pump on the hill to the reactor water injection pump in the Turbine Building and we increased the water injection volume from the feed water system from approx. 5.6 m^3/h to approx. 6.5 m^3/h, and decreased the volume from the reactor core spray system from 0.9 m^3/h to approx. 0m^3/h at 10:38 am on January 30. At 3:50 pm on January 30, since we completed the replacement of water injection line of water injection pump on the hill with polyethylene pipes following the reliability improvement of water injection to the reactors, we have adjusted the amount of water injection to the reactor through water feeding system from approx. 6.5m^3/h to approx. 5.5 m^3/h and that through Core Spray System from approx. 0 m^3/h to approx 1.0 m^3/h.

- At 10:15 pm on January 30, since the decrease of water injection rate was confirmed, we adjusted the amount of water injection to the reactor of Unit 1 through core spray system from approx.0.5 m^3/h to approx.1.0 m^3/h. (Continuing water injection from feeding water system at approx.5.8 m^3/h.)
- After we finished replacing the water injection line from the reactor water injection pump on the hill to polyethylene pipe in order to improve the reliability of water injection to the reactor, we have been changing the water injection volume to the reactor gradually. At 11:25 pm on January 31, we adjusted the water injection volume to the reactor of Unit 1 through the feed water system from approx. 5.8 m^3/h to approx. 4.5 m^3/h, and the volume from the reactor core spray system from approx. 0.9 m^3/h to approx. 2.0m^3/h.
- To improve reliability of water injection to a reactor, line connecting to injection piping in water injection line of reactor injection pump on the hill of Unit 1 had replaced with polyethylene piping. So at 10:35 am, we changed injection route from injection pump in turbine building to reactor injection pump on the hill.
- We confirmed the decrease in volume of injecting water to reactors, so at 3:15 pm on February 2, we adjusted volume of water injection in each reactor as follows:
  Feed water system from approx. 4.2 m^3/h to approx. 4.5 m^3/h,
  Reactor core spray system from approx. 1.5 m^3/h to approx. 2.0m^3/h.
- As we confirmed injection amount change at 7:20 pm on February3, we adjusted the water injection amount through feed water system from approx. 4.7 m^3/h to approx. 4.5 m^3/h (water injection amount through reactor core spray system keeps at approx. 2.0 m^3/h).
- At 10:21 am on February 10, 2012, because the decrease of the volume of injected water to the Unit 1's reactor, we adjusted the injected water volume from Core Spray System from approx. 1.7 m^3/h to approx. 2.0 m^3/h (we have kept the injected water volume from reactor feed water system at approx. 4.5 m^3/h).
- At 10:15 am on February 25, as the amount of water injected to reactor of Unit 1 decreased the water injection volume from the core spray system changed from approx.1.6m^3/h to approx. 2.0m^3/h (the reactor feed water system stays the same: approx.4.5m^3/h)
- At 10:52 am on March 3, as the amount of water injected to reactor was decreased, we changed the water injection volume from the core spray system from approx.4.4 m^3/h to approx. 4.5m^3/h, and that from the reactor feed water system approx. 1.6 m^3/h to approx. 2.0m^3/h)
- At 3:00 pm on March 22, as we found a change in the water volume injected into the reactor, Unit 1, water injection volume from the feed water system was decreased from 4.7 m^3/h to 4.5 m^3/h, and that from the reactor core system increased from 1.5 m^3/h to 2.0 m^3/h.

<Water injection to Spent Fuel Pool>

※Nothing.

<Alternative Cooling of Spent Fuel Pool>

※Formal operation is carried out from August 10, 2011.

- At 3:05 pm on January 30, we stopped the operation of the secondary air-fin coolers of spent fuel pool in order to prevent overcooling of alternative cooling system of spent fuel pool of Unit 1 (the temperature of fuel pool at the time of stoppage: 12℃)

<Draining water from the underground floor of the turbine building>

- Around 1:40 pm on January 14, extremely small amount of water leakage was found from 2 pinholes of the hose in water transfer line between the vertical shaft in Unit 1 to the centralized radiation waste treatment facility while water passing test was being conducted. The leakage stopped after suspending the pump. The result of sampling indicated Iodine 131 was below measurable limit, Cesium 134 was 1.8 $\times 10^1$Bq/cm^3 and Cesium 137 was 2.0 $\times 10^1$Bq/cm^3. We estimate that it is mixture of sea water and rain water. The pinholes were closed by plastic. The water leakage point is the outdoor laying part at flushing line that transfer the accumulated water of the vertical shaft in Unit 1 to the accumulated water transfer line in Unit 2. The amount of water leakage is estimated to be less than approximately 1 liter.

- At 3:37 pm on January 20, we started transferring accumulated water from the basement of turbine building of Unit 1 to the basement of turbine building of Unit 2. At 10:03 am on January 22, we stopped the transfer.
- At 10:20 am on February 25, we started the accumulated water from the basement of Turbine building of Unit 1 to the basement of Turbine building of Unit 2. At 9:44 am on February 26, the transfer stopped
- At 9:37 am on March 20, we started transferring the accumulated water from the basement of Turbine building of Unit 1 to the basement of Turbine building of Unit 2. At 9:48 am of March 21, we stopped the transfer.
- At 9:31 am on April 7, we started transferring the accumulated water from the basement of Turbine building of Unit 1 to the basement of Turbine building of Unit 2. At 9:18 am of April 8, we stopped the transfer.

< Injection of nitrogen gas into Primary Containment Vessel >

※Nitrogen gas into Primary Containment Vessel is carried out from April 7, 2011.

※Nitrogen gas into Primary Containment Vessel is carried out from November 30, 2011.

- At approximately 4:10 pm on January 17, 2012, due to the trouble of switching facilities at the Minami-iwaki switching station, the Yonomori line 1 and 2 instantaneously turned to off. Due to this trouble, Unit 1's nitrogen injection facility stopped its operation. Later, after confirming that there were no significant problem over the facility, we started its operation at 4:57 pm on the same day. There is no significant change for the major parameters which have resulted from the event.
- At 9:40 am on February 24, we started the work to add the flow-meters to the nitrogen injection line at the side of Primary Containment Vessel of Unit 1 in order to improve the reliability of nitrogen injection activity. Due to this work, we suspended the nitrogen injection task temporarily (*).After the completion of the installation, we restarted the nitrogen injection. At 1:10 pm, it was confirmed that there was no significant variation in the parameters.

  * In the Chapter 12 of Nuclear Reactor Facilities Security Regulation "The Way of Ensuring Mid-term Security", as the treatments like "Operational limitation" or "Measures required in case of not satisfying the operational limitation" are determined, it is supposed the operator act per the required measures if it fails to satisfy the operational limitation. This time, to implement maintenance works, we have suspended the work of nitrogen injection at the side of Primary Containment Vessel of Unit 1 by conducting a planned shift beyond the range of operational limitation (from 9:40 am to 1:10 pm on February 24).
- At around 11:47 am on March 12, our staff confirmed by over current alarm of fan motor of compressor at the site, that the nitrogen supply equipment (nitrogen gas separator A), which supplied nitrogen to the PCVs and the RPVs of Unit 1-Unit 3, stopped. At 12:09 pm on the same day, we started the waiting nitrogen supply equipment (nitrogen gas separator B) and at 12:19 pm, nitrogen injection started again. Regarding the pressure of PCVs of Unit 1 – Unit 3 and hydrogen density, we did not confirm any significant fluctuation (hydrogen density of Unit 3 is monitored as reference data because the PCV gas control system is now under test operation).At 8:52 pm on March 16, we changed injection rate of nitrogen into the primary containment vessel from approx.18 m^3/h to approx.23 m^3/h as upward trend of the reading has been observed with some of the thermometers of containment atmosphere of Unit1.
- At around 10:55 am on April 4, a TEPCO employee found the measurement flow volume of the nitrogen injection line to PCV of Unit 1-3 and RPV was 0 m^3/h at the Seismic Isolated Building. When we checked the equipment, we found the nitrogen supply system (nitrogen/gas separator B) was stopped due to failure alert of compressor. After that, at 12:16 pm on the same day, we started a stand-by nitrogen supply system (nitrogen/gas separator A) and we restarted the nitrogen supply to PCV of Unit 1-3 and RPV at 12:29 pm. No significant changes of pressure of PCV of Unit 1-3 and density of hydrogen were confirmed.
- At around 5:00 pm on April 7, when verifying the plant data, the flow volume of the nitrogen injection line to PCV and RPV was confirmed to be 0 m^3/h. By conducting

on-site verification, it was confirmed that nitrogen supply facility (nitrogen gas separator A) was halt due to compressor failure alert. Subsequently, at 17:43, backup nitrogen supply facility (nitrogen gas separator B) was activated and at 17:56, injection of nitrogen to PCV and RVP was recommenced. No significant changes have been confirmed in regard to parameters in connection with PCV of Unit 1-3, density of Hydrogen and monitoring post data.

- At 1:00 am on April 13, 2012, a TEPCO employee found the measurement flow volume of the nitrogen injection line to PCV of Unit 1-3 and the pressure decreased. At 1:04 am, we checked on the site. And at 1:30 am, we found the nitrogen supply system (nitrogen/gas separator B) was stopped due to failure alert of compressor. At 3:10 am, we started a stand-by nitrogen gas separator and we restarted the nitrogen supply to PCV of Unit 1-3 and RPV at 3:46 am. As for stopped nitrogen/gas separator B, at 4:20 am, we started nitrogen injection from nitrogen/gas separator B. After separating the suction filter which was assumed as the cause, at 9:25 am, we stopped the operation of a stand-by nitrogen gas separator since no problem was found as a result of trial operation with regard to separator and compressor. We continue nitrogen injection with nitrogen supply system B. No significant changes of pressure of PCV of Unit 1-3 and density of hydrogen are confirmed.

<Installation of gas controlling system of primary containment vessel>

※Formal operation of gas controlling system of primary containment vessel is carried out from December 19,.

<Primary containment vessel gas sampling>

- On January 4 2012, we conducted sampling of the gas of the PCV gas management system. As a result of the analysis, we confirmed that at the entrance of the system Xenon 135 was below detection limit (1.1×10^{-1}Bq/cm^3), and below the re-criticality criterion which is 1Bq/cc.
- On March 2 and April 2, 2012, we took samples at the charcoal filter and particulate filter of Unit 1 RCV gas control system.

<Reactor building dust sampling>

- On January 3 and On March 1 and On April 2, 2012, we conducted dust sampling at the upper part of Unit 1 reactor building at emission filter of Unit 1 reactor building cover.

<Others>

- Since December 22, the atmospheric temperatures at point C of Unit 1 Primary Containment Vessel (PCV) monitored by the Containment Atmospheric Monitoring System had risen (the atmospheric temperature of the PCV on December 22 was approx. 38℃, at 7 pm on December 27 was approx. 49℃). The other temperatures had not risen, so we conducted a survey from 9 am to 10 am on December 28, and we confirmed that there are no problems. From 11:00am to 12:15pm on the same date, to identify cause with monitoring, we adjusted the volume of Nitrogen injection, from approx. 8 m^3/h to approx.18 m^3/h, and emission of the gas management system, from approx. 23 m^3/h to approx.30 m^3/h, as of before December 22. The temperature, the maximum went up to approx. 54.6℃ at 6 pm on December 28, fell to approx. 52.3℃ at 10 am and 1 pm on December 29. Temperatures at other two points also indicated slight increases but are currently in the stable status. (Temperature at 1:00 pm on December 29: point D: approx. 34.8℃, point E: approx. 39.2℃)

  We estimated that the cause of rise in temperature is change the volume of nitrogen included into PCV and exhausted from PCV. We will continuously conduct the survey for the cause of temperature increase and surveillance of the plant. Temperatures on the following time are shown as follows.

  (Maximum temperature since December 22)

  Point C: Approx. 54.6℃ at 6:00 pm on December 28

  Point D: Approx. 35.8℃ at 5:00 pm on December 29

  Point E: Approx. 40.0℃ at 5:00 pm on December 29

At 11:00 am on December 31: Point C approx. 45.9℃, Point D approx. 33.4℃, Point E approx. 36.9℃
At 5:00 am on January 1, 2012: Point C approx. 44.7℃, Point D approx. 32.9℃, Point E approx. 36.2℃
At 11:00 am on January 1, 2012: Point C approx. 44.4℃, Point D approx. 32.9℃, Point E approx. 36.3℃
At 11:00 am on January 3, 2012: Point C approx. 42.8℃, Point D approx. 32.4℃, Point E approx. 35.5℃
At 5:00 am on January 4, 2012: Point C approx. 42.4℃, Point D approx. 32.2℃, Point E approx. 35.2℃
At 11:00 am on January 4, 2012: Point C approx. 42.3℃, Point D approx. 32.1℃, Point E approx. 35.1℃
At 5:00 am on January 5, 2012: Point C approx. 41.6℃, Point D approx. 31.4℃, Point E approx. 34.4℃
At 11:00 am on January 5, 2012: Point C approx. 41.4℃, Point D approx. 31.3℃, Point E approx. 34.3℃
At 5:00 am on January 6, 2012: Point C approx. 42.0℃, Point D approx. 31.5℃, Point E approx. 34.5℃

- At 7:10 on February 9, a partner company's worker found that one end of a silt fence of Unit 1 screen came off. The silt fences were installed both inside and outside of the screen, and the one which came off was the inside. At 10:30 am we refitted it. We implemented sampling survey of both silt fences everyday and there was no significant change from today's sample which we took before the incident.
- At approximately 6:30 pm on February 9, 2012, at Main Anti-Earthquake Building, we confirmed that data monitoring using temporarily-installed meters at Unit 1 was disabled. The measurement of plant parameters including Containment Atmospheric Monitor, Containment vessel pressure, Drywell HVH temperature, and the water level of the reactor was cancelled. Later, because it is confirmed that a fuse of the equipment which supply electricity to the temporarily-installed meters was blown at the central control center of Unit 1 & 2 and that the power source for the meters was out of order, at 6:15 am on February 10, we replaced the fuse, resulting in that the plant parameters excluding Containment Vessel pressure and the water level of the reactor and the others were turned to under monitoring using Unit 1's temporarily-installed meters. Later, after switching the power from the power source for meters whose fault was found to the other power source for meters, all the plant parameters turned to be monitored using the temporarily-installed meters of Unit 1 at 10:55 am on the same day. For reference, while data monitoring using Unit 1's temporarily-installed meters was disabled, the key parameters in terms of safety were continued to be monitored using web-cameras and others inside the Main Anti-Earthquake Building. Because we confirmed that there have been no significant fluctuation of the parameters, we concluded that there is no problem in terms of safety.
- When we were working the related thermometer of reactor pressure vessel / primary containment vessel of Unit 1, we found out that the signal cables of thermometer of VESSEL DOWN COMMER 130° (TE-263-69G2) has been connected not only the input of the correct recorder but also the input of VESSEL DOWN COMMER 15° (TE-263-69G1) and the signal cables of thermometer of VESSEL DOWN COMMER 15° (TE-263-69G1) has not been connected the input of the recorder. VESSEL DOWN COMMER 15° (TE-263-69G1) is monitor measuring instrument on the safety regulation (Article 138 and 143) but we confirmed that this thermometer was out of data in the past, so we excluded from monitor measuring instrument on the safety regulation (Article 138 and 143) after data collecting at 9:00 pm on March 22. We are monitoring by another thermometers according to the temperature monitoring of reactor pressure vessel
- At approx. 11:00 am on March 29, 2012, we confirmed that the indicators for reactor water level (fuel range)B, pressure of PCV and pressure of suppression chamber were disabled. Afterwards, we reset the power of the indicators. At 12:56 pm on the same day, we confirmed that the indicators recovered normal condition. Now, the cause is under investigation. While data monitoring was disabled, the key parameters in terms of safety were continued to be monitored using other indicators. Because we confirmed that there has been no significant fluctuation of the parameters, we concluded that there is no problem in terms of safety.

【Unit 2】

<Water injection to the reactor>

- As it was confirmed that there was fluctuation in the amount of water injection for the reactor at 10:15 am on January 1, 2012, we adjusted the rate of water injection from water feeding system from 1.8m^3/h to approx. 2.0 m3/h. We also adjusted the rate of water injection from piping of core spray system from 7.1m^3/h to approx. 7.0 m3/h.
- At 9:36 am on January 4, 2012, we adjusted the volume of water injected into the reactor of Unit 2 through reactor spray system from approx. 7.2m^3/h to approx. 8.2m^3/h in order to decrease reactor temperature for containment monitoring.
- At 9:58 am on 5 January 2012, due to diversification works of reactor water injection pumps, we adjusted water injection through reactor feed water system from approx.1.7m^3/h to 1m^3/h, and water injection from core spray system from approx. 8.2m^3/h to 9m^3/h.
- At 10:46 am on January 6, 2011, due to a switching operation of injection pipe for the feed water system in preparation for a test run of the core spray pump installed at T/B, we decreased the feed water system injection from approx. 0.2 m^3/h to 0m^3/h and increased core spray system water injection from approx. 9.2 m^3/h to 9.3 m^3/h. The switching operation was finished at 11:11 am, thus the feed water system injection was adjusted from approx. 0m^3/h to 1.0m^3/h as well as core spray system water injection from approx. 9.3 m^3/h to 9.0 m^3/h at 11:25 am.
- At 11:53 am on January 7, we completed the switching operation of injection pipe for the feed water system in preparation for a test run of the core spray pump installed at T/B of Unit 2, we increased the feed water system injection from approx. 0.5 m^3/h to 2m^3/h and decreased core spray system water injection from approx. 9 m^3/h to 8 m^3/h for Unit 2 reactor.
- At 10:04 am on January 9, because the replacement work of the water injection piping arrangement from the water feed system in association with the trial run of reactor injection pump in Turbine Building has been completed, we have adjusted the amount of injected water to the reactor gradually. For the amount of injected water to the reactor, we adjusted water injection from the reactor feed water system from approx. 1.7 m^3/h to 3.0 m^3/h, and water injection from the core spray system for approx. 8.1 m^3/h to 7.0 m^3/h.
- As it was confirmed that there was fluctuation in the amount of water injection for the reactor at 11:20 am on January 13, 2012, we adjusted the rate of water injection from water feeding system from approx. 2.5m^3/h to approx. 3.0m^3/h. We also adjusted the rate of water injection from piping of core spray system approx. 7.2m^3/h to approx. 7.0m^3/h.
- At 9:53 am on January 18, 2012, because the change of the water amount injected to the reactor, we adjusted the amount of the water injection for Unit 2from approx. 2.4 m3/h to approx. 3.0 m3/h through the reactor feed water system, from approx. 7.5 m3/h to approx. 7.0 m3/h through the core spray system
- At 10:50 am on January 20, 2012, regarding water injection into the reactor, in order to switch the water injection piping for reactor injection pump on the hill, we adjusted the amount of water injection gradually. We adjusted the amount of the water injection from approx. 4.0 m^3/h to approx. 5.0 m^3/h through the reactor feed water system, from approx. 5.0 m^3/h to approx. 4.0 m^3/h through the core spray system.
- We are gradually adjusting the water injection rate to Reactor, Unit 2 in order to switch the water injection piping for reactor injection pump on the hill. At 9:55 am on January 21, we adjusted the amount of the water injection from approx. 5.0 m3/h to approx. 6.0 m3/h through the reactor feed water system, from approx. 5.0 m3/h to approx. 4.0 m3/h through the core spray system.
- At 10:04 am on January 22, we adjusted the water injection rate to the reactor in order to switch the water injection piping for reactor injection pump on the hill gradually. We kept the amount of water injection through the reactor feed water system at approx. 6.0 m^3/h and adjusted the amount of water injection through the core spray system from approx. 3.9 m^3/h to 3.0 m^3/h.
- In order to switch piping of reactor injection pump on the hill, we have been intergrading the water injection rate to the reactor, we adjusted the rate of water injection through feeding system from approx. 6.0 m^3/h to approx. 7.0 m^3/h, adjusted the rate of water injection through core spray system from approx.

3.0m^3/h to approx. 2.0m^3/h at 10:16 am on January 23.

