Record from March 11, 2011 to December 31, 2011

* Last updated time: 15:00 pm,April 6, 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.”
- Off-site power has been connected to Units 1 to 6 by March 22, 2011.
- At approximately 6:38am, April 12, fire has been found at the distribution switchboard containing batteries located in the sampling equipment switchbox situated close to the south water discharge channel for Units 1 to 4. The self defense fire fighting team conducted the fire fighting at an early stage. At the same time, at approximately 6:45am, we reported to the Futaba fire authorities. There is no impact on the external release of radioactive substances or on the cooling capability of the reactor by this incident. There has been no change on the monitoring figures of the surrounding environment. The Futaba fire authorities confirmed fire extinguishment on site survey at 9:12am, April 12.
- At approximately 8:00 am on May 31, we confirmed oil leakage to the sea around the curtain wall of the water intake canal of Unit 5 & 6 and reported the issue to Futaba Wide-area Fire Headquarters and Fukushima Coastguard Office. As a result of our investigation, we confirmed that oil leaked from pipes around seawall to the port through holes of steel sheet piles and that the leakage already stopped. Since the diffused area was just around the curtain wall and the surface of the sea around Shallow Draft Quay and the oil film was very thin, we confirmed that there is no spread to the outer sea. We completed installing oil-absorbing mat around seawall at approximately 2:00 pm and also completed installing oil fences at 4:50 pm. We plan to protect pipes around seawall and collect the oil. At 10:00 am on June 14, we closed the open part at the bottom of curtain wall, through which the oil leaked
- At approximately 2:30 pm on May 31, big sound was confirmed at the southern side of the reactor building of Unit 4, where wireless unmanned heavy machineries were removing rubbles. We confirmed that the sound was the impact sound when the unmanned heavy machinery tucked and broke some cylinder. Nobody got injured. There was no change in the data of the monitoring post.
- At 2:20 pm on June 8, the main control room lights of unit1/2 went out. At 2:35 pm, a part of power panel suspended. At 2:49 pm, monitoring post (MP7/8) transmission path were suspended. At 2:57 pm, nitrogen supply facilities were halt due to pressure rise.

  After that, at 5:32 pm, the power panel was restored. At 5:50 pm, monitoring post (MP7/8) transmission paths were resumed. Also, at 5:54 pm, injection of nitrogen to Unit 1 was resumed. Due to suspension of this power panel, transfer of accumulated water at Unit 2 turbine building vertical shaft to the Centralized Radiation Waste Treatment Facility (Process Main Building) had also been suspended, however at 6:03 pm, transfer was resumed. As a result of an investigation, we presume that the power panel was suspended due to error signal from supply side of an unused facility.
- At 7:10 am on July 22, the circuit breaker for the bus which supplies electricity to a part of power network in the power station opened the circuit due to overload, resulting in the power off of the following facilities: the alternative cooling facility for spent fuel pool at Unit 3, monitoring gauges in the reactor of Unit 3 & 4, water treatment facilities, Main Anti-Earthquake Building, and the cooling facility of common pool. For Main Anti-Earthquake Building, we restore its power supply immediately using backup power generator. For reference, this event did not affect the following operations: water injection and nitrogen gas injection to a reactor of each unit, and data of each monitoring post. Later, we have switched the power supply source and have resumed power supply for Main Anti-Earthquake Building

at 9:33 am on the same day, for monitoring gauges in the reactor of Unit 3 & 4 at 10:35 am, for the cooling facility of common pool at 10:40 am on the same day, the alternative cooling facility for spent fuel pool at Unit 3 at 11:50 am on the same day. At 3:37 pm on the same day, we started water treatment facility and at 3:51 pm resumed water treatment. It has been figured out that the overload shutdown was caused by the lower threshhold to trip, which was set by mistake.

- There is no affect by the earthquake which occurred around Fukushima prefecture offshore at approximately 3:54 am on July 31.(M6.4)
  - No anomalous value in main parameters of each unit.
  - No affect to the following operations: water injection and nitrogen gas injection to a reactor of each unit, and data of each monitoring post.
- At 12:09 pm on August 4, we stopped the operation of diesel generator (5B) manually due to automatic start of the generator caused by an error signal related to the rector water level during the connect test of power supply associated with enhancement of instrument power. For reference, this event did not affect the power system.
- At approx. 12:50 pm on August 4, electricity went out at Main Anti-Earthquake Building. At around 12:51 pm on the same day, its power supply was restored due to start-up of emergency gas turbine generator. The cause of this power outage is currently under investigation. For reference, this event did not affect the plant status and we continue injecting water and nitrogen gas to the reactor.
- At approx. 3:00 pm on August 11, we confirmed that the circuit breaker supplying power to the charger for control power of the temporary power board for Units 1 and 2 was open. At 4:00 pm on the same day, we confirmed that the voltage of the back-up battery for control power dropped. At 1:21 am on August 12, we replaced the battery and the charger and resumed receiving power.
- At approx. 3:22 am on August, 12, an M 6.0 earthquake with the seismic center at offshore of Fukushima prefecture occurred. Events confirmed are as follows:
  - The boiler for the evaporative concentration apparatus at the water treatment facility stopped. At 3:42 am on the same day, we restarted the boiler and resumed vaporization and condensation.
  - At 3:52 am on the same day, we confirmed that the reactor water injection rate for Unit 1 dropped to 3.2m^3/h. At 3:52 am on the same day, we adjusted the rate to 3.9m^3/h. Reactor water injection for Units 1 to 3 is continuing.
  - At 5:06 am on the same day, we confirmed that one out of two of the temporary control air compressor, Unit 1 stopped. As we could not restart this, at 6:44 am on the same day, we started the back-up diesel-driven air compressor. There is no impact on the nitrogen gas injection for Unit 1.
  - At 5:27 am on the same day, we found very small volume of water leakage from a hose, primary system, alternative Spent Fuel Pool cooling system located in the radioactive waste treatment building, Unit 4. We are planning to replace the hose.
- At approx. 2:46 pm on August 19, an M6.8 earthquake with the seismic center at offshore of Fukushima prefecture occurred. Events confirmed are as follows:
  - There were no abnormalities on the major parameter for each unit.
  - There were no abnormalities on the outside power supply, water injection into reactors, Nitrogen injection into the reactors and cooling water of the spent fuel pools.
- At approx. 11:30 am on August 25, we found that oil piping for cooling main transformer is damaged and blowing out of contained insulation oil, during the removal work of debris near main transformer of unit 3. At 6:10 pm on the same day, we confirmed the oil leakage from the oil pipeline stopped
- At around 3:00 pm on October 3, TEPCO staff observed an oil leakage from the transformer B system for transportation of Okuma 3 line (in-vehicle) while on patrol. The amount of the oil leakage was about one drop in ten seconds and the oil formed an oil film of approximately 1m x 1m. An emergency procedure was taken to stop the leakage. A further investigation will be conducted, though the transformer can be used without problems.
- Water treatment facilities suspended at 6:30 on November 25 to switch the power source of Oukuma 2 line movable transformer. Cesium adoption apparatus

resumed after switching power source to Oukuma 3 line at 12:37pm. (1st Cesium adoption apparatus at 15:00, 2nd Cesium adoption apparatus at 17:00)

On December 2, as we finished the construction work to reinforce on-site power, we stopped the evaporative concentration apparatus (reverse osmosis membrane type) at 6:00pm on December 6 and the cesium adsorption apparatus at 8:04am on December 3, respectively, in order to start receiving power from the power source. As for the second cesium adsorption apparatus, it is operated without interruption and the treatment of accumulated water is in progress. There is no adverse effect to water injection into the reactor, as purified water in the buffer tank is utilized. We restarted the water desalinations (reverse osmosis membrane type) at 1:30 pm on December 3 and the cesium adsorption apparatus at 2:22 pm, and the evaporative concentration apparatus at 2:34 pm, after power receiving operation.

- For works to stop of the leakage detected between cable duct for starting transformer and control building of Unit 3, which was confirmed on August 4 (announced on August 8, 2011), we conducted switching power of power panel from at 7:07 pm to 9:01 pm on December 3, to transfer and disconnect cables of power panel of backup transformer, receiving power from Okuma line 2L. Due to the switching work, lightings of rest houses in the site, regional air-exhaust ventilators, dust monitors located at main entrance, Main Anti-Earthquake Building, and rest houses of Unit 5/6 service building were stopped. After finishing switching works, the abovementioned systems recovered

- At around 2 pm on October 23, TEPCO's employee found seemingly oil spill outside the oil retaining wall of temporary oil tank for main transformer in the power plant premise (Wild Bird Forest). At around 2 pm on October 24, we confirmed at the site that there were oil film in the water accumulated in the oil retaining wall and the oil was accumulated in the space which the water in the oil retaining wall spilled. From these reasons, we assumed that the oil observed on October 23 was the oil which spilled from the oil retaining wall by inflow of rain water to the wall. At this moment, we are investigating in detail, including nuclide analysis for the water accumulated in the wall and analysis on the oil film.
- On 9:30 am on November 15, at the emergency feed water injection lines of Units 1 to 3, in preparation for the installation of flow control valves to increase the water flow controllability, in order to secure a place to install, we started transfer of a truck on which to load an emergency diesel generator located upland for feed water injection. On 10:37 am on the same day, the transfer of track finished. In line with the transfer we disconnected and then reconnected the power line. Although the diesel generator became unready due to the transfer of track, there is no effect caused by the installation work because we continue water injection into the reactor with the regular-use feed water pump located upland.
- At 9:10 am on December 16, a cooperative firm worker discovered the burnt trace in the distribution panel at Centralized Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]). But a smoke was not found. We reported the incident to the fire station at 9:19 am on the same day. At 10:28, we stopped power supply to the distribution panel. Afterwards, as the result of confirmation at the site of this facility by fire station, it is considered that the fire was not occurred. At 2:30 pm, we resumed power supply to the distribution panel.
- 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】

- The explosive sound and white smoke was confirmed near Unit 1 when the big quake occurred at 3:36pm, March 12.

<Water injection to the reactor>

- At 7:04 pm, March 12 seawater injection was started. Later boric acid which absorbs neutron was added.
- At approx. 2:30am, March 23: sea water injection through feed water system was

started. At 3:37pm, March 25, it was switched to fresh water. At 8:32am, Mar 29, the fire pump used to inject fresh water was replaced by a temporary motor driven pump. From 10:42 am to 11:52am on April 3, the fire pump was temporarily used for the water injection in order to switch the power of the motor driven pump from temporary power to the off-site power. It was again switched to the motor driven pump, and the fresh water injection was continued.

- Water injection to the reactor was temporarily suspended due to partial shutdown of the off-site power caused by the earthquake which occurred at approximately 5:16pm, April 11. Following the restoration of off-site power, water injection resumed at approximately 6:04pm.
- At 5:00 pm, on April 15, we completed transferring emergency power sources to spray water to the reactor to the upland.
- On April 18, in order to replace hoses, which were used to inject water to the reactor, injecting water was temporarily suspended. After replacement, we restarted injecting water by pumps.
- Before the work to connect high voltage power panels of Unit 1/2 and Unit 5/6 was initiated, the power source of pumps to inject water to reactors was switched to a temporary diesel generator at 10:57 am on April 25. At 6:25pm on April 25, the power source was switched back to the power system.
- In order to identify the appropriate injection amount of water in making the fuels submerged in water, at 10:02 am, April 27, we started the operation to increase the amount of water to the reactor of Unit 1 from approx. 6 m^3/h. By monitoring the parameters, we injected approximately 10 m^3/h of freshwater to the reactor. From 10:14 am, April 29, we put the amount of injecting freshwater back to approximately 6m^3/h into the reactor and continue injecting freshwater.
- At 10:01 am on May 6, in order to submerge nuclear reactor in water, we have increased the amount of injecting freshwater from approximately 6m^3/h to approximately 8m^3/h.
- We calibrated water level gauge of the reactor of Unit 1 from May 10 to 11.
- We calibrated pressure gauge of the primary containment vessel of Unit 1 on May 11.
- At 1:28 pm on May 15, we have increased the amount of freshwater injected into the reactor from approximately 8m³/h to approximately 10m³/h so that we can monitor the trend shift of parameters of the Reactor Pressure Vessel as well as the Primary Containment Vessel, the shift which would be resulted from the increase of the amount of injected freshwater.
- Trend monitoring of how the parameters of reactor pressure vessel and primary containment vessel varied when water injection to Unit 1 reactor increased, was completed. At 11:50 am on May 17, water injection rate to the reactor was changed from approx. 10m^3/h to approx. 6m^3/h.
- Since we finished monitoring trends of parameters, at 8:30 pm on May 31, we changed the rate of water injection to the reactor of Unit 1 from approx. 6m^3/h to approx. 5m^3/h.
- We suspended water injection into the reactor of Unit 1 from 9:57 am to 10:02 am and from 1:43 pm to 1:56 pm on June 4 in order to change the route of water supply. At 10:02 am on June 4, we restarted water injection by fire engines. At 1:43 pm on June 4, we stopped the fire engine (suspended water injection). At 1:56 pm, we restarted water injection with an electric pump.
- At 3:35 pm on June 14, water injection was temporarily suspended due to the switch of injection pipeline to Unit 1 reactor. Water injection was resumed at 3:50 pm.
- At 10:06 am on June 15, the amount of injected water to the reactor was changed from approx. 5 m^3/h to approx. 4.5 m^3/h.
- At 10:02 am on June 21 we changed the rate of water injection to the reactor from approx. 4.5 m^3/h to approx. 4.0m^3/h through reactor feed water system piping arrangement.
- At 10:02 am on June 22, we changed the volume of water injection from feed water system piping arrangement into the reactor of Unit 1, from approx. 4.0m^3/h to approx. 3.5 m^3/h.
- At 4:20 pm on June 27, in addition to injecting water from the filter tank, we started to

use treated water. At 5:55 pm, we stopped supplying treated water.

- At 11:47 am on June 28, we adjusted injection rate from feed water system piping arrangement to approximately 3.5m^3 since decrease in amount of water injection at the reactor of Unit 1 was confirmed.
- At 2:36 pm on June 28, we started to operate the transfer pumps of water treatment system. After confirming no leakage and adjusting water volume, we started to operate circulating injection cooling at 3:55 pm, June 28.
- At 10:59 am on June 29, we stopped the transfer pumps, and started it at 1:12 pm. At 1:33 pm on June 29, we started to operate circulating injection cooling.
- Since the amount of water injected into the reactor of Unit 1 was decreased at 1:49 pm on June 29, we adjusted water injection at approx. 3.5 m^3/h through reactor feed water system piping arrangement.
- At 7:27 am on Junly 1, At 7:27 am on July 1,we stopped injecting treated water and implemented injecting filtered water to (no change in amount) due to construction of installment of the Tank (buffer tank) for injecting to the reactor. At 6:00 pm on July 2, we started full scale operation of circulating injecting cooling which inject treated water by accumulated water treatment system to the reactor via buffer tank.
- At 8:13 am on June 4, an alarm showing decrease in amount of water injection was confirmed at unit 1 reactor. We adjusted injection rate from approximately 3.0m^3 to approximately 7.5m3 with flushing. At 8:50 am on the same day, we adjusted injection rate to approximately 3.8m^3. We are currently following up the details.
- At 5:30 am on July 14, due to the fall of water injection amount at Unit 1 reactor, we adjusted the water injection amount to approx. 3.5m^3/h.
- At 8:55 am on July 15th, as we found decrease of the volume of water injection into the reactor of Unit 1, we increased the injection volume to approx. 3.8m^3/h.
- At 9:46 am on July 17, an alarm showing decrease in amount of water injection to Unit 1 reactor rang. At 10:06 am on the same day, we adjusted the water injection rate at approx. 3.8 m^3/h as we confirmed that the rate of water injected into the reactor decreased to approx. 3.0 m^3/h.
- At 2:25 pm July 17, we changed the water injection line so that we could inject water to Unit 1 and 2 reactors by the motor driven pump for Unit 2 and stopped the motor driven pump to inject water into Unit 1 reactor. In addition, we adjusted the rate of water injection into Unit 1 at approx 4.0 m^3/h.
- At 10:10 am July 19, we changed the ratet of water injection into Unit 1 reactor from approx. 4.0m^3/h to approx. 3.8m^3/h.
- At 11:10 am on July 24, flow rate of injecting water to Unit 1 reactor was adjusted to approx. 3.8m3/h after reduction of flow rate was observed.
- At 11:57 am on July 30, we adjusted the amount of water injection in each Unit to approx. 3.6 m^3/h since we confirmed a decrease in the amount of water injected to the reactor.
- At 5:01 am on July 31, we adjusted the amount of water injection in each Unit to approx. 3.7 m^3/h since we confirmed a decrease in the amount of water injected to reactor in Unit 1 and 2.
- From 5:55 pm to 5:56 pm on August 1, we changed the volume of water injected into the reactor to approx. 3.9m^3/h.
- At 9:02 am on August 5, decrease of water injection volume to the reactor was confirmed and it was adjusted to approx. 3.9 m^3/h.
- At 8:32 am on August 10, we adjusted flow rate of injecting water at approx. 3.8m^3/h due to the decrease of injected water to reactors
- At 12:20 pm on August 10, we adjusted flow rate of injecting water at approx. 3.8m^3/h due to the increase of injected water in reactor.
- At approx. 3:22 am on August 12, an M 6.0 earthquake with the seismic center at offshore of Fukushima prefecture occurred. At 3:52 am on the same day, we confirmed that the reactor water injection rate for Unit 1 dropped to 3.2m^3/h. At 3:52 am on the same day, we adjusted the rate to 3.9m^3/h.
- At 7:36 pm on August 13, we adjusted the rate of water injection to the reactor to approximately 3.8m^3/h as we confirmed decrease in the amount of water injection.
- At 3:20 pm on September 1, as it was confirmed that there was a decrease in the

amount of water injection for the reactor of Unit 1, we adjusted the rate to approx. 3.8m^3/h.

- At 9:40 am on September 3, as it was confirmed that there was a decrease in the amount of water injection to the reactor, we adjusted the rate of water injection to approx. 3.8m^3/h.
- At 2:53 pm on September 7, as it was confirmed that there was a decrease in the amount of water injection to the reactor, we adjusted the rate of water injection to approx. 3.8m^3/h.
- At 5:40 pm on September 11, as it was confirmed that there was a decrease in the amount of water injection to the reactor, we adjusted the rate of water injection to approx. 3.8m^3/h.
- At 6:07 pm on September 13, as it was confirmed that there was a decrease in the amount of water injection to the reactor, we adjusted the rate of water injection to approx. 3.8m^3/h.
- At 3:41 pm on September 16, as it was confirmed that there was a decrease in the amount of water injection to the reactor, we adjusted the rate of water injection to approx. 3.8m^3/h.
- At 11:40 am on September 21, as it was confirmed that there was a decrease in the amount of water injection to the reactor, we adjusted the rate of water injection to approx. 3.8m^3/h.
- At 10:25 am on September 28, we switched water injection line to emergency line at Units 1,2 and 3 for the trial run of mini flow line in the regular injection line set on the hill. At 2:02 pm on the same day, we switched back to the regular water injection line after the trial run. There was no change in the injection amount due to this work
- At 9:28 am on October 6, we arranged the amount of water injected to the reactor to 3.8m^3/h since we found the reduction in the amount of injected water.
- At 2:22 pm on October 25, since we observed reduction of water injection volume to the reactor, we adjusted the injection volume at approx. 3.8m^3/h.
- At 6:10 pm on October 25, we adjusted the rate of water injection to reactor from approximately 3.0 m^3/h to approximately 3.8m^3/h following the alert that showed decrease of water injection at 5:48 pm on the same day.
- At 9:47 am on October 26, for the water injection to the reactor, we switched from normal water injection line to emergency water injection line, due to the shutoff of facilities for power source reinforcement work. Along with the switching work, we adjusted the amount of water injection from water feeding system to approximately 3.8m^3/h. At 4:10 pm on the same day, we switched from emergency water injection line to normal water injection line due to completion of power source reinforcement work and confirmed the injection amount was stable.
- At 9:30 am on October 28, due to the additional installment of control valve of Unit 1 water injection line to improve controllability of water injection, we switched water injection line into the reactor of Unit 1 and Unit 2 from normal line to emergency line. As the installment work was finished, at 1:30 pm on the same day, we switched water injection line from emergency line to normal line. At 2:00 pm on the same day, accompanied by the switching of injection line, we adjusted water injection rate from feed water system approx. 3.9m^3/h for Unit 1.
- At 4:10 pm on October 28, we adjusted the amount of water injected to the reactor of Unit 1 to approx. 4.5m^3/h in order to improve the working condition inside the covers at Unit 1 by holding down the evaporation from the reactor.
- At 3:30 pm on October 29, we adjusted the amount of water injected to the reactor of Unit 1 to approx. 5.5m^3/h in order to improve the working condition inside the covers at Unit 1 by holding down the evaporation from the reactor.
- At 3:05 pm on October 30, we adjusted the amount of water injection to the reactor of Unit 1 to approximately 6.5m^3/h in order to improve the working environment inside the covering, making it sure to mitigate the steam emission at the reactor building of Unit 1.
- At 2:59 pm on October 31, we adjusted the amount of water injection to the reactor of Unit 1 to approximately 7.5m^3/h in order to improve the working environment inside the covering, making it sure to mitigate the steam emission at the reactor building of Unit 1.
- The injecting water line changed for injecting boric acid water was replaced. At

4:14pm on November 2, we adjusted injecting water volume into the reactor Unit 1 at approx. 7.5m^3/h from reactor feed water system.

- On November 4, due to inspection of Unit 3 reactor water injection pump, it was switched to Unit 1/2 reactor water injection pump. At 3:13 pm, together with this switch, in regard with water injection to Unit 1 reactor, water injection amount of feed water system was adjusted to approx.7.6 m^3/h.
- At 9:15 am on November 17, at unit 1 emergency reactor injection line, the additional installation work for water flow adjusting valve was commenced to better control the amount of water injection, and completed at 1:09 pm on the same day. Water injection to reactor had been done through regular reactor water injection line, and therefore the additional installation work above had no impact to water injection.
- At 3:33 pm on November 18, we adjusted flow rate of injecting water of reactor of Unit 1 at approx. 5.5m^3/h before the addition of water injection line from Core Spray System in order to enhance security of water injection.
- At 1:58 pm on November 20, as it was confirmed that there was a decrease in the water injection amount from the feed water system, injection amount was adjusted from 5.3m^3/h to 5.5m^3/h.
- On October 28, after regular operation of the gas control system for PCV, Unit 2, since a relatively high density hydrogen was detected on October 29, we are intending to control the hydrogen density below the inflammable limit (4%) even if there is no steam, by directly including nitrogen into the RPV for Units 1 to 3.

  Until we have included nitrogen into RPV, in order to lower the hydrogen density of RPV by increasing the temperature and the steam ratio thereby, on November 24, we lowered the amount of water injection into the reactor of Units 1 to 3. After that, we monitored the temperature trend in the RPV and the PCV. Since the change of the temperature was small and there was a possibility of significant change of the temperature by further reduce of the water injection, we adjusted it from approx. 5.0 m^3/h to approx. 4.5 m^3/h through reactor feed water system from 10:18 am to 11:02 am on November 26. As we assumed that the hydrogen density of RPV was decreased from the result of the operation, at 10:09 am on December 10, we started water injection from the core spray system addition to the water feeding system to cool down the reactors more stably. At 10:11 am on the same day, we adjusted the water injection volume of the core spray system to approx 1.0m^3/h. (The current water injection volume is approx 4.2m^3/h from the water feeding system.)

- On November 29, since we observed decrease in water injection into the reactor, we adjusted the water injection amount 4.2m^3/h to 4.5m^3/h from feed water system from 10:13 am to 10:28 am.
- At 10:35 am on December 2, we adjusted water injection volume from approx. 4.0m^3/h to approx. 4.5m^3/h since decrease in injection volume was observed.