- At 10:42 am on January 24, the water injected into the reactor from the reactor feed water system was adjusted from approx. 7.0m^3/h to approx. 8.0 m^3/h and the amount of water injected from the core spray system was adjusted from approx. 1.9 m^3/h to approx. 1.0 m^3/h.
- At 7:15 pm on January 24, regarding the water injection of Unit 2, we adjusted the water injection amount from core spray system from approx 0.6 m^3/h to approx 1.0 m^3/h since we confirmed change of water injection amount.
  (We maintain the water injection amount from water injection system at 8 m^3/h)
- At 5 :10 pm on January 25, regarding the reactor injection from the feed water system at the Unit 2, we changed the injection line from the pump located uphill to the T/B reactor injecting pump. At 9:47 am on January 26, due to the change of injection duct owned by the pump located uphill, the volume from the feed water system increased from approx. 7.9m^3/h to 8.7 m^3/h, and the volume from the reactor core system decreased from approx. 1.0m^3/h to 0m^3/h. After finishing switching work of the water injection line from the water injection pump on the hill at 2:51 pm, the injection line from the feed water system was switched from the reactor water injection pump on the hill to the reactor water injection pump in the turbine building at 3:31. At 3:50 pm, the volume from the feed water system decreased from approx. 8.7 m^3/h to approx. 8.0 m^3/h, and the volume from the reactor core spray system increased from 0 m^3/h to approx. 1.0 m^3/h. At 9:43 am on January 27, the volume from the feed water system decreased from approx. 8.2 m^3/h to approx. 6.9 m^3/h, and the volume from the reactor core spray system increased from approx. 0.7 m^3/h to approx. 2.0 m^3/h.
- Because we completed the replacement of water injection line of water injection pump located on upland with polyethylene pipes following the reliability improvement of water injection to the reactors, we have changed the amount of water injection to the reactors in a step-by-step manner. At 10:10 am on January 30, for the amount of water injection to the Unit 2's reactor, we changed the amount of water injection from water feeding system from approximately 7.0m^3/h to approximately 6.0 m^3/h and that from Core Spray System from approximately 1.8 m^3/h to approximately 3.0 m^3/h. At 10:50 am on January 31, we adjusted the water injection volume to the reactor through the feed water system from approx. 6.6 m^3/h to approx. 5.0 m^3/h, and the volume from the reactor core spray system from 2.8 m^3/h to approx. 4.0m^3/h. At 11:50 am on February 1, the water injected into the reactor from the reactor feed water system was adjusted from approx. 5.0m^3/h to approx. 4.0 m^3/h and the amount of water injected from the core spray system was adjusted from approx. 4.0 m^3/h to approx. 5.0 m^3/h.
- At 10:55 am in February 2, we adjusted water injection volume to the reactor of Unit 2 through the feed water system from approx. 3.9 m^3/h to approx. 3.0 m^3/h, and the volume from the reactor core spray system from approx. 5.1 m^3/h to approx. 6.0m^3/h.
- We confirmed the decrease in volume of injecting water to reactors, so at 3:15 pm on February 2, we adjusted volume of water injection in each reactor as follows:
  Feed water system from approx. 2.5 m^3/h to approx. 3.0 m^3/h,
  Reactor core spray system from approx. 5.2 m^3/h to approx. 5.5m^3/h.
- After completion of adjusting water flow amount as planned on February 2, tendency of temperature rise at the bottom of PCV was observed. Thus, at 7:20 pm on February 3, we changed the injection amount into Unit 2 reactor through feed water system from approx. 2.9 m^3/h to approx. 4.9 m^3/h and changed that though reactor core spray system from approx. 5.8 m^3/h to approx. 3.8 m^3/h (which means setting them at those of before flow adjustment on February 1). As for the temperature rise, the temperature at the upper head of the bottom of PCV has risen to approx. 67.2 ℃ at the highest (as of 4 pm on February 4), but currently, it is approx. 65.1 ℃ (as of 5 pm on February 4). The trend of the temperature rise seems to be steady. After that, we have observed the tendency of temperature at the upper head of the bottom of PCV. Because we found the temperature has risen again (approximate 66.1 ℃ at 11:00 pm on February 4), at 12:52 am on February 5, we changed the water injection volume to Unit 2 reactor through the feed water system from approx. 4.8 m3/h to approx. 5.8 m3/h (the water injection through the

reactor core spray system remains approx. 3.8 m3/h). At this moment, the temperature indicates approxi. 67.4 ℃ (as of 5:00 am on February 5). We will monitor it continuously. The temperature was around 70.0 ℃ (approx. 70.3 ℃ at 11:00 pm on February 5) and in order to prevent further temperature increase, we decided to increase the amount of water injected to the reactor. At 2:29 pm on February 6, the water injection volume to the Unit 2 reactor through the feed water system was changed from approx. 5.8 m^3/h to approx. 6.8 m^3/h (the water injection through the reactor core spray system remains approx. 3.8 m^3/h). At this moment, temperature indicates approx. 70.6 ℃ (as of 5:00 am on February 6). We will monitor it continuously. As a result of the sampling for the Gas Control System of the Unit 2 which we conducted on the same day to make sure there is no re-criticality state, we confirmed that the concentration of Xe-135 was below the detectible limit (1.0×10^{-1} Bq/ cm^3) at the system's entrance, meaning that it falls below the re-criticality criteria, or 1 Bq/cm^3. Wile we continued to monitor the trend as it was still showing a high value, in oder to avoid the possibility of re-criticality being increased as a result of the water density in the reactor being increase due to the rapid injection of the cold water, from 0:19 am to 3:20 am on February 7, which was before the water injection, we injected boric acid into the reactor as a safety countermeasures against the re-criticality, and on 4:24 pm we changed the amount of the core spray system injection water from 3.7m^3/h to 6.7m^3/h* (the amount of the continuing feed water system injection is 6.8m^3/h). Currently, the temperature is 72.2℃ (as of 5 am on February 7). We will monitor the progress continuously.

- As of 11:00 am on February 5: Approx. 68.6 ℃.
- As of 11:00 pm on February 5: Approx. 70.3 ℃.
- As of 5:00 am on February 6: Approx. 70.6 ℃.
- As of 11:00 am on February 6: Approx. 71.0 ℃.
- As of 5:00 am on February 7: Approx. 72.2 ℃
- As of 11:00 am on February 7: Approx. 69.6 ℃
- As of 5:00 am on February 8: Approx. 66.7 ℃
- As of 11:00 am on February 8: Approx. 66.0 ℃
- As of 5:00 am on February 9: Approx. 67.9 ℃
- As of 11:00 am on February 9: Approx. 66.8 ℃
- As of 5:00 am on February 10: Approx. 66.7 **℃**
- As of 11:00 am on February 10: Approx. 68.0 **℃**
- As of 5:00 am on February 11: Approx. 68.5 **℃**
- As of 11:00 am on February 11: Approx. 70.0 **℃**
- As of 5:00 am on February 12: Approx. 75.4 **℃**

In the Chapter 12 of Nuclear Reactor Facilities Security Regulation "The Way of Ensuring Mid-term Security", as the treatments like "Operational limitation" or "Measures required in case of not satisfying the operational limitation" are determined, it is supposed the operator act per the required measures if it fails to satisfy the operational limitation. This time, to implement maintenance works, we have suspended the water injection into the Unit 2 reactor by conducting a planned shift beyond the range of operational limitation (from 3:48 am on Feb 7 to 6:48 pm on Feb 8).

- 6:20 pm on February 10, as decrease of water injection rate into reactor of Unit 2 was observed, adjustment was made from approx.6.3m^3/h to approx. 6.8m^3/h for feed water system and from approx. 6.6m^3/h to approx. 6.7m^3/h for core spraying system.
- At 10:45 pm on February 11, as we found a slight increase of the temperature in the lower part of the Reactor Pressure Vessel of Unit 2, we changed the water injection amount through the reactor feed water system from approx. 6.8m^3/h to 7.8m^3/h (the water injection amount through the core spray system is kept at approx. 6.8m^3/h). At 3:22 am on February 12, we conducted a sampling of gas in the gas management system in the Primary Containment Vessel of Unit 2 and the result is that around the entry of the system, Xe-135 was below the detection limit (9.5×10^{-2} Bq/cm^3). As it is below 1 Bq/cm^3, the criterion to judge re-criticality, we have confirmed that it has not reached re-criticality. After that, we continued monitoring the tendency of the temperature fluctuation, and then found that the temperature at the bottom of PCV

tended to be still high. Therefore, in order to avoid a chance of the re-criticality due to the increase of water density in the PCV by sudden cold water injection, from 11:38 am to 1:50 pm on February 12, before starting water flow rate change, we injected boric acid into the reactor for the safety measures. Then, from 2:10 pm on the same day, although we increased the water injection rate, the indicated temperature of the bottom of PCV was confirmed to be 82°C beyond 80 °C so that, At 2:20 pm, we judged that it was not satisfied "the temperature is below 80 °C at the bottom of PCV [*1]", which is stipulated in "the Reactor Facility safety Regulation [*2]" as one of the "Conditions of operation". Thereafter, we continued the increased water injection, and changed the water flow rate from approx. 7.2m^3/h to 7.5m^3/h through the reactor feed water system, and from approx. 6.9m^3/h to 9.9m^3/h through the core spray system. Currently, the temperature is approx. 79.2 °C as of 3pm on February 12 for reference. We continue to monitor the tendency of the temperature.

- The current temperature is 93.3℃ (at 1:00 pm of February 13) (reference)
- At 5:01 pm on February 12, we sampled the gas of the gas control system of Unit 2 Primary Containment Vessel. The density of Xenon 135 at the entrance of the system was below the detection limit (9.3×10^{-2}Bq/cm^3). Since it is below 1Bq/cm^3, which is the threshold for judging re-criticality, we confirmed the reactor didn't go re-critical.
- Since we confirmed a change in the amount of water injection to the Unit 2 nuclear reactor, at 7:30 pm on February 12, we changed the amount of the water injection from the feed water system from 7.1m^3/h to 7.5m^3/h and water injection from the core spray system from 10.0m^3/h to 9.9m^3/h.
- Since we confirmed a change in the amount of water injection to the Unit 2 nuclear reactor, at 9:50 am on February 13, we changed the amount of the water injection from the feed water system from 7.0m^3/h to 7.5m^3/h (water injection from the core spray system maintained at 9.9m^3/h).
- We investigated the thermometer in the lower part of the RPV of Unit 2 from 2:02 pm to 2:54 pm on February 13. Through the investigation, we consider the device seems to be damaged due to possible breaking of wire, as the higher DC resistance value than normal was measured when investigated the electric circuit. The thermometer after the investigation indicated 342.2℃ (Reference value). After that we investigated the soundness of the thermometer, and confirmed that it was damaged. Therefore, at 2:00 pm on February 17, we judged that the temperature at the bottom of PCV was not actually increasing, and we corrected the judge of the deviation from the conditions of operations stipulated in the management of facilities retrospectively back from February 12. We also excluded this device from the items to be monitored for the temperature at the bottom of PCV stipulated in the Reactor Facility safety Regulation, and we decided to monitor the temperature using other devices.
- *1) Based on the management of facilities stipulated at the Article 12 "Mid-term safety securing" of Act of the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors, it provides "Operational Limit" and "measures required in the case that does not satisfy the Operational Limit", it is required to respond based on the measures required in the case that does not satisfy the Operational Limit. In this case, in order to implement the preservation work, it was shifted to outside of operational limit condition [the rate of the increase in the water injection volume is less than 1.0m^3/h in any 24 hour period] as planned (from 1:55 pm on February 12), we change the water injection amount into the reactor of Unit 2. Later at 2:20 pm on February 17, we judged that the Operational Limit [the temperature at the bottom of PCV is below 80 °C] has been satisfied, and corrected the judge of the deviation from Operational Limit. We also lifted the application of the planned shift to the outside of operational limit condition.
- *2) Reactor Facility Safety Regulation provides necessary conditions such as the numbers of the permitted machines etc. or criteria of temperatures and pressures for securing multiple safety function for operating reactors and for keeping nuclear power stations stable and these are treated as conditions for operation. When there happen some malfunctions of equipment provided in the regulation and a nuclear power station can not clear the conditions temporarily, operators have to take

required countermeasures.

- At 12:00 pm on February 19, since we finished to check out noble gas monitoring of the PCV gas controlling system of Unit 2, we started operation(sampling data of noble gas) . At 3:30pm on February 19, we started continuous monitoring for the controlling system.
- With regard to the water injection volume for Unit 2 reactor, which was increased with temperature figure raising, we adjusted the original volume before temperature increasing (Feed water system: approx. 3.0m³/h, core spray system: approx. 6.0m³/h). At 6:40pm on February 19, we changed the water injection volume from core spray system from approx.10.0m³/h to 6.0m³/h (The water injection level from feed water system is continuing at approx. 7.6m³/h) At 7:19 pm on February 20, we changed the water injection volume from feed water system from approx.7.6m³/h to approx. 5.6m³/h (The water injection level from core spray system is continuing at approx. 6.0m³/h). As no abnormality has been observed in the variation of the plant parameter after the change in the flow rate on February 20, at 7:44 pm on February 21, we changed the water injection volume from feed water system from approx.5.5m³/h to approx. 4.0m³/h. At 8:17 pm on February 22, we changed the water injection volume from feed water system from approx.4.0m³/h to approx. 3.0m³/h (The water injection level from core spray system is continuing at approx. 6.0m³/h).). During our observing the plant parameter after the decreasing the flow rate of feed water system on February 22, we found that one thermometer in the lower part of the RPV (top of the lower head 135 °) indicated the different movement from others. From 0:21 pm to 2:48 pm on February 23, we investigated the concerned device. As the result of the measurement of DC resistance, we found no breaking wire and availability of the thermometer. But we confirmed that the DC resistance of it became higher than the previous measurement test data. We will evaluate the soundness of the concerned device and examine correspondence in future. We make sure no re-criticality state because there were no significant changes at the monitoring post and as the result of the sampling for the Gas Control System of the Unit 2, we confirmed that the concentration of Xe-135 was below the detectible limit. Through the investigation, we confirmed the concerned device is soundness. We submitted the report on the soundness of concerned device and the alternative method for monitoring temperature inside the Reactor of Unit 2 at Fukushima Daiichi Nuclear Power Station to NISA on March 1. We continue the observation of the concerned device.

  At 5:00 am on February 24, the temperature of the lower part of the RPV (top of the lower head)(135 °) : approximate 48.9 ℃ (approximate 41.7℃ at 5:00 am on February 23)
  At 11:00 am on Feb. 24: approx. 47.1℃ / At 5:00 am on Feb. 25: approx. 45.2℃
  At 11:00 am on Feb. 25: approx. 45.0℃ / At 5:00 am on Feb. 26: approx. 44.7℃
  At 11:00 am on Feb. 26: approx. 44.7℃ / At 5:00 am on Feb. 27: approx. 44.4℃
  At 11:00 am on Feb. 27: approx. 44.3℃ / At 5:00 am on Feb. 28: approx. 44.3℃
  At 11:00 am on Feb. 28: approx. 44.6℃ / At 5:00 am on Feb. 29: approx. 44.6℃
  At 11:00 am on Feb. 29: approx. 44.7℃ / At 5:00 am on Mar. 1: approx. 44.3℃
  At 11:00 am on Mar. 1: approx. 44.8℃ / At 5:00 am on Mar. 2: approx. 44.7℃
  At 11:00 am on Mar. 2: approx. 44.8℃ / At 5:00 am on Mar. 3: approx. 44.9℃
  At 11:00 am on Mar. 3: approx. 44.5℃ / At 5:00 am on Mar. 4: approx. 43.9℃
  At 11:00 am on Mar. 4: approx. 43.7℃ / At 5:00am on Mar. 5: approx. 43.4℃
  At 11:00 am on Mar. 5: approx. 43.2℃ / At 5:00 am on Mar. 6: approx. 42.5℃
  At 11:00 am on Mar. 6: approx. 42.3℃ / At 5:00 am on Mar. 7: approx. 42.5℃
  At 11:00 am on Mar. 6: approx. 42.4℃ /At 5:00 am on Mar. 8: approx. 42.4℃
  At 11:00 am on Mar.8: approx. 42.0℃ / At 5:00 am on Mar. 9: Approx. 41.8℃
  At 11:00 am on Mar. 9: approx. 41.7℃/ At 5:00 am on Mar. 10: Approx. 41.9℃
  At 11:00 am on Mar. 10: approx. 41.7℃/ At 5:00 am on Mar. 11: Approx. 41.4℃
  At 11:00 am on Mar. 11: Approx. 41.2℃/ At 5:00 am on Mar. 12: Approx. 42.0℃
  At 11:00 am on Mar. 12: Approx. 42.3℃/ At 5:00 am on Mar. 13: Approx. 39.9℃
  At 11:00 am on Mar.13: Approx. 39.5℃/ At 5:00 am on Mar. 14: Approx. 39.5℃
  At 11:00 am on Mar.14: Approx. 39.7℃/ At 5:00 am on Mar. 15: Approx.40.6℃
  At 11:00 am on Mar.15: Approx. 40.4℃/ At 5:00 am on Mar.16: Approx. 40.8℃
  At 11:00 am on Mar.16: Approx. 40.9℃/ At 11:00 am on Mar.17: Approx. 40.9℃

(Reference)

- At 5:00 am on February 24, the temperature of the lower part of the RPV (top of the lower head)(270 °) : approximate 38.1 ℃ (approximate 35.9℃ at 5:00 am on February 23)
  At 11:00 am on Feb. 24: approx. 38.5℃ / At 5:00 am on Feb. 25: approx. 39.5℃
  At 11:00 am on Feb. 25: approx. 39.8℃ / At 5:00 am on Feb. 26: approx. 40.3℃
  At 11:00 am on Feb. 26: approx. 40.5℃ / At 5:00 am on Feb. 27: approx. 40.7℃
  At 11:00 am on Feb. 27: approx. 40.7℃ / At 5:00 am on Feb. 28: approx. 40.8℃
  At 11:00 am on Feb. 28: approx. 40.9℃ / At 5:00 am on Feb. 29: approx. 40.9℃
  At 11:00 am on Feb. 29: approx. 41.1℃ / At 5:00 am on Mar. 1: approx. 41.0℃
  At 11:00 am on Mar. 1: approx. 41.1℃ / At 5:00 am on Mar. 2: approx. 41.4℃
  At 11:00 am on Mar. 2: approx. 41.6℃ / At 5:00 am on Mar. 3: approx. 41.7℃
  At 11:00 am on Mar. 3: approx. 41.5℃ / At 5:00 am on Mar. 4: approx. 41.1℃
  At 11:00 am on Mar. 4: approx. 41.0℃ / At 5:00am on Mar. 5: approx. 40.8℃
  At 11:00 am on Mar. 5: approx. 40.7℃ / At 5:00 am on Mar. 6: approx. 40.4℃
  At 11:00 am on Mar. 6: approx. 40.3℃ / At 5:00 am on Mar. 7: approsx. 40.3℃
  At 11:00 am on Mar. 7: approx. 40.3℃ /At 5:00 am on Mar.8: approx. 40.3℃
  A t 11:00 am on Mar. 8: approx. 40.3℃/ A t 5:00 am on Mar. 9: approx. 40.3℃
  A t 11:00 am on Mar. 9: approx. 40.2℃/ A t 5:00 am on Mar. 10: approx. 40.3℃
  A t 11:00 am on Mar. 10: approx. 40.1℃/At 5:00 am on Mar. 11: Approx. 40.1℃
  At 11:00 am on Mar. 11: Approx. 40.1℃/At 5:00 am on Mar. 12: Approx. 40.1℃
  At 11:00 am on Mar. 12: Approx. 40.1℃/ At 5:00 am on Mar. 13: Approx. 40.3℃
  At 11:00 am on Mar. 13: Approx. 40.3℃/ At 5:00 am on Mar. 14: Approx. 40.6℃
  At 11:00 am on Mar. 14: Approx. 40.6℃/ At 5:00 am on Mar. 15: Approx. 40.8℃
  At 11:00 am on Mar. 15: Approx. 40.9℃/ At 5:00 am on Mar. 16: Approx. 41.1℃
  At 11:00 am on Mar. 16: Approx. 41.2℃/ At 11:00 am on Mar. 17: Approx. 41.3℃
- At 10:15 am on February 25, as the amount of water injected to reactor of Unit 2 decreased we changed the water injection volume from the reactor feed water system from approx.2.6 m³/h to approx. 3.0m³/h (the core spray system stays the same: approx.6.0m³/h)
- At 6:20 pm on March 2, since the flow rate of the water injected to the reactor was dropped, we adjusted the water injection amount from the reactor feed water system from approx. 2.6 m^3/h to approx. 3.0 m^3/h and that from the core spray system from approx. 5.7 m^3/h to approx. 6.0 m^3/h.
- Since the temperature measured by a RPV thermometer (at the upper part of RPV supporting skirt junction 270 °) was increasing, we surveyed the thermometer during 11:08 am to 11:23 am on March 2, and found the DC resistance increasing. In order to check the reliability of it, we examined the trend of the temperature. As a result, at 11:00 pm on the same day, we decided to exclude it from the monitoring meters stipulated by the Safety Regulations, and to keep monitoring the valued it shows as a reference. The reactor is kept being cooled, and the concentration of Xenon 135 measured by the noble gas monitor of Unit 2 PCV gas control system was below the detection limit, meaning that the concentration is below 1 Bq/cm^3, which is the threshold of re-critical condition. Therefore, we consider it hasn't gone re-critical. We will keep monitoring the temperature at the bottom of PCV using other devices.
- At 9:45 am on March 19, we started increasing nitrogen injection to the reactor from approx. 2.5m³/h to 3.0m³/h due to preparation of investigation on the inside of Unit 2 reactor (The injection amount to core spray system is still approx. 6.0 m³/h).
- At 9:55 am on April 9, changing the amount in water injection to the reactor was confirmed and we adjusted water injection from the reactor feed water system from approx 2.8 m^3/h to 3.0 m^3/h, and water injection from the core spray system from approx. 6.5 m^3/h to 6.0 m^3/h.

< Water injection to Spent Fuel Pool>

※Timely injection of hydrazine is implemented.

< Cooling of spent fuel pool by alternative system>

※Formal operation is carried out from May 31, 2011.

- At approximately 4:10 pm on January 17, 2012, due to the trouble of switching facilities at the Minami-iwaki switching station, the Yonomori line 1 and 2 instantaneously turned to off. The spent fuel pool Alternative Cooling system stopped its operation due to the event. Later, after confirming that there was no significant problem over the stopped facility, we started their operation at 4:53 pm on the same day. There is no significant change for the major parameters which have resulted from the event. Afterwards, water flow difference turned to be normal figure and we considered the cause is stuck of dust in the pipe of flow sensor. From 1:46 pm to 2:38 pm on February 20, we conducted flashing of pipes of flow sensor. During flushing, the system was not suspended and there are no abnormalities on operation after flushing.

- At 10:31 am on March 13, because the suction pressure of the primary system Circulating Water Pump had a tendency to decrease in the spent fuel pool Alternative Cooling system, we stopped the cooling of spent fuel pool in order to change the primary system Strainer to manual cleaning system and conduct the check of valves etc. until March 16. The temperature rise on this period is expected approx. 21 ˚C. (Temperature of water in spent fuel pool when we stopped: approx. 14.1 ˚C). After we completed the works, at 1:12 pm on March 16, 2012, we restarted the cooling process (temperature of the pool at this point was 24.9℃).

<Desalting of Spent Fuel Pool>

- At 11:50 am on January 19, 2012, we started the operation of the spent fuel pool desalting facility since no problem was found as a result of trial operation.
- At 2:17 pm on January 24, at the desalting facility of the spent fuel pool of Unit 2, an emergency alarm of “RO unit warning” activated, and the system stopped automatically. We are currently checking for cause of the alarm. All of the separation valves of the system were closed by the inter-lock, and the alternative cooling system continues operation. Therefore, there is no influence on cooling, In addition, as a result of the on-site confirmation, no leakage of liquid was confirmed.
- At 3:40 pm on January 25, we found there are no abnormalities by resuming the device. Since we could not detect the cause of the alarm warming although we think it resulted from the filter clogging, we continuously monitor the progress.
- At 10:56 pm on February 4, “Abnormal state (low pressures) in suction pressure of RO high pressure pump“ triggered the alarm in the desalting facility for spent fuel pool of Unit 2, and the facility automatically stopped. Because all isolation valves of the system have been closed due to the interlock and the alternative cooling system for spent fuel pool is continuously operated, it does not affect the cooling for the spent fuel pool. In addition, as a result of site check, it was confirmed that any leakage from the facility was not found. At 5:35 pm of February 5, the operation of the system was resumed and no abnormality was confirmed. Also, there was no abnormality regarding the RO high pressure pump. We will monitor it continuously.
- At around 5:00 am on February 8, the alarm of “abnormally low suction pressure of the high pressure RO pump” in the desalination apparatus for the Unit 2 spent fuel pool went off, and the its operation was automatically stopped. The interlock arrangement closed all the isolation valves in the system, and the alternative cooling system for the spent fuel pool continues its operation. Therefore, there is no impact on the cooling. We also confirmed by the site investigation that there was no leakage from the apparatus.
- Due to the investigation afterwards we assumed that an instantaneous fall in the pressure had caused this shut down. After we confirmed that certain measures have been taken to prevent this we restarted the operation at 3:20 pm of February 18, but at 7:05 pm on the same day another alarm which indicates that the difference of the water flow between the entrance and the exit of the primary line pump of the substitutive cooling system of the spent fuel pool of unit 2 went off and the system shut had down automatically. Due to this the desalting facility has also shut down, but later we reactivated the system and at 10:44 am on February 19 we restarted the operation of the desalting facility.
- At 7:05 am on February 18, within the Unit 2 SFP alternative cooling system, an alarm sounded showing that the water flow difference was large at the gateway of primary system pump and the system automatically shutdown. After that, we confirmed there was no abnormalities such as leakage at the location where the primary system shutdown. However, as temperature decreased in the outer

temperature, the secondary system cooing water temperature also decreased and it may freeze, with a view toward facility protection, we resumed it so as to prevent the primary and secondary system from freezing. Upon resumption, we made sure there was no leakage or parameter abnormalities, and by releasing the alarm at 11:54 pm on February 18, we activated the system. Since we do not see any abnormalities, operation of the system is still continuing.

- At 1:25 pm on March 6, 2012, the spent fuel pool desalting facility was stopped automatically because of an alert caused by increase of water level of waste water treatment tank. All Isolation valves of desalting facilities were closed by the interlock, and the alternative cooling system continues operation. Therefore, there is no influence on cooling. In addition, as a result of the on-site confirmation, no leakage of liquid was confirmed. According to our investigation, we confirmed that the increase of the water level had occurred because of the water supply to the waste water treatment tank exceeded the drainage volume, after the treated water by the reverse osmosis membrane unit of the facility continued to increase because of the purification of the water supplied to the facility had proceeded. At 4:04 pm on March 7, we restarted the facility and conducted a test operation, and as there was no problem, we started regular operation at 5:06 pm on the same day.
- At 9:23 am on April 2, a reduction in the salt concentration of Unit 2 SFP was confirmed and thus we shutdown the desalination apparatus.
- At 10:06 am on April 12, we started the operation of an ion exchange membrane device

<Draining water from the underground floor of the turbine building>

- At 9:30 am on January 5 2012, we started transferring accumulated water from the ground floor of the turbine building of Unit 2 to the Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building] and the Process Main Building) . At 9:27 am on January 8, we stopped the transferring.
- At 9:47 pm on January 8, 2012, we started transferring accumulated water from the basement of the turbine building of Unit 2 to the Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building] and the Process Main Building) . At 8:05 am on January 9, we stopped the transferring.
- At 9:51 pm on January 9, 2012, we started transferring accumulated water from the basement of the turbine building of Unit 2 to the Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building] and the Process Main Building) . At 7:57 am on January 10, we stopped the transferring.
- At 8:17 am on January 10, 2012, we started transferring accumulated water from the basement of the turbine building of Unit 2 to the Centralized Radiation Waste Treatment Facility (the Process Main Building). At 3:21 pm on January 11, we stopped the transfer.
- At 3:45 pm on the same day, we started transfer of the accumulated water from the basement of the Unit 2 turbine building to the centralized radiation waste treatment facility (the miscellaneous solid waste volume reduction treatment building [the high temperature incinerator building] and the process main building). At 8:02 am on January 12, we stopped the transfer.
- At 9:55 am on January 12, we started transferring accumulated water from the basement floor of the turbine building of Unit 2 to the Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building] and the Process Main Building). At 7:58 am on January 13 we stopped this transfer.
- At 2:46 pm on January 13, we started transferring accumulated water from the basement floor of the turbine building of Unit 2 to the Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building] and the Process Main Building). At 8: 07 am on January 14, transfer was stopped.
- At 2:57 pm on January 15, we started transferring accumulated water from the

basement floor of the turbine building of Unit 2 to the Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building] and the Process Main Building). At 2:10 pm on January 17, we stopped the transfer.

- - At 3:23 pm on January 20, we started transferring accumulated water from the basement of T/B, Unit 2 to the Central Radioactive Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]).
- At 7:02 am on January 21, a worker from the cooperating company found water leakage from the transfer piping at the large equipment hatch, T/B, Unit 4. We checked the work site and observed water leakage from a flange of the piping to a valve unit. Part of water dripped to the floor outside of the valve unit. At 7:48 am on the same date, we stopped the transfer pump for the accumulated water. At 7:55 am, we confirmed that the dripping of water stopped. The water was within the T/B and there was no leakage to outdoor, no leakage to the sea. The volume of water dripped to the floor of T/B was approx 2 liters. The surface dose rate was 0.1mSv/h. We believe that this was not high density contaminated water. The location of the leak was at a flange of newly installed piping. After installation of the piping, we checked leakage using water at the vertical pit, Unit 1*. We estimate that that water was pushed out and dripped to the floor. After that, from 1:58 pm to 2:49 pm, we conducted flushing of the transfer piping and confirmed that there was no leakage. Regarding the cause of the leakage, we estimate that shielding material over the hose became load to the connection part and it lost the sealing characteristics, and then it reached leakage. The shielding material over the hose was removed. On January 22, after we conducted replacement of the hose and leakage check, at 2:33 pm, we started transferring accumulated water to the Central Radioactive Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]). At 10:02 am on January 24, we stopped the transfer.

  * water at the vertical pit, Unit 1: we estimate that this was a mixture of seawater and rainwater. The measurement result on January 14 was as below:

  (I-131: below detectable limit [1.7×10^{-2}Bq/cm^3], Cs-134: 1.8×10^{-1}Bq/cm^3, Cs-137: 2×10^{-1}Bq/cm^3)

- At 3:36 pm on January 24, we started transferring the accumulated water from the basement of the turbine building of Unit 2 to the centralized radiation waste treatment facility (miscellaneous solid waste volume reduction treatment building [high temperature incinerator building] and process main building) At 8:53 am on January 25, we stopped transferring.
- At 9 :42 pm on January 25, we transferred the accumulated water from the basement of T/B, Unit 2 to the Centralized Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building] and Process Main Building). At 8:13 am on January 26, the transfer was paused.
- At 9:44 pm on January 26, we started transfer of the accumulated water from the basement of the turbine building of Unit 2 to the Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Facility]).

  At 8:14 am on January 27, we stopped it.
- At 9 :51 pm on January 27, we started to transfer the accumulated water from the basement of T/B, Unit 2 to the Centralized Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building] and Process Main Building). At 8:29 am on January 28, the transfer was paused.
- At 10:12 pm on January 28, we started transferring accumulated water from the basement floor of the turbine building of Unit 2 to the Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building] and the process main building). At 8:21 am of January 29 we have stopped this transfer.
- At 9:45 pm on January 29, we started transferring accumulated water from the basement of Unit 2 turbine building to Centralized Radiation Waste Treatment

Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building] and Process Main Building), and at 8:19 am on January 30, we stopped the transferring.

- At 4:05 pm on January 30, we started to transfer the accumulated water from the basement of T/B, Unit 2 to the Centralized Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building] and Process Main Building) through newly installed polyethylene pipes and stopped the transfer at 10:20 am on February 3.
- At 4:07 pm on February 3, we started to transfer accumulated water from the basement of Unit 2 T/B to Central Radioactive Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building (High Temperature Incinerator Building)). At 8:47 am on February 6, the transfer was stopped.
- At 2:14 pm on February 7, 2012, we started transferring the accumulated water from the basement of turbine building of Unit 2 to Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]). We stopped the transfer at 8:21 am on February 10, 2012.
- At 2:43 pm on February 10, we started to transfer accumulated water from underground floor of turbine building of Unit 2 to centralized radiation waste treatment facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]).
- At 9:17 am on February 20, due to switching the transfer pumps, we transferred the accumulated water at the basement of Unit 2 Turbine Building to Centralized Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]) stopped. At 9:39 am on February 20, the transfer restarted. At 8:28 am on February 23, the transfer stopped.
- According to the investigation on trenches on January 19, 2012, high density contaminated water inside was found inside circulating water pump discharge valve pit of Unit 2 water pump room Therefore, at 10:11 am on February 20, 2012, we started transfer of the accumulated water from the pit to the basement of Unit 2 Turbine Building. At 5:11 pm on the same day, we stopped the transfer. At 9:50 am on February 21, we started the transfer. At 3:34 pm on the same day, we stopped the transfer. We restarted the transfer at 9:43 am and stopped it at 3:58 pm on February 22.
- At 2:04 pm on February 23, we started to transfer accumulated water from underground floor of turbine building of Unit 2 to the centralized radiation waste treatment facility (process main building). At 1:51 on February 26, the transfer stopped.
- At 2:04 pm on February 26, from the Unit 2 Turbine Building basement towards the Centralized Waste Treatment Facility [Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]), transfer of the accumulated water started. At 10:37 am on February 27, we stopped transferring.
- At 10:50 am, on February 27, we started transferring accumulated water from basement of unit 2 turbine building to Centralized Radiation Waste Treatment Facility (Process Main building). At 1:41 pm on February 28, we stopped transfer due to switching of the transfer pump. At 2:00 pm on the same day, we restarted the transfer. At 10:09 am on March 5, we stopped transfer.
- At 1:55 pm on March 7, we started transferring accumulated water from the basement of Turbine Building of Unit 2 to Centralized Waste Treatment Facilities (Process Main Building) At 8:30 on March 11, we stopped transferring.
- At 8:47 am on March 11, we started transferring accumulated water from the basement of Turbine Building of Unit 2 to the centralized radiation waste treatment facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]). At 10:13 am on March 18, we stopped transfer.
- At 10:13 am on March 18, 2012, we started transferring the accumulated water from the basement of Turbine Building of Unit 2 to the centralized radiation waste treatment facility process main building. At 9:48 am on March 20, we stopped the transfer.
- At 10:14 am on March 20, we started transferring the accumulated water from the

basement of Turbine Building of Unit 2 to the centralized radiation waste treatment facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]). At 9:43 am on April 6, we finished the transferring.

- At 10:08 am on April 6, we started transferring of accumulated water from the basement of Unit 2 T/B to Centralized Radiation Waste Treatment Facility (Process Main Building). At 9:21 am on April 9, we stopped transferring.
- At 9:26 am on April 11, we started transferring of accumulated water from the basement of T/B of Unit 2 to the Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]). At 10:04 am on April 13, we stopped transferring.
- At 10:29 am on April 13, we started transferring of accumulated water from the basement of T/B to the Centralized Radiation Waste Treatment Facility (Process Main Building). At 3:04 pm on April 14 we stopped the transfer.
- At 3:27 pm on April 14, we started transferring of accumulated water from the basement of T/B to the Centralized Radiation Waste Treatment Facility (Process Main Building).

<Injection of nitrogen for primary containment vessel and reactor pressure vessel >

- At 12:33 pm on January 6, 2012, in order to decrease amount of steam generated as well as pressure in PCV in preparation for inner inspection for PCV, amount of nitrogen injection to PCV was adjusted from approx. $10Nm^3/h$ to approx. $13Nm^3/h$. Also, at 1:26 pm, exhaust amount from PCV gas management system was adjusted from approx. $30Nm^3/h$ to approx. $35Nm^3/h$.
- At 10:10 am on January 11, due to the preparation of inspection of the Primary Containment Vessel(PCV) of Unit 2, we adjusted the amount of nitrogen injected to the PCV from $13m^3/h$ to 10m3/h to reduce the pressure of the inside.
- At approximately 4:10 pm on January 17, 2012, due to the trouble of switching facilities at the Minami-iwaki switching station, the Yonomori line 1 and 2 instantaneously turned to off. The nitrogen injection facility and the gas management system of Primary Containment Vessel stopped its operation due to the event. Later, after confirming that there were no significant problem over the stopped facilities, we started the operation of nitrogen injection facility at 4:57 pm and that of the gas management system of Primary Containment Vessel at 5:25 pm on the same day. There is no significant change for the major parameters which have resulted from the event.
- From 10:21 am to 12:35 pm on February 9, for the reliability improvement of nitrogen injection, we are working for installing additional flow meter to the nitrogen injection line of the Primary Containment Vessel (PCV) of Unit 2. Although we suspended the injection temporarily, there is no significant change of the parameter.

* In the Chapter 12 of Nuclear Reactor Facilities Security Regulation "The Way of Ensuring Mid-term Security", as the treatments like "Operational limitation" or "Measures required in case of not satisfying the operational limitation" are determined, it is supposed the operator act per the required measures if it fails to satisfy the operational limitation. This time, to implement maintenance works, we suspended the nitrogen injection into the PCV of Unit 2 (from 10:21 am on February 9 to 12:35 pm on February 9) by conducting a planned shift beyond the range of operational limitation.

- At around 11:47 am on March 12, our staff confirmed by over current alarm of fan motor of compressor at the site, that the nitrogen supply equipment (nitrogen gas separator A), which supplied nitrogen to the PCVs and the RPVs of Unit 1-Unit 3, stopped. At 12:09 pm on the same day, we started the waiting nitrogen supply equipment (nitrogen gas separator B) and at 12:19 pm, nitrogen injection started again. Regarding the pressure of PCVs of Unit 1 – Unit 3 and hydrogen density, we did not confirm any significant fluctuation (hydrogen density of Unit 3 is monitored as reference data because the PCV gas control system is now under test operation).
- At 10:33 am on March 19, we started decreasing nitrogen injection to the reactor from approx. 10 m^3/h to 5 m^3/h due to preparation of investigation on the inside of Unit 2 reactor (There was no change in the injection amount to reactor pressure

vessel).

- At 11:20 am on March 22, the volume of nitrogen included into PCV was changed from 5 m^3/h to 0 m^3/h (No change of nitrogen included into the RPV).
- At 12:10 pm on March 27, the amount of injected nitrogen into the PCV was adjusted from 0 m^3/h to approx. 5 m^3/h as the internal investigation of the Unit 2 PCV was finished.
- At around 10:55 am on April 4, a TEPCO employee found the measurement flow volume of the nitrogen injection line to PCV of Unit 1-3 and RPV was 0 m^3/h at the Seismic Isolated Building. When we checked the equipment, we found the nitrogen supply system (nitrogen/gas separator B) was stopped due to failure alert of compressor. After that, at 12:16 pm on the same day, we started a stand-by nitrogen supply system (nitrogen/gas separator A) and we restarted the nitrogen supply to PCV of Unit 1-3 and RPV at 12:29 pm. No significant changes of pressure of PCV of Unit 1-3 and density of hydrogen were confirmed.
- At 1:00 am on April 13, 2012, a TEPCO employee found the measurement flow volume of the nitrogen injection line to PCV of Unit 1-3 and the pressure decreased. At 1:04 am, we checked on the site. And at 1:30 am, we found the nitrogen supply system (nitrogen/gas separator B) was stopped due to failure alert of compressor. At 3:10 am, we started a stand-by nitrogen gas separator and we restarted the nitrogen supply to PCV of Unit 1-3 and RPV at 3:46 am. As for stopped nitrogen/gas separator B, at 4:20 am, we started nitrogen injection from nitrogen/gas separator B. After separating the suction filter which was assumed as the cause, at 9:25 am, we stopped the operation of a stand-by nitrogen gas separator since no problem was found as a result of trial operation with regard to separator and compressor. We continue nitrogen injection with nitrogen supply system B. No significant changes of pressure of PCV of Unit 1-3 and density of hydrogen are confirmed.
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<Installation of gas controlling system of primary containment vessel>

- At around 3:43pm on February 20, we observed that an error message was displayed in the screen of the noble gas monitoring system B of the gas management system of the primary containment vessel of Unit 2. Accordingly, the density of the noble gas in the system B was no longer observable at the Central Monitoring Station in the Main Anti-Earthquake Building. Observation was continued using the system A, one of the two systems A and B, which did not display any error message. However, at around 5:20pm on February 21, the same error message was displayed in the screen of system A. As a result, the density of the noble gas was no longer observable at Central Monitoring Station in the Main Anti-Earthquake Building. After investigating the situation at the site, we detected a failure of the transmission system which connects the site and the Central Monitoring Station in the Main Anti-Earthquake Building. However, there is no difficulty in confirming the subcriticality, as both the system A and B can be observed from the monitor at the site and, at the moment, the monitor screen can be remotely watched from the Central Monitoring Station in the Main Anti-Earthquake Building. The cause of the failure is now being investigated for restoration. The gas management system of the primary containment vessel of Unit 2 itself is in normal operation. After we revised software for the transmission system for B system on March 9 and A system on March 12, the monitoring from the Main Anti-Earthquake Building became available. Since 2:00 pm on the same day, we restarted data sampling at the Central Monitoring Station in the Main Anti-Earthquake Building.

<Primary containment vessel gas sampling>

- On January 4, 11, 18, 25, and February 1, 12～17, 22, 29, and March 7, 14 ,21, 28, April 3 and 13, we conducted sampling of the gas of the PCV gas management system. As a result of the analysis, we confirmed that at the entrance of the system Xenon 135 was below detection limit, and below the re-criticality criterion which is 1Bq/cm^3.
- On January 13, and February 6, 13, and March 7, and April 3 and 13, we conducted

sampling of the charcoal filter and particulate filter of Unit 2 PCV gas control system.

<Reactor building dust sampling>

- On January 13, and February 6, 13, and March 7, April 3 and 13, we conducted the dust sampling at the open part of the Reactor Building (Blowout panel).

<Others>

- From approx. 9:00 am to 10:10 am on January 19, we conducted insight survey and ambient temperature survey of Primary Containment Vessel of Unit 2 by using endoscope. Regarding insight survey, due to high humidity and influence of noise by water drop or radioactivity, clear visual image could not be confirmed, however we confirmed inner wall of Primary Containment Vessel and piping around the camera etc. And from the result of ambient temperature survey, we got the result of almost same ambient temperature as usual measure.
- From 9:40 am to 12:30 pm on March 26, the water level and water temperature inside the PCV of Unit 2 was investigated with the industrial endoscope. As a result, the water level was confirmed to be 60 cm from the bottom of the PCV and the water temperature was confirmed to be in the range of approx. 48.5 ℃ to 50.0 ℃. Also from 9:30 am to 10:30 am on March 27, we conducted dose measurement of the atmosphere inside the PCV by penetrating dose meter through one of the penetration (X-53 penetration) of PCV to upper part of the grating. We confirmed that the dose rate of the atomosphere was 31.1-48.0Sv/h at the point where 50cm inserting to the center from the edge of the penetration, and 39.0-72.9Sv/h at the point where 1m inserting to the center from the edge.
- At around 9:00 pm on April 14, we confirmed that the servey thermometer showed a temperature rise (6.1 ℃ rise at a moment) at the bottom of the Reactor Pressure Vessel of Unit 2 (Upper part of the head of the bottom 135℃) . From 10:36 pm to 10:57 pm on the same day we conducted a direct current resistance test with this instrument to confirm the reliability of it. As a result, the direct current resistance had increased, and the instrument was judged as malfunction. At 12:20 am on April 15 2012, we delisted this instrument from the survey objects according to the safety regulations, and decided to use the shown figures as a reference. Other instruments have not shown any temperature rise and the monitoring post and the gas controlling system of the Primary Containment Vessel has not shown any unusual figures. We will continuously monitor the temperature of the bottom of the Reactor Pressure Vessel with other instruments.

【Unit 3】

<Water injection to the reactor>

- At 10:05 am on January 10, because of the replacement work of the water injection piping arrangement from the water feed system in association with the commissioning of reactor injection pump in Turbine Building of Unit 3, we have controlled the amount of injected water to the reactor gradually. The amount of injected water to the reactor of Unit 3 from the reactor feed water system was adjusted from approx. 3.0 m3/h to approx. 2.0 m3/h, and the amount from the core spray system was adjusted from approx. 6.0 m3/h to approx. 7.0 m3/h.
- At 10:18 am on January 11, because of the replacement work of the water injection piping arrangement from the water feed system in association with the commissioning of reactor injection pump in Turbine Building of Unit 3, we have controlled the amount of injected water to the reactor gradually. The amount of injected water to the reactor of Unit 3 from the reactor feed water system was adjusted from approx. 1.9 m^3/h to approx. 1.0 m^3/h, and the amount from the core spray system was adjusted from approx. 7.0 m^3/h to approx. 8.0 m^3/h.
- At 10:30 am on January 12, 2012, we adjusted the amount of the water injection from approx. 1 m^3/h to 0 m^3/h (the reactor feed water system), from approx. 8.2 m^3/h to approx. 9.0 m^3/h (the core spray system) in order to switch the injection pipe arrangement of the reactor feed water system for preparation for test operation of the reactor injection pump in the turbine building. At 11:00 am, we adjusted the amount of the water injection from approx. 0 m^3/h to 1 m^3/h (the reactor feed water system), from approx. 9 m^3/h to approx. 8 m^3/h (the core spray system) since the switch work was completed.