  At 5:47 pm on 5 December, Amount of water injected through feed water system was adjusted from approx. 4.0 m^3/h to 4.5 m^3/h as the decrease of such amount was observed.
- At 10:13 am on December 9, as we observed reduction of the water injection rate, adjusted the rate from the feed water system from approx 4.2m^3/h to approx 4.5m^3/h.
- At 10:30 am on December 11th, we adjusted water injection from Core Spray System from approx. 1.0 m^3/h to approx. 2.0m^3/h to cool down the reactor more safely. (Water injection from the Feed Water System continued with the level of approx. 4.2m^3/h).
- At 9:40 am on December 16, as the decreasing of injecting water was confirmed, we adjusted injection rate of core spray system from approx.1.6m3/hour to approx.2m3 /hour. (the injection of feed water system is continuing at 4.5 m^3/h)
- At 5:05 am of December 21, decrease in water injection was confirmed and we adjusted water injection from the reactor feed water system from approx 4.3 m^3/h to 4.5 m^3/h, and water injection from the core spray system from approx. 1.8 m^3/h to 2.0 m^3/h.
- On 10:30 am on December 23, the change of injection water flow to Reactor was found so that water injection from Core Spray System was adjusted from approx.

1.9 m^3/h to 2.0 m^3/h (water injection from feed water system was remained unchanged as approx. 4.5 m^3/h).

- At 9: 44 am on December 30, the injected water amount was adjusted from approx. 4.4 m3/h to approx.4.5 m3/h in feed water system, from approx. 1.8m^3/h to approx.2.0m^3/h in corer spray system as the change in the injected water amount was observed.

<Water spray to the spent fuel pool>

- The sea water spray was conducted using the concrete pumping vehicle from 1:03pm to 4:04pm, March 31.
- In order to confirm the position of water spray to the spent fuel pool by the concrete pumping vehicle, the sea water spray was conducted from 5:16pm to 5:19pm, April 2.
- From 3:07 pm to 3:18 pm on May 14, we sprayed freshwater into the spent fuel pool of Unit 1 with the concrete pumping vehicle (We broke off due to a strong wind).
- From 3:06 pm to 4:15 pm on May 20, we sprayed freshwater into the spent fuel pool of Unit 1 with the concrete pumping vehicle (We broke off due to a strong wind).
- From 3:22 pm on May 22, we started spraying water into the spent fuel pool of Unit 1 by a concrete pumping vehicle, and finished at 5:09 pm.
- From 4:47 pm to 5:00 pm on May 28, we conducted the leak test for Unit 1 spent fuel pool by fresh water injection using Spent Fuel Pool Cooling and Filtering (Clean up) System).
- From 11:10 am on May 29, we started spraying freshwater into the spent fuel pool of Unit 1 through Spent Fuel Pool Cooling and Filtering (Clean up) System), and finished at 3:35 pm.
- From 10:16 am on June 5, we started spraying freshwater into the spent fuel pool of Unit 1 through Spent Fuel Pool Cooling and Filtering (Clean up) System), and finished at 10:48 am.
- From 3:10 pm on July 5, we started spraying freshwater into the spent fuel pool of Unit 1 through Spent Fuel Pool Cooling and Filtering (Clean up) System), and finished at 5:30 pm.
- At 3:20 pm on August 5, we started freshwater injection into the Spent Fuel Pool of Unit 1 through Spent Fuel Pool Cooling and Filtering System, and finished at 5:51 pm.
- At 8:59 am on August 10, we started freshwater injection into the Spent Fuel Pool using Fuel Pool Cooling and Filtering System, and finished at 9:19 am on same day.

<Alternative Cooling of Spent Fuel Pool>

- From 10:06 am to 11:15 on August 10, we started cyclic cooling of Spent Fuel Pool of Unit 1 by using alternative cooling system of the Pool's cooling and filtering system. And at 11:22 on same day, we started full-scale operation.
- At 5:43 am on November 9, cooling system of spent fuel pool was stopped due to the switching work of electricity to enhance security of electricity source. (The temperature at 5:43 am was 22℃.) The cooling system of spent fuel pool was restarted 10:29 pm. (The temperature of the spent fuel pools were 20℃when the instruments were restarted.) The temperature of the spent fuel pool of Unit 1 became lower. This was presumed to be influenced by water in Skimmer Surge Tank whose temperature was lowered by open air.
- To switch the power source for the purpose of improving the reliability of power, we suspended the alternative cooling of the spent fuel pool of Unit 1 at 10:20 pm on December 11 (SFP water temperature at the time of suspension was 14 ^{o}C). At 5:07 pm on December 12, Unit 1 SFP alternative cooling system was resumed (SFP water temperature at the time of resume was 15 ^{o}C).
- At 10:23 on December 17, in the spent fuel pool alternative cooling system, an alarm for "Air fin cooler panel malfunction" was triggered. After the investigation at the site, it was confirmed that the secondary system pressure decreased and the circulating pump (A) was shutdown automatically. After the detailed investigation, it

was confirmed that the water leaked through the drainage line in the safety valve installed in the upside of the pump (A). As the position of the handle of the valve was off the usual position, we fixed it and at around 11:00 the leaking stopped. After that, we increased the system pressure. Confirming that no water leaked through the system, at 13:39, we restarted the circulating pump (A) and cooling the spent fuel pool. The leaked water from the drainage line is for the fire extinction purpose (filtered water) and does not contain radioactive materials. The temperature of the spent fuel at the cold shutdown and restart is 13℃ and no there is no temperature rising.

- At 11:11 am on December 19, we found water drops on a few drops per second from connection point of the valve and piping of pressure indicating instrument of secondary coolant system of the spent fuel pool alternative cooling system of Unit 1. At 11:55 am on the same day, we tightened the connection point and then water drops stopped. The dropped water was filtrate water (fresh water) and no radioactive material was contained. Also, spent fuel pool alternative cooling system was in operation continuously and there is no problem on cooling.

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

- At approximately 5:00pm, March 24, draining water from the basement of the turbine building into a condenser was started. It was paused at approx. 7:30am, March 29 because it reached almost full capacity. In order to move the water in the condenser to a condensate storage tank, water in the condensate storage tank was transferred to suppression pool's water surge-tank from around 12:00pm, March 31 to 3:26pm, April 2.
- The water transfer from the condenser to the condensate storage tank was started at 1:55pm, April 3. It was completed at 9:30am, April 10.
- From 2:58 pm to 5:43 pm on June 13, we transferred accumulated water from the condenser to the Turbine Building.
- At 10:33 on June 15, transfer of accumulated water in the Unit 1 condenser to condenser storage tank was initiated. We stopped transferring at 9:52am on June 16.
- At 9:53 am on September 14, we stared transfer of the accumulated water from the condenser of Unit 1 to the basement of Turbine Building of Unit 1. At 2:35 pm on September 16, we stopped transfer.
- At 10:35 am on October 22, we started transfer of the accumulated water from the basement of Turbine Building of Unit 1 to the basement of Turbine Building of Unit 2. At 9:07 am on October 24, we stopped transfer.
- At 5:31 pm on October 25, we started transfer of the accumulated water from the basement of Turbine Building of Unit 1 to the basement of Turbine Building of Unit 2. At 2:01 pm on October 26, we stopped transfer.
- At 3:48 pm on November 4, we started transfer of the accumulated water from the basement of Turbine Building of Unit 1 to the basement of Turbine Building of Unit 2. At 9:41 am on November 6, we stopped transferring.
- From 3:42 pm on November 11, we started transferring accumulated water from the basement of Unit 1 turbine building to the basement of Unit 2 turbine building. At 10:45 am on November 13, we stopped transferring.
- At 2:54 pm on November 25, we started transferring accumulated water from Unit 1 T/B to Unit 2 T/B. At 9:38 am on November 27, we stopped transferring it.
- At 2:00 pm on December 10, we started transferring of accumulated water from underground of the Turbine Building of Unit 1 to underground of the Turbine Building of Unit 2. At 9:22 am on December 12, we stopped the transfer.
- At 4:07 pm on December 23, we started transferring accumulated water from the basement of turbine building of Unit 1 to the basement of turbine building of Unit 2. At 9:38 am on December 25, we stopped transferring.

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

- As it is suspected that hydrogen gas may be accumulated inside the primary containment vessel, at 10:30pm, April 6, we started the operation of the valve for the injection of nitrogen to the vessel in order to prevent the increase of oxygen density. Then, nitrogen injection to the vessel was started at 1:31am, April 7.

- Injection of nitrogen to the vessel was suspended due to the earthquake which occurred at approximately 5:16pm, April 11, and resumed at 11:34pm on the same day.
- Regarding the work to connect high voltage power panels of Unit 1/2 and Unit 5/6, that of Unit1/2 became temporarily offline and a pump to inject nitrogen was stopped from 2:10 pm on April 25. At 7:10pm on the same day, we restated the pump.
- The pump to inject nitrogen to Unit 1 was stopped from 8:51 am on May 11 since part of power source of Unit 1 & 2 had been switched to Okuma Line No.2. Restarted at 3:58 pm, on May 11.
- At approx. 2:00 pm, May 21, nitrogen injection to the vessel was stopped (The compressor stopped due to “High temperature”.) On the same day, the back-up supply facility was started up (approx. 20m^3/h) at 5:00pm. The amount of nitrogen was increased to approx. 26 m^3/h at 8:31pm. At 10:56 am, on May 22 we stopped the back-up supply facility. At 11:23 am, on May 22, we started the nitrogen gas injection pump for Units 2 and 3 (increased to approx 28 m^3/h).
- Due to the change of onsite power source structure after the restoration of Okuma No. 2 line, power source to electromagnetic valve in nitrogen injection line was switched. In order to switch to the temporal power source, nitrogen injection was temporarily suspended at 9:14 am May 25 and was resumed at 9:18 am May 25. When we suspended nitrogen injection from 3:16pm to 3:18pm on May 25 and checked the operation condition in order to switch to the permanent power source, at 3:45pm, we found that the nitrogen injection compressor was stopped. At 7:44pm on the same day, we started a substitution compressor and injecting nitrogen at about 28m³/h.
- At 11:48 am on June 19, we stopped the equipment to supply nitrogen to the primary containment vessel of Unit 1 due to switching the power in the site. At 4:15 pm on the same day, we resumed its operation.
- At 11:55 am on June 21 we temporarily stopped operating the nitrogen supply equipment to Primary Containment Vessel due to work to install a transformer in the Power Station. At 6:03 pm on same day, we recommenced operation of nitrogen supplying facility.
- At 8:51 am on June 27, due to the changeover of power source inside the power station, we temporarily stopped nitrogen gas injection to Primary Containment Vessel.
- From 5:52 am on August 2, in order to replace the nitrogen gas injector device, we stopped nitrogen gas injection into the Primary Containment Vessels of Units 1 to 3. After completion of the replacement, we restarted injection of nitrogen gas at 8:33 am.
- In order to construct the nitrogen injection line direct to the reactor branched by the nitrogen injection line into the primary containment vessel, at 9:55 am on November 29, we temporarily stopped Nitrogen injection into the primary containment vessel. Then, we restarted Nitrogen injection into the primary containment vessel. At 11:30 am on the same date, we confirmed the nitrogen injection amount (28m^3/h) into the primary containment vessel was stable.
- In order to construct the nitrogen injection line direct to the reactor branched by the nitrogen injection line into the primary containment vessel of Unit 1. Then, we restarted Nitrogen injection into the primary containment vessel of Unit 1. At 12:23 pm on the same day, we confirmed the nitrogen injection amount (28m^3/h) into the primary containment vessel was stable. At 4:04 pm on November 30, we started operation to inject nitrogen into the reactor pressure vessel. At 4:08 pm, injection amount reached the scheduled amount of 5 m^3/h.
- At 10:44 am on 5 December we started increasing nitrogen injection to the reactor , from which we started on 30 November from approx. 5m3/h to 10m3/h, due to stabilized parameters of the facilities of the power plants such as the Reactor Pressure Vessel and the Primary Containment Vessel.
- At 1:15 pm on December 7, we adjusted the nitrogen injection rate to RPV of Unit 1 from 10m3/h to 15m3/h so that we can have some margin to the flammability limit of hydrogen in RPV even if the nitrogen injection facility is stopped.
- At 10:55 on December 7, to improve the reliability of nitrogen injection, we started

installing a flow meter and a pressure meter to the nitrogen injection line of Unit 1. At 11:26 on the same day, we completed the installment. We suspended the nitrogen injection due to this work, however, there is no problem since the suspended period is short.

- At 10:20 am on December 8, we started the exhaust fan of gas management system of Unit 1's Primary Containment Vessel, having started trial operation.
- When we cut the power of the PCV gas control system (Line A: under suspension) of Unit 1 to switch the power source for the improvement work of the on-site power source at approx. 10:38 am on December 12, the monitoring system in the main anti-earthquake building for the same system (Line B: under commissioning) was stopped. At approx. 11:30 am, we confirmed on site that the system (Line B) was stopped. Later, it was revealed that the power for controlling Line B comes from Line A, therefore we switched the power for the control, then at 12:00 pm we resumed Line B. Since Line B is normally operating after the re-start, we estimate that the reason Line B went down is that the power for Line A was cut.
- Since the monitoring results of the decontamination of radioactivity material and hydrogen density at the Primary Containment Vessel (PCV) gas controlling system which was in a test run was stable, we started regular operation of this system at 6:00 pm of December 19.
- On December 20, according to the operational record thus far, we changed the volume of nitrogen included into PCV and that of gas emitted from PCV gas control system. At 11:00 am on the same day, we decreased the reactor nitrogen amount from 28Nm3/h to 18Nm3/h, and at 11:30 am, we increased the gas emission amount from 15Nm3/h to 30Nm3/h,
- On December 22, according to the operational record thus far of Unit 1, we changed the volume of nitrogen into PCV and that of gas emitted from PCV gas control system. At 10:35 am on the same day, we decreased the nitrogen injection amount from approx. 18Nm3/h to approx. 13Nm3/h. In addition, at 11:45 am, we confirmed the volume of gas emitted from the gas management system decreased from approx. 30Nm3/h to 26.9Nm3/h.
- On December 26, as to the injection of nitrogen into the Primary Containment Vessel of Unit 1 and gas emission from gas management system of for the Primary Containment Vessel, considering the operating track record, we changed the volume of nitrogen injection and the emission amount from the gas management system. At 1:22 pm on the same day, we adjusted the volume of nitrogen injection into the Primary Containment Vessel from approx. $13m^3$ / h to approx. $8m^3$ / h. At 1:43 pm on the same day, we adjusted the emission amount from the gas management system from approx. $28m^3$ / h to approx. $23m^3$ / h.
- From 11:00 am to 0:15 pm on December 28, we adjusted the amount of nitrogen injection from approximately $8m^3$/h to approximately $18m^3$/h, and the amount of emission from gas management system from approximately 23 m^3/h to approxiatemly $30m^3$/h.

<Installation of gas controlling system of reactor containment vessel>

- At 5:07 pm, to install a gas controlling system of RPV, Unit 1, we started cutting a pipe in the RPV spray after we confirmed the hydrogen density was low enough. At 10:30 pm on the same day, the cutting finished.
- At 1:17 pm on October 26, we started cutting off the designated piping after confirming that the hydrogen density inside the piping for cooling in case of reactor shutdown was less than 0.1 %, as one of the construction work to install gas monitoring system inside the Primary Containment Vessel. At 3:15 pm on the same day, we finished cutting pipes. After that, we conducted welding of blind plates of cut pipes and covering holes of the pipes. At 7:00 pm on the same day, we finished all operations.
- On December 7, as a part of installation work of the Primary Containment Vessel Gas Management System in the Unit 1 reactor building, we conducted nitrogen substitution in order to eliminate hydrogen in the existing pipe arrangement to be used in the system.
- At 10:29 am on December 8, we activated an exhaust fan in the Primary

Containment Vessel Gas Management System and started test operation of the system.

- When we cut the power of the PCV gas control system (Line A: under suspension) of Unit 1 to switch the power source for the improvement work of the on-site power source at approx. 10:38 am on December 12, the monitoring system in the main anti-earthquake building for the same system (Line B: under commissioning) was stopped. At arround 11:30 am, we confirmed on site that the system (Line B) was stopped. Later, it was revealed that the power for controlling Line B comes from Line A, therefore we switched the power for the control, then at 12:00 pm we resumed Line B. Since Line B is normally operating after the re-start, we estimate that the reason Line B went down is that the power for Line A was cut.
- Since the monitoring results of the decontamination of radioactivity material and hydrogen density at the Primary Containment Vessel (PCV) gas controlling system which was in a test run was stable, we started regular operation of this system at 6:00 pm of December 19.

<Reactor containment vessel gas sampling>

- From 10:37 am to 1:10 pm on July 29, we implemented the gas sampling of Unit 1 Primary Containment Vessel.
- From 9:15 am to 12:10 pm on September 14, we sampled gases in the Reactor Pressure Vessel of Reactor Building, Unit 1.

<Improvement of working environment>

- On May 2, we started work to install the local exhausters in order to improve the working environment in the reactor building.
- At 4:36pm on May 5, we started to ventilate with 6 local exhausters the reactor building of Unit 1 in order to improve the working environment of the building.
- Consequently, we confirmed that radioactivity density inside of the reactor building decreased enough, and opened the double doors (removed the duct of the local exhauster) of the reactor building at 8:08 pm on May 8. After removing sheets used for the installation of the local exhausters, we opened the double doors of the reactor building at 4:17 am on May 9. Then, we confirmed air dose rate as of 5:00 am and evaluated that there was no impact on the surrounding area.

<Installation of reactor building cover>

- Preparatory work to cover reactor building was initiated on May 13. On June 28, we started construction work of installing covers over the reactor buildings by moving crawler cranes.
- On October 28, we completed the installation of cover panels which cover the reactor building of Unit 1 to control emission of radioactive materials.

<Reactor building dust sampling>

- From 12:30 pm to 1:50 pm, on May 22, we sampled, on a trial basis, radioactive materials in the ambient air at the opening of the Reactor Building, Unit 1. As a result of analysis, Iodine 134, Cesium 134, and Cesium 137 were detected.
- From 4:28 am to 5:57 am on July 24, we implemented dust sampling over the reactor building of Unit 1 with an unmanned helicopter.
- From 8:10 am to 2:25 pm on August 28, we conducted dust sampling at the upper part of Unit 1 reactor building using a large crane vehicle.
- From 9:45 am to 1:30 pm on September 11, we conducted dust sampling at the upper part of reactor building of Unit 1 using a large crane vehicle.
- From 8:55 am to 12:05 pm on October 3, we conducted dust sampling at the upper parts of Unit 1 reactor building using a large-scale crane.
- From 11:44 am to 2:03 pm on October 7, we conducted dust sampling at Opening section for equipment hatch and truck bay door of Unit 1 Reactor building.
- From 2:17 pm to 3:17 pm on October 12, we conducted dust sampling at Opening section for equipment hatch and truck bay door of Unit 1 Reactor building.
- From 11:31 am to 0:31 pm on October 25, we conducted dust sampling at the opening for the equipment hatch in the reactor building of Unit 1.

- From 1:35 pm to 2:35 pm on November 4, we conducted dust sampling at the opening for the equipment hatch in the reactor building and truck bay door of Unit 1.
- From 10:10 am to 12 pm on December 2, we conducted dust sampling at the ventilation equipment filter of Unit 1 reactor building cover.
- From 1 pm to 2 pm on December 2, we conducted dust sampling and measured air flow at the upper part of the reactor building equipment hatch of Unit 1.

<Others>

- Lights in the main control room were turned on at approx. 11:30am, March 24.
- Some of turbine building lights were turned on April 2.
- From 4:00pm to 5:30pm, April 17, the condition (radiation dose, temperature, oxygen density) inside the reactor building of Unit 1 was observed by a remote-controlled robot.
- From 11:35 am to 1:24pm, April 26, the condition inside the reactor building of Unit 1 was observed by a remote-controlled robot and we confirmed that there was neither major change in the radiation dose nor significant water leakage from the Primary Containment Vessel.
- From 11:36 am to 2:05pm, April 29, the condition inside the reactor building of Unit 1 was observed by a remote-controlled robot and we confirmed that there was no significant water leakage from the Primary Containment Vessel.
- From 4:01 pm to 5:39pm, May 13, the condition inside the reactor building of Unit 1 was observed by a remote-controlled robot.
- On May 20, our staffs went into the reactor building of Unit 1 to measure the water level and radiation level by a camera.
- From 10:38 am to 12:21 pm on June 3, installation work of temporary reactor pressure meter at Unit 1 was implemented.
- On June 15, test of decontamination was conducted inside the truck bay door to investigate the measures of decontamination. Result is being analyzed.
- At 3:22 am on August 12, an M 6.0 earthquake with the seismic center at offshore of Fukushima prefecture occurred. We confirmed that one out of two of the temporary control air compressor stopped. As we could not restart this, at 6:44 am on the same day, we started the back-up diesel-driven air compressor.
- 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℃

【Unit 2】

- At approx. 6:14am, March 15, the abnormal sound was confirmed near the suppression chamber and the pressure inside the chamber decreased afterwards. It was determined that there was a possibility that something happened in the suppression chamber. While sea water injection to the reactor continued, TEPCO employees and partner companies' workers not in charge of water injection work started tentative evacuation to a safe location. Sea water injection to the reactor continued.
- At approx. 9:24 am, May 18, the first workers went into the reactor building after the occurrence of abnormal sound near the suppression chamber.

<Water injection to the reactor>

- At 1:25pm, March 14, since the Reactor Core Isolation Cooling System failed, it was determined that a specific incident stipulated in Clause 1, Article 15 of Act on Special Measures Concerning Nuclear Emergency Preparedness occurred (failure of reactor cooling function).
- At 5:17pm, March 14, while the water level in the reactor reached the top of the fuel rod, we resumed the water injection with the valve operation.
- At 10:10am on March 26, freshwater (with boric acid) injection was initiated. (switched from the seawater injection) At 6:31pm, March 27, the fire pump used for the injection was switched to a temporary motor driven pump.
- From 10:22am to 12:06pm on April 3, the fire pump was temporarily used for the water injection in order to switch the power of the motor driven pump from temporary power to the off-site power. It was again switched to the motor driven pump, and the freshwater injection is continued.
- Water injection to the reactor was temporarily suspended due to partial shutdown of the off-site power caused by the earthquake which occurred at approximately 5:16pm, April 11. Following the restoration of off-site power, water injection resumed at approximately 6:04pm.
- At 5:00 pm, on April 15, we had completed transferring emergency power sources to spray water to the reactor to the upland.
- On April 18, in order to replace hoses, which were used to inject water to the reactors, injecting water was temporarily suspended. After replacement, we restarted injecting water by pumps
- Before the work to connect high voltage power panels of Unit 1/2 and Unit 5/6, the power source of pumps to inject water to reactors was switched to a temporary diesel generator at 10:57 am on April 25. Offsite power was restored at 6:25 pm.
- From 11:33 am on May 29, we started water injection to the reactor of Unit 2 through reactor feed water system at approximately $5m^3$/h. (water injection through fire extinction system was continued at approximately $7m^3$/h.)
- At 12:01 am on May 30, we changed the rate of water injection to the reactor of Unit 2 through the fire extinction system from approximately $7m^3$/h to approximately $2m^3$/h. The rate of water injection was changed to approximately 1 m^3/h at 10:38 am. At 6:05 pm on the same day, water injection through the fire extinction system was stopped (water injection through feed water system was continued at approximately 5 m^3/h.)
- At 1:49 pm on June 3, freshwater injection was suspended in Unit 2 due to re-routing of the water supply line to the reactor. At 2:09 pm on June 3, freshwater injection was resumed.
- At 12:14 pm on June 14, water injection was temporarily suspended due to the switch of injection pipeline to Unit 2 reactor. Water injection was resumed at 12:37 pm.
- At 10:04 am on June 22 we changed the rate of water injection to Reactor from approx. 4.5 m^3/h to approx. $4.0m^3$/h through reactor feed water system piping arrangement. After that the indicated value of injection flow was fluctuating, however it settled at approximately $3.5m^3$/h now.
- At 6:27 pm on June 23, regarding the water injection line to the reactor of each unit, we changed for Unit 1 and Unit 2 by using electrical reactor water injection pumps for Unit1, and stopped electrical reactor water injection pumps for Unit 2.