- As the switching of water injection system of the reactor feed water system for the preparation of test operation of the reactor injection pump in the turbine building was completed, water injection amount is adjusted by stages. At 11:13 am on January 13, 2012, we adjusted the water injection, from approx. 0.5m^3/h to approx. 2.0m^3/h for the reactor feed water system, and from approx. 8.3m^3/h to approx. 7.0m^3/h for the core spray system.
- At 7:04 pm on January 16, 2012, we adjusted the amount of the water injection from approx. 1.8 m3/h to approx. 2.0 m3/h through the reactor feed water system, from approx. 7.6 m3/h to approx. 7.0 m3/h through the core spray system since we confirmed volatility of the amount of the water injection into the Unit 3 reactor.
- At 9:43 am on January 18, 2012, related to the switch of water injection piping for reactor injection pump on the hill, we changed the amount of the water injection from approx. 1.9 m3/h to approx. 3.0 m3/h through the reactor feed water system, from approx. 7.5 m3/h to approx. 6.0 m3/h through the core spray system regarding the water injection to Unit 3.
- At 10:20 am on January 19, 2012, in order to switch injection piping of reactor injection pump on the hill of Unit 3, gradual adjustment of the amount of water injection to the reactor has been made. Injection amount from the reactor feed water system is adjusted from approx. 3.0 m^3/h to approx. 4.0 m^3/h. Also, injection amount from the core spray system is adjusted from approx. 6.0 m^3/h to approx. 5.0 m^3/h.
- At 11:15 am on January 20, 2012, regarding water injection into the reactor, in order to switch the water injection piping for reactor injection pump on the hill, we adjusted the amount of water injection gradually. We adjusted the amount of the water injection from approx. 4.2 m^3/h to approx. 5.0 m^3/h through the reactor feed water system, from approx. 6.0 m^3/h to approx. 5.0 m^3/h through the core spray system.
- In order to switch piping of reactor injection pump on the hill, we have been intergrading the water injection rate to the reactor, we adjusted the rate of water injection through feeding water system from approx.5.0 m^3/h to approx.6.0m^3/h, through core spray system from approx.3.9m^3/h to 3.0m^3/h at 10:13 am on January 23.
- At 10:38 am on January 24, the amount of water injected into the reactor from the reactor feed water system was adjusted from approx. 6.0m^3/h to approx. 7.0 m^3/h and the amount of water injected from the core spray system was adjusted from approx. 2.9 m^3/h to approx. 2.0 m^3/h.
- At 10:52 am on January 25, we changed injection water amount to the reactor of Unit 3 for switching piping arrangement of reactor injection pump on the hill. We changed the water injection amount to the reactor gradually, and the water from the reactor feed water system changed from approx. 7.1m3/h to approx. 8.0m3/h, and the water from the core spray system changed from approx. 1.8m3/h to approx. 1.0m3/h.
- For the reliability enhancement of water injection into the reactor, the water discharge line of the reactor water injection pump on the hill is planned to be changed from pressure hose to polyethylene pipe. Therefore, there is the necessity of the temporary stopping of water injection from the reactor water injection pump for it. At 11:50 am January 26, the water injection to the reactor of Unit 3 from the feed water injection system was switched from the reactor water injection pump to the reactor water injection pump in the turbine building. At 9:14 am on January 27, the volume from the feed water system increased from approx. 8.5 m^3/h to approx. 8.9 m^3/h, and the volume from the reactor core spray system decreased from approx. 1.0 m^3/h to 0 m^3/h. At 3:01 pm on January 27, the water injection to the reactor of Unit 3 from the feed water injection system was switched from the reactor water injection pump in the turbine building to the reactor water injection pump on the hill. At 3:11 pm on January 27, the volume from the feed water system decreased from approx. 8.9 m^3/h to approx. 7.9 m^3/h, and the volume from the reactor core spray system increased from approx. 0 m^3/h to 1.0 m^3/h. At 2:02 pm on January 28, the volume from the feed water system decreased from approx. 8 m3/h to approx. 7 m3/h, and the volume from reactor core spray system increased from approx. 0.5 m3/h to approx. 2 m3/h.

- At 10:00 am on January 29, since we confirmed decrease in water injection to the reactor of Unit 3 we adjusted water injection from the reactor core spray system from approx. 1.5 m^3/h to 2.0m^3/h. (water injection from the feed water system is maintained at approx. 7.1 m^3/h.)
- Because we completed the replacement of water injection line of water injection pump located on upland with polyethylene pipes following the reliability improvement of water injection to the reactors, we have changed the amount of water injection to the reactors in a step-by-step manner. At 10:14 am on January 30, for the amount of water injection to Unit 3's reactor, we change d the amount of water injection from water feeding system from approximately 7.1m^3/h to approximately 6.0 m^3/h and that from Core Spray System from approximately 1.9 m^3/h to approximately 3.0 m^3/h. At 11:00 am on the same day, we adjusted the volume to the reactor through the feed water system from approx. 6.2 m^3/h to approx. 5.0 m^3/h, and the volume from the reactor core spray system from 2.8 m^3/h to approx. 4.0m^3/h. At 11:50 am on February 1, the water injected into the reactor from the reactor feed water system was adjusted from approx. 5.0m^3/h to approx. 4.0 m^3/h and the amount of water injected from the core spray system was adjusted from approx. 4.0 m^3/h to approx. 5.0 m^3/h.
- At 11:10 am on February 2, we adjusted water injection volume to the reactor of Unit 3 through the feed water system from approx. 3.8 m^3/h to approx. 3.0 m^3/h, and the volume from the reactor core spray system from approx. 5.2 m^3/h to approx. 6.0m^3/h.
- We confirmed the decrease in volume of injecting water to reactors, so at 3:15 pm on February 2, we adjusted volume of water injection in each reactor as follows:

  Feed water system from approx. 2.5 m^3/h to approx. 3.0 m^3/h,

  Reactor core spray system from approx. 5.2 m^3/h to approx. 5.5m^3/h.
- At 7:20 pm on February 3, As we confirmed a change in water injection amount into the reactor, we adjusted water injection amount through reactor core spray system from approx. 5.5 m^3/h to 6.0 m^3/h (water injection amount through feed water system keeps at approx. 3.0 m^3/h).
- At 10:05 am on February 10, 2012, because the decrease of the volume of injected water to the Unit 3's reactor, we adjusted the injected water volume from reactor feed water system from approx. 2.7 m^3/h to approx. 3.0m^3/h (we have kept the injected water volume from Core Spray System at approx. 6.0 m^3/h).
- At 11:33 on February 17, we reduced the water injection rate to Unit 3 by the core spray system from approx. 6.0m^3/h to approx. 5.0m^3/h in order to transfer the accumulated water increased due to the increase of the water injection rate to Unit 2 as well as to reduce the burden of the water treatment, seeing that we had some margins in the volume of water injection at that time against the rate equivalent to the delay heat. We also adjusted the water injection rate from the feed water system, which was fluctuating, from approx. 2.9 m^3/h to approx. 3.0 m^3/h.
- At 9:57 am on February 19, we changed the water injection volume by feed water system from approx. 3.0 m^3/h to 2.0 m3/h. (The water injection level from reactor core system is continuing at 5.0 m^3/h.)
- At 10:05 am on February 24, as the change in the injected water amount was observed, the injected water amount was adjusted from approx. 1.6m^3/h to 2.0m^3/h in the feed water system and from approx. 5.2m^3/h to 5.0m^3/h in the core spray system.
- At 10:56 am on March 3, as the change in the injected water amount was observed, the injected water amount was adjusted from approx. 1.5m^3/h to 2.0m^3/h in the feed water system and from approx. 5.2m^3/h to 5.0m^3/h in the core spray system.
- At 9:53 am on March17, fluctuation was observed for the water injecting into the reactor of Unit 3, we changed rate of water injection from approx. 1.8m^3/h to approx. 2.0 m^3/h for feed water system and from approx. 5.6 m^3/h to approx. 5.0 m^3/h for core spraying system respectively.
- At 10:01 on April 1, a change in the amount of water injected into the reactor was observed and thus we adjusted the water injected from the feed water system by increasing from 1.8 m^3/h to 2.0 m^3/h, and that injected by the reactor core spray system by increasing from 4.9 m^3/h to 5.0 m^3/h, respectively.

<Water injection to Spent Fuel Pool>

※Timely injection of hydrazine is implemented.

<Alternative cooling of Spent Fuel Pool>

※Formal operation is carried out from July 1, 2011.

- At 9:56 am on January 4, 2012, we restarted to operate the alternative cooling system of spent fuel pool. After restarting, we will implement flushing of strainer with consideration of the suction pressure of the primary system circulating pump.
- Since the suction of the primary circulating pump of the spent fuel pool substitute cooling system of Unit 3 was continuously low, at 11:46 am on January 5 2012, we stopped the pump and temporarily suspended the cooling of the spent fuel pool to replace the strainer at the entrance of this system. (Temperature at the time of suspension: 23.7℃) After that, since we finished the replacing the strainer, at 4:27 pm on January 7, we restarted the pump and the cooling of the spent fuel pool and confirmed restoring the suction of the pump. (Current Temperature: 27.5℃)

At 9:35 am on January 12, we stopped the Unit 3 spent fuel pool alternative cooling system in order to install the radioactive materials removal equipment in the Unit 3 spent fuel pool. After we completed the installation of the instruments, at 4:46 pm on the same day we restarted the cooling of the pool (temperature of the spent fuel pool: 12.7℃ at the time we stopped cooling, 13.1℃ after we restarted cooling).

- At approximately 4:10 pm on January 17, 2012, due to the trouble of switching facilities at the Minami-iwaki switching station, the Yonomori line 1 and 2 instantaneously turned to off. The spent fuel pool Alternative Cooling system and spent fuel pool radioactive materials removal equipment stopped their operation due to the event. Later, after confirming that there were no significant problem over the stopped facilities, we started the operation of spent fuel pool Alternative Cooling system at 5:15 pm and that of spent fuel pool radioactive materials removal equipment at 7:04 pm on the same day. There is no significant change for the major parameters which have resulted from the event.
- Regarding the water leakage from Filtrate water supply valve of Unit 3 spent fuel pool cooling system occurred on January 29,we removed the valve and completed installation of blanking plate, In addition, we are temporally suspending the secondary cooling tower in order to prevent overcooling of spent fuel pool alternative cooling facility. Because the pool temperature began to increase, at 9:55 am on February 6, we initiated the secondary cooling tower.
- At 10:07 am on February 8, we stopped the operation of the secondary cooling tower in order to prevent overcooling of alternative cooling system of spent fuel pool of Unit 3. Afterward the temperature of the water of the pool was increased so we operate the secondary cooling tower at 10:08 am on February 13.
- At 9:38 am on March 18, 2012, such system and cooling of the pool was temporarily suspended in order to implement the disassemble inspection of valve in the primary coolant system (Temperature of the pool at the time of the operation stoppage: approx. 15.0℃). Since we completed the work, we resumed the cooling operationof the spent fuel pool at 1:01pm on March 20(the water temperature at the time of shutdown: approx. 15.0℃, the water temperature at the time of restart: approx. 21.2℃).

<Removal of radioactive material from spent fuel pool>

- At 3:18 pm on January 14, we started operation of the radioactive material removal instrument for the spent fuel pool in Unit 3.
- At around 4:10 pm on January 17, due to defect of switching gear at Minami-Iwaki switching station, the voltage of Yonomori line 1 and 2 were instantaneous drop down and the radioactive material removal system were shut down. We confirmed there is no problem on the facilities which were shut down and re-started the system at 7:04 pm on the same day. At 1:35 pm on March 1, we stopped the operation since we finished the cleaning.

<Desalting of Spent Fuel Pool>

- At 2:47 pm on April 11, we started operation of the spent fuel pool desalting facility of Unit 3 since no problem was found as a result of trial operation.

<Draining water from the underground floor of the turbine building>

- At 10:01 am on January 3, 2012, we started to transfer accumulated water from the basement of turbine building of Unit 3 to the Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building] and the Process Main Building).
  At 9:31 am on January 8, we stopped the transferring.
- At 9:37 pm on January 8, 2012, we started to transfer accumulated water from the basement of the turbine building of Unit 3 to the Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building] and the Process Main Building). At 8:07 am on January 9, we stopped the transferring.
- At 9:55 pm on January 9, 2012, we started to transfer accumulated water from the basement of the turbine building of Unit 3 to the Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building] and the Process Main Building). At 8:00 am on January 10, we stopped the transferring.
- At 3:39 pm on January 11, we started transfer of the accumulated water from the basement of the Unit 3 turbine building to the centralized radiation waste treatment facility (the miscellaneous solid waste volume reduction treatment building [the high temperature incinerator building] and the process main building). At 8:07 am on January 12, we stopped the transfer.
- From 10:15 am on January 12 to 0:50 pm on the same day, we transfer water from Unit 3 water storage tank to basement of Unit 2 turbine building.
- At 9:59 am on January 12, we started transferring accumulated water from the basement floor of the turbine building of Unit 3 to the Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building] and the Process Main Building). At 8:03 am on January 13 we stopped this transfer.
- At 2:54 pm on January 13, we started transferring accumulated water from the basement floor of the turbine building to the Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building] and the Process Main Building). At 8:11 am on January 14, we stopped the transfer.
- At 2:48 pm on January 15, we started transferring accumulated water from the basement floor of the turbine building of Unit 3 to the Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building] and the Process Main Building). At 2:14 pm on January 17, we stopped the transfer.
- At 9:42 am on January 19, we started injecting water to unit 3 condensate storage tank. At 6:00 pm on the same day, we finished filling water.
- At 9:05 am on January 21, we started injection water t o unit 3 condensate storage tank. At 5:40 pm on the same day, we finished filling water.
- At 3:17 pm on January 20, we started transferring accumulated water from the basement of T/B, Unit 3 to the Central Radioactive Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]). At 2:18 pm on January 21, we stopped the transfer. As water leakage occurred on the piping for transferring accumulated water from the basement of T/B, Unit 2 to the Central Radioactive Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]), we started checking similar flanges to confirm leakage. At 2:30 pm, we found seepage at one location (without water dripping). Regarding the cause of the seepage, we estimate that shielding material over the hose became load to the connection part and it lost the sealing characteristics, and then it reached seepage. The shielding material over the hose was removed.
  From 0:07 pm to 0:40 pm on January 22, we conducted flushing, and after replacement of the hose and leakage check, at 2:30 pm, we started transferring accumulated water to the Central Radioactive Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High

Temperature Incinerator Building]). At 3:45 pm on January 23, we stopped the transfer.

- At 9:01 am on January 23, we started to fill water in the condensate storage tank of Unit 3. At 4:10 pm on the same day, we finished filling water.
- At 3:24 pm on January 24, we started transferring the accumulated water from the basement of the turbine building of Unit 3 to the centralized radiation waste treatment facility (miscellaneous solid waste volume reduction treatment building [high temperature incinerator building] and process main building). At 8:57 am on January 25, we stopped the transferring.
- At 9 :53 pm on January 25, we transferred the accumulated water from the basement of T/B, Unit 3 to the Centralized Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building] and Process Main Building). At 8:18 am on January 26, the transfer was paused.
- At 9:40 pm on January 26, we started transfer of the accumulated water from the basement of the turbine building of Unit 3 to the Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Facility]).
  At 8:10 am on January 27, we stopped it.
- At 9 :48 pm on January 27, we started to transfer the accumulated water from the basement of T/B, Unit 3 to the Centralized Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building] and Process Main Building). At 8:31 am on January 28, the transfer was paused.
- At 10:06 pm on January 28, we started transferring accumulated water from the basement floor of the turbine building of Unit 3 to the Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building] and the process main building). At 8:18 am of January 29 we have stopped this transfer.
- At 9:50 pm on January 29, we started transferring accumulated water from the basement of Unit 3 turbine building to Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building] and Process Main Building), and at 8:23 am on January 30, we stopped the transferring.
- At 4:12 pm on January 30, we started to transfer the accumulated water from the basement of T/B, Unit 3 to the Centralized Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building] and Process Main Building) through newly installed polyethylene pipes and stopped the transfer at 10:12 am on February 3.
- From 9:49 am on February 5 to 1:56 pm on February 7, we transferred the accumulated water from the basement of turbine building of Unit 3 to Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]).
- At 9:57 am on February 12, we started to transfer accumulated water in the underground of turbine building of Unit 3 to the Centralized Radiation Waste Treatment Facility (Process Main Building). At 9:50 pm on February 16, transfer was suspended.
- At 9:30 am on February 20, regarding the accumulated water at the basement of Unit 3 Turbine Building, transfer to Centralized Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]) started. At 9:52 am on February 22, we stopped the transfer.
- At 2:09 pm on February 25, we started transfer the accumulated water from the basement of turbine building of Unit 3 to Miscellaneous Solid Waste Volume Reduction Treatment Building (High Temperature Incinerator Building) At 1:45 pm on February 28, we stopped transfer due to switching of the transfer pump. At 1:56 pm on the same day, we restarted the transfer. At 9:54 am on March 4, we suspended the transfer.
- At 1:48 pm on March 7, we started transferring accumulated water from the basement of Turbine Building of Unit 3 to Centralized Waste Treatment Facilities

(Process Main Building) . At 10:01 am, on March 8, we stopped transferring.

- At 10:10 am on March 10, 2012, we started the transfer of accumulated water from the basement floor of the turbine building of Unit 3 to the centralized radiation waste treatment facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]).At 9:53 am on March 13, we stopped transferring.
- At 8:46 am on March 15, we started transferring accumulated water on the basement of Turbine Building of Unit 3 to the process main building of Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building "High Temperature Incinerator Building"). At 10:00 am on March 18, we stopped transfer.
- From 8:41 am on March 19, we started transferring the accumulated water from the basement floor of the turbine building of Unit 3 to the centralized radiation waste treatment facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]). At 9:27 am on March 24, we stopped transferring.
- At 10:10 am on March 26, we started transferring of accumulated water from the basement of Unit 3 T/B to Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building "High Temperature Incinerator Building"). At 4:34 pm on the same day, the transfer was stopped.
- At 9:26 on March 30, we started the transfer of accumulated water from the basement of Unit 3 T/B to the Centralized Radiation Waste Treatment Facility (Process Main Building). At 9:50 am on April 3, we resumed transferring.
- At 10:08 am on April 3, we started transferring the water accumulated in the basement of Unit 3 T/B to the centralized radioactive waste treatment facilities [High Temperature Incinerator Building]. At 2:54 pm on April 5, we stopped transferring
- At 1:31 pm on April 10, we started transferring of accumulated water from the basement of T/B of Unit 3 to the Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]). Since there was other operation around transferring line, to secure safety, at 11:04 am on April 13, we stopped transferring. At 1:47 pm on the same day, we restarted transferring.

<Injection of nitrogen for primary containment vessel and reactor pressure vessel >

※Since July 14, 2011, injection of nitrogen to primary containment vessel was started.

※Since November 30, 2011, injection of nitrogen to reactor pressure vessel was started.

- At approximately 4:10 pm on January 17, 2012, due to the trouble of switching facilities at the Minami-iwaki switching station, the Yonomori line 1 and 2 instantaneously turned to off. The nitrogen injection facility stopped their operation due to the event. Later, after confirming that there were no significant problem over the stopped facilities, we started their operation at 4:57 pm on the same day. There is no significant change for the major parameters which have resulted from the event.
- Since 9:50 am on February 10, we have conducted the work to add flowmeters to the nitrogen injection line at the side of Primary Containment Vessel of Unit 3 in order to improve the reliability of nitrogen injection activity. During this period, due to this work, we suspended the nitrogen injection task temporarily (*). At 10:55 am on the same day, we started operation to inject nitrogen and at 11:24 am, we complete the series of the operation.

  * In the Chapter 12 of Nuclear Reactor Facilities Security Regulation "The Way of Ensuring Mid-term Security", as the treatments like "Operational limitation" or "Measures required in case of not satisfying the operational limitation" are determined, it is supposed the operator act per the required measures if it fails to satisfy the operational limitation. This time, to implement maintenance works, we have suspended the work of nitrogen injection at the side of Primary Containment Vessel of Unit 3 by conducting a planned shift beyond the range of operational limitation (from 9:50 am to 11:30 am on February 9).
- At around 11:47 am on March 12, our staff confirmed by over current alarm of fan

motor of compressor at the site, that the nitrogen supply equipment (nitrogen gas separator A), which supplied nitrogen to the PCVs and the RPVs of Unit 1-Unit 3, stopped. At 12:09 pm on the same day, we started the waiting nitrogen supply equipment (nitrogen gas separator B) and at 12:19 pm, nitrogen injection started again. Regarding the pressure of PCVs of Unit 1 – Unit 3 and hydrogen density, we did not confirm any significant fluctuation (hydrogen density of Unit 3 is monitored as reference data because the PCV gas control system is now under test operation).

- At around 10:55 am on April 4, a TEPCO employee found the measurement flow volume of the nitrogen injection line to PCV of Unit 1-3 and RPV was 0 m^3/h at the Seismic Isolated Building. When we checked the equipment, we found the nitrogen supply system (nitrogen/gas separator B) was stopped due to failure alert of compressor. After that, at 12:16 pm on the same day, we started a stand-by nitrogen supply system (nitrogen/gas separator A) and we restarted the nitrogen supply to PCV of Unit 1-3 and RPV at 12:29 pm. No significant changes of pressure of PCV of Unit 1-3 and density of hydrogen were confirmed.
- At around 5:00 pm on April 7, when verifying the plant data, the flow volume of the nitrogen injection line to PCV and RPV was confirmed to be 0 m^3/h. By conducting on-site verification, it was confirmed that nitrogen supply facility (nitrogen gas separator A) was halt due to compressor failure alert. Subsequently, at 17:43, backup nitrogen supply facility (nitrogen gas separator B) was activated and at 17:56, injection of nitrogen to PCV and RVP was recommenced. No significant changes have been confirmed in regard to parameters in connection with PCV of Unit 1-3, density of Hydrogen and monitoring post data.
- At 1:00 am on April 13, 2012, a TEPCO employee found the measurement flow volume of the nitrogen injection line to PCV of Unit 1-3 and the pressure decreased. At 1:04 am, we checked on the site. And at 1:30 am, we found the nitrogen supply system (nitrogen/gas separator B) was stopped due to failure alert of compressor. At 3:10 am, we started a stand-by nitrogen gas separator and we restarted the nitrogen supply to PCV of Unit 1-3 and RPV at 3:46 am. As for stopped nitrogen/gas separator B, at 4:20 am, we started nitrogen injection from nitrogen/gas separator B. After separating the suction filter which was assumed as the cause, at 9:25 am, we stopped the operation of a stand-by nitrogen gas separator since no problem was found as a result of trial operation with regard to separator and compressor. We continue nitrogen injection with nitrogen supply system B. No significant changes of pressure of PCV of Unit 1-3 and density of hydrogen are confirmed.

<Installation of gas controlling system of primary containment vessel>

- As installation works of the PCV gas control system of Unit 3 was completed, we started a test operation at 11:38 am on February 23. We confirmed that an exhaust flow amount was stable at 33m^3/h at 2:10 pm and started an adjustment operation. As the result of the adjustment operation, we confirmed no significant problem with the gas control system. Therefore, the operation mode was switched to the regular mode at 7:00 pm on March 14.

<Primary containment vessel gas sampling>

- On February 23, 24, and March 1, 8 we conducted gas sampling survey of the PCV gas control system of Unit 3 and confirmed that Xenon 135 was below the detection limit at the inlet of the system and also below 1 Bq/cm3 that is a threshold of recriticality.
- On March 1 and April 15, we took samples at the charcoal filter and the of Unit 3 RCV gas control system.
- On March 1 and April 15 2012, we took samples at the charcoal filter and the particulate of the PCV gas control system.

<Reactor building dust sampling>

- On January 5 and April 5 and April 15 we conducted dust sampling by large size crane at upper part of the reactor building of Unit 3.
- At 11:05 am on January 6, we conducted a dust sampling near the large stuff

entrance at Unit 3 Reactor Building by using a robot.

- On February 23, 24, and March 1, 8 we conducted gas sampling survey of the PCV gas control system of Unit 3 and confirmed that Xenon 135 was below the detection limit at the inlet of the system and also below 1 Bq/cm3 that is a threshold of recriticality.

<Others>

- At around 12:20 pm on April 12, at the road between Unit2 and Unit3 reactor buildings, we found a leakage of fuel (diesel oil) of heavy machinery (grab bucket) which has been used for removing rubbles of upper part of Unit 3 reactor building on the iron plate under the vehicle in the area of approx. 1.5 m x 1m. At around 12:40 pm on the same day, we informed Tomioka fire station. Afterwards, Futaba wide-area fire-defense headquarters and Tomioka fire station checked the site and at 2:05 pm, confirmed that this oil leakage did not dorrespond to the leakage from dangerous facilities stipulated in the Fire Services Act. This oil leakage was stopped when it was found, and there will be no radiation effects to the outside by this event. Regarding the cause, we estimated that fuel was dripping due to the damage of the fuel filter in the fuel supply line for heavy equipments. By way of caution, an oil absorbent mat and a receiving can was set at the leaking point.

【Unit 4】

<Water spray to the spent fuel pool>

※Timely injection of hydrazine is implemented.

<Alternative cooling of spent fuel pool>

- At around 1:00 pm on January 8, at circulating cooling system for spent fuel pool of unit 4, we found water leakage from 4 points of cooling pipe of air fin cooler (System B) when we tried to conduct scheduled switching of air fin cooler (From System A to System B). Currently, we are investigating the cause of the leakage. Leaked water is purified water (pure water)* and is not contained radioactive materials. Now we secluded the air fin cooler from the system to prevent the spread of water leakage. In addition, the cooling of spent fuel pool has no problem because we are currently using air fin cooler (System A) to cool spent fuel pool.
  * Purified water (pure water): The water from Sakashita dam
- Around 9:35am on 29 January 2012, an alarm on a system failure (Unit 4 SFP backup cooling system) was given in Unit 4 spent fuel pool backup cooling system. According to the site investigation, a pump (A) to circulate cooling water of a secondary system had been stopped and the water circulation was stopped accordingly (Fuel pool temperature at the time of the alarm: 21℃). After the event, we discovered cooling water leakage from A2 line of air-fin cooler unit (A1-A4 lines) of the A system of the secondary system. We confirmed that the water leakage was stopped by closing valve of the Unit A2 line. The cooling water is from a filtrate tank for fire extinction and doesn't contain radioactive materials. The stopped secondary pump (A) was restarted at 11:14am and water cooling of the spent fuel pool was restarted accordingly (Fuel pool temperature at the time of cooling restart: 21℃)
- At 4:27 pm on January 29, we stopped the operation of the secondary air-fin coolers (the temperature of fuel pool at the time of stoppage: 21℃) of spent fuel pool in order to prevent overcooling of alternative cooling system of spent fuel pool of Unit 4. At 3:13 pm on January 30, we restarted the operation of the air-fin cooler. (the temperature of fuel pool at the time of restart: 29℃)
- At 3:11 pm on February 23, in the alternative cooling system of the spent fuel pool of Unit 4, as the inhale pressure of the primary circulating pump showed the tendency of decrease, we stopped the pump in order to conduct flushing of the strainer on its entry side and suspended cooling of the spent fuel pool (the temperature of the pool at the time of the suspension was approx. 25℃) After the flushing, at 5:18 pm on the same day we resumed the pump and cooling of the spent fuel pool of Unit 4. (the temperature of the pool at the time of the resuming was approx. 26℃)

- At 9:58 am on March 20, we stopped the cooling operation to check the inside of the spent fuel pool Unit 4. After completing the check, we resumed the cooling operation at 1:44 pm on the same day (the water temperature at the time of shutdown: approx. 32℃, the water temperature at the time of restart: approx.31℃).
- At 9:46 am on March 21, 2012, we stopped the cooling of the Spent Fuel Pool of Unit 4 in order to investigate the status of the pool. At 12:01 pm on the same day the inspection finished, and the cooling process was restarted (Temperature of the pool at the time of the operation stoppage: approx. 28.0℃, water temperature at the time of restart: approx. 28.0℃).

- At 5:41 am on March 27, the cooling of the spent fuel pool of Unit 4 was stopped (water temperature at the time of stoppage: approx. 24 ℃) in order to implement the replacement of flexible hose in the primary coolant system and pump inlet strainer in the secondary coolant system. Stoppage is scheduled to continue till March 28.At 4:35 pm on March 28, we restarted the cooling of the spent fuel pool since we finished the replacement. (The water temperature of the spent fuel pool was approx. 33 ℃ when we restarted the cooling)
- In the alternative cooling system for spent fuel pool of Unit 4, since we observed that the suction pressure of the circulating pump of the primary system tended to decrease, we temporarily stopped cooling the spent fuel pool by stopping the operation of the pump, in order to flash the suction strainer of the pump at 1:50 pm on April 4 (Water temperature in the pool at the time of stop of operation: approx. 26 ℃). After flashing, at 3:01 pm on the same day, we restarted the pump to resume cooling the spent fuel pool of Unit 4. We confirmed the recovery of suction pressure of the pump. (Water temperature in the pool at the time of restart of operation: approx. 26 ℃).
- At 1:14 pm on April 6, we resumed operation of primary water circulating pump and cooling of spent fuel pool in order to conduct flashing to suction side strainer of the pump since suction pressure of the pump showed downward trend. (Water temperature in the pool at the time of stop of the operation: approx. 25 ℃). After flashing, at 3:29 pm on the same day, we restarted the pump to resume cooling the spent fuel pool. We confirmed the recovery of suction pressure of the pump. (Water temperature in the pool at the time of restart of operation: approx. 25 ℃).
- At 2:44 pm on April 12, 2012, an alarm “excessive leaking flow amount from heat exchange unit” went off and the pumps of the system automatically stopped. As a result of site investigation on leakage from the system, the following events were confirmed. We are investigating their relevance with the automatic stop of cooling system of the spent fuel pool. The water temperature of the spent fuel pool was 28℃ and the temperature rising rate was estimated at approx. 0.5 ℃/h.
    1. During checking leakage from the system, at around 3:04 pm on the same day, we confirmed that hydrazine was leaking at a rate of one drop per 7 seconds from a check-valve installed in the hydrazine injection pipes of the cooling system. We closed the check-valve and the leakage stopped. (We injected hydrazine from 1:35 pm to 2:56 on the same day.) The amount of leaked hydrazine below the check-valve was approx. 20 cc (approx. 10cm x 20 cm x 1 mm).
    2. At 3:10 pm on the same day, at the east side of the 1 floor of Unit 4 Waste Treatment Building, we found water leaking at a rate of 1 drop per 2 seconds from the pipe flange of alternative cooling line for the spent fuel pool. Afterwards, at around 3:55 pm on the same day, we retorqued the flange and confirmed that the leakage stopped. We confirmed that the leakage was approx. 40 liters (approx. 1m x 2m x 1-2 cm) around the funnel near the flange. The leaked hydrazine and water were only in the Waste Treatment Building and we confirmed no other leakage than these two places after the investigation.

Afterwards, it was assumed that the leakage was caused by the pressurization of a part of the system by the continuous injection of the hydrazine after the shutdown of the alternative cooling system of the spent fuel pool. We replaced the gland flange of the first-order system where the leakage occurred. We investigated the cause of the shutdown of the alternative cooling system of spent fuel pool.

However, we could not find any abnormality other than a little air entrapped into the instrumentation piping of the fluid meter. To confirm operation status, we started up the system at 4:04 pm, April 13. From 5:35 pm to 5:56 pm, we vented air of the fluid meter. At 6:10 pm, we adjusted the flow to normal volume and confirmed that the flow detector sensor is working correctly. The spent fuel pool temperature after startup was 35℃. We will keep monitoring the operation status.

<Desalting water in Spent Fuel Pool>

※Since November 29, operation of ion exchange device is started.

<Water injection into the reactor well and the equipment storage pool of Unit 4>

- At approx. 5:30 pm on January 1, 2012, we observed approx. 240 mm decrease in the water level of the skimmer surge tank*1 of Unit 4 spent fuel pool in the three hours between 2:00 pm to 5:00 pm (According to the operation record so far, there had been an approx. 50 mm decrease.). As a result of the site investigation later, we did not observe any leakage around the Unit 4 reactor building, connecting points of primary system pipes of Unit 4 spent fuel pool alternative cooling system, or its installation space. The water temperature of Unit 4 spent fuel pool as of 5:00 pm on January 1 is 23℃ (22℃ as of 5:00 am on January 2). The spent fuel pool alternative cooling system is still in operation and there is no problem in cooling the reactor. Though the water level of the spent fuel pool is kept stable without any problem, the water level in the skimmer surge tank continues decreasing. Therefore, from 10:27 pm to 11:13 pm on January 1, we filled water in the skimmer surge tank. At present, the water level in the skimmer surge tank keeps decreasing approx. 90mm/hour. We will strengthen surveillance on observation of the water level in the skimmer surge tank, increasing the frequency to once in an hour from once in three hours.

  At present, no leakage is observed outside the building. No significant change is observed in the water level of the accumulated water in the building.

  By further investigation, we confirmed that amount of water that is equivalent to decreased water level of the skimmer surge tank and amount of water that is equivalent to increased water level of the reactor well*2 are almost the same and the water level at reactor well is lower than that of the spent fuel pool. With these facts, we estimate that situation of gate between the reactor well and the spent fuel pool changed and water flow from the spent fuel pool to the reactor well increased made decrease in water flow from the spent fuel pool to the skimmer surge tank, and so decrease in water level at the skimmer surge tank was more than usual. To decrease the difference between the water level of the reactor well and that of the spent fuel pool, we put the water into the reactor well from 11:50 am to 11:59 am on January 2. As of 4:00 pm, we can not find decrease in the water level of the skimmer surge tank. We will continue surveillance the water level of the skimmer tank.

  *1 The tank installed in order to receive the water overflows from the spent fuel pool. The water in the spent fuel pool is overflowed into the skimmer surge tank in order to cool the fuel assembly and remove impurities in the water. The water returns to the spent fuel pool after passing through the heat exchanger and the filter.

  *2 The reactor well is the space which contains the reactor pressure vessel and the lid of the primary containment vessel. During the periodical inspections, the space filled with water and the fuel is changed.

<Others>

- At approx. 9:30 am on March 27, workers of the other company found the water leakage from the underground pipes (Anti-disaster pipe for Unit 4 transformer) during the removal work of such pipes using heavy machine to prepare the ground condition for the installation work of Unit 4 covering. After the inspection, it was confirmed that such pipes were already isolated and the leaked water was treated water remaining in the pipes. *Treated water (fresh water): water from the Sakashita Dam
- At 2:00 pm on March 27, Hydrazine injection into the Unit 4 reactor well through the

instrument pipes inside the reactor was started.

Finished injecting Hydrazyne at 4:40 pm on the same day.(Arbitrarily conduct Hydraziyne injection thereafter)

【Unit 5】

<Treatment of Accumulated Water>

- From 10:30 am to 2:00 pm on March 6, 2012, we started transfer of Sub-drain Water of Unit 5 to the temporary tank. Hereafter, we will conduct transferring to the temporary tank arbitrarily.

<Others>

- At 2:39 pm on January 11, to protect the decline of facilities which are needed to maintain the stable cold shutdown and improve the high-humidity environment in the Reactor Building of Unit 5, we started up ventilation and air-conditioning system in the building. This air conditioning system inlet and outlet air by high-efficiency particle filter. The air out of the conditioning system has been emitted through high-performance particle filter installed at the intake and exhaust side. On January 13, we conducted the nuclide analysis on the samples collected at exhaust stack of Unit 5 and 6. As a result, no radioactive materials were detected.
- At 6:00 am on February 24, in order to change the delivery valve of the pump (A) of the reactor sea water system of Unit 5, we stopped the pump (C) of the reactor sea water system. As a result, the cooling of the spent fuel pool was stopped. (the temperature of the spent fuel pool at the time : approx 17.4℃) At 12:08 pm on the same day, the system was restarted after the completion of the work. Accordingly the cooling of the spent fuel pool was restarted as well. (pool temperature at the time of the cooling restart: approx 18.2℃)
- At 7:05 am on March 28, for the case of Station Black Out of unit 5,6, due to the construction for deployment of power source car, we stopped Shut Down Cooling System for instrument's power-off. Cooling reactor stopped by this (Water temperature at reactor shut down: approx.32.3℃). At 2:56 pm on the same day, as comleted the work, we restarted Shut Down Cooling System and recommenced cooling the reactor (The temperature of the reactor water at the recommencement: approx.38.2℃).

【Unit 6】

< Treatment of Accumulated Water>

- We transferred accumulated water from the basement of turbine building of Unit 6 to temporary tank.

From 10:00 am to 4:00 pm on January 4/ from 10:00 am to 4:00 pm on January 8
From 10:00 am to 4:00 pm on January 16/ from 10:00 am to 4:00 pm on January 20
From 10:00 am to 4:00 pm on January 24/from 10:00 am to 4:00 pm on January 28
From 10:00 am to 4:00 pm on January 31/from 10:00 am to 4:00 pm on February 1
From 10:00 am to 4:00 pm on February 2/ from 10:00 am to 4:00 pm on February 3
From 10:00 am to 4:00 pm on February 6/from 10:00 am to 4:00 pm on February 8
From 10:00 am to 4:00 pm on February 9/From 10:00 am to 4:00 pm on February 10
From 10:00 am to 4:00 pm on February 14/From 10:00 am to 4:00 pm on February 15
From 10:00 am to 4:00 pm on February 17/From 10:00 am to 4:00 pm on February 18
From 10:00 am to 4:00 pm on February 19/From 10:00 pm to 4:00 pm on Feburary 20
From 10:00 am to 4:00 pm on Feruary 21/From 10:00 am to 4:00 pm on Feruary 27
From 10:00 am to 4:00 pm on Feruary 28/ From 10:00 am to 4:00 pm on Ferup 29
From 10:00 am to 4:00 pm on March 1/From 10:00 am to 4:00 pm on March 5
From 10:00 am to 4:00 pm on March 9/From 10:00 am to 4:00 pm on March 12.
From 10:00 am to 4:00 pm on March 13/From 10:00 am to 4:00 pm on March 14.
From 10:00 am to 4:00 pm on March 15/From 10:00 am to 4:00 pm on March 16.
From 10:00 am to 4:00 pm on March 22/From 10:00 am to 4:00 pm on March 23.
From 10:00 am to 4:00 pm on March 26/From 10:00 am to 4:00 pm on March 27
From 10:00 am to 4:00 pm on March 28/ From 10:00 am to 4:00 pm on March 29
From 10:00 am to 4:00 pm on April 2/ From 9:30 am to 3:30 pm on April 3

From 10 am to 4:00 pm on April 4/ From 10:00 am to 4:00 pm on April 5

From 10 am to 4:00 pm on April 6/ From 10:00 am to 4:00 pm on April 7

From 10 am to 4:00 pm on April 8/ From 10:00 am to 4:00 pm on April 9

From 10 am to 4:00 pm on April 10/ From 10:00 am to 4:00 pm on April 11.

From 10 am to 4:00 pm on April 12/ From 10:00 am on April 16.

- At 9:18 am on January 31, we started transfer of Sub-drain Water of Unit 6 to the temporary tank. Hereafter, we will conduct transferring to the temporary tank arbitrarily. From 9:53 am on February 23, we started transfer to the temporary tank. At 1:00 pm on the same day, we completed the transfer. We will properly transfer the water to the temporary tank.

<Others>

- At 4:20 pm on January 11, we activated the air ventilation/conditioning system of the Unit 6 turbine building in order to avoid degradation of the facilities to maintain the cold shutdown in the reactor buildings, and in order to improve the high-humidity environment in the reactor building. The air out of the conditioning system has been emitted through high-performance particle filter installed at the intake and exhaust side. On January 13, we conducted the nuclide analysis on the samples collected at exhaust stack of Unit 5 and 6. As a result, no radioactive materials were detected.
- At approximately 4:10 pm on January 17, 2012, due to the trouble of switching facilities at the Minami-iwaki switching station, the Yonomori line 1 and 2 instantaneously turned to off. The spent fuel pool Coolant purification system stopped their operation due to the event. Later, after confirming that there was no significant problem over the stopped facilities, we started their operation at 5:19 pm on the same day. There is no significant change for the major parameters which have resulted from the event. At 8:05 am on February 5, our employee on patrol confirmed the water leakage from valve flange in the outdoor fire protection system piping in Unit 6. Around 8:31 pm, the valve for upper stream was closed and leakage was stopped. The water leaked was already processed and there supposed to be no outflow of the water to the sea because there is no drain located near by.
- With the regular inspection of the residual heat removal system (RHR) at 10:14 on February 9, we stopped the RHR. At 2:02 pm, we rebooted the system and restarted the reactor cooling. Due to the suspension, the reactor's water temperature increased from 27.5**℃** to 30.6**℃** temporarily, but in terms of the increase level of reactor water temperature, we estimated it no problem.
- In order to conduct inspection of the strainer changeover valve of the pump of the reactor sea water system of Unit 6 from February 14 to February 17, at 10:02 am on February 14, we stopped cooling of the spent fuel pool by the spent fuel pool cooling system (B) and at 10:06 am on the same day, we stopped the pump of the reactor sea water system (A) (spent fuel pool water temperature during the stoppage: approx. 23℃). Because the spent fuel pool cooling system isn't in operation during the inspection, we conduct alternating cooling of the reactor and the spent fuel pool by the residual heat removal system. At 2:07 pm on February 17, we finished the inspection and started the pump of the reactor sea water system (A), and at 2:53 on the same day, we resumed the cooling of the spent fuel pool by the spent fuel pool cooling system (B), back to normal cooling condition (the maximum temperature during the alternative cooling period: 33.6℃(water in the reactor), 29℃ (water in ths spent fuel pool).
- As the component cooling sea water system pump (C) of Unit 6 has been restored, we started test operation at 10:05 am on February 22. Accordingly, the component cooling sea water system pump (A) stopped its operation at 10:07 am on the same day. At 11:25 on the same day, we confirmed that there was no problem in the operation of the component cooling sea water system pump (C). As a result, two of the component cooling sea water system pumps of Unit 6, (A) and (C) are in operation,

【Others】

<Detection of radioactive materials>

[Soil]

- Plutonium was detected in the soil sampled on January 2, 9, 16, 23, 30, February 6, 13, 20, 27, March 5, 12, 19 and 26 2012 at the power station's premise. In addition, as a result of nuclide analysis of the gamma ray contained in the soil, radioactive materials were detected.

- As a result of nuclide analysis of the strontium contained in the soil of the plant's premise which was sampled on January 16, February 13, 2012, Strontium 89 and 90 were detected.

[Air]

- We detected radioactive materials in the data collected on January 2, 5, 6, 10, 11, 12, 13, 14, 15, 16, 20, 26, 31, February 2, 4, 9, 16, 28, March 2, 6, 7, 8 ,13, 15, 16, 18, 22, 29, April 3 and 6 in the air inside the site.

[Water]

- We detected radioactive materials in the sampling of close sea area of power station conducted on January 1 - 31, February 1 - 29, from March 1-13, 16 - 28, April 4 - 11.
- We detected Strontium in the sampling of close sea area of power station conducted on January 17 and 18, and February 13, 15, March 12.
- -As the result of analyzing Tritium, all alfa and all beta about subdrain water sampled on March 12, all β was detected.
- On January 2, 4, 6, 9, 11, 13, 16, 18, 20, 23, 25 27, 30, February 1, 3, 6, 8, 10,13, 15, 17,20, 22, 24, 27, 29, March 2, 5, 7, 9,12, 16, 23, 26, 28, 30, April 2, 4 9, 11 and 13 we detected radioactive materials in the sampling of sub drain near the turbine building.
- As the result of the Strontium analysis about subdrain water sampled on February 13, Sr 89 and 90 were detected.
- As the result of analyzing Tritium, all alfa and all beta about subdrain water sampled on February 13, Tritium and all beta were detected.
- As the result of analyzing Tritium, all alfa, all beta and Strontium about subdrain water sampled on March 12, Tritium and all beta and Strontium89.90 were detected.

[Marine soil]

- Cesium were detected through a nuclide analysis in the marine soil sampled on January 5, 7, 10, 13, 17, 18, 25, 26, 27 and February 4, 6, 8 9, 13, 14, 19, March 1,4, 15, 21, 22, 23, 26, 28 and April 6 and 7.
- Strontium was detected in the marine soil sampled on January 18.

[fish and shellfishseafood]

Radioactive materials were detected from fish and shellfishseafood taken on March 29 such as Salangichthys ishikawae and young lancefish.

<Accumulated water treatment facility>

- At 10:40 on January 9, a water pond was found near the evaporative concentration apparatus 2B (under suspension) of the water treatment facility. The amount of the water is about 11 liter and is staying in the dam. The leakage was from float type flow meter at vent condenser spray line of evaporative concentration apparatus(*) and the amount of leakage is about one drop in 6 seconds. After closing the valve of the line, it was about one drop in 15 ～ 20 seconds. A dish will be settled under the leakage. The water is purified one in evaporative concentration apparatus (for water injection to the reactor). We conduct nuclide analysis for the water of the line regularly and the last result was as fallows: β-ray is 6.0×10-1Bq/c m^3 (November 29, 2011) and γ-ray is below measurable limit（December 20, 2011）.

  *Vent condenser spray line of evaporative concentration apparatus: cooling the vapor (purified water) that is generated in the evaporative concentration apparatus and supply water for injection to the reactor.