- At 4:20 pm on June 27, in addition to injecting water from the filter tank, we started to use treated water. At 5:55 pm, we stopped supplying treated water.
- At 2:36 pm on June 28, we started to operate the transfer pumps of water treatment system. After confirming no leakage and adjusting water volume, we started to operate circulating injection cooling at 3:55 pm, June 28.
- At 10:59 am on June 29, we stopped the transfer pumps, and started it at 1:12 pm. At 1:33 pm on June 29, we started to operate circulating injection cooling.
- At 7:27 am on July 1,we stopped injecting treated water and implemented injecting filtered water to (no change in amount) due to construction of installment of the Tank (buffer tank) for injecting to the reactor. At 6:00 pm on July 2, we started full scale operation of circulating injecting cooling which inject treated water by accumulated water treatment system to the reactor via buffer tank.
- At 10:10 am July 19, we changed the rate of water injection into Unit 2 reactor from approx. 4.1m^3/h to approx. 3.8m^3/h.
- At 8:43 am on July 22, because we confirmed that the amount of water injection had been lowered, we adjusted the amount to approximately 3.8m3/h.
- At 9:35 am on July 23, since the volume of injected water into the reactor was found to be decreased, we adjusted the volume up to 3.8m3/h.
- At 5:30 pm on July 28, flow rate of injecting water to Unit 2 reactor was adjusted to approx. 3.6m3/h after reduction of flow rate was observed.
- At 11:57 am on July 30, we adjusted the amount of water injection in each Unit to approx. 3.6 m^3/h since we confirmed a decrease in the amount of water injected to the reactor.
- At 5:01 am on July 31, we adjusted the amount of water injection in each Unit to approx. 3.7 m^3/h since we confirmed a decrease in the amount of water injected to the reactor.
- From 5:55 pm to 5:56 on August 1, we changed the rate of water injection into the reactor to approx. 3.9m^3/h.
- At 5:50 pm on August 4, decrease in the rate off water injection into Unit 2 reactor was confirmed and it was adjusted to approx. 3.8m^3/h.
- At 8:32 am on August 10, we adjusted flow rate of injecting water at approx. 3.8m^3/h due to the decrease in the rate of water injection to reactor.
- At 12:20 pm on August 10, we adjusted the rate of injecting water at approx. 3.8m^3/h due to the increase in the rate of injecting water to reactor.
- At 7:30 pm on August 12, we adjusted the rate of injecting water at approx. 3.8m^3/h, as we confirmed the increase in the rate of injecting water to reactor.
- At 9:48 pm on August 15, we adjusted the rate of injecting water at approx. 3.8m^3/h as we confirmed the decrease in the rate of injecting water to reactor.
- At 3:46 pm on August 17, we adjusted the rate of injecting water to the reactor at approx. 3.8m^3/h, as we confirmed the decrease in the rate of water injection.
- At 3:30 pm on August 19, we adjusted the rate of injecting water to the reactor at approx. 3.8m^3/h, as we confirmed decrease in it.
- At 6:56 pm on August 30, we adjusted the rate of injecting water to the reactor at approx. 3.8m^3/h, as we confirmed decrease in it.
- At 7:17 am on September 2, as it was confirmed that there was a decrease in the amount of water injection for the reactor of Unit 2, we adjusted the rate to approx. 3.8 m^3/h
- At 9:40 am on September 3, as it was confirmed that there was a decrease in the amount of water injection for the reactor, we adjusted the rate of water injection to approx. 3.8m^3/h.
- At 4:27 pm on September 6, as it was confirmed that there was a decrease in the amount of water injection for the reactor, we adjusted the rate of water injection to approx. 3.8m^3/h.
- At 2:55 pm on September 7, as it was confirmed that there was a decrease in the amount of water injection for the reactor, we adjusted the rate of water injection to approximately 3.8m^3/h.
- At 10:33 pm on September 8, as it was confirmed that there was a decrease in the amount of water injection for the reactor, we adjusted the rate of water injection to approximately 3.8m^3/h.
- At 5:40 pm on September 11, as it was confirmed that there was a decrease in the

amount of water injection for the reactor, we adjusted the rate of water injection to approximately 3.8m^3/h.

- At 6:07 pm on September 13, as it was confirmed that there was a decrease in the amount of water injection for the reactor, we adjusted the rate of water injection to approximately 3.8m^3/h.
- At 2:59 pm on September 14, we started water injection into the reactor of Unit 2 through the core spray system in addition to the injection through the reactor feed water system. At 3:25 pm on the same day, we adjusted the volume water from the core spray system to 1.0 m^3/h. The volume of water injected from the feed water system remains unchanged
- At 3:45 pm on September 15, with regard to the injection into the reactor of Unit 2, we adjusted the amount of water injection from the core spray system to approx. 2.0 m^3/h (the amount from the feeding water system is kept at approx. 3.8 m^3/h)
- At 9:11 am on September 16, as it was confirmed that there was a decrease in the amount of water injection for the reactor, we adjusted the rate of water injection to approx. 2.0m^3/h.
- At 3:35 pm on September 16, with regard to the injection into the reactor of, we adjusted the amount of water injection through the core spray system to approx. 3.0m^3/h (injection through feed water system remain at 3.8m^3/h).
- At 3:16 pm on September 19, we adjusted water injection amount from Core Spray System to the reactor of Unit 2 to approx. 4.0 m^3/h. (Water injection amount from Reactor Feed Water System remains approximately. 3.8 m^3/h.)
- At 11:40 am on September 21, as it was confirmed that water injection through reactor water feed system was decreased. We adjusted the amount of water injection to approximately at 4.0 m^3/h. The amount of water injection through reactor core spray system was also adjusted to approximately 4.0 m^3/h.
- At 3:36 pm on September 22, we adjusted the volume of water injected at 5.0 m^3/h from Core Spray System into Reactor Building (we continue injecting water at of 4.0 m^3/h from Feed Water System).
- At 3:05 pm on September 26, we adjusted the volume of water injected at 6.0 m^3/h from Core Spray System into Reactor Building of Unit 2 (while we continue injecting water at of 4.0 m^3/h from Feed Water System).
- At 10:25 am on September 28, we switched water injection line to emergency line at Unit 1,2 and 3 for the trial run of mini flow line in the regular injection line set on the hill. At 2:02 pm on the same day, we switched back to the regular water injection line after the trial run. There was no change in the injection amount due to this work.
- At 3:00 pm on October 4, we adjusted water injection rate into Unit 2 through reactor spraying system at approx. 7.0 m^3/h (injection rate through feed water system remains at approx. 4.0 m^3/h).
- At 5:38 pm on October 6, we adjusted water injection rate through reactor feed water system at 3.8 m^3/h, since we observed decrease in water injection. (Injection rate through core spray system remains at approx. 7.0 m^3/h.)
- At 6:52 pm on October 25, we adjusted water injection rate through reactor feed water system at 3.0 m^3/h, since we observed decrease in water injection. (Injection rate through core spray system remains at approx. 7.0 m^3/h.)
- - At 9:47 am on October 26, for the water injection to the reactor, we switched from normal water injection line to emergency water injection line, due to the shutoff of facilities for power source reinforcement work. Along with the switching work, we adjusted the amount of water injection to the reactor to approximately 3 m^3/h from water feeding system, and to approximately 7m^3/h from Core Spray System . At 4:10 pm on the same day, we switched from emergency water injection line to normal water injection line due to completion of power source reinforcement work.
- At 9:55 am on October 27, we switched water injection line of unit 1 and 2 from normal water injection line to emergency water injection line to add the vane to adjust flow amount of water injection line to the Unit 2's reactor in order to improve the ability to control the water injection amount. At 2:35 pm on the same day, we switched from emergency water injection line to normal water injection line due to completion of the work. Injection amount is stable after the work.

- At 9:30 am on October 28, due to the additional installment of control valve of Unit 1 water injection line to improve controllability of water injection, we switched water injection line into the reactor of Unit 1 and Unit 2 from normal line to emergency line. As the installment work was finished, at 1:30 pm on the same day, we switched water injection line from emergency line to normal line. At 2:00 pm on the same day, accompanied by the switching of injection line, we adjusted water injection rate from feed water system approx. 3.0m^3/h and from core spraying system approx. 7.0 m^3/h for Unit 2.
- At 3:50pm on November 1, we adjusted water injection rate from feed water system approx. 3.0m^3/h and from core spraying system approx. 7.0 m^3/h for Unit 2.
- The injecting water line changed for injecting boric acid water was replaced. At 4:14pm on November 2, we adjusted injecting water volume into the reactor Unit 2 at approx. 3/0 m^3/h from reactor feed water system and at approx. 7.0 m^3/h from core spray system.
- On November 4, due to inspection of Unit 3 reactor water injection pump, it was switched to Unit 1/2 reactor water injection pump. At 3:13 pm, together with this switch, water injection amount of feed water system was adjusted to approx.3.0 m^3/h, and that of the reactor core spray system to approx.7.2 m^3/h.
- At 9:15 am on November 17, at unit 2 emergency reactor injection line, the additional installation work for water flow adjusting valve was commenced to better control the amount of water injection, and completed at 1:09 pm on the same day. Water injection to reactor had been done through regular reactor water injection line, and therefore the additional installation work above had no impact to water injection.
- At 3:33 pm on November 18, along with the adjustment of water injection amount of Unit 1, we adjusted the amount of water injection to the reactor of Unit 2 to approximately 3.1m^3/h from water feeding system, and to approximately 7.1 m^3/h from Core Spray System.
- On October 28, after regular operation of the gas control system for PCV, Unit 2, since a relatively high density hydrogen was detected on October 29, we are intending to control the hydrogen density below the inflammable limit (4%) even if there is no steam, by directly including nitrogen into the RPV for Units 1 to 3.Until we have included nitrogen into RPV, in order to lower the hydrogen density of RPV by increasing the temperature and the steam ratio thereby, on November 24, we lowered the amount of water injection into the reactor of Units 1 to 3.Unit 2: At 7:11 am, the water injection amount by the reactor core system decreased from 7.2 m3/h to 5.6 m3/h. (the injection of feed water system is continuing at 2.9 m3/h) After that, we monitored the temperature trend in the RPV and the PCV. Since the change of the temperature was small and there was a possibility of significant change of the temperature by further reduce of the water injection, we adjusted it from approx. 5.5 m^3/h to approx. 4.5 m^3/h through core spray system from 10:18 am to 11:02 am on November 26 (through reactor feed water system it remains unchanged, approx. 3.0 m^3/h). As we assumed that the hydrogen density of RPV was decreased from the result of the operation, at 11:25 am on December 10, we adjusted the water injection volume of the core spray system from approx. 4.5 m^3/h to approx 5.5m^3/h to cool down the reactors more stably (The current water injection volume is approx 2.9m^3/h from the water feeding system.)
  At 10:13 am on December 9, as we observed reduction of the water injection rate, adjusted the rate from the core spray facility from approx 4.2m3/h to approx 4.5m3/h (from feed water system remains at approx 3.0m3/h).
- At 10:44 am on December 11th, We adjusted water injection from Core Spray System from approx. 5.6 m3/h to approx. 6.0 m3/h to cool down the reactor more safely, while we adjusted water injection from the Feed Water System from approx. 2.5 m3/h to approx. 3.0 m3/h
- At 10:40 am on December 14, as the decreasing of injecting water from feed water system was confirmed, we adjusted injection rate from approx.2.5m3/hour to approx.3m3 /hour. And also adjusted injection rate of core spray system from approx. 6.2m3/hour to approx.6m3/hour.
- At 11:14 am on December 19, because we found decrease of water injection rate

from water feeding system, we adjusted injection rate from approx. 1 m^3/h to approx. 3 m^3/h (water injection from core spray system with approx. 6 m^3/h was continuing).

- On 10:30 am on December 23, the change of injection water flow to Reactor was found so that water injection from feed water system was adjusted from approx. 2.5 m^3/h to 3.0 m^3/h (water injection from Core Spray system was remained unchanged as approx. 6.0 m^3/h).
- At 11 am on December 27, regarding the water injection into the reactor core of unit 2, for the purpose of preparation of commissioning of water injection pumps for diversification, water injection rate from feed water system was adjusted from approx. 2.8 m^3/h to 2.0 m^3/h, from core spraying system was adjusted from approx. 6.0 m^3/h to 7.0 m^3/h.
- At 9: 44 am on December 30, the injected water amount was adjusted from approx. 1.8 m^3/h to approx.2.0 m^3/h in feed water system (no change in corer spray system with approx. 7.0m^3/h) as the change in the injected water amount was observed.

<Water spray to the spent fuel pool>

[Seawater spray]

- From approx. 3:05pm to approx. 5:20pm on March 20: about 40 tons of sea water injection through Spent Fuel Pool Cooling and Filtering (Clean up) System) (by TEPCO).
- From approx. 4:07pm to 5:01pm on March 22: about 18 tons of sea water injection through Spent Fuel Pool Cooling and Filtering (Clean up) System) (by TEPCO).
- From 10:30am to 12:19pm on March 25: sea water injection through Spent Fuel Pool Cooling and Filtering (Clean up) System).

[Freshwater spray]

- From 4:30pm to 6:25pm on March 29: fresh water injection through Spent Fuel Pool Cooling and Filtering (Clean up) System) (Switched to fresh water injection).
- At 9:25am, March 30, we started fresh water injection by a temporary motor driven pump, but the pump was switched to a fire pump due to the pump trouble. At 1:10pm, March 30, fresh water injection was suspended, because we found the crack on a part of the hose. At 7:05pm, March 30th, freshwater injection was resumed and finished at 11:50pm, March 30.
- Freshwater injection through Spent Fuel Pool Cooling and Filtering (Clean up) System

  From 2:56pm to 5:05pm on April 1: water injection using the temporary motor driven pump.

  From 11:05am to 1:37 pm on April 4: water injection using the temporary motor driven pump.

  From 1:29pm to 2:34pm on April 7: water injection using the temporary motor driven pump.

  From 10:37am to 12:38pm on April 10: water injection using the temporary motor driven pump.

  From 1:15pm to 2:55pm on April 13: water injection using the temporary motor driven pump

  From 10:13am to 11:54am on April 16: water injection using the temporary motor driven pump

  From 4:08pm to 5:28pm on April 19: water injection using the temporary motor driven pump

  From 3:55pm to 5:40pm on April 22: water injection using the temporary motor driven pump

  From 10:12am to 11:18am on April 25: water injection using the temporary motor driven pump

  From 10:15am to 11:28am on April 28: water injection using the temporary motor driven pump

  From 10:05am to 11:40am on May 2: water injection using the temporary motor driven pump

  From 9:36am to 11:16am on May 6: water injection using the temporary motor

driven pump

- From 1:09pm to 2:45pm on May 10, water injection through Spent Fuel Pool Cooling and Filtering (Clean up) System (hydrazine was added for the period from 1:19pm to 2:35pm)
- Freshwater injection through Spent Fuel Pool Cooling and Filtering (Clean up) System

  From 1:00pm to 2:37 pm on May 14, (hydrazine injection from 1:08pm to 2:02pm)

  From 1:10 pm to 2:40 pm on May 18 (hydrazine injection from 1:15 pm to 2:30 pm)

  From 1:02 pm to 2:40 pm on May 22 (hydrazine injection from 1:04 pm to 2:03 pm)

  From 10:06 am to 11:36 am on May 26 (hydrazine injection from 10:10 am to 11:10 am)

  From 12:06 pm to 1:52 pm on May 30

  From 6:06 am to 6:53 pm on June 1
- At 12:29 am, on July 25, 2011, we started the hydrazine injection into the spent fuel pool of Unit 2using the circulating cooling system. At 1:27 pm on the same day, we finished the hydrazine injection (After that, Timely injection of hydrazine is implemented.).

< Nuclide analysis of spent fuel pool water>

- On April 16, in order to check the condition of the water in the spent fuel pool for the purpose of designing temporary cooling equipment that we are planning to install in the pool, we collected and conducted a nuclide analysis of approximately 400 ml of water that flowed out of the pool into the skimmer surge tanks*, and as a result iodine-131, cesium-134, and cesium-137 were detected. Later we conducted detailed analysis, and on May 31 we concluded that the large portion of spent fuel was sound.

  * skimmer surge tanks: 2 tanks installed between the spent fuel pool and the nuclear reactor well to store the water that overflows from the pool and the well.

< Cooling of spent fuel pool by alternative system>

- On May 24, a heat exchanger installation work was conducted.
- On May 25, a pipe connecting work was conducted.
- At 11:15 am on May 30, we conducted the leakage test of the secondary system of the alternative cooling system for the spent fuel pool, and started to make a trial run of the secondary system at 3:02 pm.
- At 11:40 am on May 31, we conducted leakage test on the primary system of the alternative cooling system of the spent fuel pool. At 5:21 pm on the same day, we started the operation. At 6:11 pm we reached to the rate flow (approx. 100m^3/h). Later at 1:47 am on June1, we adjusted the flow rate to 80m^3/h.

  At 5:06 am on June 1, we stopped primary pumps. From 6:06 am to 6:53 am, we injected freshwater through Spent Fuel Pool Cooling and Filtering (Clean up) System. At 7:06 am, we restarted primary pumps.

  At 11:03 am on June 19, we stopped the operation of Spent Fuel Pool Cooling and Filtering (Clean up) System) of Unit 2 due to switching the power in the plant. At 4:00 pm on the same day we resumed its operation.
- At 8:23 am on June 27, due to the changeover of power source inside the power station, we temporarily stopped Spent Fuel Pool Cooling and Purification System.
- At 6:38 am on July 15th, we found that cooling makeup water was not sprayed in the cooling tower in the second order of circulating cooling system in the spent fuel pool for Unit 2. At 8:22 am on the same day we stopped the circulating pumps in the second order cooling tower and the fans. After that, we confirmed the feed water valves from the filtering water tanks are closed. At 11:47 am on the same we opened the valves and confirmed feeding water from the filtering water tanks and resumed operating the circulating pump and the fans.
- At 10:03 am on September 6, we stopped the operation of Spent Fuel Pool Cooling and Filtering System of Unit 2 due to cleaning the secondary cooling tower of circulating cooling system in the spent fuel pool for Unit 2. At 10:42 am on the same day, we resumed its operation.

- At 11:04 am on November 6, we started operation of radioactive material removal instruments for the spent fuel pool of Unit 2. After its continuous operation for a month, the concentration of radioactive materials is expected to go below the level of 10^2, the facilities finished its operation on December 5. Sampling analysis of water in the spent fuel pool thereafter confirmed that the concentration of radioactive material actually decreased to the level of 10^2 from the level of 10^5 before the removal operation.
- At 4:24 pm on November 8, we stopped operation of radioactive material removal instruments for the spent fuel pool of Unit 2 in order to conduct switching work of the power source to enhance security of power source. At 8:47 on November 9, we restarted operation of radioactive material removal instruments for the spent fuel pool of Unit 2.
- At 5:41 am on November 9, cooling system of spent fuel pool was stopped due to the switching work of electricity to enhance security of electricity source. (The temperature of the spent fuel pool at 5:41 am: 23.9℃.) At 8:20 pm on the same day, alternative cooling system was operated. (The temperature of the spent fuel pool at 8:20 pm: 26.3℃
- At 10:30 am on November 12, we temporarily stopped operating radioactivity material removal facility for spent fuel pool of Unit 2, and started to change adsorption tower. Cooling spent fuel pool by circulated cooling system was kept operating. After that we completed change of adsorption tower and restarted operating the facility at 12:05 pm. We hereafter change adsorption tower in radio activity removal facility for spent fuel pool appropriately.
- At 9:12 am on November 28, the alarm indicating that the difference of flow rates between at the entering and at the exit of the primary pump at the alternative cooling system for the spent fuel pool is big went off, and the system automatically stopped. At 9:16 am on the same day we checked the site and no abnormality such as no leakage was confirmed. Then, considered the cause is stuck of dust in the pipe of flow sensor from the investigation result, at 11:50 am on November 29, we started the system and flushed. Then, we confirmed the flow sensor was operating normally. We will monitor the status of the system operation.
- At 11:13 on November 30, the alarm went off at the alternative cooling system in the Fuel Pool Cooling and Filtering System indicating that the difference of the flow rate between at the inlet and at the outlet is large and the system automatically stopped its operation. At 11:34 pm on the same day, no leakage was confirmed by the site inspection. At 11:00 pm on the same day, the temperature of spent fuel pool was 22.7 ℃ and the anticipated temperature increase was 0.3 ℃/h. As there is sufficient buffer, the inspection is scheduled during the morning of December 1. However, the inspection, the repair work and the cause analysis is rescheduled to December 2 as it turned out that the material preparation for such work needs time. On December 2, it was estimated that air or foreign materials entered the detection line. We conducted flushing and fulfilled it with clean water and restarted cooling the spent fuel pool at 1:50pm on the same day. (As at restart temperature of water was 28.0℃.)
- At 4:17 am on December. 7, on the alternative Spent Fuel Pool cooling system of Unit 2, the alarm indicating that the difference of flow rates between at the entering and at the exit of the primary pump is big went off, and the system stopped automatically. At 4:41 on the same day, after field investigation, no defect such as leakage was confirmed. Currently the cause is under investigation,. At 4:00 am, the temperature of Spent Fuel Pool was 18.4 degree C, the assumed increase of temperature is 0.3 degree C/h, from the viewpoint of Spent Fuel Pool temperature, there is still enough allowance, so that there is no problem. After that, as any troubles are not detected although we conducted flushing of flow rate measure and detection line and filling water, the cause of the alarm was not identified. As temporary operation procedure to identity the cause, we deleted the condition of automatic shutoff by the alarm indicating that the difference of flow rates between at the entering and at the exit of the primary pump is big. In addition, for the alternative monitoring method, we strengthen monitoring of the water level of skimmer surge tank and change the operation procedure to stop the system manually when system troubles occurred. After that, at 11:37 am on

December 10, we restarted cooling of the spent fuel pool by this system. (Water temperature of spent fuel pool at the injection restarted :31.3 ℃)

- At 3:53 pm on December 12, the annunciator alerted for the Unit 2 SFP alternative cooling system, which showed the difference between inlet and outlet flow at the primary pump exceeded the limit. Any abnormalities like water leakage were not observed by patrolling at the site. Currently the automatic trip system by the annunciator is temporarily removed, and monitoring the level of the skimmer surge tank is enhanced as the alternative monitoring measure. The cooling system will be manually tripped if there are abnormalities on the skimmer surge tank level, which is confirmed there is no change on the level. At 5:18 pm, after vibrated the instrument piping, it was confirmed the annunciator was cleared. It is planned to enhance the monitoring after the inspection of flow meters and the flushing of detection lines. There is no problem on the SFP cooling as the alternative cooling system is continuously operated.
- At 6:54 on December 14, an alarm went off indicating that there was a significant gap in the flow rates at the inlet and the outlet of the primary system pump of the spent fuel pool alternative cooling system of Unit 2. There was no accident such as a leakage found at the site. Later we implemented a vibration experiment on the instrumentation piping and confirmed that the alarm has stopped. Hereafter, we will check the flow rates every one hour. The spent fuel pool alternative cooling system has been kept in operation without any trouble in cooling

  The alarm went off again for the same reason at 3:06 am of December 19 and 5:04 am of December 20. We implemented a vibration experiment on the instrumentation piping and confirmed that the alarm has stopped.
- At 3:03 pm on December 20, we stopped the alternative cooling system of the Spent Fuel Pool of Unit 2 due to inspections in the flow rate detector of the system, This is scheduled to last until around 2:00 pm of December 23 and during this time we are expecting that the temperature of the spent fuel pool will rise by 21 ℃ (temperature at the time the we stopped the system: 15.4 ℃). After that, deposits were piled up inside the inlet and outlet pipes of flow meter when we cut those pipes for inspection. Therefore, we cleaned up the pipes to remove the deposits. After the completion of the inspection of the flow meter, at 2:18 pm on December 23, we started the water injection system and confirmed that there was no fluctuations in water flow difference (water temperature of spent fuel pool at the time of system start: 26.6 ^{o}C).
- At 1:58 pm on December 26, in the alternative cooling system of the spent fuel pool of Unit 2, 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. 14.2℃)

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

- In order to drain the accumulated water in the basement of the turbine building to a condenser, at approx. 4:45pm, March 29, the water in a condensate storage tank was started to be transferred to suppression pool's water surge-tanks as a preparatory work for the water transfer from a condenser to a condensate storage tank. At 11:50am, April 1, transfer was completed.
- The water transfer from the condenser to the condensate storage tank was started at 5:10pm, April 2. It was finished at 1:10pm, April 9th.
- The water transfer from the trench to Centralized Radiation Waste Treatment Facility (Process Main Building) was started at 10:08 am, April 19.
- In order to check the transfer facility and bolster the supervising function, we temporarily suspended transfer at 9:16 am, April 29. We resumed transfer at 2:05 pm, April 30.
- In order to allow work for switching the water injection line for Reactor, Unit 3 to the reactor feed water system, we temporarily suspended transfer at 9:22 am, May 7. We resumed at 4:02 pm. Similarly, we suspended at 9:01 am, May 10 and resumed at 3:20 pm, May 12.
- We altered the configuration of power source inside the power station after restoration of Okuma line, #2. To do so, we stopped the temporary power board.

In connection with that, we temporarily suspended transfer from 9:05 am to 3:30 pm on May 25. Given the volume of water accumulated at Centralized Radiation Waste Treatment Facility, we suspended transfer at 4:01 pm on May 26.

- At 2:45 pm on May 26, we started to empty water in the condenser, T/B in order to be prepared for the construction for water injection through feed water system piping arrangement into the reactor of Unit 2.Completed at 2:30 pm on May 27.
- At 6:39 pm on June 3, we started transferring the accumulated water in the trench of the turbine building of Unit 2 to the condenser hot well in the turbine building. The transfer completed at 0:28 pm on June 4.
- As the accumulated water in T/B of Units 2 and 3 was increasing, in order to avoid leakage to outside, we reconsidered the allowable water level at Centralized Radiation Waste Treatment Facility (Process Main Building). We reported the result to Minister of METI, had it reviewed by NISA, then started transfer of accumulated water in the pit, T/B, Unit 2 to Centralized Radiation Waste Treatment Facility (Process Main Building).
- At 2:20 pm on June 8, we temporarily suspended transfer due to stoppage of electricity supply for the pump. We resumed transfer at 6:03 pm, June 8. We stopped transfer at 8:40 am, June 16.
- At 2:20 pm on June 17, we started a water transfer from the vertical shaft of the turbine building of Unit 2 to the surface condenser hot well of Unit 1. We confirmed that the water did not flow at the entrance of pump and interrupted the work at 2:59 pm on the same day. Now we are investigating the causes.
- At 1:37 pm on June 20, we started transferring accumulated water in the basement of the turbine building of Unit 2 to Condenser, turbine building, Unit 1. At 5:09 pm on June 21, we stopped to transfer.
- At 9:56 am on June 22, we began to transfer the accumulated water from the vertical shaft of Unit 2 to the Centralized Radiation Waste Treatment Facility (Process Main Building).
- At 9:02 am on June 27, due to the changeover of power source inside the power station, we temporarily stopped transfer of paddle water from the pit, Unit 2 to Central Radioactive Waste Disposal Facility. At 5:07 pm, we resumed the operation. At 3:10 pm on July 7, we stopped transfer of the accumulated water from the vertical shaft of T/B, Unit 2 to Centralized Radiation Waste Treatment Facility (Process Main Building) due to the water level of Process Building came close to O.P.+4,950 (target to stop transfer).
- From 10:09 am on July 13 to 11:02 am on July 15, we transferred the accumulated water from the vertical shaft of the Unit 2 turbine building to Centralized Radiation Waste Treatment Facility (Process Main Building)
- At 10:56 am on July 16, we started transfer of the accumulated water from the vertical shaft of the Unit 2 turbine building to Centralized Radiation Waste Treatment Facility (Process Main Building). At 4:04 pm on July 21, we stopped the transfer.
- At 4:56 pm on July 22, transfer of accumulated water at Unit 2 turbine building vertical shaft to the Centralized Radiation Waste Treatment Facility (Process Main Building) started. At 9:43 m on July 29, we stopped the transfer.
- At 4:10 pm on July 30, we started transferring accumulated water from the vertical shaft of Unit 2 turbine building to Centralized Radiation Waste Treatment Facility (Process Main Building). We stopped transfer at 6:49 pm, August 2.
- At 7:09 am on August 4, we started transferring accumulated water from the vertical shaft of Unit 2 Turbine Building to Centralized Radiation Waste Treatment Facility (Process Main Building). At 4:56 pm on August 9, we stopped the transfer.
- At 4:47 pm on August 10, we started transferring the accumulated water from the vertical shaft of Unit2 Turbine Building to Centralized Radiation Waste Treatment Facility (Process Main Building). At 11:43 am on August 16, we stopped transfer.
- At 4:19 pm on August 18, we started transferring the accumulated water from the vertical shaft of Unit2 Turbine Building to Centralized Radiation Waste Treatment Facility (Process Main Building).
- At 10:03 am on August 25, we stopped transferring accumulated water from vertical shaft of Unit 2 Turbine Building to the Centralized Waste Treatment Facility (Process Main Building), and started transferring to Centralized Waste

Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]).

- At 9:31 am, August 30, we stopped transfer of accumulated water from the vertical shaft of turbine building of unit 2 to Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]) and started transfer of accumulated water to Centralized Radiation Waste Treatment Facility (Process Main Building).
- At 10:11 am on September 6, as it was confirmed that there was a decrease of accumulated water level at the basement of Unit 2 turbine building, we started transferring accumulated water from Unit 2 condenser to the basement of Unit 2 turbine building. At 2:54 pm on the same day, we stopped transiting.
- At 10:00 am on September 7, we started transferring accumulated water from Unit 2 condenser to the basement of Unit 2 turbine building. At 4:07 pm on the same day, we stopped transfer.
- At 9:35 am on September 13, we stopped transferring accumulated water at Unit 2 turbine building vertical shaft to Centralized Radiation Waste Treatment Facility (Process Main Building), and at 9:51 am, we started transferring accumulated water to Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]).
- To change transfer route of accumulated water of Unit 2, at 1:16 pm on October 4, we stopped transfer of accumulated water from vertical shaft of turbine building of Unit 2 to Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]). At 1:48 pm on October 6, 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]) through the new route.
- At 9:07 am on October 12, for blocking work of opening section on the basement of Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]), we stopped transferring accumulated water from the basement of turbine building to High Temperature Incinerator Building. At 2:17 pm on October 13, we restarted transferring from the basement of Unit 2 turbine building to the Centralized Waste Treatment Facility (Process Main Building).
- At 9:10 am on October 18, we suspended the transfer of accumulated water from the basement of the turbine building of Unit 2 to the Centralized Radiation Waste Treatment Facility (Process Main Building) due to the suspension of the water treatment facility.
- At 10:12 am October 20, transportation of accumulated water from unit 2 turbine building basement to Centralized Radiation Waste Treatment Facility (Process Main Building) was started.
- At 9:18 am on October 24, transportation of accumulated water from the basement of Turbine Building of unit 2 to Centralized Radiation Waste Treatment Facility (Process Main Building) was stopped temporally by the pumps change. After the pump changes, the transportation was re-started at 9:34 am on the same day.
- For the purpose of changing transfer route, at 9:32 am on October 28, we stopped transfer of accumulated water from underground of turbine building of Unit 2 to centralized radiation waste treatment facility (process main building). At 9:54 on the same day, we changed transfer route and started transfer of accumulated water from underground of turbine building of Unit 2 to centralized radiation waste treatment facility (Miscellaneous Solid Waste Volume Reduction Treatment Building)[High Temperature Incinerator Building]).
- At 10:02 am on October 31, transfer of accumulated water from Unit 2 turbine building underground to centralized radiation waste treatment facility(Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]) is suspended.
- At 9:38 am on November 4, we started transferring accumulated water from the basement of the Unit 2 turbine building to Centralized Radiation Waste Treatment

Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]).

- At 3:00 pm on November 8, as the power supply of Unit 2 accumulated water transfer pump will be stopped as the preparation of the power source reinforcement work, we stopped 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]).
- At 9:10 am on November 10, we started transferring accumulated water from the basement of the Unit 3 turbine building to Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building])
- At 8:59 am on November 30, we stopped the 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 6:03 pm on November 30, we started the transfer of 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 7:51 am on December 13, we stopped the transfer of 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]) in order to stop power supply to Unit 2 accumulated water transfer pump for power supply enhancing work.
- At 10:12 on December 17, 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). At 12:24 pm on the same day, we stopped the transfer since the water level at Unit 2 turbine building did not change. Then we confirmed at the site that the switching valve of the transfer line was closed and that there was no leakage from the line. Then we opened the valve and restarted the transfer at 1:22 pm on the same day. At 9:58 am on December 18, we stopped the transfer.
- At 1:57 pm on December 21, transfer was started from Unit 2 turbine building to the Centralized radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High temperature incinerator building] and Process Main Building). At 9:42 am on December 23, the transfer was suspended.
- At 10:10 am on December 26, we started to transfer 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] and the Process Main Building). At 9:54 am on December27, we stopped transfer.
- At 3:22 pm on December 28, we started to transfer 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] and the Process Main Building). We stopped to transfer them at 9:44 am, on January 3, 2012.

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

- At 8:06 pm on June 28, we started to inject nitrogen gas into the Primary Containment Vessel of Unit 2.
- From 5:52 am on August 3, in order to replace the nitrogen gas injector device, we stopped nitrogen gas injection into the Primary Containment Vessel of Units 1 to 3. After completion of the replacement, we restarted injection of nitrogen gas at 8:29 am. We continued injection of nitrogen gas with a backup injector from 5:58 am to 8:27 am.
- At 12:30 pm on October 6, we arranged the amount of nitrogen injected to the reactor containment vessel of Unit 2 to 13.5 m^3/h because we found the increase in amount of injected nitrogen.

- At 5:55 pm on October 18, since we confirmed reduction of injection volume of nitrogen gas to the primary containment vessel of Unit 2, we adjusted the injection volume to approx. 14m^3/h.
- Regarding the concentration of hydrogen in the exhaust gas of the gas control system for the Primary Containment Vessel of Unit 2, we found that the concentration of hydrogen which was approx. 1 % at the commencement of full-scale operation increased to approx. 2.3 % as of 5:00 pm on October 29. Therefore, at 6:10 pm on October 29, we adjusted nitrogen gas injection rate from approx. 14 m^3/h to 16.5 m^3/h in order not to exceed the inflammable limit concentration (4 %).
- It is confirmed that hydrogen concentration in the exhaust gas of gas monitoring system inside the Unit 2's Primary Containment Vessel increased to approximately 2.7 % as of 5:00 pm on October 30. Therefore, we adjusted the amount of nitrogen gas injection to the Primary Containment Vessel to approximately 21 m^3/h from approximately 16.5 m^3/h at 6:10 pm on the same day so that hydrogen concentration in the exhausted gas would not surpass the combustible limiting concentration (4%).
- At 12:40 pm on November 3, we started the work to install an additional flow meter into the nitrogen gas injection line into Unit 2 to improve the reliability of the nitrogen injection. It was finished at 2:00 pm on the same day, For this work the nitrogen injection was suspended for approximately 10 minutes, however, there were no significant changes in the parameters of Unit 2.
- At 2:20 pm on November 4, we arranged the amount of emission from the gas management system from 14m^3/h to 22 m^3/h in order to balance the amount of nitrogen injected to the reactor containment vessel and exhaust gas from the gas management system of Unit 2.
- Hydrogen concentration in the exhaust gas of the gas management system of Unit 2 primary containment vessel was increased from 2.7% (at 6:10 pm, October 30, when the last change of the amount of nitrogen filling) to 2.9% (at 4:30 pm, November 3). Therefore, at 4:50 pm that day, the amount of nitrogen gas filling was adjusted from approximately 21 m^3/h to 26 m^3/h so that hydrogen concentration in the exhaust gas does not exceed inflammability limiting concentration (4%)..
- In order to construct the nitrogen injection line direct to the reactor branched by the nitrogen injection line into the primary containment vessel, at 1:47 pm on November 29, we temporarily stopped nitrogen injection into the primary containment vessel of Unit 2. Then, we restarted Nitrogen injection into the primary containment vessel of Unit 2. At 2:37 pm on the same date, we confirmed the nitrogen injection amount (26m^3/h) into the primary containment vessel was stable.

  At 1:45 pm on November 30, we started nitrogen injection to the Reactor Pressure Vessel.

  At 2:47 on the same day, as we confirmed nitrogen injection had not increased, we temporally stopped the operation. The cause is under investigation. We are continuing nitrogen injection into the primary containment vessel The inspection thereafter revealed that the valve which was not described in the operation manual was not open. At 10:46 am on December 1, we restarted the injection operation. At 11:00 am, injection amount reached the scheduled amount of 5 m^3/h. Along with this operation, in order to balance the injected amount of nitrogen into the Reactor Pressure Vessel and the Primary Containment Vessel of Unit 2 and the exhaust amount from the gas management system, the exhaust amount from the system was adjusted from approx. 22 m^3/h to approx. 34 m^3/h
- At 10:25 am on December 2, we adjusted the volume of nitrogen injected into the Reactor Pressure Vessel from approx. 5Nm^3/h to approx. 10Nm^3/h. In addition, in order to balance the volume of nitrogen injected into the Reactor Pressure Vessel and the Primary Containment Vessel of Unit 2 and the volume of exhaust air from gas control system, we adjusted the volume of exhaust air from gas control system of the Primary Containment Vessel from approx. 34Nm^3/h to approx. 39Nm^3/h at 11:20 am on the same day.
- At 2:16 pm on December 7, in order to secure the sufficient time before hydrogen reaching the flammability limit in case the nitrogen injection facilities stop its

operation in the Unit 2 Reactor Pressure Vessel, nitrogen injection amount into the RPV was increased from 10 m^3/h to 13 m^3/h. As it is considered that there would be sufficient time in the Unit 2 Primary Containment Vessel, the nitrogen injection amount into the PCV was decreased from 26 m^3/h to 20 m^3/h.

- At 4:15 pm on December 8, in order to secure the sufficient time before hydrogen reaching the flammability limit in case the nitrogen injection facilities stop its operation in the Unit 2 Reactor Pressure Vessel, nitrogen injection amount into the RPV was increased from 13 m^3/h to 14.5 m^3/h. As it is considered that there would be sufficient time in the Unit 2 Primary Containment Vessel, the nitrogen injection amount into the PCV was decreased from 20 m^3/h to 16.5 m^3/h.
- On December 21, regarding nitrogen injection to the PCV and gas exhaust amount from the PCV gas controlling system, change in nitrogen injection amount and gas exhaust amount from the gas controlling system was conducted based on the past operation. At 2:52 pm on the same day, injection of nitrogen to the PCV was adjusted from approx. 16m^3/h to approx. 10 m^3/h. At 3:15 pm. A gas exhaust amount from gas controlling system was adjusted from approx. 40m^3/h to approx. 32 m^3/h.

<Installation of gas controlling system of reactor containment vessel>

- At 1:05 pm on October 26, we started nitrogen purge of the designate system after confirming that hydrogen is stored with the density of 6.5 % when connecting piping arrangements on October 20, 2011, as one of the construction work to install gas monitoring system inside the Primary Containment Vessel. We finished the nitrogen purge at 1:42 pm because we confirmed that the hydrogen density was 0%.
- At 10:30 am on October 27, we conducted leak test of the system as a part of construction to settle the gas control system of Primary Containment Vessel at the reactor building of Unit 2. As a result, we confirmed in-leak volume to the system had no problem. In addition, we conducted tentative operation test. As a result, we confirmed operational aspect of electric heater and exhaust fun had no problem.
- At 12:53 pm on October 28, we started up the exhaust fan of gas management system of primary containment vessel in the reactor building of Unit 2 and commenced commissioning. After we confirmed the stable operation of the system, from 6:00 pm on the same day, we put the system in operation.

<Reactor containment vessel gas sampling>

- From 10:39 am to 11:13 am on August 9, we conducted sampling of gas in the Primary Containment Vessel.
- We found a possibility to detect short-half-life radionuclide such as Xe-133 and Xe-135 according to our radionuclide analysis sampled on November 1 by the gas management system of the reactor containment vessel of Unit 2. We continued to monitor the temperature, pressure and data from monitoring post and there was no significant fluctuation from those data. As we can't be denied a possibility of fission reactions, we decided to start injecting boric acid water from reactor feed water system at 2:48 am on November 2 and stopped it at 3:47 pm on the same day. At around 7:20 pm on the same day, Japan Atomic Energy Agency evaluated that the TEPCO's analysis result of the short-half-life radionuclide such as Xe-133 and Xe-135 detection was valid. We consider that they were generated by the spontaneous fission on the grounds that the concentration of detected short-half-like radionuclide (Xe-135) is low, that short-half-like radionuclide (Xe-135) was detected even after the boric acid, which stops nuclear fission chain reactions, was injected, and that the parameters of the reactor were not significantly changed.
- On November 9, sampling survey of gas at the gas management system of Unit 2 primary containment vessel was implemented. According to its analysis, it is considered that recriticality was not occurred because radioactive Xe135 at the entrance of gas management system of Unit 2 was below detection limit (1.1×10^{-1}Bq/cm^3). In addition, Xe-135 (1.9×10^{-5}Bq/cm^3) was detected by charcoal filter. This was measured value and evaluated to be the amount emitted from the gas management system. Thus, the value measured by gas vial was converted into

the value of 1.1×10^{-2}Bq/cm^3 using achievement rate. This value was the same as 2.7×10^{-2}Bq/cm^3 that was evaluated before.

- On November 14, sampling survey of gas at gas management system of Unit 2 primary containment vessel was implemented. According to its analysis, it is considered that recriticality was not occurred because radioactive Xe-135 at the entrance of gas management system of Unit 2 was below the detection limit (9.2×10^{-2}Bq/cm^3)
- We have conducted gas analysis at the primary containment vessel in the reactor building of Unit 2 by using gas management system since October 28, 2011. It was found that a part of measurement results collected on October 28, November 1, 2 and 14 were evaluated about 10% lower in terms of the concentration of radioactive materials due to computation process error. The errors were only affected number corrected, but not affected the criterion of criticality resumption nor evaluation results.
- On November 22, we sampled gases in gas management system in primary containment vessel of Unit 2 to analyze nuclides. As a result of nuclides analysis, we evaluated that there is no recriticality since the density of Xe-135 is below the detection limits (1.1×10^{-1} Bq/cm^3) and that indicates the analyzed figure is below the determination criteria for recriticality such as 1 Bq/cm^3. Regarding Xe-135, we decided to use the sampling result at gas vial container at inlet in gas management system to evaluate the recriticality based on the “Report with regard to "Policy on the mid term security" for the Units 1 to 4 of Fukushima Daiichi Nuclear Power Station to Nuclear and Industrial Safety Agency at the Ministry of Economy, Trade and Industry (1) (revision)” (Press released on November 9th) because charcoal filter was used to detect Xe-135 and we evaluated that they are created by spontaneous fission.

  * Detection Limits Charcoal Filter: Order of 10^{-6}, Gas Vial Container: Order of 10^{-1}

- On November 29, December 6, 15, 22, 28 sampling survey of gas at the gas management system of Unit 2 primary containment vessel was implemented. As a result of the analysis, we regarded the situation was not recriticaly because the radioactive density at the gas management system of Unit 2 primary containment vessel was under ND, the criteria of recriticaly is 1 Bq/cc. Regarding Xe-135, its radioactive density was detected by charcoal filter* (we regarded spontaneous fission). According to the Report with regard to ″Policy on the mid term security″ for the Units 1 to 4 of Fukushima Daiichi Nuclear Power Station to Nuclear and Industrial Safety Agency at the Ministry of Economy, Trade and Industry (1) (revision) (for public on November 9), the situation of recriticaly therefore should be regarded by the sampling survey of gas at the gas management system of Unit 2 primary containment vessel by vial.
- On December 2, we conducted sampling at charcoal filter and particulate filter of gas control system of Unit 2 Primary Containment Vessel.
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<Improvement of working environment>

- We installed local exhausters and started to operate them at 12:42 pm on June 11 in order to improve the working environment inside the reactor building.
- At 12:12 pm on June 19, we stopped local exhausters in the primary containment vessel of Unit 2 due to switching the power in the site. At 4:22 pm on the same day we resumed their operation.
- At 8:51 pm on June 19 we began to open the air lock, while coordinating a degree of its opening. Then we confirmed a result of monitoring dose rate in the air and evaluated there was no impact in the surrounding area.

<Reactor building dust sampling>

- From 10:35 am to 1:20 pm on August 29, we conducted sampling of dust at the openings (blow out panel) of Reactor Building.
- From 10:05 am to 11:05 am and from 2:43 pm to 3:43 pm on September 17, we conducted sampling of dusts at the openings (blow out panel) of Reactor Building.
- From 9:26 am to 10:26 am on October 5, we conducted sampling of dusts at the openings (blow out panel) of Reactor Building.
- From 10:00 am to 12:00 pm on October 13, we conducted sampling of dusts at the openings (blow out panel) of reactor building of Unit 2.
- From 10:31 am to 11:31 am on October 25, we conducted dust sampling at the

opening (blowout panel) of the reactor building of Unit 2.

- From 11:23 am to 13:23 pm on November 1, we conducted dust sampling at the opening (blowout panel) of the reactor building of Unit 2.
- From 12 pm to 2 pm on December 2, we conducted dust sampling at the opening of Unit 2 reactor building (blow-out panel).
- At 8:25 am on 6 December, dust sampling at opening part (blow out panel) of Reactor Building in Unit 2 was started. At 10:25 am, sampling was completed.

<Others>

- Lights in the main control room were turned on at approx. 4:46pm, March 26.
- Some of turbine building lights were turned on April 2.
- From 1:42pm to 2:33pm, April 18, the condition (radiation dose, temperature, oxygen density) inside the reactor building of Unit 2 was observed by a remote-controlled robot
- From 11:15 am to 12:00 pm on June 22, we installed a temporary reactor pressure indicator.
- From 10:34 am to 1:49 pm on July 8, we measured radiation dose in the air at the second and third floor of Unit 2 Reactor Building using remote controlled robot.
- From 5:06 am to 6:02 am on July 22, dust sampling survey was implemented for the upper part of Unit 2's reactor building, using unmanned helicopter.
- From 11:20 am to 11:52 am on October 21, aiming to restore the function of primary reactor water level gauge, we filled the measurement piping with water from makeshift gauge (gauge in the makeshift lack) in the primary reactor Water Level Gauge in Unit 2.
- As of 5:00 pm on November 26, the indicator of the gas temperature of Suppression Chamber of Unit 2 read 52.7℃, but at 11:00 pm on the day we confirmed that it read "Overscaled" (digital recorder). Then, as of 5:00 am on November 27, it read 102.6℃. Though the readings were not stable, as there were no significant changes or variations in the temperatures of the same types of 2 thermometers and the pool water in Suppression Chamber, we have been investigating the causes for this event including the possibility of malfunction of the measuring instruments. Later, we inspected the measuring instruments and estimated that the readings were overscaled due to certain impacts on the signal detection line seeing that signal from the temperature detector is not stable. We will keep monitoring readings of this instrument and also monitor the temperature using instruments close to it.
- The indicator for the inside of the Primary Containment Vessel (Drywell) of Unit 2 (base line temperature of the air conditioning unit, local cooling equipment) read 78.2℃ as of 5:00 am on November 27 but at 6:50 am on the day it was confirmed that it read approximately 84℃, increasing in a staircase pattern. On the other hand, it was also confirmed that the temperature changes of the bottom of the Reactor Pressure Vessel and the water in the pool of the Suppression Chamber were smaller than that of the inside of the Primary Containment Vessel (Drywell) and that there was no significant change in the temperature.