- At 9:25 am on January 10, second Cesium adsorption apparatus was stopped to backwash the filter because there was a gradual downward tendency. At 12:58 pm on the same day, the apparatus was started up and it achieved the steady flow (approx. 36 m^3/h) at 1:04 pm. Actual records for backwash of filter (stop time, start time and arrival time of regular flow (regular flow) of equipment) are as below.
  9:13 am on January 16 / 12:12 pm / 12:17 pm [approx. 28m^3/h]
  8:35 am on January 24 / 2:55 pm / 3:03 pm [approx. 36m^3/h]
  8:49 am on January 29 / 12:06 pm / 12:18 pm [approx. 36.5m^3/h]
  8:36 am on February 2 / 11:12 am / 11:15 am [approx. 36m^3/h]
  8:40 am on February 6 / 1:25 pm / 1:33 pm [approx. 34m^3/h]
  8:39 am on February 10 / 2:19 pm / 2:32 pm [approx. 35m^3/h]

8:52 am on February 14 / 3:30 pm / 3:40 pm [approx. 35m^3/h]
8:46 am on February 17 / 10:59 am / 11:05 am [approx. 36.4m^3/h]
8:35 am on February 20 / 11:07 am / 11:11 am [approx. 36.2m^3/h]
8:21 am on February 24 / 10:30 am / 10:32 am [approx. 36.0m^3/h]
8:37 am on February 29/10:07 am/10:12 am [approx. 34.4m^3/h]
8:30 am on March 21 / 11:48 am / 12:05 pm [approx. 42.0m^3/h]

- At 10:28 am on January 10, TEPCO staff found a leakage of water from the packing at the bottom of the tank of concentrated water storage at water desalinations (reverse osmosis membrane type), which was about one drop in one second. The amount of leaked water is approx. 10 litter and is staying on the concrete. After retightening of the bolt at the joint of the tank, we confirmed the leakage was stopped around 12:35 pm on January 10. In addition, sandbags were piled around the water pond to protect its expansion. Because water leaked from waste storage tank, it does not need to stop the water treatment system and there was no impact to the water injection to reactor.
- At approximately 4:10 pm on January 17, 2012, due to the trouble of switching facilities at the Minami-iwaki switching station, the Yonomori line 1 and 2 instantaneously turned to off. The Cesium adsorption apparatus stopped their operation due to the event. Later, after confirming that there were no significant problem over the stopped facilities, we started their operation at 6:42 pm on the same day, having reached the steady level of flowing at 6:45 pm. There is no significant change for the major parameters which have resulted from the event.
- At 12:00 pm on January 28, when a TEPCO worker checked the water treatment facility, he found water was leaked around a drop per second from the Valve Flange around the Demineralizer of the Evaporation Concentration Apparatus. (We estimated the amount of leakage was approx. 8 liters.) The water did not flow out to the sea because it was in the weir tank. We also checked that the surface dose rate around the leakage point was the same level of the atmosphere dose rate. Currently, we took countermeasure to receive leaked water by pan. This facility is now suspended. As there is sufficient desalinated water, we continue the operation of the water treatment facility and the injection to the reactor.
- At 12:00 pm on January 28, when a TEPCO worker checked the water treatment facility, he found water was leaked around a drop per 5 seconds from the Valve Flange of Mini Flow Piping of the Waste RO Supply Pump where the treated water is sent from the suppression pool water surge-tank to the water desalinations. (The amount of leakage was approx. 0.5 liters.) The water did not flow out to the sea because it was in the weir tank. We also checked that the surface dose rate around the leakage point was the same level of the atmosphere dose rate. Currently, we took countermeasure to receive leaked water by pan. The 2 RO Supply Pumps are now on stand-by and we continue the operation of the water treatment facility and the injection to the reactor.
- At 12:28 pm on February 6, 2012, at a group of concentrated water storage tanks, a TEPCO employee found a leakage from on the tanks. As a result of tightening a connecting volt of the tank, at 2:03 pm on the same day, we confirmed stoppage of the leakage's bleed at the connecting part. The leaked water originated from the concentrated water (salt water) after being treated by the desalination equipment (reverse osmosis membrane) and we evaluated a leakage amount of 0.6L. Currently, as there still remains the bleed coming down from the connecting part on the surface of the cement on which the tank is installed, we don't find any water flowing into the gutter, and thus it will not flow out into the ocean. (At 2:45 pm on the same day, we have piled sandbags jus in case). In the mean time, as a result of measuring the surface radioactive rate at the cement basement right under the connecting part that has the bleed, Gamma ray was 20mSv/h and Beta ray 250mSv/h.
- At 8:30 am on February 25, TEPCO and partner company workers found a water leakage at the welded piping part at B line of the 2nd Cesium adsorption apparatus (SARRY) installed on the 1st floor of the Centralized Waste Treatment Facility [Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]). The leakage volume was just one drop per second and the total amount of water leaked was approx. 10 litters, staying within

the barrier of the building and not leaking out. At 10:44 am on the same day, we stopped operation of the 2nd Cesium adsorption apparatus and closed a valve positioned in the upstream of the leaked point to prevent the water from further leaking, and at 11:10 am on the same day, we confirmed stoppage of the water leakage. When measuring the surface radiation rate, it was approx. 4-5mSv/h (2mSv/h in the background). As the accumulated water treatment will not be affected despite the suspension of the apparatus and sufficient purified water remains, there is no effect on reactor water injection into. The nuclide analysis results for the water leakage were as follows:

I-131: Below detection limit, Cs-134: 1.3 x 105 Bq/cm3, Cs-137: 1.8 x 105 Bq/cm3

After that, per the remote controlling implementation of the 2nd Cesium absorption apparatus (B line), where a water leakage was found, we have activated the system A line since 6:41 pm. At 6:44 pm, the water flow amount reached 20 m3/h and we stably started treating the accumulated water. At 8:35 am on February 26, to replace the duct and filter of the apparatus B line, we shutdown A line of the apparatus. Since the repair work was finished thereafter, at 1:31 pm on the same day, both A and B lines of the apparatus activated, and at 1:50 pm, it reached regular flow amount (33.6 m^3/h), enabling to start a stable treatment of the accumulated water.

- In order to conduct the work to improve the reliability of water treatment facilities, we are planning to stop water treatment facilities one after another. At 8:45 am on March 1, we stopped the cesium adsorption apparatus. We calculated the estimated water level increase at each building due to the stop o the facilities, and confirmed that the water levels in each building will be maintained within the limits. We also have sufficient volume of treated water, therefore there will be no impact on the water injection to the reactors. At 8:07 am on March 2, we stopped the 2nd cesium adsorption apparatus. At 5:00 pm on March 10, we started the 2nd cesium adsorption apparatus after the improvement works. At 6:34 pm on March 10, the water injection volume reached at normal level (approx.42 m^3/h). The Cesium adsorption apparatus was stopped to implement a work for improving reliability of the water treatment system. At 1:08 pm on March 15, 2012, we made a trial run of the added oil separator treated water transfer pump of the Cesium adsorption apparatus. At 2:40 pm on the same day, we confirmed that the flow rate had steadied (19.8m^3/h), the water treatment operation was stable, and that there were no operational problems.
- At 9:44 am on March 2, in order to conduct the work to switch the control circuits of on-site power source for operation of southern switching station, we cut the power of on-site power source. The evaporation apparatuses of water desalination facilities and desalination facilities (reverse osmosis membrane type) are out of service due to the work to switch the control circuits. We also have sufficient volume of treated water, therefore there will be no impact on the water injection to the reactors. At 1:05 on the same day, we completed the work.
- According to the power supply construction for reliability improvement and reinforcement of offsite power after the earthquake disaster, at 11:17 am on March 12, 2012, we started conducting to receive with ookuma-line No.4 and south switching station, and we finished conducting to receive at 3:58 am on the same day.
- In order to stop the offset power and change the station power supply with starting to operate the south switching station, we stopped the operation of desalination facility (reverse osmosis membrane type) at 4:25 am on March 13, 2012,and the cesium adsorption instrument No.2 at 5:43 am on the same day. Since we finished changing the station power supply, we resumed the operation of desalination facility (reverse osmosis membrane type) at 12:23 pm on the same day, and the cesium adsorption instrument No.2 at 12:39 pm on the same day.
- At 8:09 am on March 14, in order to investigate soundness of the transfer line from Centralized Radiation Waste Treatment Facility (Process Main Building) to cesium absorption instrument No.2, that was newly settled to enhance security in the water treatment system, cesium absorption instrument No.2 was suspended. After its trial run, no significant problem with the instrument was confirmed. Therefore the transfer line was switched and the instrument was started at 7:32 pm on the same day. The treatment of the accumulated water at the process main building of

Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building "High Temperature Incinerator Building") was restarted. At 7:39 pm, the constant flow status was attained (approximately 42m^3/h).

- Due to the commencement of the operation of south switching station, it was necessary to switch the power receiving of the power plant. Thus at 10:01 am of March 16 we suspended the first Cesium adsorption apparatus and at 10:02 am of March 16 we suspended the second Cesium adsorption apparatus. After the switching works were completed, at 2:32 pm on the same day, we activated the second Cesium adsorption apparatus, and at 2:36 pm it reached the rated flow (42.6m^3/h). At 2:55 pm we activated the first Cesium adsorption apparatus, and at 2:58 pm it reached the rated flow (19.8m^3/h).
- At around 8:30 on March 26, 2012, in the area of condensed water tanks for water desalinations (reverse osmosis membrane) of Fukushima Daiichi Nuclear Power Station, a partner company worker found that water was leaked from a pipeline (anti-pressure hose) which transferred the condensed water from the water desalinations to the condensed water tanks. In order to stop the water leakage, we stopped the transfer pumps of the water desalinations (reverse osmosis membrane) and then the leakage stopped. After that, we closed the valves at the both sides to the leakage point of the pipeline (anti-pressure hose). When we checked the leakage on the site later, we found that a part of the leaked water had been poured into a nearby drainage for general draining water. And then, we conducted sampling surveys on the leaked water, the water which was poured into the drainage, and the seawater around the exit of the drainage. As a result, we judged that some water including radioactive materials was poured into the sea from the exit of the drainage located at about 300 m south from the discharge channel of Unit 1-4 of Fukushima Daiichi Nuclear Power Station. At this moment, the water desalinations (reverse osmosis membrane and evaporative concentration apparatus) are not in service. However, because we have much treated fresh water, it does not affect water injection to the reactors. Total amount of leaked water is estimated to be approx 120 m^3 in accordance with the operation hour of the pump. 80 L out of 120 m^3 is estimated to flow into the sea at maximum. Thereafter, the cesium adsorption apparatus was stopped at 5:00 pm and the second cesium adsorption apparatus was stopped at 5:29 pm.

  At 9:10 am on March 28, as the countermeasure for leaking was completed, we restarted 2nd Cesium adsorption system. At 9:20, achieve regular flow rate(approx.40m^3/h). At 12:07 pm and 12:13 pm, we activated 2 systems of water desalinations (reverse osmosis membrane). Regarding cesium adsorption system, as construction for building 2 lines of accumulated treatment facility, after completion of this work, 2:32 pm, we activated Cesium adsorption system and achieved regular flow rate (approx. 19.1m^3/h)
- -At 8:30 am on April 4, in the second cesium adsorption apparatus, because we observed the treated volume gradually decreased, we temporarily stopped the apparatus to wash the filter. At 11:20 am on the same day, we restarted the apparatus and the flow rate reached the normal volume (about 40.0 m3/h) at 11:30 am.

※ At around 1:10 am, because the amount of flow which transfer condensed water from the water desalinator (reverse osmosis membrane) to the condensed water storage tank increased at around 1:05 am on April 5, 2012, we stopped the operation of the desalinator manually considering the possibility of water leakage. At around 1:45 am, In order to prevent water leakage, we closed the valve located before and after the piping (pressure-proof hose) which transfer condensed water from the water desalinator to the condensed water storage tank. At around 1:50 am, TEPCO's employee checked the site and found water leakage from the piping. At around 2:20 am, the employee confirmed that the leakage stopped since the desalinator was stopped its operation and the valve was closed. Because it was confirmed that water leaked from the lagging material of the pressure-proof hose, the employee removed the material, confirming that the pressure-proof horse had been disconnected from the joint flange. Because there was possibility that condensed water amounting to approximately 12 m3 might have flown into sea via the ditch for general water discharge, we conducted sampling of the leaked water, water at the drainage ditch, and seawater around the exit of the ditch for general water discharge which locates around 300 m south from the water outlet of Unit 1 – 4. As a result, all gamma and beta nuclide was detected from the leaked water and water at ditch was below the detection limit. And on the same day we confirmed the all gamma and beta nuclide from re-sampling of the plant offshore was below the detection limit. On the same day, we conducted re-sampling the seawater around the exit of the ditch and we confirmed the result of all gamma was below the detection limit and the result of all beta was the same level of the detection limit. To keep watch on the trend, we conducted sampling of the seawater around the exit of the ditch on April 9. As a result of the sampling, though gamma nuclide was detected it was at the same level of detection limit and it was also confirmed all beta radiation was below detection limit. In view of the reactor water condition (the water lever in the temporary storage tank of RO treated water for the water buffer tank to the reactor was decrease), at 9:50 am on April 8, we started the water desalinator (reverse osmosis membrane) to dispose of the water in waste liquid tank of RO. Before the operation, we exchanged the all polyethylene pipe which were set from the outlet of the pump for concentrated water to storage tank for RO concentrated water and we confirmed the no problem for the leakage. At 9:43 on the same day, we stopped the water desalinator (reverse osmosis membrane) after disposing the water in waste liquid tank of RO. As series of countermeasures* regarding this leakage were finalized, at 9:52 pm on April 9, we started water desalinator (reverse osmosis membrane) to recommence the treatment of accumulated water. Desalinator (reverse osmosis membrane) will be operated intermittently considering the water balance.

* Series of countermeasures

- Setting of absorbent to the leaking point. Setting of sandbags to the connecting point of U-drainage ditch and general water discharge
- Collection of accumulated water in the drainage and cleaning, and collection of cleaning water.
- Setting of sandbags along with the transfer line from suppression pool water surge tank (SPT)(B) to desalinator (reverse osmosis membrane) to prevent expansion the leakage (SPT building side, slope, drainage, around manhole).
- Hose from outlet of condensed water feed water pump to RO condensed water pool was replaced to the polyethylene pipe (the line which is currently used for the desalination).

- At 1:05 am on April 5, 2012: 2nd Cesium adsorption apparatus automatically stopped its operation triggered by the alarm. After checking the site, we confirmed there was no leakage. The cause of the stop is that an operator mistakenly touched the "button for switching modes" on the operation panel (touch panel) of the apparatus. At 9:48 am on April 10, the second cesium adsorption apparatus was started and reached to the normal operation flow (40.0 m^3/h) at 9:50 am on the same day.

<Transferring accumulated water in Centralized Radiation Waste Treatment Facility >

- At 9:47am on January 11 2012, we started to transfer accumulated water from the On-site Bunker Building of the Central Radiation Water Treatment Facility to the Process Main Building. At 3:32 pm on the same day, we stopped the transfer.
- At 10:36 am on January 23, we started transferring accumulated water from On-site Bunker Building to Process main building at Centralized Radiation Waste Treatment Facility. At 3:51 pm on the same day, we stopped the transfer.
- At 9:35 am on January 31, we started transfer of accumulated water from site banker to process main building in the centralized radiation waste treatment facility. At 3:33 pm, we stopped the transfer.
- At 8:45 am on February 10, 2012, at the Centralized Radiation Waste Treatment Facility, we started transferring accumulated water from On-site Bunker Building to Process Main Building. Stopped on 4:39 pm on the same day.
- At 9:40 am on February 21, at the centralized radiation waste treatment facility, we started transfer of accumulated water from site banker to process main building. We

stopped the transfer at 3:45pm on the same day.

- From 9:43 am to 3:58 pm on March 3, 2012, we started transferring the water accumulated in the site banker building to the process main building in the centralized waste treatment facilities.
- At 8:37 am on March 12, we started transferring the water accumulated in the site banker building to the process main building in the centralized waste treatment facilities. At 1:31 pm on the same day, we stopped transferring.
- Accumulated water (volume: about 220 m^3) in the trench located between the process main building of Centralized Radiation Waste Treatment Facility and Miscellaneous Solid Waste Volume Reduction Treatment Building (High Temperature Incinerator Building) found on December 18, 2011 was transferred to Miscellaneous Solid Waste Volume Reduction Treatment Building (High Temperature Incinerator Building) on December 23 in the same year (transfer volume: about 120 m^3). Since then, the water level has been monitored. Because the water level has been rising, the accumulated water was started to be transferred to Miscellaneous Solid Waste Volume Reduction Treatment Building (High Temperature Incinerator Building) at 3:35 pm on March 14, 2012. The transfer was stopped at 8:20 am on March 15, 2012 (transfer volume: about 120 m^3).
- At 8:27 am on March 19, 2012, we started transferring the accumulated water from On-site Bunker Building to Process Main Building. At 4:23 pm on the same day, we stopped the transfer.
- At 9:08 am on March 29, 2012, as for the Centralized Radiation Waste Treatment Facility, we started to transfer accumulated water from the On-site Bunker Building to Process Main Building and stopped it at 5:25 pm on the same day.
- At 9:30 am on April 10, we started transferring of accumulated water from the Site Banker Building to Process Main Building at Centralized Radiation Waste Treatment Facility. At 4:52 pm on the same day, we stopped transferring.

< Situation of accumulated water of trench, etc.>

- On December 18, 2011, we found accumulated water in the trench located between the process main building of Centralized Radiation Waste Treatment Facility and Miscellaneous Solid Waste Volume Reduction Treatment Building (High Temperature Incinerator Building). After that we confirmed that water inflow from cable duct near the ceiling of the trench. As a result of the inspection, the cable duct was used for the PHS line and led to the electric wire duct line of the outdoor lighting, and we estimated that the puddle of water near the lighting flowed through the opening of electric wire duct line which was made by a tsunami, into the trench. On January 5, 2012, we cut the cable duct line and carried out water stops work with seal materials and seal tape at both entrance and exit sides of the duct line. On January 6, we confirmed that there is no inflow of the water into the trench from the cable duct line. For the concerned trench, we will investigate for the identification the leak in point of the highly-concentrated radioactive contaminated water sequentially, and examine and carry out the investigation to determine the causes and recurrence preventive measures, and carry out the check for other trenches in the Fukushima Daiichi Nuclear Power Plant.
- Because of the finding of accumulated water included radioactive materials at the trench between the Process Main Building and the Miscellaneous Solid Waste Volume Reduction Treatment Building[High Temperature Incinerator Building](December 18, 2011), we started the inspection of other trenches at the site on January 11. As of the last inspection on February 15, the inspection of trenches etc. were completed.
- As a result of the inspection, the locations where accumulated water was discovered and the nuclide analysis results are as follows:

January 11

・The Unit 2-4 DG connecting duct

- I-131：below measurable limit, Cs-134：approx. 1.9×10^{0} Bq/cm3、Cs-137：approx. 2.6×10^{0} Bq/cm3

・The accumulated water treatment building～the connecting duct in the Unit 1 turbine building

I-131：below measurable limit, Cs-134：approx. 8.8×10-1Bq/cm3、Cs-137：approx. 1.3×10０Bq/cm3

January 12

・ Unit 1 chemical tank connecting duct

I-131: below measurable limit, Cs-134: 2.4×10^{0}Bq/cm^{3} ,Cs-137: 3.5×10^{0}Bq/cm^{3}

・ Unit 3 transformer cable duct for activation.

The radioactive concentration of the puddle water is below measurable limit for I-131, 4.9×10１Bq/cm^{3} for Cs-134, 6.9×10１Bq/$cm^{3}$for Cs-137 （Total of the major three nuclides reaches 100Bq/cm^{3}）. As indicated above, it was found out that the water contained relatively highly-concentrated radioactive materials. We presume that the accumulated water in the building is not likely to have flown into the cable duct since the water level (water surface) of the puddle is higher than that of the accumulated water in the building.

We confirmed that there was no puddle in the duct for radioactive fluid of Unit 3.

January 13

・Unit 1 radioactive fluid piping duct

I-131: below measurable limit, Cs-134: 1.4×10^{0}Bq/cm^{3} ,Cs-137: 1.9×10^{0}Bq/cm^{3}

・Unit 4 radioactive fluid piping duct

I-131: below measurable limit, Cs-134: 2.2×10^{1}Bq/cm^{3} ,Cs-137: 2.8×10^{1}Bq/cm^{3}

January 16

・The Unit 1 water intake power cable duct

I-131：below measurable limit, Cs-134：2.3×10０Bq/cm3、Cs-137：3.2×10０Bq/cm3

January 17

・The Unit 4 Chemical tank connection duct

I-131：below measurable limit, Cs-134：1.3×10０Bq/cm3、Cs-137：1.7×10０Bq/cm3

・The Unit １ water intake power cable duct

I-131：below measurable limit, Cs-134：5.4×10-1Bq/cm3、Cs-137：8.0×10-1Bq/cm3

January 18

-Unit 1 Seawater piping tunnel

I-131:Not detected, Cs-134:2.9×10^{-1}Bq/cm^{3}、Cs-137:4.4×10^{-1}Bq/cm^{3}

-Unit1 Common piping duct

I-131:Not detected, Cs-134:1.0×10^{1}Bq/cm^{3}、Cs-137：1.5×10^{1}Bq/cm^{3}

-Unit1 Control cable duct

I-131:Not detected, Cs-134:4.8×10^{-1}Bq/cm^{3}、Cs-137：7.1×10^{-1}Bq/cm^{3}

-We confirmed that no accumulated water in the Unit 4 Seawater piping duct.

・ It has been confirmed that there is no accumulated water at The Unit 3 Chemical tank connection duct and at the piping duct for Unit 2 radioactive liquid.

January 19

- Unit 2 water pump room, circulating water pump discharge valve pit

I-131:Not detected, Cs-134:7.1×10^{3}Bq/cm^{3}、Cs-137:9.1×10^{3}Bq/cm^{3}

- Unit 3 water pump room, circulating water pump discharge valve pit

I-131:Not detected, Cs-134:3.8×10^{2}Bq/cm^{3}、Cs-137：4.8×10^{2}Bq/cm^{3}

・ The accumulated water was confirmed at circulating water pump discharge valve pit in water pump room of Unit 2 and 3 during the inspection. As a result of nuclide analysis, we found out that relatively high concentration of radioactive material is included in the water. However, the possibility of the outflow to the sea is extremely low since there has been no significant change in the sampling result conducted daily basis at Unit 2 and Unit 3 (Inside and outside of dust inhibitor).