Now we have been decreasing the flow rate of water injection as shown in the below and therefore it is expected that the temperature inside the Primary Containment Vessel will rise, but, as the line of which temperature rose in a staircase pattern was only one line of the five lines and the rest of the lines did not show the same changes, we have been investigating the causes for this event, including the possibility of malfunction of the measuring instruments. We will continue to monitor the temperatures. Later we inspected the instrument but got no data indicating malfunction, and the readings after the inspection are not different from those before. Therefore, we estimated that the signal detection line was somehow affected, which raised the temperature indicated. We will keep monitoring this instrument and also monitor the temperature using instruments close to it.

【Unit 3】

- At approximately 11:01am, March 14, an explosion followed by white smoke

occurred near Unit 3. 4 TEPCO employees and 3 workers from partner companies (all of them were conscious) sustained injuries and were taken to the hospital by ambulances.

- Since 6:15am, March 17, the pressure of the Suppression Chamber temporarily increased, on March 20, we were preparing for implementing measures to reduce the pressure of the primary containment vessel (partial discharge of air containing radioactive material to outside) in order to fully secure safety. However, at present, it is not a situation to immediately implement such measures and discharge air containing radioactive material to outside. We will continue monitoring the status of the pressure of the primary containment vessel.
- At approx. 3:55pm, March 21, we confirmed light gray smoke was arising from the southeast side of the roof of the reactor building. The situation was reported to the fire department at approx. 4:21pm. The parameters of reactor pressure vessel, primary containment vessel, and monitored figures at the surrounding areas remained stable without any significant changes. However, workers around Unit 3 evacuated indoors as a precautionary measure. On March 22, the color of smoke changed to somewhat white and it was slowly disappearing.
- At approx. 4:20pm on March 23, we observed light black smoke was belching from the reactor building. The situation was reported to the fire department at approx. 4:25pm. The parameters of the reactor, the primary containment vessel, and monitored figures at the surrounding area remained stable without any significant changes. Just to be safe, workers around Unit 3 evacuated indoors. At approx. 11:30pm on March 23 and 4:50am on March 24, TEPCO employees confirmed the smoke has disappeared. Accordingly, workers evacuation was lifted.
- At approx. 4:30 pm, May 18, the first workers went into the reactor building after the occurrence of white smoke.

<Water injection to the reactor>

- High Pressure Coolant Injection System automatically stopped. We endeavored to restart the Reactor Core Isolation Cooling System but failed. Also, we could not confirm the water inflow of Emergency Core Cooling System. As such, we decided at 5.10am, Mar 13, and we reported and/or noticed the government agencies concerned to apply the clause 1 of the Article 15 of Act on Special Measures Concerning Nuclear Emergency Preparedness at 5:58am, Mar 13. At 9:25am, Mar 13, the injection of water with boric acid and which absorbs neutron using the fire pump to the reactor was started.
- At 6:02pm on March 25, the injection of fresh water to the reactor was started (switched from the seawater injection). At 8:30pm on March 28, the fire pump used to inject water was replaced by temporary motor driven pumps. From 10:03 am to 12:16pm on April 3, the fire pump was temporarily used for the water injection in order to switch the power of the motor driven pump from temporary power to the off-site power. It was again switched to the motor driven pump, and the fresh water injection is continued.
- Water injection to the reactor was temporarily suspended due to partial shutdown of the off-site power caused by the earthquake which occurred at approximately 5:16pm, April 11th. Following the restoration of off-site power, water injection was resumed at approximately 6:04pm.
- At 5:00 pm, on April 15, we had completed transferring emergency power sources to spray water to the reactor to the upland.
- On April 18, in order to replace hoses, which were used to inject water to the reactor, injecting water was temporarily suspended. After replacement, we restarted injecting water by pumps
- Before the work to connect high voltage power panels of Unit 1/2 and Unit 5/6 was initiated, the power source of pumps to inject water to reactors to a temporary diesel generator was switched at 10:57 am on April 25. Offsite power was restored at 6:25 pm.
- At 10:09 am May 4, we increased the volume of water injection to the reactor from approximately $7m^3$/h to $9m^3$/h, following an increase of temperature at the reactor pressure vessel.

- At 4:53 pm on May 12, as a part of work to switch the water injection line to the nuclear reactor of Unit 3 from the fire extinction system piping arrangement to the reactor feed water system piping arrangement, we started water injection through the reactor feed water system piping arrangement at approximately 3 m^3/h in addition to the fire extinction system piping arrangement at approximately 9 m^3/h.At 4:01 pm on May 13, we changed water injection amount to through the fire extinction system piping arrangement at approximately 6 m^3/h and the reactor feed water system piping arrangement at approximately 6 m^3/h. At 10:01 am on May 14, we increased water injection to the nuclear reactor of Unit 3 through the fire extinction system piping arrangement from at approximately 6 m^3/h to 9 m^3/h. (water injection thorough the reactor feed water system piping arrangement is maintained at approximately 6 m^3/h).
- At 2:33 pm, on May 15, started injection of boric acid to the reactor and finished at 5:00 pm, May 15.
- At 10:11 am, May 17, amount of water injection to Unit 3 reactor by feed water system piping was increased from approx. 6m^3/h to approx. 9 m^3/h.
- At 2:15 pm, May 20, amount of water injection to Unit 3 reactor by feed water system piping was increased from approx. 9m^3/h to approx. 12 m^3/h. At 5:39 on the same day, amount of water by fire protection system piping was gradually decreased from approximately 9 m^3/h, reached to 6m^3/h at 11:54 pm.
- In order to switch the facility for water injection to the reactor from reactor feed water system piping arrangement to electric water-injection pump placed on a hill, the conventional fire pump was stopped at 3:12pm on May 21 and electric water-injection pump was started up at 3:15pm (we maintained the amount of injection water at about 13.5m³/h*). * Adjustment in the amount of injecting water due to the replacement of the flow meter (about 12m³/h → 13.5m³/h).
- On May 23, we changed the rate of water injection to Unit 3 through the fire extinction system piping arrangement from approximately 6m³/h to approximately 5m³/h at 11:31 am and from approximately 5m³/h to approximately 4m³/h at 2:08 pm. We changed the rate of water injection through the fire extinction system piping arrangement from approximately 4m³/h to approximately 3m³/h at 5:19pm.
- At 8:52 pm on May 26, we changed the rate of water injection to the reactor through the fire extinction system piping arrangement from approximately 3m3/h to approximately 2 m3/h.
- At 8:42 pm on May 27, we changed the rate of water injection to the reactor of unit3 through the fire extinction system piping arrangement from approximately 2m^3/h to approximately 1 m^3/h.
- At 8:54 pm on May 28, we stopped water injection to the reactor of Unit 3 through the fire extinction system.
- At 10:19 am on May 31, we changed rate of water injection through the reactor feed water system piping arrangement from approximately 13.5 m^3/h to approximately 12.5 m^3/h.
- At 10:10 am on June 1, we changed rate of water injection through the reactor feed water system piping arrangement from approximately 12.5 m^3/h to approximately 11.5 m^3/h.
- At 1:16 pm on June 3, freshwater injection was suspended due to re-routing of the water supply line to the reactor. At 1:32 pm on June 3, freshwater injection was resumed.
- At 1:02 pm on June 14, water injection was temporarily suspended due to the switch of injection pipeline to Unit 3 reactor. Water injection was resumed at 1:31 pm.
- At 10:06 am on June 21 we changed the rate of water injection to Unit 3 Reactor from approx. 11 m^3/h to approx. 10m^3/h through reactor feed water system piping arrangement.
- At 10:13 am on June 23, we changed the volume of water injected through reactor feed water system from approx. 10.0m³/h to approx. 9.5m³/h.
- At 10:07 am on June 24, we changed the water amount injected to Unit 3 through reactor feed water system piping arrangement from approx. 9.5m³/h to approx. 9 m³/h.
- At 4:20 pm on June 27, in addition to injecting water from the filter tank, we started to

use treated water. At 5:55 pm, we stopped supplying treated water.

- At 2:36 pm on June 28, we started to operate the transfer pumps of water treatment system. After confirming no leakage and adjusting water volume, we started to operate circulating injection cooling at 3:55 pm, June 28.
- At 10:59 am on June 29, we stopped the transfer pumps, and started it at 1:12 pm. At 1:33 pm on June 29, we started to operate circulating injection cooling.
- At 7:27 am on July 1,we stopped injecting treated water and implemented injecting filtered water to (no change in amount) due to construction of installment of the Tank (buffer tank) for injecting to the reactor. At 6:00 pm on July 2, we started full scale operation of circulating injecting cooling which inject treated water by accumulated water treatment system to the reactor via buffer tank.
- At 7:19 am on August 7, as we observed increase in the rate of water injection to reactor on unit 3, we adjusted water injection rate to approx. 9.0m^3/h.
- At 4:22 pm on August 10, as we observed fluctuation of reactor water injection rate, we adjusted the rate to approx 9.1m^3/h.
- At 7:30 pm on August 12, we adjusted the rate of injecting water at approx. 9.0m^3/h, as we confirmed the increase in the rate of injecting water to reactor.
- At 12:20 pm on August 18, we added and replaced flow regulating valves of water injection line of Unit 3. At 12:27 pm on the same day, we adjusted the rate of water injection into the reactor at approx. 8.0m^3/h.
- At 1:00 pm on August 20, we adjusted the rate of water injection into the reactor at approx. 7.0m^3/h.
- At 2:09 pm on September 1, in order to restart injecting water to the reactor of unit 3 by core spray system in addition to feeding line, we started to adjust flow rate of injection. At 2:58 pm on the same day, we adjusted flow rate at approx.7.0m^3/h for injecting from feeding line and at 1.0 m^3/h for injecting from core spray system.
- At 2:50 pm on September 2, we adjusted flow rate at approx.7.0m^3/h for injecting from feeding line and at 2.0m^3/h for injecting from core spray system.
- At 2:37 pm on September 3, we adjusted the rate of water injection at approx. 7 m^3/h through reactor feed water system piping arrangement, and at approx. 3 m^3/h through core spray system.
- At 2:43 pm on September 5, we adjusted the rate of water injection through reactor feed water system piping arrangement to approx. 6.0 m^3/h. (Water injection through core spray system continues at approx. 3.0 m^3/h.)
- At 2:46 pm on September 7, we adjusted the rate of water injection for the reactor through reactor feed water system piping arrangement to approx. 5.0 m^3/h. (Water injection through core spray system continues at approx. 3.0 m^3/h.)
- At 2:01 pm on September 12, we adjusted the rate of water injection for the reactor through reactor feed water system piping arrangement to approx. 4.0 m^3/h. (Water injection through core spray system continues at approx. 3.0 m^3/h.)
- From 10:16 am to 2:15 pm on September 16, at increasing volume of water injecting into the reactor of Unit 3, we conducted injection of boric acid into the reactor. Thereafter, we increased injection rate of water through core spray system and at 3:05 pm adjusted at 8.0m^3/h (injection rate from feed water system remain at 4.0m^3/h).
- At 3:17 pm on September 22, we adjusted the volume of water injected at 3.0m^3/h from Feed Water System into Reactor Building of Unit 3 (while we continue injecting water at 8.0 m^3/h from Core Spray System).
- At 10:25 am on September 28, we switched water injection line to emergency line at Unit 1,2 and 3 for the trial run of mini flow line in the regular injection line set on the hill. At 2:02 pm on the same day, we switched back to the regular water injection line after the trial run. There was no change in the injection amount due to this work.
- At 9:47 am on October 26, for the water injection to the reactor, we switched from normal water injection line to emergency water injection line, due to the shutoff of facilities for power source reinforcement work. Along with the switching work, we adjusted the amount of water injection to the reactor to approximately 3.0m^3/h from water feeding system, and to approximately 8.0 m^3/h from Core Spray System. At 3:20 pm on the same day, we switched from emergency water injection line to

normal water injection line due to completion of power source reinforcement work.

- On October 26, we replaced the vane to adjust flow amount of water injection line to the Unit 3's reactor in order to improve the ability to control the water injection amount.
- On November 4, due to inspection of Unit 3 reactor water injection pump, it was switched to Unit 1/2 reactor water injection pump. At 3:13 pm, together with this switch, water injection amount of feed water system was adjusted to approx.2.5 m^3/h, and that of the reactor core spray system to approx.8.1 m^3/h.
- At 4:05 pm on November 8, water injection to reactor of unit 3, as decrease of injection rate from feed water system was observed, injection rate was adjusted to approx. 3.0m^3/h (water injection continues from core spray system at approx. 8.0m^3/h).
- At 9:33 am on November 16, at the emergency feed water injection lines of Units 3, in order to increase the water flow controllability, we started additional work for flow control valves. It was finished at 11:41 am on the same day. For reference, It didn't affect the water injection to the reactor because the water injection uses usual feed water injection lines.
- At 3:33 pm on November 18, along with the adjustment of water injection amount of Unit 1, we adjusted the amount of water injection to the reactor of Unit 3 to approximately 2.5 m^3/h from water feeding system, and to approximately 8.1 m^3/h from Core Spray System.
- At around 4:10 pm on November 18, water leakage of one drop in 3 seconds was observed from pressure hose connecting point of suction side of emergency feed water injection pump located upland of Unit 1. Valves before and after the hose were closed and isolated, and a saucer was placed to receive the drop. We confirmed the radiation dose in ambient air near the leaking point was not specifically different from surrounding area. There was no impact to the water injection to the Reactor because the pump was for emergency feed water injection and not in operation at that time. As the preparation for replacement of that hose was completed, we started the replacement work at 9:30 am on November 22. At 10:20 am on the same date, we completed the work. As we are injecting water to the Reactor by the main reactor water injection line, there is no impact to the water injection from this work.
- On October 28, after regular operation of the gas control system for PCV, Unit 2, since a relatively high density hydrogen was detected on October 29, we are intending to control the hydrogen density below the inflammable limit (4%) even if there is no steam, by directly including nitrogen into the RPV for Units 1 to 3.

  Until we have included nitrogen into RPV, in order to lower the hydrogen density of RPV by increasing the temperature and the steam ratio thereby, on November 24, we lowered the amount of water injection into the reactor of Units 1 to 3.

  Unit 3: At 7:19 am, the water injection amount by the reactor core system decreased from 8.5 m^3/h to 6.7 m^3/h. (the injection of feed water system is continuing at 2.3 m^3/h).

  After that, we monitored the temperature trend in the RPV and the PCV. Since the change of the temperature was small and there was a possibility of significant change of the temperature by further reduce of the water injection, we adjusted it from approx. 7.0 m^3/h to approx. 6.0 m^3/h through core spray system from 10:18 am to 11:02 am on November 26 (through reactor feed water system it remains unchanged, approx. 2.0 m^3/h). As we assumed that the hydrogen density of RPV was decreased from the result of the operation, at 11:25 am on December 10, we adjusted the water injection volume of the water feeding system from approx. 2.2 m^3/h to approx 3.2m^3/h to cool down the reactors more stably (The current water injection volume is approx 6.0m^3/h from the core spray system.)
- On November 29, since we observed decrease in water injection into the reactor, we adjusted the water injection amount 1.9m^3/h to 2.1m^3/h from feed water system from 10:13 am to 10:28 am. (The water injection amount from core spray system keeps 6.0m^3/h)
- At 5:47 pm on 5 December, Amount of water injected through feed water system was adjusted from approx. 2.0m^3/h to 2.2 m^3/h as the decrease of such amount was observed (Water injection through core spray system continues with approx.

6.0 m^3/h).

- At 10:13 am on December 9, as we observed reduction of the water injection rate, adjusted the rate from the feed water system from approx 2.0m^3/h to approx 2.2m^3/h, from the core spray facility from approx 6.2m^3/h to approx 6.1m^3/h
- At 11:10 am on December 11th, as we found that there was small vibration at the Flow Control Valve of Core Spray System, we adjusted water injection from Core Spray System to unit 3 from approx. 6.1 m^3/h to approx. 6.5 m^3/h, while we adjusted water injection from the Feed Water System from approx. 3.1 m^3/h to approx. 2.5 m^3/h. Because the vibration of the Flow Control Valve still continued, we adjusted water injection from the Feed Water System to approx. 3.0 m^3/h, and from Core Spray System to approx. 6.0 m^3/h. Because the vibration is tiny and would do little influence on pipe arrangements and others, we will study on its countermeasure later.
- At 10:47 on December 20, we decreased the water injected from the feed water pipe from 3.9m^3/h to 3.0m^3/h, and increased the water injected from the reactor core spray system pipe from 5m^3/h to 6m^3/h.
- At around 1 pm on December 22, it was found that the hose of Unit 3 Reactor Water Injection Line was swollen to the extent of 2 meter long. Although there was no leakage from the swollen hose, it was decided that the pump for Reactor water injection should be switched from the reactor injection pump on the hill to the emergency motor pump and the hose should be replaced with new one.(+) At 7:12 pm on the same day, the emergency motor pump was started to operate. From 7:44 pm, the valve to the normal water injection line was closed in order to weep drain from the line. After the replacement of the hose, at 8:47 pm, the valve to the normal water injection line was opened to fill water in the line. At 10 pm, it was confirmed that there was no water leakage from the new hose, so that water injection to the Reactor was adjusted to about 3 m^3/hour from Reactor Feed Water System and about 6 m^3/hour from Reactor Core Spray System at about 10:30 pm. At 10:38 pm, the emergency motor pump was stopped. After that, it was checked that there was no leakage from the hose and its connection. During the hose replacement work, the water injection was continued and there was no remarkable change in temperature of the Reactor Pressure Vessel.

+ Article 12 of Safety Regulation at Nuclear Facilities stipulates “operational limit” and “required measures if the operational limit is not satisfied” according to the facility management based on “the mid-term view point for securing safety”. It also stipulates to respond based on the required measures if the operational limits is not satisfied. In the case of today’s hose swollen, it was regarded to be sifted off the operational limit as planned (from 6:35 pm on December 22 to 10:43 pm on the same day) from the proactive maintenance point of view, so that the hose replacement work was implemented accordingly.

- On 10:30 am on December 23, the change of injection water flow to Reactor was found so that water injection from Core Spray System was adjusted from approx. 6.5 m^3/h to 6.0 m^3/h (water injection from feed water system was remained unchanged as approx. 3.0 m^3/h).

<Water spray to the spent fuel pool>

[Freshwater spray]

- From 7:05pm to 8:07pm, March 17 the police and Self-Defense Forces sprayed fresh water by water cannon trucks upon our request for the cooperation.
- From around 2:00pm to 2:45 pm, March 18 Self-Defense Forces and the United States Armed Forces sprayed fresh water by water cannon trucks upon our request for the cooperation.

[Seawater spray]

- Upon our request for the cooperation, spraying water to the upper part of the reactor building by helicopters with the support of the Self Defense Forces was considered on March 16. However the operation was cancelled.
- From approx. 9:30am to past 10:00am, March 17, water was sprayed by helicopters upon our request for the cooperation to Self-Defense Forces.
- From approx. 12:30am to 1:10am, March 19, water was sprayed with the cooperation of Fire Rescue Task Forces of Tokyo Fire Department. They resumed

the operation from approx. 2:10pm to 3:40am, March 20.

- From approx. 9:36pm, March 20th to 3:58am, March 21, water was sprayed with the cooperation of Fire Rescue Task Forces of Tokyo Fire Department.
- From approx. 3:10pm to 3:59pm, March 22, water was sprayed with the cooperation of Fire Rescue Task Forces of Tokyo Fire Department.
- Sea water was injected through Spent Fuel Pool Cooling and Filtering (Clean up) System);
  - From approx. 11:03am to 1:20pm on March 23
  - From approx. 5:35am to 4:05pm on March 24
- From 1:28pm to 4:00pm, March 25, water was sprayed with the cooperation of Fire Rescue Task Forces of Tokyo Fire Department.
- From approx. 12:34pm to 2:36pm, March 27, water was sprayed by the concrete pumping vehicle.

[Freshwater spray]

- From approx. 2:17pm to 6:18pm, March 29, fresh water was sprayed by the concrete pumping vehicle (switched to fresh water spray).
- Fresh water was sprayed by the concrete pumping vehicle;
  - From 4:30pm to 7:33pm, March 31 / From 9:52am to 12:54pm, April 2
  - From 5:03pm to 7:19pm, April 4 / From 6:53am to 8:53am, April 7
  - From 5:06pm to 8:00pm, April 8 / From 5:15pm to 7:15pm, April 10
  - From 4:26pm to 5:16pm, April 12 / From 3:56pm to 4:32pm, April 14
  - From 2:17pm to 3:02pm, April 18/ From 2:19pm to 3:40pm, April 22
- From 1:40pm to 2:00pm on April 22, we injected fresh water by the Spent Fuel Pool Cooling and Filtering (Clean up) System) on a trial basis.
- On April 26, spraying of fresh water by concrete pumping vehicle was conducted (for around 2 minutes) in order to check the water level of spent fuel pool. After that, from 12:25 pm to 2:02 pm, fresh water injection by Spent Fuel Pool Cooling and Filtering (Clean up) System) was conducted.
- On May 8, water was injected through Spent Fuel Pool Cooling and Filtering (Clean up) System) from 12:10 pm to 2:10 pm.
- At 12:14 pm on May 9, we started injection of freshwater into Unit 3 spent fuel pool using Spent Fuel Pool Cooling and Filtering (Clean up) System) (from 12:39 pm to 2:36pm, hydrazine was also injected). The injection was finished at 3:00pm.
- At 3:00 pm on May 16, we started injection of freshwater into Unit 3 spent fuel pool using Spent Fuel Pool Cooling and Filtering (Clean up) System) (from 3:10 pm to 5:30 pm, hydrazine was also injected). The injection was finished at 6:32 pm.
- At 10:15 am on May 24, we started injection of freshwater into Unit 3 spent fuel pool using Spent Fuel Pool Cooling and Filtering (Clean up) System) (from 10:20 am to 0:56 pm, hydrazine was also injected). The injection was finished at 1:35 pm.
- At 1:28 pm on May 28, we started freshwater injection to the spent fuel pool of Unit 3 by Spent Fuel Pool Cooling and Filtering (Clean up) System) (we also injected hydrazine from 1:42 pm to 2:40 pm). The injection was finished at 3:08 pm.
- From 2:34 pm to 3:54 pm on June 1, we injected freshwater into Unit 3 spent fuel pool through Spent Fuel Pool Cooling and Filtering (Clean up) System) (Hydrazine was injected from 2:41 pm to 3:26 pm on June 1 at the same time).
- From 1:08 pm to 3:14 pm on June 5, we injected freshwater into Unit 3 spent fuel pool through Spent Fuel Pool Cooling and Filtering (Clean up) System) (Hydrazine was injected from 1:14 pm to 2:16 pm on June 5 at the same time).
- From 1:42 pm to 3:31 pm on June 9, we injected freshwater into Unit 3 spent fuel pool through Spent Fuel Pool Cooling and Filtering (Clean up) System) (Hydrazine was injected from 1:45 pm to 2:40 pm at the same time).
- From 10:09 am to 11:48 am on June 13, we injected freshwater into Unit 3 spent fuel pool through Spent Fuel Pool Cooling and Filtering (Clean up) System) (Hydrazine was injected from 10:13 am to 11:36 am at the same time).
- From 10:19 am to 11:57 am on June 17, we injected freshwater into Unit 3 spent fuel pool through Spent Fuel Pool Cooling and Filtering (Clean up) System)

(Hydrazine was injected from 10:23 am to 11:31 am at the same time)

- From 9:56 am to 11:23 am on June 26, we injected boric acid into Unit 3 spent fuel pool through Spent Fuel Pool Cooling and Filtering (Clean up) System
- From 3:00 pm to 5:18 pm on June 27, we injected boric acid into spent fuel pool through Spent Fuel Pool Cooling and Filtering (Clean up) System.
- From 2:45 pm to 3:53 pm on June 29, we injected fresh water into the spent fuel pool using Fuel Pool Cooling and Filtering System.
- At 11:55 am on July 29, we injected hydrazine into Unit 3 Spent Fuel Pool by using circulation cooling system. At 1:29 pm on the same day, we stopped the injection. (Hydrazine will be injected through Circulating Cooling System periodically from now on.)
- At 1:30 pm on October 27, we started injection of hydrazine to spent fuel pool of Unit 3 through the circulating cooling system. At 3:08 pm on the same day, we stopped injection of hydrazine.
- From 1:10 pm to 2:49 pm on November 10, we conducted injection of hydrazine to spent fuel pool of Unit 3 through the circulating cooling system.

< Nuclide analysis of spent fuel pool water>

- On May 8, we took approximately 40ml of pool water using concrete pumping vehicle, in order to check the status within the spent fuel pool. On May 10, we conducted a nuclide analysis with the collected pool water, and detected Cesium-134, Cesium-136, Cesium-137, and Iodine-131.

< Alternative cooling of spent fuel pool >

- At 7:47 pm on June 30, we started the Alternative Cooling System of the spent fuel pool of Unit 3 and conducted the commissioning. At 11:00 am on July 1, after the performance evaluation, we have started the full operation of the system.
- At 8:20 am on July 8, we stopped the Alternative Cooling System of the spent fuel pool of Unit 3 due to replace the electronic cable in the site. At 2:24 pm on the same day, we restarted the Alternative Cooling System of the spent fuel pool of Unit
- Due to switching power sources for installation of double circuits for offsite power for Unit 5 and 6, we stopped operation of the alternative cooling facility of the spent fuel pool during the following period:
  July 21: from 8:20 am to 2:52 pm / July 23: from 3:24 am to 11:45 pm
- At 3 pm on September 30, in order to add transformer control panel as power supply for works related Unit 3, the power supply for Spent Fuel Pool Cooling was temporary stopped. At 7:26 pm, the power was restored and the cooling was resumed.
- At 2:30 pm on November 7, we suspended the alternative cooling in order to clear clogs in the primary strainer resulted from reverse cleaning, as a countermeasure against the alarm suction pressure decrease of primary coolant system pump in spent fuel pool of Unit 3 at Fukushima Daiichi Nuclear Power Station (water temperature of spent fuel pool as of suspension: approx. 24.8℃). After finishing the reverse cleaning of the primary strainer, then, at 7:17 pm on the same day we restarted the alternative cooling (water temperature of spent fuel pool as of restart: approx. 22.5℃. It is supposed that water temperature as of restart became lower than that as of suspension because water in skimmer surge tank was cooled down by outside air.
- At 1:32 pm on November 17, in order to clean up the 1st system strainer of Unit 3 spent fuel pool circulating cooling system as measures for an alert caused by decrease of suction pressure at 1st system pump of circulating cooling system, circulating cooling was temporarily stopped (Water temperature of spent fuel pool at the time that circulating cooling was stopped: approx. 19.2 ^{o}C). At 2:55 pm on the same day, the cleaning of the 1st system strainer by reverse flow washing, the alternative cooling was resumed (Water temperature of spent fuel pool at the time that circulating cooling was resumed: approx. 18.8 ^{o}C, which was assumed that water in the skimmer surge tank was cooled down by ambient air so that the water temperature of spent fuel pool when the circulating cooling was resumed was lower than that when the circulating cooling was stopped.)

- Around 11:00 pm on November 18, it was confirmed that coolant water temperature at the heat exchange facility exit of unit 3 alternative cooling facility for the fuel spent pool tends to increase (16.5℃ at 8 pm → 17.3℃ at 11 pm). At 7:00 am on November 19, it was confirmed main tap for watering was closed. The temperature decreased after tap opening (19.5℃ at 5 am → 17.9℃ at 8 am). The research for tap close is currently underway.
- On November 19, it was confirmed that coolant water temperature at the heat exchange facility exit of unit 3 alternative cooling facility for the fuel spent pool is once again in the trend to increase (17.9℃ at 8 am → 19.6℃ at 2 pm). Spray of water is being continued, however, as it was found that net in the spray tank is clogged up, from 4:11 pm to 4:50, there was a switch from Unit 3 spent fuel pool alternative cooling facility 2 cooling tower (A) to (B). Currently, the temperature is stable.
- At 2:00 am on November 27, we confirmed the difference in temperature at the gateway of the heat exchanger on the primary side of the Unit 3 spent fuel pool alternative cooling equipment was getting small (inlet temperature: 19.7℃, outlet temperature: 19.0℃). However, as we could figure out that it did not affect the cooling of the spent fuel pool immediately, we decided to conduct a field investigation after dawn. At 6:33 am, as a result of the field investigation, we confirmed the main valve of watering equipment was closed and therefore we opened it and filled with water for watering. As a result, we could confirm that the outlet temperature fell down (as of 7:00 am on November 27, inlet temperature: 20.3℃, outlet temperature: 15.1℃). Considering this result, it is confirmed that the cause for the difference in temperature is that the valve was closed down and the cooling water was not supplied. We will further investigate the reason of the closing down of the valve (the temperature of the inlet port of the heat exchanger on the primary side = the temperature of the spent fuel pool).
- At 9:01 am on December 2, we interrupted the operation of the alternative cooling in order to replace the inside mesh of the primary strainer as a countermeasure against the decrease in inhale pressure of the primary pump for alternative cooling of the spent fuel pool. (The temperature of the spent fuel pool as at the interruption: 18℃) After we replaced the mesh inside the primary strainer, we restarted the operation of the alternative cooling (The temperature of the spent fuel pool as at the restart: 18.1℃).
- At 9:43 am on December 22, At the Alternative Cooling apparatus of Spent Fuel Pool Cooling and Filtering System of Unit 3, since the suction force of primary circulating pump decreased, we stopped the pump to conduct flushing of entrance-side strainer of primary circulating pump and stopped cooling of spent fuel pool. (The temperature of pool is approx. 13℃ when the pump stopped) Then, we flushed the strainer so that the suction force recovered. Thus, at 11:06 am on the same day, restarted the pump and began to cool the spent fuel pool. (The temperature of pool is approx. 13℃ when the pump restarted)
- At 2:00 pm on December 26, in the alternative cooling system of the spent fuel pool of Unit 3, 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 the spent fuel pool (the temperature of the pool at the time of the suspension was approx. 13℃). After flashing, as inhale pressure of the pump has recovered, at 4:32 pm on the same day, the pump was restarted and cooling of spent fuel pool was restarted (the temperature of the pool at the time of restart was approx. 13℃).
- At 10:23 am on December 29, due to the declining tendency of the suction pressure of the primary system circulating pump of the spent fuel pool alternative cooling system of Unit 3, we stopped the pump and then stopped cooling of the spent fuel pool temporarily to conduct flushing of the intake side strainer of the pump (water temperature at the stoppage: approx. 12.4℃). After that we conducted flushing and the suction pressure of the pump recovered, therefore at 0:09 pm on the same day, we restarted the pump and resumed cooling of the spent fuel pool (water temperature at resuming: approx. 12.5℃).
- At 10:27 am on December 30, since inlet pressure of the primary circulation pump was decreasing in the alternative cooling system of the spent fuel pool of Unit 3,

cooling of the spent fuel pool was temporary stopped by shutting down the pump, in order to flush the inlet strainer of the primary circulation pump. (Temperature of the spent fuel pool was approx. 13.0℃ at the time of shutdown.) Flushing was conducted subsequently, and since inlet pressure of the pump was recovered, cooling of the spent fuel pool resumed by restarting the pump, at 1:42 pm of the same day. (Temperature of the spent fuel pool was approx. 13.1℃ at the time of restart.)

- Since inlet pressure of the primary circulation pump in the alternative cooling system of the spent fuel pool of Unit 3 frequently tended to decrease due to the effect of clogging of the inlet strainer of the pump, the pump was stopped at each time in order to flush the strainer. However, since this tendency is supposed to continue and the temperature of the spent fuel pool is sufficiently low, which is approx. 13.0℃, and there is enough margin from the operational limit value (upper limit) by the safety regulation, which is 65.0℃, we determined to stop the pump by January 4 of 2012 and temporary stop the cooling of spent fuel pool, considering the exposure dose during the flushing.

  At 4:54 pm on December 30 of 2011, the pump was stopped. (Temperature of the spent fuel pool was approx. 13.3℃ at the time of shutdown.) It is valuated that the temperature rise of the spent fuel pool due to the shutdown of the pump is approx. 5 to 6 degrees for a day. And it is planned that this pump operates for one time in a day to check the temperature of the spent fuel pool during this temporary operation, since December 31, 2011.

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

- In order to drain the accumulated water in the basement of the turbine building to a condenser, at approx. 5:40pm, March 28, the water in a condensate storage tank was started to be transferred to suppression pool's water surge-tanks. At approx. 8:40am, March 31, transfer was completed.
- In order to change the water injection line into the reactor to Reactor Feed Water System, draining water from the condenser in the turbine building was started at 4:18pm on May 8. We cut a part of pipes of Reactor Feed Water System.
- On May 10, laying out transferring pipes to transfer the accumulated water in the turbine building to Centralized Radiation Waste Treatment Facility was started and completed on May 11. On May 12, we completed a leak check. On May 17, we finished a leak check on transferring pipes and stated to transfer at 6:04 pm (approx. 12m³/h). Transfer was suspended at 9:10am May 25 in order to check the transfer lines and buildings.
- From 12:50 pm on June 2, we started transferring water from the condenser to the condensate storage tank to drain water in the basement of the turbine building to a condenser. At 9:56 pm on June 4 we stopped transferring water.
- At 6:26 pm on June 5, we started transferring the accumulated water at the basement of Turbine Building to the condenser. At 10:44 pm on June 9 we stopped transferring water.
- At 3:30 pm on June 11, we started transferring the accumulated water at the basement of Turbine Building to the Centralized Waste Treatment Facility (Process Main Building). At 5:01 pm on June 12, we finished the transfer.
- At 10:05 am on June 14 to 8:46 am on June 16, we transferred we started transferring the accumulated water at the basement of Turbine Building to the Centralized Waste Treatment Facility (Process Main Building).
- At 1:31 pm on June 18 we started transferring water accumulated in the basement of the turbine building to Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building[High Temperature Incinerator Building]). At 12:02 am on June 20, the transfer was finished.
- At 3:32 pm on June 21, we started to transfer accumulated water in the basement of turbine buildings to central waste treatment facility (process building). At 3:44 pm on June 27, we suspended the operation of transferring pumps. At 5:00 pm, we resumed the operation of 2 transferring pumps.
- At 9:58 am on June 28, we stopped transferring accumulated water in turbine building basement of Unit 3 to central waste treatment facility building.

- At 8:56 am on June 30, we started transferring the accumulated water from the basement of the turbine building of Unit 3 to Centralized Radiation Waste Treatment Facility (Process Building). At 2:49 pm on July 9, we suspended the transfer in order to do a plumbing so that we will utilize the water accumulated at Surge Tank Building for Common Suppression Pool to substitute with flushing water for the transfer line.
- At 3:15 pm on July 10th to 11:11 am on July 15th, we started transferring the accumulated water in the basement of the turbine building of Unit 3 to Centralized Radiation Waste Treatment Facility (Process Main Building).
- At 10:50 am on July 16, we started transfer of accumulated water from the vertical shaft, T/B, Unit 3 to Centralized Radiation Waste Treatment Facility (Process Main Building). At 3:59 pm on July 21, we stopped the transfer.
- At 4:53 pm on July 22, transfer of accumulated water at Unit 3 turbine building vertical shaft to the Centralized Radiation Waste Treatment Facility (Process Main Building) started. At 9:48 1m on July 21, we stopped the transfer.
- At 4:13 pm on July 30, we started transferring accumulated water at Unit 3 turbine building to Centralized Radiation Waste Treatment Facility. At 7:17 am on August 4, we stopped the transfer.
- At 8:42 am on August 5, we started transferring accumulated water from the basement of Unit 3 turbine building to Centralized Radiation Waste Treatment Facility (Process Main Building). At 4:46 pm on August 15, we stopped the transfer.
- At 8:51 am on August 19, we started transferring accumulated water from the basement of Unit 3 turbine building to Centralized Radiation Waste Treatment Facility (Process Main Building). At 9:28 am on August 21, we stopped the transfer.
- At 9:39 am on August 21, we started transferring accumulated water from the basement of the turbine building of Unit 3 to Miscellaneous Solid Waste Volume Reduction Treatment Building (High temperature incinerator facility). In addition, at 4:15 pm on August 23, we started transferring accumulated water from the basement of the turbine building of Unit 3 to Centralized Radiation Waste Treatment Facility (Process Main Building). At 9:30 am on August 24, we stopped transferring accumulated water from the basement of the turbine building of Unit 3 to Miscellaneous Solid Waste Volume Reduction Treatment Building (High Temperature Incinerator Building). We continue to transfer to the Process Main Building.
- At 9:46 am, August 30, we stopped transfer of accumulated water from the basement of turbine building of unit 3 to Centralized Radiation Waste Treatment Facility (Process Main Building) and at 9:54 am, we started transfer of accumulated water to Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]).
- At 9:11 am on September 8, we stopped transferring accumulated water from the basement, T/B to Misc Solid Waste Volume Reduction Building [High Temperature Incinerator Building], Centralized Radiation Waste Treatment Facility. From 9:30 am, we started transferring accumulated water to Process Main Building, Centralized Radiation Waste Treatment Facility.
- At 9:35 am on September 11, we stopped transferring accumulated water from the basement of turbine building of Unit 3 to Centralized Radiation Waste Treatment Facility (Process Main Building). At 10:00 am, we started transferring the accumulated water to Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]).
- At 9:44 am on September 15, we stopped transfer of the accumulated water from the basement of the turbine building of Unit 3 to Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]), and restarted transfer to Centralized Radiation Waste Treatment Facility (Process Main Building).
- At 9:46 am on September 30, we stopped transferring accumulated water from Unit 3 turbine building basement to Centralized Radiation Waste Treatment Facility (Process Main Building). At 10 am on the same day, we resumed the transfer to Centralized Radiation Waste Treatment Facility (Miscellaneous Solid

Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]).

- At 10:59 am on October 3, we started transferring accumulated water at the Unit 3 condenser to the basement of the turbine building. It was stopped at 10:22 am on October 9.
- At 1:16 pm on October 12, due to the blocking work of opening section on the basement of Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]), we stopped transferring accumulated water from the basement of turbine building to High Temperature Incinerator Building. At 2:02 pm on October 13, we restarted transferring.
- At 9:16, we suspended the transfer of 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]), due to the suspension of the water treatment facility.
- At 10:00 am October 20, transportation of accumulated water from unit 3 turbine building basement to Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]) was started. At 9:16 am on October 28, we stopped the transfer.
- At 10:11 am on November 2, we started transferring the accumulated water, which had been transferred from Unit 3 turbine building underground to centralized radiation waste treatment facility(Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building]) At 3:05 pm on November 8, for the purpose of switching off accumulated water transfer pump of unit 3 for enhancement work of electricity source, transfer of accumulated water of underground of turbine building of unit 3 to centralized radiation waste treatment facility (miscellaneous solid waste volume reduction treatment facility (high temperature incinerator building) was stopped.
- From 9:25 am on November 15 to 9:45 am on November 24, we transferred the accumulated water from the basement of Turbine Building Unit 3 to Centralized Radiation Waste Treatment Facility (Process Main Building).
- For the reliability enhancement of water injection into reactor, plan to construct water injection facility into reactor of unit 1 to 3 by using condensed water storage tank is under consideration, prior to this plan, at 10:22 am on November 21, we started transfer of water in the condensed water storage tank of unit 3 to under ground of turbine building of unit 3. At 9:45 on November 24, we finished the transfer As the calibration of water level gauge is required if all the water is transferred, approx. 200 ton was left in the tank. During the measurement of salt concentration in the left water, it turned out that concentration was high. In order to secure the space for additional water injection to decrease such concentration, at 10:00 am on December 6, the left water was transferred from the tank to the basement of the turbine building of Unit 3. At 8:54 am on December 7, we stopped transferring. At 9:19 am on the same day we started feeding water to the tank. Then we discovered that there was a leak of water (approx. 5l) from the connecting part of the hose and the tank. At 9:52 am we stopped water transfer and confirmed that the leak stopped. The leaked water was after absorption of radioactive substances and desalination. After that, we finished changing the hose. From 9:05 am on December 9, we started feeding water. At 9:25 on the same day, we finished checking the water feeding line for water leakage. At 7:00 pm on the same day, we finished the filling. At 9:30 am on December 12, we started transferring of the accumulated water in the condensate storage tank of Unit 3 to the basement of Turbine Building of Unit 3 before feeding water to reduce salt level in the tank. After that we confirmed decrease of transferring quantity of water from the water level fluctuation, at 0:00 pm on December 14, we stopped transferring of the accumulated water in the tank. Also we confirmed that there was no water leakage at the site. Currently we are investigating the cause. At 0:30 pm on the same day we flushed the pipe and started the system. Then, as we have confirmed the system was operating normally, we presume the cause is stuck of dust in the pipe. At 4:00 pm on December 16, we stopped it.
- At 2:22 pm on December 15, we started transferring accumulated water from the

basement of Unit 3 turbine building to Centralized Radiation Waste Facility (Process Main Building). At 10:04 am on December 17, we stopped it.

- At 2:35 pm on December 24, we started transferring 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 9:50 am on December 26, we stopped it.
- At 3:32 pm on December 28, 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 9:03 am on December 29, we stopped transfer.
- At 2:37 pm on December 30, we started the transfer of the accumulated water from the basement of turbine building of Unit 3 to the Centralized Radiation Waste Treatment Facility (the Miscellaneous Solid Waste Volume Reduction Treatment Building [High Temperature Incinerator Building] and the Process Main Building). At 9:58 am on December 31, we stopped the transfer.

<Nitrogen Injection into the Primary Containment Vessel and Reactor Pressure Vessel>

- From 1:35 pm to 1:44 pm on July 8th, workers confirmed the condition of the point of nitrogen injection line in the reactor building with a vehicle for the work at high areas.
- At 1:30 pm on July 12th, we started connecting work for arranging pipes for nitrogen injection and finished it at 1:45 pm on the day
- At 8:01 pm on July 14th, we started to inject nitrogen gas into Primary Containment Vessel.
- From 5:52 am on August 3, in order to replace the nitrogen gas injector device, we stopped nitrogen gas injection into the Primary Containment Vessel of Units 1 to 3. After completion of the replacement, we restarted injection of nitrogen gas at 8:29 am.
- On October 28, after regular operation of the gas control system for PCV, Unit 2, since a relatively high density hydrogen was detected on October 29, we are intending to control the hydrogen density below the inflammable limit (4%) even if there is no steam, by directly including nitrogen into the RPV for Units 1 to 3.

Until we have included nitrogen into RPV, in order to lower the hydrogen density of RPV by increasing the temperature and the steam ratio thereby, on November 24, we lowered the amount of water injection into the reactor of Units 1 to 3.

- Unit 3:At 7:09, as the amount of nitrogen included was smaller than that of Units 1 and 2, the amount increased from 14 m^3/h to 28.5 m^3/h.
- In order to construct the nitrogen injection line direct to the reactor branched by the nitrogen injection line into the primary containment vessel of Unit 3, at 11:33 am on November 30, we temporarily stopped Nitrogen injection into the primary containment vessel. Then, we restarted Nitrogen injection into the primary containment vessel. At 1:20 pm on the same day, we confirmed the nitrogen injection amount (28m^3/h) into the primary containment vessel was stable. At 4:26 pm, we started operation to inject nitrogen into the reactor pressure vessel. At 4:40 pm, injection amount reached the scheduled amount of 5 m^3/h.
- At 10:25 am on 5 December we started increasing nitrogen injection to the reactor , from which we started on 30 November from approx. 5Nm^3/h to 10Nm^3/h, due to stabilized parameters of the facilities of the power plants such as the Reactor Pressure Vessel and the Primary Containment Vessel.
- At 10:52 am on December 7, in order to secure enough time before the hydrogen reached the explosion limit in case the nitrogen injection facility stops, we increased the injection amount of Nitrogen to the Reactor Pressure Vessel from 10Nm^3/h to 15Nm^3/h.

<Reactor building dust sampling>

- From 9:00 am to 12:35 pm on August 24, we conducted dust sampling at the upper part of Reactor Building of Unit 3 using a large crane vehicle.

- From 8:05 am to 9:35 am on September 12, we conducted dust sampling at the upper part of Reactor Building of Unit 3 using a large crane vehicle.
- From 2:13 pm to 3:47 pm on October 6, we conducted dust sampling at the upper part of Reactor Building of Unit 3 using a large crane vehicle.
- From 1:45 pm to 3:17 pm on October 11, we conducted dust sampling at the upper part of Reactor Building of Unit 3 using a large crane vehicle.
- From 8:41 am to 10:08 am on October 12, we conducted dust sampling at the upper part of Reactor Building of Unit 3 using a large crane vehicle.
- From 11:25 am to 2:00 pm on November 5, we implemented dust sampling at the upper part of the Reactor Building of Unit 3 by using the large crane.
- From 9:22 am to 12:55 pm on November 9, we implemented dust sampling at the upper part of the Reactor Building of Unit 3 by using the large crane.
- From 9:05 am to 1:30 pm on November 10, we conducted a dust sampling top of unit 3 reactor building by using the large crane.
- At 9:24 am on November 29, we started sampling of dusts at the upper part of reactor building of unit 3 using a large crane vehicle. At 1:00 pm on the same date, we finished the sampling.
- At 12:30 pm on November 29, we started dust sampling by using a robot near the opening section for equipment hatch and truck bay door of Unit 1 Reactor building. At 1:00 pm on the same date, we finished the sampling.
- At 9:00 am on November 30, we started dust sampling above the reactor building of Unit 3 with a large crane. At 12:30 pm on the same day, we finished the sampling.
- At 10:00 am on November 30, we started dust sampling by a robot near the equipment hatch of ground floor, reactor building unit 3. At 10:30 am on the same day, we finished sampling.
- At 10:35 am of 5 December, we started dust sampling above the reactor building with a large crane. At 12:05 pm we finished this.
- At 9:00 am on December 10, we started dust sampling above the reactor building of Unit 3 with a large crane. At 10:30 am on the same day, we finished the sampling. At 3:15 pm on the same day, the hydrazine injection was completed.