- No accumulated water was confirmed in the common piping duct of Unit 2.

- Unit 2 water pump room, circulating water pump discharge valve pit

I-131:Not detected, Cs-134:7.1×103Bq/cm3、Cs-137:9.1×103Bq/cm3

- Unit 3 water pump room, circulating water pump discharge valve pit

I-131:Not detected, Cs-134:3.8×102Bq/cm3、Cs-137：4.8×102Bq/cm3

- Unit 4 water pump room, circulating water pump discharge valve pit

I-131:Not detected, Cs-134:9.1×100Bq/cm3、Cs-137：1.2×101Bq/cm3

- Centralized Environment Facility radiation waste common duct

I-131:Not detected, Cs-134:7.3×10-1Bq/cm3、Cs-137：9.4×10-1Bq/cm3

January 20

- Off-gas piping duct, Unit 3

I-131: below detection limit, Cs-134: 3.1x101Bq/cm^3, Cs-137：4.1×101Bq/cm^3

January 24,

・Inside of Connection trench between boiler room and electric equipment room of Unit 1

I-131：below measurable limit, Cs-134：approx. 7.9×10^{-1}Bq/cm^3、Cs-137：approx. 1.0×10^{0}Bq/cm^3

・We confirmed no puddle in Unit 3-4 heavy oil pipe trench.

・Inside of Unit 4 main transformer cable duct

I-131：below measurable limit, Cs-134：approx. 7.5×10^{-1}Bq/cm^3、Cs-137：approx. 1.0×10^{0}Bq/cm^3

January 25

- Inside of the connecting duct of Unit 1 Waste Liquid Surge Tank

  I-131: below measurable limit, Cs-134：approx. 1.2×10^{1}Bq/cm^3, Cs-137：approx. 1.5×10^{1}Bq/cm3

- Inside of the main transformer cable duct

  I-131: below measurable limit, Cs-134: approx. 1.5×10^{0}Bq/cm^3, Cs-137: approx.2.3×10^{0}Bq/cm^3

- Inside of the fire extinguishing duct trench

  I-131: below measurable limit, Cs-134: below measurable limit, Cs-137: approx.1.0×10^{-1}Bq/cm^3

- January 26

Off-gas piping duct, Unit 1

I-131: below measurable limit,

Cs-134: 5.5×10^{-1}Bq/cm^3, Cs-137: 8.9×10^{-1}Bq/cm^3

Activated Carbon holdup duct, Unit 1

I-131: below measurable limit,

Cs-134: 1.6×10^{-1}Bq/cm^3, Cs-137: 2.7×10^{-1}Bq/cm^3

Main Transformer Cable Duct, Unit 2

I-131: below measurable limit,

Cs-134: 8.1×10^{-1}Bq/cm^3, Cs-137: 1.1×10^{0}Bq/cm^3

Connection Duct of Waste Liquid Surge Tank, Unit 2.

We confirmed that no accumulated water.

Common-use Boiler Trench of Unit 2-3

We confirmed that no accumulated water.

Main Transformer Cable Duct, Unit 3

I-131: below measurable limit,

Cs-134: 1.4×10^{0}Bq/cm^3, Cs-137: 1.8×10^{0}Bq/cm^3

January 30

・Unit 2 Transformer trench for disaster prevention

I-131：below measurable limit, Cs-134：approx. 2.1×10^{0}Bq/cm^3、Cs-137：approx. 3.0×10^{0}Bq/cm^3

January 31

・Discharge pit of the circulation water pump in the pump room, Unit 4

I-131: Below detection limit, Cs-134：4.5×10^{0}Bq/cm^3、Cs-137：6.3×10^{0}Bq/cm^3

・Cable duct at the start-up transformer, Unit 1

I-131: Below detection limit, Cs-134：2.2×10^{0}Bq/cm^3、Cs-137：3.0×10^{0}Bq/cm^3

・We confirmed that no water was accumulated in the trench on the north of former Administration Office Building.

February 6

・IInside the Unit 6 off-gas plumbing duct

I131: below the detectible limit, Cs-134: 1.2×10^{-1} Bq/ cm^3, Cs-137: 1.9×10^{-1} Bq/ cm^3

・Inside the Unit 5 pump room circulating water pump valve disorption pit

I131: below the detectible limit, Cs-134: 1.0×10^{-1} Bq/ cm^3, Cs-137: 1.6×10^{-1}

Bq/ cm^3

・Inside the Unit 6 pump room circulating water pump valve disorption pit

I131: below the detectible limit, Cs-134: 1.1×10^{-1} Bq/ cm^3, Cs-137: 1.4×10^{-1} Bq/ cm^3

・Inside the Unit 5 off-gas duct and heavy oil plumbing trench (the west side of Unit 5), we confirmed there is no puddle water

February 7

- Inside the duct for power cables for the Unit 5 water intake
  I-131: below the detectible limit, Cs-134: 1.4×10^{-1} Bq/ cm^3, Cs-137: 2.0×10^{-1} Bq/ cm^3
- Inside the duct for Unit 5 seawater pipes
  I-131: below the detectible limit, Cs-134: 8.2×10^{-2} Bq/ cm^3, Cs-137: 1.1×10^{-1} Bq/ cm^3
- Inside duct for Unit 5 main transformer cables
  I-131: below the detectible limit, Cs-134: 7.3×10^{-2} Bq/ cm^3, Cs-137: 1.3×10^{-1} Bq/ cm^3
- Inside duct for Unit 5 start-up transformer cables
  I-131: below the detectible limit, Cs-134: 2.0×10^{-1} Bq/ cm^3, Cs-137: 2.9×10^{-1} Bq/ cm^3

February 8

- Inside the duct for power cables for the Unit 6 water intake
  I-131: below the detectible limit, Cs-134: 1.0×10^{-1} Bq/ cm^3, Cs-137: 8.3×10^{-2} Bq/ cm^3
- Inside the trench for the Unit 5 and 6 storm drain pipes
  I-131: below the detectible limit, Cs-134: 1.7×10-^{1} Bq/ $cm^{3,}$ Cs-137: 2.5×10^{-1} Bq/ cm^3
- Inside the duct for the Unit 5 radioactive fluid pipes
  I-131: below the detectible limit, Cs-134: 8.0×10^{-2} Bq/ cm^3, Cs-137: 1.3×10^{-1} Bq/ cm^3
- Inside the duct for the Unit 6 main transformer cables
  I-131: below the detectible limit, Cs-134: 2.8×10^{-1} Bq/ cm^3, Cs-137: 4.3×10^{-1} Bq/ cm^3
- Inside the trench for heavy oil pipes (east of Unit 5)
  I-131: below the detectible limit, Cs-134: 2.0×10^{-1} Bq/ cm^3, Cs-137: 2.8×10^{-1} Bq/ cm^3

February 9

- Inside the duct for telecommunication cables of Unit 5 & 6
  I-131: below the detectible limit, Cs-134: below the detectible limit, Cs-137:7.2✕10-2 Bq/ cm3
- Inside the duct for emergency gas treatment piping
  I-131: below the detectible limit, Cs-134:4.6✕10-1 Bq/ cm3, Cs-137:6.7✕10-1 Bq/ cm3
- Inside the connection duct of Unit 5's chemical tank, inside the trench for the piping of suppression pool water, inside the duct for common suppression pool water surge pipe, inside the trench for fire-extinguishing piping (at the west of Unit 5), inside the trench for fire-extinguishing piping (at the west of Unit 6), and the inside the trench of fire-extinguishing piping (at the south of Unit 5), we confirmed no accumulated water.

February 10

- Unit 6, inside of seawater pipe duct (SW system)
  I-131:Below detection limit (ND), Cs-134:$2.1\text{x}10^{-1}$Bq/cm^3, Cs-137:$3.4\text{x}10^{-1}$Bq/cm^3
- Unit 5, inside of seawater pipe duct (SW system)
  I-131:ND, Cs-134:$1.4\text{x}10^{-1}$Bq/cm^3, Cs-137:$1.5\text{x}10^{-1}$Bq/cm^3
- No6, inside of trench for diesel fuel pipe
  I-131:ND, Cs-134:$2.5\text{x}10^{-1}$Bq/cm^3, Cs-137:$3.7\text{x}10^{-1}$Bq/cm^3
- Unit 6, inside of pipe duct (b/w pump room and MG set build.)
  I-131:ND, Cs-134:$1.1\text{x}10^{-1}$Bq/cm^3, Cs-137:$2.0\text{x}10^{-1}$Bq/cm^3
- Unit 6, inside of seawater pipe duct (North side, emergency line)
  I-131:ND, Cs-134:ND, Cs-137:$1.2\text{x}10^{-1}$Bq/cm^3

- Unit 6, inside of seawater pipe duct (South side, emergency line)
  I-131:ND, Cs-134:1.4×10^{-1}Bq/cm^3, Cs-137:2.0×10^{-1}Bq/cm^3

February 13

- Water treatment piping shaft (East side of Administration Office Building)
  I-131: Below the detection limit, Cs-134: 2.2×10^0Bq/cm^3, Cs-137: 3.3×10^0Bq/cm^3
- Water treatment piping shaft (East side of filtrate water tank)
  No pool of water is confirmed.
- Because of the finding of accumulated water included radioactive materials at the trench between the Process Main Building and the Miscellaneous Solid Waste Volume Reduction Treatment Building[High Temperature Incinerator Building](December 18, 2011), we started the inspection of other trenches at the site on January 11.

February 14

- Unit 6, fluid piping duct
  I-131: Below the detection limit, Cs-134: 2.2×10^{-1}Bq/cm^3, Cs-137: 2.8×10^{-1}Bq/cm^3
  No pool of water was confirmed at common piping duct of Unit 5 and Unit 6.

February 15

- Inside of fire extinction pipe trench (East of Unit 3)
  I-131: Below the detection limit, Cs-134: 3.4×10^0Bq/cm^3, Cs-137: 4.8×10^0Bq/cm^3
- Inside Unit 5 and 6, Transformer disaster prevention pipe trench
  I-131: Below the detection limit, Cs-134: 1.0×10^{-1}Bq/cm^3, Cs-137: 9.3×10^{-2}Bq/cm^3
- Fire extinction pipe trench (Southwest of Unit 5)
  I-131: Below the detection limit, Cs-134: 1.4×10^{-1}Bq/cm^3, Cs-137: 1.6×10^{-1}Bq/cm^3

-At an inspection of trenches on January 19, we confirmed high contamined water in the circulation pump exhaustion pit of Unit 2. We conducted transferring the water to the basement floor of Unit 2 turbine building at the following time.

From 10:11 am to 5:11 pm on February 20.
From 9:50 am to 3:34 pm on February 21.
From 9:43 am to 3:58 pm on February 22.

-At an inspection of trenches on January 19, we confirmed high contamined water in the circulation pump exhaustion pit of Unit 3. We conducted transferring the water to the basement floor of Unit 2 turbine building at the following time.

From 10:13 am to 3:34 pm on February 27.
From 8:51 am to 3:45 pm on February 28.
From 8:17 am to 3:40 pm on February 29.
From 8:26 am to 3:18 pm on March 1.

-For the level of the accumulated water in the trench located between the process main building of Centralized Radiation Waste Treatment Facility and Miscellaneous Solid Waste Volume Reduction Treatment Building (High Temperature Incinerator Building) found on December 18 was rising, we conducted transferring the water to Miscellaneous Solid Waste Volume Reduction Treatment Building (High Temperature Incinerator Building) from 3:35 pm on March 14 to 8:20 am on March 15 (approx. 120 m^3).

-The level of the accumulated water in the circulation pump exhaustion pit of Unit 2 rose after the water transfer to Unit 2 turbine building from February 20 to February 22. After it became stabilized at the level before transfer, we conducted transferring the water to the basement floor of Unit 2 turbine building at the following time.

From 12:28 pm to 6:04 pm on April 15 (approx. 160 m^3)
From 8:04 am on April 16 to

<Common spent fuel pool>

*common spent fuel pool: a spent fuel pool for common use set in a separate building in a plant site in order to preserve spent fuel which are transferred from the spent fuel pool in each Unit building.

- On October 27, while the staff from a cooperating company was conducting an annual checkup of the ceiling crane, which handles used fuel casks, a crack was found on the casing of the connection point of the vehicle for driving. We will inspect the further details of the connection point. After that, as we found that the damaged part was a crack that occurred at the gear coupling cover of the vehicle's running drive, we completed a replacement of the part with a same kind. On January 25, 2012, we confirmed completion of the crane rehabilitation after we implemented a loading test and made sure there are no abnormalities.

- At 10:02 am on February 16, we stopped cooling the common spent fuel pool due to the restoration of the station common diesel generation (A) (the temperature of the water in the pool at the time: 18.2 ℃). We restarted cooling at 2:06 pm (the temperature of the water in the pool at the time: 19.0 ℃).
- At 10:11 am on March 6, 2012, we stopped cooling the common spent fuel pool due to the restoration of the station common diesel generation (A) (the temperature of the water in the pool at the time: 18.4 ℃). We restarted cooling at 2:01 pm (the temperature of the water in the pool at the time: 19.3 ℃).

<Injured / ill health>

- At around 2:22 pm on January 9, at the Spent Sludge Storage Facility (*) of Fukushima Daiichi Nuclear Power Station (1F), a partner company's worker who had been engaged in concrete placement work reported his physical disorder. He was carried to the emergency medical room of 1F's Unit 5/6 and received medical treatment. Because he was in cardiopulmonary arrest, he was carried from 1F to Iwaki Kyouritsu Hospital at 3:25 pm. For reference, no radioactive materials were found to be attached to the worker's body.
- At around 1 pm on January 11, we were reported from the partner company that his death was confirmed by a doctor at 5:02 pm on January 9.

  *Spent Sludge Storage Facility: The facility to store radioactive waste (spent sludge), which is produced during the process of accumulated water treatment, on a temporary basis.
- At 3:00 pm on January 18, 2012, the instrument to measure the concentration of radioactive materials in air continuously (continuous dust monitor), which is located in front of Main Anti-Earthquake Building, issue an alert. Following the alert, based on the operation rule of full-face mask wearing, we instructed to wear the full-face masks from 3:11 pm on the same day.
- Later, we confirmed that there was no valid fluctuation on the value shown by the monitoring post. We replaced the filters of the measurement instrument, and rebooted the instrument by resetting at 3:40 pm on the same day. According to the result of manual measurement of radioactive materials in air in front of Main Anti-Earthquake Building, the concentration of radioactive materials in air at Main Anti-Earthquake Building was less than the detection level (the detection limit: 1.4 x 10^{-5}[Bq/cm^3] and the value was less than the standard level to wear full-face masks (1x10^{-4}[Bq/cm^3]. Therefore, we announced to resume the normal operation which does not require to wear full-face masks.
- At 12:00 pm on January 24, one of the staff from a cooperating company struck his full-face mask against the edge of the carrier of a truck and the filter of his mask temporarily dropped off. As there was a possibility of intake of radioactive materials, we measured his internal exposure dose with a whole body counter. As a result, there was no significant problem of internal radiation dose (the measured level was below the standard of inscription in the radiation dose management notebook.), therefore, we evaluated that there was no intake of radioactive materials. There was no pollution on the inner side of the full-face mask, the face, and the nostril.
- At about 7:10 pm on February 4, a worker of a partner company which operated the water desalinations said he was in bad shape. He was examined and treated at the emergency medical clinic of Unit 5&6 and judged that he required an emergency transfer. Then he was transferred to the J Village at 9:06 pm. After that, at 9:50 pm, he was transferred to Iwaki Kyouritsu Hospital from the J Village. At this moment, the doctors examine and treat. The patient does not have any radiation materials. After the examination by the doctors, the worker went home.
- At around 8:30 pm on February 15, we detected radiation from a face of a worker of co-operating company who was collecting and delivering debris at around the

Unit 3 and the Solid Waste Storage Facility No1 and 2 by the contamination test at J-Village. After the decontamination of the face, we conducted the contamination test again by whole body counter. As a result, no radioactive materials was taken in(below 2mSv). We evaluated that the radiation was attached when he removed the equipment, because there were no other workers who were detected the radiation at the area and no defects of the equipment situation.

- As we confirmed that high radioactivity contaminated water is accumulating in the pit of water circulating pump discharge valve of unit 3 pump chamber at the inspection of trench etc. conducted on January 19, we started to transferring accumulated water from the pit to the basement of unit 2 turbine building at 10:13 am, February 27. At 3:34 pm on the same day, we stopped transfer. At 8:51 am on February 28, we restarted the transfer. At 3:45 pm, the transfer was suspended. At 8:17 am on February 29, we restarted the transfer. At 3:40 pm on the same day, we suspended the transfer. At 8:26 am on March 1, we restarted the transfer. At 3:18 pm on the same day, we suspended the transfer.

<Others>

- At around 11:20 on January 27, the subcontractor employees who were patrolling at that time found the leakage at the flange of the pure water piping between the Solid Waste Storage and the Regular Inspection Material Storage, which is approx. 0.5 liter/min. At around 1:28 pm, After retightening, we confirmed that the leakage stopped. In addition, the leakage water was pure water (The radiation dose in ambient air near the leaking point was not different from surrounding area). Because there was no drain around there, it is considered that there was no leakage to the ocean.
- At 10:29 am on January 28, when a TEPCO worker checked the reactor water injection system, he found water leakage from the Vent Valve around the Normal Reactor Injection Pump (B) on the Hill which was on standby. At around 10:36 am, we closed the anterior and posterior valve of the pump and at around 11:19 am, we checked that the leakage was stopped. (We estimated the amount of leakage was approx. 9 liters.) The water did not flow out to the sea because there was no drain there. We also checked that the surface dose rate around the leakage point was the same level of the atmosphere dose rate. Currently, we are checking the similar places. We will conduct a detail inspection to find the reason of the leakage and take countermeasures. We continue to inject water to the reactor from the Normal Reactor Injection Pump on the Hill (A) and (C).
- At around 9:50 am on January 29, one of our employees, during adjustment works of the water flow to the feed water spray system, found a water leak from near the flow rate detector of the emergency reactor injection pump on the hill (C) which is now at standby. We shut down the valve at the leakage point and at 9:55 am confirmed that the water leak has stopped (amount of leakage under examination). The leakage point is on the hill (at the front of the main office building) and there are traces that show that a certain amount of water has flowed into the drain, and we are examining whether this water has flowed into the ocean or not. According to the sampling results we conducted at the lower side of the gutter both Cs -134 and Cs-137 was below detection limit (detection limit: Cs-134:2.4×10^{-2}Bq/cm^3, Cs-137:2.9×10^{-2}Bq/cm^3). The surface radioactivity concentration near the leakage point is as the same level as the atmosphere around (radioactivity concentration near the buffer water tank upper side of the pump is below measurable limit in all three major nuclides (sampled on 28 January 2012) : I-131: 1.3×10^{-2}Bq/cm^3, Cs-134:2.9×10^{-2}Bq/cm^3, Cs-137:5.4×10^{-2}Bq/cm^3. We will continue to assess and review the possibility of leakage through all beta nuclides analysis of the sampling points, outlets of Unit 5/6 and the buffer tank water. Water injection to the reactor is maintained by the ordinary reactor injection pump on the hill (A) and (C).

· Other leakage points confirmed by 3:00 pm is as follows:

○ Secondary water cooling unit of Unit 4 spent fuel pool (three points)
(Filtrate water*: Approx. 40L)

○ "A" system minimum flow line flange, waste liquid supply pump, Water desalinations (RO)
(Water after decontamination and before purification: approx. 10L (in the barrage))
[Surface radioactive density gamma ray: 0.6mSv/h, beta ray: 35mSv/h,

atmosphere radioactive density gamma ray: 0.11mSv/h, beta ray: 2mSv/h]

○ Flow meter of reactor water injection pump from Unit 3 condensate storage tank to Unit 2
(RO water: Approx. 4L)
[atmosphere radioactive density as same as background level]

○ Flow meter of reactor water injection pump from Unit 3 condensate storage tank to Unit 3
(RO water: Approx. 4L)
[atmosphere radioactive density as same as background level]

○ Flange of demineralizer resin transfer line of water desalinations (evaporative concentration apparatus)
(RO water: Approx. 0.5L (in the barrage))
[atmosphere radioactive density as same as background level]

○ Boiler "B" system, Water desalinations (evaporative concentration apparatus)
(Filtrate water*: Approx. 25L (total of system B and C))

○ Boiler "C" system, Water desalinations (evaporative concentration apparatus)
(Filtrate water:* Approx. 25L (total of system B and C))

○ Header of filtrate water supply line into fuel pool make up system
(Filtrate water:* Approx. 9L)

○ Flow meter of filtrate water backwash line of boiler water supply of evaporative concentration apparatus
(Filtrate water:* Approx. 18L)

○ Flow meter of filtrate water of deionizer
(Filtrate water*: Approx. 1L)

○ Flange of cooling water line of Unit 6 water circulation pump
(Pure water (made from filtrate water): Approx. 7,000L)

○ Flow meter of waste water line of deionizer
(Pure water (made from filtrate water): Approx. 9L)

○ Filtrate water supply valve of Unit 3 spent fuel pool cooling system
(Filtrate water*: Approx. 50L)

- On January 29, we conduct a patrol under the series of water leakage which seems to be occurred by the freeze. At 10:55 pm on the same day, a freeze of Filtrate water was found around the header valve of the circulating cooling equipment for the spent fuel pool. We have been conducting water passing in order to prevent freezing around the area. Also we established a floodlight and warmed the area to protect the facility, we confirmed water passing trough the area in the morning patrol which was started at 6:25 am on January 30.

- The water leakage newly found from the previous release (as of 6:00 pm on January 29)was as follows;

○ The exit line flange of seal water cooler of evaporative distillation apparatus 3B (found at approx. 6:20 pm on January 29)
(Filtrate water*: Approx. 30L)

○ Minimum circulation pipe flange of water injection pump (A) located upland (found at approx. 9:03 am on January 30)
(Filtrate water*: Approx. one drop in 7～8 seconds)

- On January 30, we conducted night patrol due to water leakage that was thought to be due to freezing. At 10:50 pm on the same day, we found something that looked like crack that was thought to be due to freezing at valve box of filtrate water side piping at the entrance of the reactor water injection pump (C) on the hill. The surface water of this point has been freezing and we found no water leakage. From this time, we will review the implementation of valve replacement and measure against freezing.