<Others>

- Lights in the main control room were turned on at approx. 10:45pm on March 22.
- Some of turbine building lights were turned on April 2.
- From 11:30am to 2:00pm, April 17, the condition (radiation dose, temperature, oxygen density) inside the reactor building of Unit 3 was observed by a remote-controlled robot.
- On May 10, in order to place an alternative cooling facility, we started removing the debris using robots and unmanned heavy machinery. Operation was completed on June 7.
- From 11:47 am to 12:14 pm on June 9, TEPCO employees entered into Unit 3 reactor building and conducted radiation dose survey by γ camera as a preparation for the nitrogen injection into the PCV.
- From 3:33 pm to 3:53 pm on June 13, we sampled radioactive materials in the ambient air at the opening of the Reactor Building. We will analyze and evaluate.
- At 11:43 am on July 1, we started to clean up the first floor of Unit 3 Reactor Building using a robot. At 4:36 pm on the same day, we finished the cleaning.
- At 10:59 am on July 2, we measuring radiation dose at the first floor of Unit 3 Reactor Building using a robot. At 12:14 pm on the same day, we finished measuring radiation dose.
- On July 3, we laid steel sheet near the carry in entrance of unit 3 reactor building to decrease the exposure dose. On July 4, we completed to set steel plates.
- From 3:24 PM to 5:10 PM on July 6, we checked the radiation dose (γcamera) and the status at the upper level of 1FL, R/B, Unit 3 by the remote controlled robot.
- At 8:30 am on July 18, we started installation work of temporary roofing as a countermeasure against rainwater to the roof aperture of Unit 3 turbine building and completed the work at 3:30 pm on July 22..
- From 4:37 am to 6:08 am on July 23, dust sampling survey was implemented for the upper part of Unit3 reactor building, using unmanned helicopter

- From 11:15 am to 1:00 pm on July 26, we conducted the inspection of the 1st and 2nd floor of Unit 3 Reactor Building by using a robot.
- From 12:00 pm to 12:40 pm on July 27, 3 TEPCO employees entered in the Reactor Building for the investigation at the point of injecting water.

【Unit 4】

- At approx. 6:00am, March 15, an explosive sound was heard and the damage in the 5th floor roof of Unit 4 reactor building was confirmed. At 9:38am, the fire near the northwest part of 4th floor of Unit 4 reactor building was confirmed. At approx. 11:00am, TEPCO employees confirmed that the fire was extinguished.
- At approx. 5:45am on March 16, a TEPCO employee discovered a fire at the northwest corner of the reactor building. TEPCO immediately reported this incident to the fire department and the local government and proceeded with the extinction of fire. At approx. 6:15am, TEPCO employee confirmed at the site that there were no sign of fire.

<Water spray to the spent fuel pool>

[Freshwater spray]

- From 8:21am to 9:40am, March 20, water was sprayed by fire engines with the cooperation of Self-Defense Forces. From approx. 6:30pm to 7:46pm on the same day, water was sprayed by Self-Defense Forces' fire engines.
- From 6:37am to 8:41am, March 21, water was sprayed by fire engines with the cooperation of Self-Defense Forces and the United States Armed Forces.

[Seawater spray]

- Seawater was sprayed by the concrete pumping vehicle;
  - From 5:17pm to 8:32pm, March 22.
  - From 10:00am to 1:02pm March 23
  - From 2:36pm to approx. 5:30pm March 24
- From 6:05am to 10:20am, March 25, sea water was injected by the Spent Fuel Pool Cooling and Filtering (Clean up) System).
- Seawater was sprayed by the concrete pumping vehicle;
  - From 7:05pm to 10:07pm, March 25 / From 4:55pm to 7:25pm March 27

[Freshwater spray]

- From 2:04pm to 6:33pm March 30th, fresh water was sprayed by the concrete pumping vehicle (water spray was switched to fresh water)
- Fresh water was sprayed by the concrete pumping vehicle;
  - From 8:28am to 2:14pm, April 1/From 5:14pm to 10:16pm, April 3
  - From 5:35pm to 6:22pm, April 5/From 6:23pm to 7:40pm, April 7
  - From 5:07pm to 7:24pm, April 9/From 12:30am to 6:57am, April 13
  - From 2:30pm to 6:29pm, April 15/From 5:39pm to 9:22pm, April 17
  - From 10:17am to 11:35am, April 19/From 5:08pm to 8:31pm, April 20
  - From 5:14pm to 9:20pm, April 21/From 5:52pm to 11:53pm, April 22
  - From 12:30pm to 4:44pm, April 23 / From 12:25pm to 5:07pm, April 24
  - From 6:15pm on April 25 to 12:26am on April 26
  - From 4:50pm to 8:35pm, April 26
  - From 12:18pm to 2:01 pm and from 2:32pm to 3:15pm, April 27
  - From 12:19pm to 8:46 pm, May 5/ From 12:38 pm to 5:51 pm, May 6
  - From 2:05 pm to 5:30 pm, May 7 / From 4:30 pm to 7:30 pm, May 19
  - From 4:05 pm to 7:05 pm, May 9 (hydrazine: from 4:11 pm to 6:38 pm)
  - From 4:04 pm to 7:04 pm, May 13 (hydrazine: from 4:20 pm to 6:41 pm)
  - From 4:25 pm to 8:25 pm, May 15 (hydrazine: from 4:26 pm to 6:30 pm)
  - From 4:14 pm to 8:06 pm, May 17 (hydrazine: from 4:40 pm to 6:35 pm)
  - From 4:00 pm to 7:56 pm, May 21 (hydrazine: from 4:23 pm to 7:00 pm)
  - From 4:00 pm to 7:09 pm, May 23 (hydrazine: from 4:08 pm to 6:30 pm)
  - From 4:36 pm to 8:04 pm, May 25 (hydrazine: from 4:42 pm to 6:49 pm)
  - From 5:05 pm to 8:00 pm, May 27 (hydrazine: from 5:24 pm to 6:53 pm)
  - From 5:56 pm to 7:45 pm, May 28 (hydrazine: from 6:02 pm to 7:45 pm)
  - From 2:35 pm to 9:15 pm, June 3 (hydrazine: from 2:44 pm to 6:58 pm)
  - From 2:23 pm to 7:45 pm, June 4 (hydrazine: from 2:44 pm to 6:41 pm)

- From 3:56 pm to 6:35 pm, June 6 (hydrazine: from 4:15 pm to 5:45 pm)
- From 4:12 pm to 7:41 pm, June 8 (hydrazine: from 4:16 pm to 6:05 pm)
- From 4:36 pm to 9:00 pm, June 13 (hydrazine: from 4:38 pm to 7:15 pm)
- From 4:10 pm to 8:52 pm, June 14 (hydrazine: from 4:11 pm to 7:15 pm)

- Implementation of water injection through alternative water injection line
  - From 1:14 pm to 3:44 pm, June 16 (hydrazine: from 1:48 pm to 3:18 pm)
  - From 4:05 pm to 7:23 pm, June 18 (hydrazine: from 4:29 pm to 6:33 pm)
  - From 2:31 pm to 4:38 pm, June 22
  - From 11:30 am to 11:55 am, June 30
  - From 8:47 am to 9:38 am, July 31

[Analysis of the water in the spent fuel pool]

- On April 12, in order to confirm the status of the inside of the spent fuel pool, we collected approximately 200ml of water from the pool using the concrete pumping vehicle. On April 13, we conducted nuclide analysis and detected Cesium-134, Cesium-137, and Iodine-131. Later we conducted detailed analysis, and on May 31 we concluded that the large portion of spent fuel is sound.
- From April 22, we installed the thermocouple-type thermometer and the radiation dose meter to the concrete pumping vehicle at the spent fuel pool of Unit 4 and we investigated the water level of pool, water temperature, radiation dose, water analysis etc. As part of the investigation, we sampled 150 ml of water from the pool on April 28 and conducted nuclide analysis on April 29. As a result of the analysis, cesium 134, 137 and iodine 131 were detected. We sampled 280 ml of water from the pool on May 7 and conducted nuclide analysis on May 8. As a result of the analysis, cesium 134, 137 and iodine 131 were detected.

<Alternative cooling of spent fuel pool>

- At 10:08 am on July 31, we started alternative cooling system for spent fuel pool, and implemented trial run. At 0:44 pm on the same day, we conducted its performance assessment, and started the full-scale operation.
- At approximately 11:20 am on August 11, as we found a little water leakage in the primary hose of the circulating cooling equipment for the spent fuel pool in the centralized radiation waste treatment facility of Unit 4, we covered and reinforced the leakage part with plastic. We are planning to replace the hose, etc. We have been continuing circulating cooling of the spent fuel pool.
- At 3:22 am on August 12, an M 6.0 earthquake with the seismic center at offshore of Fukushima prefecture occurred. At 5:27 am on the same day, we found very small volume of water leakage from a hose, primary system, alternative Spent Fuel Pool cooling system located in the radioactive waste treatment building, Unit 4. We are planning to replace the hose.
- As a countermeasure against slight water leakage from the primary hose of the alternative cooling apparatus for the spent fuel pool, we stopped the alternative cooling apparatus in order to exchange the hose at 7:58 pm on August 17. At 3:00 pm on the same day, we resumed operation of the system.
- At approximately 12:30 pm August 23, small amounts of water was found leaking from a flexible hose connected to the primary system of the alternative cooling and filtering system of the Spent Fuel Pool at the Waste Treatment Building of Unit 4. Actions to repair the leakage point were taken and alternative cooling for the Spent Fuel Pool conducted continuously.
- Around 1:00 pm on September 21, small amounts of water was found leaking from a flexible hose connected to the primary system of the alternative cooling and filtering system of the Spent Fuel Pool at the Waste Treatment Building of Unit 4. Actions to repair the leakage point were taken and alternative cooling for the Spent Fuel Pool is being conducted continuously.
- At 2:58 pm on November 17, an alarm of Unit 4 spent fuel pool circulating cooling system was sounded, and the system automatically shut down. After that we confirmed the stop occurred due to error alarm of leakage at heat exchange unit. At 3:58 pm on the same day, we confirmed no leakage occurred, and we restarted the system 4:12 pm. At 10:07 am on December 13, in order to conduct the flow meter inspection for the spent fuel pool alternative cooling system in Unit 4, the

system was suspended (Water temperature at the time of suspension: 23℃). At 11:30 am, the cooling was resumed by restarting the system (Water temperature at the time of resume: 23℃).

<Desalting water in Spent Fuel Pool>

- As we confirmed that there was no problem with the desalting facility for the spent fuel pool of Unit 4 through a trial operation at 10:24 am on August 20, at 11:34 am on the same day we started to operate it fully.
- At 10:34 am on August 22, a water-level alarm of condensed waste tanks was generated and the desalination facility stopped. After confirming no leakage, we restarted its service at 6:25 pm on the same day.
- At 9:47 am on September 14, we stopped the Spent Fuel Pool's desalination system of Unit 4 to install an electric dialysis equipment. At 0:25 pm on the same day, the desalination system resumed while we continued operation of an alternative system to cool down the pool.
- At 8:54 am on October 3, the secondary cooling system piping arrangement of circulating cooling system of Unit 4 spent fuel pool was stopped due to the replacement of the secondary cooling system piping arrangement. After completing the replacement, the secondary cooling system was restarted at 3:03 pm on the same day.
- At 12:25 am on November 8, RO membrane unit of desalting facility in spent fuel pool, Unit 4 automatically stopped due to the alarm indicating leakage. Responding to the alarm, we confirmed that all the isolation valves of each unit were closed by the interlocks. Also, considering that all the spots at leakage risk were equipped with receiving pans which would be able to store all of the liquid in the unit, we judged that further deterioration of leakage or leakage to outside of the unit was unlikely. We will check the site and situation in the future. The operation of circulating cooling system has been continued. Afterwards, as the result of confirmation at the site of this facility, we confirmed that the leakage have stopped, all of the leaked liquid is in the receiving pans (approx. 5 liter), and there exists a trail of leakage from the pump casing of RO membrane unit. At 2:00 pm on the same day, we wiped out the leaked liquid and reset the alarm. We will investigate in detail.
- Regarding spent fuel pool for unit 4, from August 20 to November 8, we had decreased salinity by using the desalting facility. In order to decrease more salinity, we installed Ion exchange equipment and started the equipment at 10:58 am on November 29.

<Installation of support structure for the base of Spent Fuel Pool>

- On May 9, preparatory work to install support structure was started. On June 6, preparatory work has completed.
- On June 7, installation and construction of post material made of steel are commenced.
- On June 20, installation of post material made of steel for the base of Spent Fuel Pool has completed.
- On July 30, filing concrete and grout have completed.

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

- From 9:14 am to 11:57 am on June 19, we injected fresh water into the reactor well and equipment storage pool of Unit 4 in order to decrease the exposure dose in the 5th floor of the reactor building of Unit 4 for working there.
- At 9:49 am on June 20, in order to lower dose during work at 5FL, R/B, Unit 4, we started freshwater injection to Reactor well and equipment storage pool. At 12:52 pm on June 21 the injection was stopped. The following track record is shown as below:
  - June 22 8:23 am to 2:31 pm
  - June 23 9:32 am to 3:29 pm
  - June 28 9:40 am to 3:29 pm
  - July 4 9:13 am to 6:18 pm
  - July 8 8:22 am to 1:52 pm

- July 16 11:22 am to 3:52 pm
- July 20 11:15 am to 3:39 pm
- July 24 10:37 am to 3:20 pm
- July 28 2:33 pm to 6:30 pm
- July 30 1:16 pm to 2:47 pm
- July 31 8:06 am to 8:48 am

- At 11:22 am on July 12th, we started to inject fresh water into the reactor well of Unit 4 and equipment storage pool. Soon we found some leakage from the connection part of the hose in the water injection line and therefore stopped the injection at 0:03 pm on the day.
- At 11:50 am on July 13th, we started to inject fresh water into the reactor well of Unit 4 and equipment storage pool. We found some leakage from the connection part of the hose in the water injection line and therefore stopped the injection at 0:45 pm on the day.
- At 1:05 pm on July 15, we exchanged injection hoses with new ones and started injecting fresh water in the reactor well and equipment storage pool. At 7:15 pm on the same date, we finished freshwater injection.

<Reactor building dust sampling>

- From 2:17 pm to 2:37 pm on May 23, we sampled, on a trial basis, radioactive materials in the ambient air at the opening of the Reactor Building, Unit 4. As a result of analysis, Iodine 134, Cesium 134, and Cesium 137 were detected.
- On June 18, we sampled radioactive materials in the ambient air at the opening of the Reactor Building of Unit 4. As a result of the analysis, Cesium-134 and Cesium-137 were detected.

<Others>

- On March 21, cabling was completed from the temporary substation to the reactor building.
- Lights in the main control room were turned on at 11:50am on March 29.
- Some of turbine building lights were turned on March 31.

【Unit 5】

- At 5:00am on March 19, we started cooling the spent fuel pool of Unit 5 by activating the Residual Heat Removal System Pump (C).
- Unit 5 has been in reactor cold shutdown since 2:30pm on March 20.
- In order to prevent hydrogen gas from accumulating within the buildings, we have made three holes on the roof of the reactor building for Unit 5.
- At approx. 5:24pm on March 23, the temporary Residual Heat Removal System Seawater Pump automatically stopped when its power source was switched. We restarted the pump at 4:14pm, March 24, and resumed cooling of reactors at 4:35pm.
- Regarding the work to connect high voltage power panels of Unit 1/2 and Unit 5/6, the pump of the residual heat removal system to cool the reactor and spent fuel pool in Unit 5 was stopped from 12:22 pm on April 25. At 4:43pm on the same day, we restated the pump.
- From March 27 to May 2, transfer of accumulated water in Unit 5 turbine building to a condenser was conducted (approximately 600m^3).
- At 9:14 pm on May 28, we found that one temporary residual heat removal system seawater pump of Unit 5 stopped. At 8:12 am on May 29, replacement work to the spare pump started. After finishing the replacement work, we started the pump at 12:31 pm, and restarted cooling from 12:49 pm.
- At 9:00 am on June 8, we suspended the Residual Heat Removal System Pump (C) in order to increase one more pump. Two pumps resumed at 0:35 pm on the same day.
- At 4:35 on June 24, the Spent Fuel Pool Cooling and Filtering (Clean up) System) was activated and we start cooling of spent fuel pool by such system and of reactor by residual heat removal system pump.

- We started operations for emergency diesel generator (A) at 6:03 pm on June 27 and emergency diesel generator (B) at 12:32 pm on June 28 respectively in Unit 5.
- At 6:55 am on July 3, our employee found a leakage of seawater from the water pipe (exit side) of one of the outside temporary seawater cooling pumps (2 pumps) of the residual heat removal system for the reactor. We stopped the pump at 10:00 am on the same day and confirmed stop of the leakage. We stopped the residual heat removal system of the reactor at 10:15 on the same day. We stopped another seawater pump at 10:20 on the same day and replaced the defected water pipe.After that, we resumed the operation of the seawater cooling pumps at 1:22 pm and 1:36 pm on the same day, and we resumed the operation of the residual heat removal system at 1:40 pm on the same day.
- At 3:03 am on July 11, with the restoration work for 2 lines of Yonomori line for the purpose of reliability improvement of site power, we started operations for emergency diesel generator (A) and (B) of Unit 5 (offsite power source for Unit 5 and 6 was stopped). Afterwards, alarm was occurred from emergency diesel generator (A) of Unit 5. Since alarm continued, at 9:07 am on the same day, we stopped the generator.
- As a countermeasure against seawater leakage from the piping of the outside temporary residual heat removal seawater system of the residual heat removal system of the Unit 5 occurred on July 3, we bound the piping tightly. However we found the similar part after reconfirmation of the site, in terms of preventive maintenance, we stopped the residual heat removal system at 6:30 am on July 13, stopped outside temporary seawater cooling pump at 6:44 am, and then replaced the piping. We restarted the residual heat removal system at 10:58 am. (outside temporary seawater cooling pump restarted at 10:52 am.
- At 10:16 am on July 15, we activated pumps of regular residual heat removal seawater system (system B) of Unit 5 and began a trial run. At 2:45 pm on the same date, we started operation of Residual Heat Removal System.
- At 4:01 am on July 16, in connection with the restoration work of 2 lines of Yonomori Line, we started the Emergency Diesel Generator (B), Unit 5 (suspension of external power supply to Units 5 & 6). At 1:05 pm on the same date, we stopped the Emergency Diesel Generator (B).
- At 3:08 am on July 17, due to the restoration work of 2 lines of Yonomori Line, we started the Emergency Diesel Generator (B) ofUnit 5 (suspension of offsite power supply to Units 5 & 6). At 3:36 pm on the same day, we stopped the Emergency Diesel Generator (B) of Unit 5.
- From 10:03 am to 10:43 am on August 8, we stopped the residual heat removal system pump (D) in order to switch the power source of the pump (C) as well as conducting its commissioning (C)
- In order to repair the outlet valve of Unit 5 residual heat removal system seawater pump (D), from 9:45 am to 10:42 am, September 26, we switched the seawater pump from B system (permanently installed) to A system (temporarily installed).
- At 11:05 am on September 27, on the second floor of the turbine building of Unit 5, while draining lubricant oil of overhead crane to drums for inspection of the crane, one of our employees found lubricant oil was leaked on the floor. The amount of the leaked oil was approximately 8 liters, and at about 1:00 pm, we wiped the oil from the floor.
- At 11:05 am on September 27, on the second floor of the turbine building of Unit 5, while draining lubricant oil of overhead crane to drums for inspection of the crane, one of our employees found lubricant oil was leaked on the floor. The amount of the leaked oil was approximately 8 liters, and at about 1:00 pm, we wiped the oil from the floor.
- On September 30, as the repair work for the outlet valve of Unit 5 Residual Heat Removal System Sea Water Pump completed, between 11:30 am and 11:34 am on the same day, the Residual Heat Removal System was switched from A system to B (the Residual Heat Removal System Sea Water Line was also switched from A system to B).
- For the purpose of Unit 5 water intake inspection, at 9:05 am October 20, unit 5 seawater pump of Equipment Water Cooing System was shutdown, and stopped cooling the spent fuel pool. At 9:13 am, Residual Heat Removal System (D) was

stopped and stopped cooling the reactor. As the inspection was completed, at 2:32 pm, seawater pumps of Equipment Water Cooing System was resumed, which resumed cooling the spent fuel pool. At 3:02 pm, Residual Heat Removal System (D) was resumed, which resumed cooling the reactor. Due to this stop, reactor water temperature temporarily rose from 22.2℃ to 31.1℃. Spent fuel pool water temperature temporarily rose from 25.5℃ to 26.2℃.

- For the purpose of the cleaning starting on November 28 to avoid the performance deterioration of pumps by sucking up sands etc. accumulated at the bottom of the inlet canal pump room, we stopped the pump (D) of the residual heat removal system thus suspended cooling the reactor, and also stopped the pump (C) of the cooling water system thus suspended cooling the spent fuel pool. When each pump was stopped, the temperatures of the water in the reactor and the spent fuel pool were 25.7℃ and 20.4℃ respectively. The planned suspension of cooling is between 7:00 am to 5:00 pm everyday, and the temperature increases of the water in the reactor and the spent fuel pool due to the suspension will be approx. 17℃ and approx. 4℃ per day respectively (we plan to do the cleaning work for approx. 1 week).
- On December 6, after the completion of such cleaning work, at 2:06 pm, we reactivated the pump (C) of the cooling water system in Unit 5 in order to restart the cooling of the spent fuel pool.(The temperature of the spent fuel pool was 23.3℃). At 2:24 pm, we reactivated the pump (D) of the residual heat removal system in Unit 5 in order to restart the cooling of the spent fuel pool.(The temperature of the spent fuel pool was 35℃).
- Due to the reconstruction work of the residual heat removal system sea water pump (B) of Unit 5, which had been out of order after the Tsunami, from 6:29 am on December 14, we stopped cooling the reactor of Unit 5 by suspending the operation of the residual heat removal system pump (B) and the residual heat removal system pump (D). After completion of the work, we started the suspended pumps, and at 4:29 pm on the same day, we restarted cooling the reactor. (The temperature of the reactor core at the time of suspension was 26.5 °C and the temperature at the time of restart was 38.2 °C)
- At 9:55 am on December 20, as a restoration work for Unit 5 residual heat removal seawater system pump (B) was completed, we started a test operation, and at 11:22 am, a full-scale operation started after we confirmed its soundness. As a result, there came two (2) pumps, or (B) and (D). Although we stopped cooling down the reactor of Unit 5 by pausing the pump (B) from 9:39 am to 10:11 am, the reactor water temperature increase was 0.1℃ and we made sure there was no security issues.
- At 11:28 am on December 21, trial operation was conducted for Unit 5 residual heat removal system pump (A) which has been stopped due to the tsunami on March 11. Because its soundness was confirmed, it was resumed to be on stand-by at 12:49 pm. Reactor cooling was temporarily suspended while switching pumps in trial operation, but there is no problem regarding the cooling.
- At 10:11 am on December 22, since we finished the recovery work of seawater pump (System B) of equipment water cooling system of Unit 5, we made a trial run. At 11:25 am on the same day, we confirmed no abnormalities and restarted the operation.

<Treatment of Accumulated Water>

- From 2:06 pm on October 7, in order to prevent from spontaneous combustion of cut trees and dust dispersing we started to sprinkle water in the site of Fukushima Daiichi Nuclear Power Station with cleared-up accumulated water of Unit 5 and 6. We measured radioactivity density in advance and confirmed to meet requirement of the guideline suggested in “Guideline regarding radioactive materials on bathing area”.

【Unit 6】

- At 10:14pm March 19, we started cooling the spent fuel pool of Unit 6 by activating the Residual Heat Removal System Pump (B).
- Unit 6 has been in reactor cold shutdown since 7:27pm on March 20.