- The water leakage newly found from the previous release (as of 10:00 am on January 30) was as follows;

○ Valve box of filtrate water side piping at the entrance of the reactor water i njection pump
(C)on the hill. (Found at around 3:15 pm on January 30)
(Filtrate water*: the width is equivalent to approx. 2 pencils
The amount trun out to be approx. 600l by later inspection,)

○ The exit line flange of seal water cooler of evaporative concentration apparatus 3A
(Found at around 3:20 pm on January 30)
(Filtrate water*: 2 drops per approx. 1 second
The amount trun out to be approx. 600l by later inspection,)

○ The condensed water return line flange of evaporative concentration apparatus (A)(Found at around 9:05 am on January 31)
(Filtrate water*: approx. 20 L)

*Filtrate water: water taken from the barrage

- Newly found water leakage that was thought to be due to freezing from the previous release (as of 10:00 am on January 31) was as follow;

○ No.2 filtered water tank valves bonnet screw part

(Two Valves. Found at 2:30 pm on January 31)

(Filtrate water*: approx. 20 L)

*Filtrate water: water taken from the bam

- At approx. 10:30 pm on January 31, we found the water eaking from the indicator test line in the rack instruments for jet pumps were stored on the 1st frloor in Unit 4 Reactor Building. At 10:43 pm, the leakage was stopped after the main valve leading to the rack was closed. Debris were scattered around on the floor, and the volume of leaked water was approx. 6 litters as far as we could confirmed. Please note that it didn't run off outside of the reactor building. We sampled the water in the test line and measured the radioactivity concentration. From the results, we estimated the water leaked from the reactor well (analysis result: 35.5 Bq/cm^3).
- Newly found water leakage after the previous announcement (as of 3:00 pm January 31) is as follows;

  ○Casing of the water injection pump (electrically driven pump for Unit 2) at the side of the pure water tank (found approx. at 4:00 pm on January 31) (Filtrate water*: approx. 10 L)

  ○Indicator (flow rate transmitter) test line in the instrument rack (instrument rack for the jet pump) at the southwest corner on the first floor of Unit 4 Reactor Building, (found approx. at 10:30 pm on January 31)
- (Water from the reactor well: approx. 6 L) From the results, we estimated the water leaked from the reactor well (analysis result: 35.5 Bq/cm^3). We estimated the amount of water leaked is 8,500 litters by measuring decrease in water level of skimmer surge tank
- Newly found water leakage after the previous announcement (as of 3:00 pm January 31) is as follows;
  - ➢ Casing of the water injection pump (electrically driven pump for Unit 2) at the side of the pure water tank (found approx. at 4:00 pm on January 31) (Filtrate water*: approx. 10 L)

    * Filtrate water: water taken from the dam
  - ➢ Indicator (flow rate transmitter) test line in the instrument rack (instrument rack for the jet pump) at the southwest corner on the first floor of Unit 4 Reactor Building (found approx. at 10:30 pm on January 31) (Water from the reactor well: approx. 8,500 L)
- At 3:20 pm on February 2, a Tepco worker on patrolling at reactor building of Unit 4 found the very small flow(just as much as lead in pencil) of water in north west corner in first floor of the reactor building. This leakage seemed to be occurred at make up water system in reactor well because the valve at reactor well is closed totally and so the leakage seemed not be from reactor well. We are investigating further. No water leakage to out side of reactor building.
- Newly found water leakage caused by congelation after the latest report (at 10:00 am February 1) are as follows:
  - ➢ two valves in discharged water piping at water treatment building where filtrate water purified(Found at 3:30 pm on February 2)
  - ➢ (Filtrate water(water taken from dam): approx. 0.5 litters)
- At 12:30 pm on February 3, one of TEPCO's employees and a worker of cooperating companies found ooze at the tank joint of concentration tank of Water Desalinations (reverse osmosis membrane). There was ooze on the surface of concrete foundation on which the tank was set, but it was not in shape of puddle and there has been no leakage to the oceans.

  We retightened the joint bolt afterwards and confirmed at 2:44 pm on the same day that the ooze from the joint had been stopped.

  The results of having measured the radiation dose of tank joint with ooze were 0.9mSv/h of γ-ray and 50mSv/h of β-ray (Those of airborne radiation dose are 0.2mSv/h of γ-ray and 7mSv/h of β-ray).

  As for the leakage, it is so little that it is invisible, but high radiation dose (22mSv/h of γ-ray and 2000mSv/h of β-ray) was confirmed at the gap between the concrete foundation which is just below the joint with ooze and the tank flange. Thus, there must have been drops. The oozed water from the joint is estimated to be concentrated water (saline water) after being treated with Water Desalinations (reverse osmosis membrane). (The radioactivity density of water at the inlet of evaporative concentration facility sampled on December 20, 2011 were $1.2\times10^{1}Bq/cm^{3}$ of cesium134, $1.7\times10^{1}Bq/cm^{3}$ of cesium137, and $2.7\times10^{5}Bq/cm^{3}$ of all-β.)

After covering the concrete surface with ooze using acrylic boards and stage planks, the radiation dose became 1.0mSv/h of γ-ray and 15mSv/h of β-ray.

- Newly found water leakage after the latest report (at 4:00 pm on February 2) are as follows:
  - ○ At header flange of purified water transfer line (line which transfer from purified water tank to common pool) (it was found at around 11:25 am on February 3)

    (filtrated water*: about a pencil lead)
- The newly found water leakage caused by frost after the previous report (at 3:00 pm on February 3) is as follow:

  Secondary cooling system air fin cooler of the spent fuel pool alternative cooling system of Unit 4(founded at 2:30 pm on February 9). (Filtrate water* : a drop per approx. 1 second)

- Approximately on 9:40 am on February 8, the staff of a partner company found the water in a temporary tank to the east of Unit 2 Turbine Building overflowing. At that time we were pumping up the water in the sub-drain to the temporary pool as a trial, thus on 10:15 am on the same day we stopped the pump, and the overflow was stopped. Later we investigated the site and confirmed that there was no water in trenches nearby, therefore we concluded that the water didn't run into trenches nor flow out into the sea. We also sampled the water in the tank. The results of nuclide analyses were Cs-134: $3.4 \times 10^{-1}Bq/cm^{3}$, Cs-137: $5.2 \times 10^{-1}Bq/cm^{3}$. These results are the same as those of the water in the sub-drain sampled today, therefore we concluded that the overflowed water was the water in the sub-drain. The volume of the water overflowed from the tank is under evaluation. The volume of water overflowed from the tank is evaluated at around 16 m^3 at maximum.
- At 3:04 pm on February 19, we confirmed the water leakage at the flange of header valve of water feeding line. The leaked water was filtrate water and the amount was approx. 20L. At 3:55 pm on February 19, the valve of upper stream was closed, and the water leakage was stopped. The radiation dose in ambient air near the leaking point was almost same as that of background. As the result of sampling of leaked water, we confirmed that the sample data of Cesium-134 and Cesium-137 were below measurable limit. In order to prevent the leakage from the surrounding gutter, at 4:20 pm on February 19, we finished piling up the sandbags. After then, we confirmed that the gutter which sandbags piled on was dry, and no water leakage happened to the ocean.
- Around 10:00 am on March 11, 2012, TEPCO's employees found the water leaks from the ceiling near the wall of the west side in the heater room at 1st floor of T/B of Unit 1 during their sampling work for the accumulated water. The puddle of water at the floor is approx. 5m x 7m and it was found the water flows into the nearby funnel*. As the result of the inspection, it was found that the water comes from the damaged part of the pipe, "the roof drain pipe", which is set at the upper of the ceiling and we assumed that the water was rain or melted snow. The radioactivity concentration of the water was Cs-134:$1.1\times10^{1}Bq/cm^{3}$ and Cs-137:$1.7\times10^{1}Bq/cm^{3}$. The leakage water was held in the underground of T/B as the accumulated water and it is considered that there is no leakage to the ocean.

  *drain to gather and lead the water from the pipe or facilities in the building in order to prevent water from leaking into the floor.
- On March 14, in order to prevent diffusion of marine soil in the port, we started the construction that covers the marine soil with solidified mud (armouring units) in earnest.
- In order to stop the offset power and change the station power supply with starting to operate the south switching station, at 5:12 am on March 19, we stopped the operation of reactor monitoring indicator of Unit 3 (the temperature of reactor

pressure vessel)＊1and the cooling operation of spent fuel pool. At 5:33 am, we stopped the cooling operation of common spent fuel pool. Since we completed the switching, we resumed the cooling operation of common spent fuel pool at 6:30 pm on the same day.(the water temperature at the time of shutdown: approx. 21 ℃, the water temperature at the time of restart: approx. 23℃). At 7:41 pm, the reactor monitoring gauge of Unit 3 (the temperature of reactor pressure vessel) recovered normal condition. At 7:56, we resumed the cooling operation of spent fuel pool of Unit 4(the water temperature at the time of shutdown: approx. 28 ℃, the water temperature at the time of restart: approx. 32℃).

＊1: During the suspension of operating power supply, it is not content with Article 138 and 143(limiting condition for operation＊2) in Safety Regulation. Therefore, we apply the Article 136 (exemption of limiting condition for operation in order to conduct maintenance work). Using temporary generator, we can monitor the temperature.(At 5:56 am on March 19, temporary generator started to supply power.) At 7:41 pm on the same day, because of the recovery of the power generator, we can monitor the temperature by the normal power supply condition. Therefore we lifted the exemption of limiting condition for operation.

＊2: Reactor Facility Safety Regulation provides necessary conditions such as the numbers of the permitted machines etc. or criteria of temperatures and pressures for securing multiple safety function for operating reactors and for keeping nuclear power stations stable and these are treated as conditions for operation. When there happen some malfunctions of equipment provided in the regulation and a nuclear power station can not clear the conditions temporarily, operators have to take required countermeasures.

- At around 11:20 am on March 21, When workers of TEPCO's partner company were doing welding operation of plumbing for fire extinguish equipment near No. 3 light oil tank (outdoor type) of Fukushima Daiichi Nuclear Power Station Unit 5 and 6, it was confirmed by the workers that lawn of approx. 3m X 3m was burned due to fire sparks by the welding operation. At 11:25 am, we confirmed that the workers had extinguished the fire with water. At 12:13 pm, we reported this incident to the Namie city fire department, and at 1:13 pm they confirmed that this was a fire incident and the fire was out. No one was injured by this accident and this gives no impact on monitoring values of the surrounding area and cooling systems of the nuclear reactors and the spent fuel pools.
- At 10:30 am on March 29, 2012, we started the trial run of the station common diesel generator (A). At 1:00 pm on the same day, we confirmed no abnormalities and completed the restoration of the station common diesel generator (A).
- At 11:04 am on April 1, a 5.9-magnitude earthquake centered in the coast of Fukushima Prefecture occurred. As a result of inspecting each plant thereafter, no abnormalities were detected.

Fukushima Daini Nuclear Power Station

Units 1 to 4: Shutdown due to the earthquake

- On December 26, declaration of cancellation of a Nuclear Emergency Situation for Fukushima Daini Nuclear Power Station was issued by the Prime Minister pursuant to Article 15, clause 4 of Act on Special Measures Concerning Nuclear Emergency Preparedness. With this, evacuation area within 8km radius of periphery of Fukushima Daini Nuclear Power Station was lifted.

【Unit 1】

- At 10:06 am on December 27, for the purpose of determine soundness of reactor primary containment vessel of unit 1 and internal facilities, airlock for the workers (hatch to enter into the primary containment vessel) was opened and started sight survey. We started cleaning and decontamination on January 10, 2012 and visual inspection of the primary containment vessel and the equipments in the vessel on February 7. The inspection has been completed on February 28. As a result, no leakage of the reactor coolant and no damage or strain of the equipments and the pipe arrangements were confirmed. Thus we confirmed that there was no influence on the capability for the cold shutdown. Although peeling paints and rusts on the surface of the equipments were found due to the effect of high temperature and humidity until the cold shut down, any of those has had no influence on the capability for the cold shutdown. We plan to conduct detailed inspections of the equipments, including the internal equipments of the primary containment vessels.

- At 2:28 pm on January 16, we stopped the Residual Heat Removal System (A System) of Unit 1 due to the switching work from System A to System B. At 2:47 on the same day, we started System B.
- At 5:32 pm on March 5, we stopped the Residual Heat Removal System (B System) of Unit 1 due to the switching work from System B to System A. At 5:59 pm on the same day, we started System A.
- At around 9:28 on April 6, on the 6th floor of Unit 1 reactor building (controlled area*1), our partner company's employee who conducted preparation for inspection of stud tensioner*2 found oil leakage on the floor where installed the facility. At around 9:42, we reported to Futaba Broad Area Fire Fighting Head Office. After on-site inspection by Fire Fighting Head Office, at 12:40 pm on the same day, regarding this oil leakage, the head office judged it didn't fall under the leakage from dangerous facility as defined in the Fire Defense Law. In addition, the water leakage had stopped when the employee found the leakage. The leaked oil was operating oil of the facility and the amount of the leaked oil was approx.250L. We assumed that of approx. 32 L leaked to flour surface (inside floodgate) and that of approx,.218 L leaked to decontaminated waste liquid receiving tank*4 through the funnel. There is no outside leakage of radioactivity due to this accident.

*1 Controlled area

An area which needs to be controlled in order to prevent unnecessary radiation exposure and radiation contamination by radioactive materials from spreading.

*2 Stud tensioner

An apparatus handling check bolts for the cover of reactor pressure vessels

*3 Funnel

Middle squares which lead drainage water from pipes of each of the buildings or equipment to the tank for the water

*4 Decontaminated waste liquid receiving tank

Tank which receives waste fluid which decontaminates equipment and so forth

【Unit 2】

- From 4:23 am on January 23, defect that unable to transmitting data to the Emergency Response Support System at Unit 2. As we reset the Circuit-Terminating Equipment, the defect was resolved at 10:04 am on the same day. Since data has been transmitted correctly there after, we suppose that it was transient phenomenon.
- At 2:17 pm on February 23, the residual heat recovery system was switched from (B) to (A). The system (B) was stopped accordingly and the system (A) was started at 2:37 pm on the same day.
- At 9:57 pm on April 14, data transfer to the ERSS of unit 2 was interrupted. At 10:31 pm on the same day, we reactivated the circit end device and the interruption has ended. There is no interruption since and we judged this as a temporary phenomenon.

【Unit 3】

- At 2:47 pm on January 13, Residual Heat Removal System (B) 3 was stopped in order to switch operation from system (B) to (A). At 3:16 pm, System (A) was activated.
- * At approximately 4:10 pm on January 17, due to the trouble of switching facilities at the Minami-iwaki switching station, the Tomioka line 1 and 2 instantaneously

turned to off. Unit 3 spent fuel pool Coolant purification system stopped their operation due to the event. Later, after confirming that there were no significant problem over the stopped facilities, we started their operation at 4:46 pm on the same day. There is no significant change for the major parameters which have resulted from the event.

- Due to the remodeling work of the power panel of Unit 3, at 10:30 am on January 26, we stopped residual heat removal system (A), and at 10:46 am on the same day, we started residual heat removal system (B). In addition, we stopped cooling the spent fuel pool of Unit 3 from 11:34 am to 1:54 pm, and we stopped the spent fuel pool coolant system from 11:41 am to 2:00 pm on the same day. (The temperature of the spent fuel pool when stopping: 28.1℃, when restarting: 28.3℃)
- To switch from the temporary power board to the regular power board with finishing installation of the circuit breaker supplying power for Unit 3, the Fuel Pool Cooling and Filtering System was suspended from 1:36 pm to 2:14 pm on February 2, and the Clean Up Water System was suspended from 1:40 pm to 2:10 pm(Temperature of the spent fuel pool when stopped:25.4℃, Temperature of the spent fuel pool when restarted:25.4℃)
- At 10:08 am on February 14, we opened the airlock for staff (hatch to come in and out of the primary containment vessel) and started visual inspection to confirm soundness of the primary containment vessel of Unit 3 and the inside facilities. On April 5, we finished visual inspection, As the result of the inspection, we confirmed there is no leakage of reactor coolant, no serious strain and damage etc at every equipments, devices and piping etc inside of the PCV, and no factors to effect on cold shutdown of the plant. In addition, we found peeling of paintworks inside the PCV due to effect of temporally high temperature environment after the plant stop and rusts at the surface of some devices due to effect of humidly environment etc. However, we assume they will not effect on cold shutdown of the plant. Hereafter, we plan to conduct detail inspection of the devices etc including inside of the PCV.
- At 10:39 am on March 12, we stopped Residual Heat Removal System (B) of Unit 3 by switching System (B) to System (A). At 10:54 am on March 12, we started Residual Heat Removal System (A).

【Unit 4】

- At 11:24 am on January 5 2012, according to switching works from Residual Heat Removal System (A) of Unit 4 to (B), we suspended Residual Heat Removal System (A) and activated Residual Heat Removal System (B) at 11:37 am on the same day.
- On November 7 2011, we started inspection work of the main turbine of Unit 4 in order to confirm the facilities' status after the quake. On January 11 2012, we finished visual inspection in the low pressure turbine (A) and the high pressure turbine. Although we found not only some cracks caused by normal operation but also some contact traces, which is located at moving and stationary blade of the low pressure turbine (A) and the high pressure turbine and oil thrower bearing, caused by the Tohoku-Chihou-Taiheiyou-Oki Earthquake, we confirmed they are minimal damage and we made sure there was no security issues.

  *1 : moving blade

  The moving blade is rotated by the intake steam, which is set at rotor

  *2 : stationary blade

  The stationary blade is structure, which is fixed on the casing in order to guide the intake steam to the moving blade effectively.
- At 11:24 am on January 5,, to change the residual heat removal system (RHR) A line of Unit 4 to B line, we suspended operation of A line and at 11:37 am on the same day, we restarted line B.
- At 5:19 pm on February 24,, to change the residual heat removal system (RHR) B line of Unit 4 to A line, we suspended operation of B line and at 5:24 pm on the same day, we restarted line A.
- Due to checkup of Process Computer System of Unit 4 (Feb. 14 to 24), we stopped transferring all data of unit 4 to Emergency Response Supporting System (ERSS) according to the plan. However, when the checkup is done on Feb. 24, we

had not set the system to restart transferring the data by mistake, so until we restored the system, there were no data transferred to ERSS (The restoration of system was done at 0:57 pm on Feb. 25)

- At 2:09 pm on April 3, we stopped Unit 4 RHR (B) due to the preparatory work to replace power cables of auxiliary systems in Unit 4 RHR (B). At 2:14 pm on the same day, we started Unit 4 RHR (A).

【Others】

- At around 11:13 am on January 30, according to the report from the field worker that smoke emitted from the switch box when he opened the door located at the basement of the control building of Unit 1 and 2, at around 11:19 am, a TEPCO worker checked the scene and fire was not found at the time. We reported the incident to the fire station at 11:48 am. Afterwards, as the result of inspection of the scene by fire station, at 0:23 pm, it is considered that fire was not occurred. There is no radioactive influence to the outside by this occurrence.
- At around 1:55 pm on March 7, at the first basement of Heat Exchanger Building* of Unit 1 (non controlled area), a partner companies' worker found another worker who was engaged in repair work of insulation material of piping was lying. After that, at 2:36 pm on the same day, we requested the helicopter emergency medical service (called "Doctor Heli") and at 3:47 pm on the same day, the worker was transferred to Iwaki Kyoritsu hospital by the Doctor Heli. The worker retained consciousness and suffered no external injury. In addition, we confirmed no radioactive materials were adhered to the worker's body

  * Heat Exchanger Building：The building installed heat elimination facility by using seawater or coolant water.
- At 12:42 pm on March 27, in the Unit 3 and 4 Service Buildings when a TEPCO member was bringing in analysis samples, which was going to be used for performance tests for the multi-nuclide removal facilities, from Fukushima Daiichi Nuclear Power Plant, he confirmed that there was contamination by radioactive materials on a desk beside a small object monitor (non-controlled area*) at the checkpoint for the confirmation of contamination of goods for workers exiting from controlled area. Currently we are investigating the cause of the contamination. The contaminated desk and other spots where there is a possibility of contamination are partitioned and under control now. After the investigation, it was confirmed that the contamination on the table next to the small monitor in the check point was due to the spilled sample (water) for for performance verification test of ALPS (Advanced Liquid Processing System). The spilled amount was approx. 2.5 cc and the surface contamination concentration was approx. 206Bq/cm^2 according to the measurement by the contamination survey meter.

  During the investigation for the contamination in the entire route of sample transportation, 7 spots were confirmed to be contaminated (max above 700Bq/cm^2). In order to prevent expansion of the contamination, 4 spots were decontaminated and 3 spots were temporarily put under control.

  While inside of the vehicle transported such sample was also confirmed to be contaminated, outside surface of the vehicle nor the entrance area of the service building were not contaminated. Therefore, it is considered that the contamination is limited in the service building of Unit 3 and 4.

  *Controlled area is the area which requires control for prevention of unnecessary exposure and prevention of increase of radioactive contamination.
  Non-controlled area is the area other than controlled area.
- At 11:04 am on April 1, a 5.9-magnitude earthquake centered in the coast of Fukushima Prefecture occurred. As a result of inspecting each plant thereafter, no abnormalities were detected.
- Periodic inspection of the monitoring posts (7 in total: from No.1 to 7) located at the site boundary was started.

  No. 1: From 10:11 am to 11:30 am on March 27

  No. 2: From 2:21 pm to 3:40 pm on March 27

  No.3: From 10:01 am to 11:10 am on March 28

  No.4: From 1:31 pm to 2:40 pm on March 28

No. 5: From 3:11 pm to 4:20 pm on March 28

No. 6: From 10:01 am to 11:20 am on March 29

No. 7: From 1:31 pm to 2:30 pm on March 29

Kashiwazaki Kariwa Nuclear Power Station	**Units 1 to 7: Outage due to regular inspections**

- [The 13th regular inspection of Unit 5 started on January 25.
- The 10th regular inspection of Unit 6 started on March 26.