- In order to prevent hydrogen gas from accumulating within the buildings, we have made three holes on the roof of the reactor building for Unit 6.
- At 3:03 am on July 11, with the restoration work for 2 lines of Yonomori line for the purpose of reliability improvement of site power, we started operations for emergency diesel generator (A) and (B) of Unit 6 (offsite power source for Unit 5 and 6 was stopped).
- At 4:21 am on July 16, in connection with the restoration work of 2 lines of Yonomori Line, we started the Emergency Diesel Generator (B), Unit 6 (suspension of external power supply to Units 5 & 6). At 1:51 pm on the same date, we stopped the Emergency Diesel Generator (B).
- At 3:28 am on July 17, due to the restoration work of 2 lines of Yonomori Line, we started the Emergency Diesel Generator (B) of Unit 6 (suspension of offsite power supply to Units 5 & 6). At 4:02 pm on the same day, we stopped the Emergency Diesel Generator (B) of Unit 6.
- At 9:27 am on August 9, as we conducted plumbing connection work to Unit 6 residual heat removal seawater system (System A), we stopped the power source of residual heat removal seawater system (System B) and cooling of the reactor and the spent fuel pool was temporarily suspended. At 2:01 pm on the same day, we completed the work and restarted cooling the reactor and the spent fuel pool by the residual heat removal seawater system (System B).
- From 9:55 am to 12:39 pm on September 8, in order to fill Residual Heat Removal System seawater system cooling pump (A) of Unit 6, we stopped Residual Heat Removal System (B). With this, cooling of Reactor and Spent Fuel Pool were also temporarily suspended
- At 2:29 pm on September 10, we stopped the residual heat removal system (B) of Unit 6. At 3:12 pm we started (A) of the same system. (Cooling of the spent fuel pool was temporarily suspended, however, there was no change in the water temperature in the pool before and after the suspension.) The water in the reactor and in the spent fuel pool will be alternately cooled by the residual heat removal system (A).
- At 9:56 am on September 15, we restored and restarted the seawater pump of Equipment Cooling Water System of Unit 6. At 2:33 pm on the same day, we completed the adjustment of the flow rate of Fuel Pool Cooling System and started cooling the spent fuel pool. Consequently, the reactor and the spent fuel pool are now separately cooled through Residual Heat Removal System and Fuel Pool Cooling System respectively.
- Because a decrease in the amount of water was confirmed at the residual heat removal system seawater pump (C), the cooling of the reactor using residual heat removal system (A) was stopped at 11:20 am on October 3, and we implemented the inspection of the residual heat removal system seawater pump (C) and the related system. The inspection result confirmed its normal function. Thus, at 12:44 pm on the same day, we resumed cooling the reactor by residual heat removal system (A).
- At 1:41 pm October 6, We stopped pumping at auxiliary cooling seawater system Unit 6 since we found slow decreasing trend in pressure of pump header at that system. At 2:07 pm October 6, we restarted the pump and confirmed that the pressure was normal value.
- As confirming downward tendency on flow rate at Residual Heat Removal system sea water pump (C) of Unit 6, we stopped cooling reactor by Residual Heat Removing system (A) and conducted check-out the pump and related system at 11:55 am on October 7. The result of check-out , we confirmed no abnormalities and restarted cooling reactor with Residual Heat Removal system (A) at 12:41 pm on the same day.
- At 9:42 am on October 13, we stopped the residual heat removal system (A) in order to check operation of residual heat removal system temporary pump (B) of Unit 6. We started the residual heat removal system (B) at 9:54 am on the same day. After completion of the check, we stopped the residual heat removal system (B) at 10:07 am, and restarted residual heat removal system (A) at 10:17 am.
- Because a decrease in the amount of water was confirmed at the residual heat removal system seawater pump (C) of Unit 6, the cooling of the reactor using

residual heat removal system (A) was stopped at 2:42 pm on October 14, and after that we stopped the residual heat removal system seawater pump (C). Later on, we restarted the residual heat removal system seawater pump (C) and confirmed that it returned to a predetermined performance. Thus, we restarted to cool the reactor using residual heat removal system (A) at 3:23 pm on the same day. Due to this suspension, the water temperature of the reactor temporarily rose to 23.3℃ from 22.6℃.

- At 2:30 pm on October 19, we stopped seawater line pump of residual heat removal system (C) after stopped cooling reactor by residual heat system (A) due to the downward trend on the flow rate and pressure of the Unit 6 residual heat removal system. After that we restarted sea water pump of residual heat removal system (C) and as we confirmed the related pump returned to running at specified performance, we restarted cooling reactor by residual heat removing system (A) at 3:02 pm on the same day. The temperature of the reactor water is rose 21.6 deg C to 22.1 deg C temporarily by this suspension.
- For the purpose of Unit 6 water intake inspection, at 9:05 am October 21, unit 6 seawater pump of Equipment Water Cooing System was shutdown, and stopped cooling the spent fuel pool. At 9:13 am, Residual Heat Removal System (A) was stopped and stopped cooling the reactor. After the inspection was finished, the cooling for the reactor was resumed by restarting the pump of Residual Heat Removal System (A). At 4:01 pm, the cooling for spent fuel pool was resumed by restarting the seawater pump of Equipment Water Cooling System. As a result of this interruption, the water temperature in the reactor increased temporarily from 24℃ to 32.1℃. The water temperature for the spent fuel pool increased temporarily from 25℃ to 26.5℃
- From November 15, due to cleanup work in order to prevent performance deterioration of pump caused by inletting sand or other materials piled up at the bottom of pump room of intake channel of Unit 6, Residual Heat Removal System (A) was shutdown, and stopped cooling the reactor. And Seawater pump of Equipment Water Cooing System (A) was shutdown, and stopped cooling the spent fuel pool. The stop is scheduled from 7:00 am to 5:00 pm everyday, reactor water temperature will rise by approx. 12℃ per day, and spent fuel pool water temperature will rise by approx. 3℃ per day. (The cleanup work is planned to be finished in a week.) On November 23, we finished all of this clean up work and at around 5:00 pm on the same day. When we restarted the pump of auxiliary cooling sea water system (A) which stopped due to the work, it shut down automatically right after it was restarted. Currently the cause is under investigation. Reactor water and Spent Fuel Pool are planned to be cooled alternatively by pump of residual heat removal system (A) until the pump is recovered. At 10:23 am on November 24, we suspended cooling reactor water. At 10:41 on the same day, we started to cool spent fuel pool. (water temperature at the time of switching: reactor 26.4℃, spent fuel pool approx. 30℃). On November 24, as a result of checkups of the pump except for the power panel switchgear that we are unable to check without overhauling, since we identified no abnormality, the pump resumed at 4:19 pm after a workout to resume by replacing the power panel switchgear. After that at 4:35 pm, as there was no abnormality we resumed cooling down the Spent Fuel Pool water by using the pump (SFP water temperature: 23.5 ℃ at the time of resumption). Since 10:23 on November 24, as for the water residual heat removal system (A) pump that has been shutdown to cool down the water of nuclear reactor, we, by changing method, resumed operation. (nuclear reactor water temperature: 33.4 ℃ at the time of resumption).
- As we observed reduction of flow rate at the residual heat removal seawater system pump (C) of Unit 6, At 10:32 am on December 9, we stopped cooling the Reactor by the residual heat removal system (A) and stopped the residual heat removal seawater system pump (C). After that, we restarted the residual heat removal seawater system pump (C) and confirmed that the performance of that pump returned to almost normal level. At 11:18 am on the same day, we resumed cooling the Reactor by the residual heat removal system (A). With this stop, Reactor water temperature temporarily increased from 26.6 Celsius to 27.5 Celsius.
- Due to the completion of restoration of residual heat recovery (RHR) sea water

pump (A) of unit 6, which was not be able to use by the affect of tsunami, at 10:19 am on December 27, commissioning was started, at 11:30 am as no incident was observed, it returned to usual operation. As a result, two RHR pumps, (A) and (C), had been returned to service. During the commissioning, while RHR pump (A) of unit 6 was temporary stopped from 10:01 am to 11:09 am and cooling of reactor core was suspended, as the increase of core water was approx. 0.7℃ and there were no concerns to the safety.

< Treatment of Accumulated Water>

- From 11:00 am to 3:00 pm on April 19, accumulated water from the basement of the turbine building of Unit 6 was transferred into the condenser.
- The transfer of accumulated water in Unit 6 turbine building to a temporary tank was started at 2 pm on May 1. At 5:00 pm, on May 1, transfer pump was stopped (approximately 119.8m^3). After that, the results of the transfer are shown below.

From 10:00 am to 4:00 pm on May 2
From 2:00 pm to 5:00 pm on May 3
From 2:00 pm to 5:00 pm on May 6
From 10:00 am to 3:00 pm on May 7
From 2:00 pm to 5:00 pm on May 9
From 10:00 am to 4:00pm on May 10
From 10:00 am to 4:00 pm on May 11
From 10:00 am to 4:00 pm on May 12
From 10:00 am to 3:00 pm on May 13
From 10:00 am to 3:00 pm on May 14
From 10:00 am to 3:00 pm on May 15
From 10:00 am to 2:00 pm on May 16
From 10:00 am to 2:00 pm on May 17
From 10:00 am to 2:00 pm on May 18
From 2:00 pm to 6:00 pm on May 21
From 9:00 am to 7:00 pm on May 24
From 9:00 am to 7:00 pm on May 25
From 9:00 am to 7:00 pm on May 26
From 9:00 am to 7:00 pm on May 27
From 9:00 am to 7:00 pm on May 28
From 9:00 am to 7:00 pm on May 29
From 10:00 am to 5:30 pm on May 30
From 2:00 pm on June 2nd to 2:00 pm on June 5, from 2:45 pm on June 5 to 6:00 pm on June 8
From 9:00 am on June 9 to 6:00 pm on June 9
From 10:00 am to 3:00 pm on June11
From 10:00 am to 3:00 pm on June 12
From 10:00 am to 4:00 pm on June 13
From 10:00 am to 4:00 pm on June 14
From 10:00 am to 4:00 pm on June 15
From 10:00 am to 4:00 pm on June 16
From 10:00 am to 4:00 pm on June 17
From 10:00 am to 4:00 pm on June 18
From 10:00 am to 4:00 pm on June 19
From 10:00 am to 4:00pm on June 20
From 10:00 am to 4:00 pm on June 21
From 10:00 am to 4:00 pm on June 22

- From 11:00am to 12:30am May 10, we conducted water transfer from the reactor building to the accessory building for reactors (the radiation waste treatment building) (Approximately 10 m^3). The results are shown below.

From 11:00 am to 12:30 pm on May 10
From 11:00 am to 12:30 pm on May 11
From 11:00 am to 12:30 pm on May 12
From 11:30 am to 12:15 pm on May 13
From 10:30 am to 12:30 pm on May 18
From 10:20 am to 12:10 pm on May 28

From 10:05 am to 12:40 pm on June 8
From 11:55 am to 2:00 pm on June 15
From 11:05 am to 1:30 pm on June 21
From 11:00 am to 1:20 pm on June 28
From 8:45 am to 10:50 am on July 6
From 8:40 am to 10:50 am on July 13

Transfer from July 14 onwards, will be considered depending on the water level at the building.

- At 3:00 pm on June 30, following start of transferring of low radioactive stored water from temporary tank to Mega Float, we restarted the transferring of accumulated water at the underground of Unit 6 turbing building to temporary tank.we paused 7:00 pm on the same day, . After that, the results of the transfer are shown below.

From 10:00 am on July 1 to 4:00 pm on July 3
From 10:00 am to 4:00 pm on July 4.
From 10:30 am to 4:30 pm on July 5
From 10:00 am to 5:00 pm on July 6
From 10:30 am to 4:30 pm on July 7
From 10:30 am to 4:30 pm on July 8
From 10:30 am to 4:30 pm on July 9
From 10:30 am to 4:30 pm on July 11
From 10:00 am to 5:00 pm on July 13
From 11:00 am to 6:00 pm on July 22
From 11:00 am to 6:00 pm on July 23
From 11:00 am to 4:00 pm on July 24
From 11:00 am on July 26 to 4:00 pm on July 27
From 11:00 am to 4:00 pm on July 28
From 10:00 am to 5:00 pm on July 29
From 11:00 am to 4:00 pm on July 30
From 11:00 am to 4:00 pm on July 31
From 11:00 am to 4:00 pm on August 2
From 11:00 am to 4:00 pm on August 3
From 11:00 am to 4:00 pm on August 5
From 11:00 am to 4:00 pm on August 6
From 11:00 am to 4:00 pm on August 8
From 11:00 am on August 9 to 5:00 pm on August 10
From 10:00 am to 4:00 pm on August 11
From 10:00 am to 4:00 pm on August 12
From 11:00 am on August 15 to 9:00 am on August 15
From 10:00 am to 5:00 pm on August 18
From 10:00 am to 1:00 pm on August 19
From 10:00 am on August 23 to 4:00 pm on August 24
From 10:00 am to 4:00 pm on August 25
From 10:00 am to 4:00 pm on August 26
From 10:00 am to 4:00 pm on August 29
From 10:00 am to 4:00 pm on September 1
From 11:30 am to 4:00 pm on September 12
From 10:00 am to 4:00 pm on September 13
From 10:00 am to 4:00 pm on September 15
From 10:00 am to 4:00 pm on September 20
From 10:00 am to 4:00 pm on September 21
From 10:00 am to 4:00 pm on September 22
From 10:00 am to 4:00 pm on September 24
From 10:00 am to 4:00 pm on September 26
From 10:00 am to 4:00 pm on September 28
From 10:00 am to 4:00 pm on September 29
From 10:00 am to 4:00 pm on September 30
From 10:00 am to 4:00 pm on October 3
From 10:00 am to 4:00 pm on October 5
From 10:00 am to 4:00 pm on October 7

From 10:00 am to 4:00 pm on October 12
From 10:00 am to 4:00 pm on October 14
From 10:00 am to 4:00 pm on October 18
From 10:00 am to 4:00 pm on October 22
From 10:00 am to 4:00 pm on October 26
From 10:00 am to 4:00 pm on October 30
From 10:00 am to 4:00 pm on November 3
From 10:00 am to 4:00 pm on November 6
From 10:00 am to 4:00 pm on November 9
From 10:00 am to 4:00 pm on November 13
From 10:00 am to 4:00 pm on November 17
From 10:00 am to 4:00 pm on November 29.
From 10:00 am on December 1 to 4:00 pm on December 2.
From 10:00 am on December 5 to 4:00 pm on December 6
From 10:00 am on December 8 to 4:00 pm on December 9.
From 10:00 am to 4:00 pm on December 12.
From 10:00 am to 4:00 pm on December 13.
From 10:00 am on December 15 to 4:00 pm on December 16 / From 10:00 am to 4:00 pm on December 26.

- At 12:00 pm on June 28, TEPCO worker found the water level gauge (manometer) of temporary tank where accumulated water from turbine building in Unit 6 is being transferred lying on the floor. Since accumulated water in temporary tank that is from turbine building basement at Unit 6 was leaking from the gauge, we stopped it by closing main valve. The amount of water leaked was approximately 15m^3. For safety, we measured surface dose rate around and confirmed the result to be equivalent to that of surrounding area (7 μSv/h). Currently, we are investigating the details.
- At 1:00 pm on June 30, we started transferring of low radioactive stored water from temporary tank to Mega Float. Although a water blow was found on the surface of the transferring hose, we cure it and confirmed no leakages to outside.
- From 10:00 am on July 1, we transferred low radioactive stored water from outdoor temporary tank to Mega Float. At 4:00 pm on June 3, the transfer was paused due to pipe arrangement change. After that, the results of the transfer are shown below.

From 1:30 pm to 5:00 pm on July 4
From 10:00 am to 5:00 pm on July 5
From 10:09 am to 5:00 pm on July 7
From 10:00 am to 5:00 pm on July 8
From 10:00 am to 5:00 pm on July 9
From 10:00 am to 5:00 pm on July 11
From 11:00 am to 4:00 pm on July 12
From 10:00 am to 5:00 pm on July 14
From 10:00 am to 5:00 pm on July 15
From 10:00 am to 3:00 pm on July 16
From 10:00 am to 5:00 pm on July 28
From 10:00 am to 5:00 pm on July 30
From 10:00 am to 5:00 pm on July 31
From 10:00 am to 5:00 pm on August 2
From 10:00 am to 5:00 pm on August 3
From 10:00 am to 5:00 pm on August 5
From 10:00 am to 5:00 pm on August 6
From 10:00 am to 5:00 pm on August 8
From 5:00 pm on August 13 to 10:00 am on August 14
From 10:00 am to 4:00 pm on October 19
From 2:00 pm to 3:00 pm on October 20
From 10:00 am to 4:00 pm on October 21
From 10:00 am to 10:30 am on October 24
From 10:00 am to 11:30 am on October 25
From 10:00 am to 4:00 pm on October 27
From 10:00 am to 4:00 pm on October 28
From 10:00 am to 4:00 pm on October 31

From 10:00 am to 4:00 pm on November 1

From 10:00 am to 3:00 pm on November 2

- At 10:00 am on July 27, regarding low level accumulated water which was transferred from Turbine Building of Unit 6 to the temporary tank, we recommenced to transferring the water from temporary tank to mega float. At 10:45 am on the same day, we found the leak of accumulated water at pump for transferring from temporary tank to mega float, and we stopped transferring. From 12:30 pm to 2:00 pm on the same day, we conducted replacement work of the transferring pump.
- At 10:00 am on August 9, we resumed transferring low-level accumulated water to Mega Float from a temporary tank where we had transferred from the turbine building of Unit 6. At 10:12 am the transfer was suspended, as we confirmed accumulated water was leaking from the transfer hose. At 1:35 pm on the same day, we restarted the transfer after replacing the hose. At 5:00 pm on the same day, we completed the transfer. After that, the results of the transfer are shown below.
- From 2:06 pm on October 7, in order to prevent from spontaneous combustion of cut trees and dust dispersing we started to sprinkle water in the site of Fukushima Daiichi Nuclear Power Station with cleared-up accumulated water of Unit 5 and 6. We measured radioactivity density in advance and confirmed to meet requirement of the guideline suggested in “Guideline regarding radioactive materials on bathing area”.

【Others】

<Securing offsite power reliability>

- On March 18, with respect to Unit 2, receiving electricity from the external transmission line to the auxiliary power transformation installation was completed. At 3:46 pm on March 20, after laying the cables from the installation towards the building side, receiving electricity by the load panel on the load side was started.
- At 10:23 am on April 19, connection work between high voltage switchgear of Unit 1&2 and Unit 3&4 was completed.
- Before the work to connect high voltage power panels of Unit 1/2 and Unit 5/6 was initiated, the power source of pumps to inject water to reactors was switched to a temporary diesel generator at 10:57 am on April 25. At 6:25pm on April 25th, the power source was switched back to the power system. The pump to inject nitrogen to Unit 1 was stopped from 2:10 pm on April 25. At 7:10pm on the same day, we restated the pump. The pump of the residual heat removal system to cool the reactor and spent fuel pool in Unit 5 was stopped from 12:22 pm on April 25. At 4:43pm on the same day, we restated the pump.
- Since April 26, aiming to increase the power supply capacity in future as well as to strengthen the insulation, we have switched the power source of Unit 3 & 4 from the current “Okuma line No.3” to “Toden Gensiryoku line” in line with the construction work to raise the voltage of the offsite power of Unit 3 & 4 from 6.9 kV to 66 kV. On April 30, we finished upgrading the voltage and switching the power source of Unit 3 & 4 to “Okuma line No.3”.
- Okuma Line No.2 (275,000 V) has been restored. Since 3:20 pm on May 11, Unit 1 and 2 are receiving power partly from the line.
- At 7:35 pm, May 17, we completed the switch of power for the power station by the increase of voltage of Okuma Line No.3.
- At 5:28 am on July 16, in connection with the restoration work of 2 lines of Yonomori Line, we stopped Yonomori Line (suspension of external power supply to Units 5 & 6). At 12:05 pm on the same date, further to the completion of the restoration work, we resumed receiving power from Yonomori Line.
- At 4:24 am on July 17, due to the restoration work of 2 lines of Yonomori Line, we stopped Yonomori Line (suspension of offsite power supply to Units 5 & 6). At 1:20 pm on the same day, we resumed receiving power from Yonomori Line (using Futaba Line).
- On July 21 we implemented the restoration work of 2 lines of Yonomori Line and finished it on July 23.

<Detection of radioactive materials>

[Soil]

- Plutonium has been detected from the sample of soil at the site of Fukushima Daiichi Nuclear Power Station collected on March 21, 22, 25, 28, 31, April 4, 7, 11,14, 21, 25, 28, May 2, 5, 9, 12, 16,19, 23, 26 ,30 , June 2, 6,9, 13, 16, 20, 23, 27, July 4, 11, 18 and 25, August 1, 8, 15, September 5, 12, 19, 26 October 3, 10, 17, 24, 31, November 7, 14, 28 and December 5, 12 and 19 We strengthened environmental monitoring of power station and surrounding environment just in case. As a result of nuclide analysis of gamma (γ)-rays of the soil using the aforementioned sample, additionally, Iodine, Cesium, Tellurium, Barium, Niobium, Ruthenium, Molybdenum, Technetium, Lanthanum, Beryllium, Silver have been detected.
- We collected the soil at the site of Fukushima Daiichi Nuclear Power Station on March 28, April 4, 11, 25, May 2, 9, 16, 30, June 6, 13 and 20 and as a result of uranium assay, detected Uranium-234, 235 and 238 which are the same level as that occurs naturally.
- Out of the soil samples gathered on March 28, April 4, 11, 25, May 2, 9, 16, 23, June 6, 13 and 20we conducted the nuclides analysis on samples from which Plutonium were detected to confirm Americium and Curium. We detected Americium 241 and Curium 242, 243 and 244.
- Strontium 89 and 90 have been detected from samples collected on April 18, May 9, June 13, July 11, August 15, September 12, October 10, December 12 and 26 from 3 regular sampling points.

[Air]

- The values of radioactive materials (iodine, etc) measured contained in the air at the site exceeded normal figures. It was determined that a specific incident stipulated in article 15, clause 1 of the Act on Special Measures Concerning Nuclear Emergency Preparedness (Extraordinary increase of radiation dose at site boundary) had occurred;
  - 4:17pm on March 12 (near MP 4)
  - 8:56am on March 13 (near MP 4)
  - 2:15pm on March 13 (near MP 4)
  - 3:50am on March 14 (near MP 6)
  - 4:15am on March 14 (near MP 2)
  - 9:27am on March 14 (near MP 3)
  - 9:37pm on March 14 (near the main gate of the station)
  - 6:51am on March 15 (near the main gate of the station)
  - 8:11am on March 15 (near the main gate of the station)
  - 4:17pm on March 15 (near the main gate of the station)
  - 11:05pm on March 15 (near the main gate of the station)
  - 8:58am on March 19 (near MP 5)

- We detected radioactive materials in the air collected at the site of Fukushima Daiichi Nuclear Power Station on March 20, 21 and from March 23 to July 4, 7, 9 ～22, 27, 28 and August 2, 3 ,6, 8 to 10, 12 14, August 2, 3, 4, 6, 8 to 10, 12, 14, 15, 17, 18, 21, 23, 25, 31 and September 1, 5, 7, 8, 9, 10, 12, 13, 14, 15 ,21, 22, 24, 25, 27, 28 ,29, 30, October 3, 7,10, 11, 13, 14, 16, 18, 22, 25, 26, 27, November 1, 2, 9, 10, 11, 12, 14, 15, 16, 17, 24, 25, 26, 27,28, December 14, 15, 22, 27, 28 and 29. The data of three detected nuclides (Iodine-131, Cesium-134 and Cesium-137) were reported as fixed data. The valuation results of other nuclides were published based on the improved methods for recurrence prevention prepared in accordance to the strong warning by NISA on April 1.
- Since permanent monitoring posts (MPs 1 to 8) were restored, we keep monitoring and publicly announce the data from them.
- On May 20, we implemented improvement of environment for a part of 8 monitoring posts (No.8) installed at the boundary of station site, by decontamination of detector and installation of cover under the detector. On May 23, we improved the environment around a monitoring post No.3 by decontaminating the detector and installing a shield to the lower half of the

detector.

- At 1:00 pm on 13th July, transportable monitoring post recorded zero. We checked monitoring equipment and resumed at 2:55 pm on the day.
- At 1:00 pm on 13th July, transportable monitoring post, which was monitoring radiation dose at the main gate, recorded zero. We checked the monitoring equipment and restored by restarting power at 2:55 pm on the day. At 10:00 pm on the same day, we found the same equipment showing zero. At 6:15 pm on July 14th, we finished repairing the transportable monitoring post.
- At 2:30 pm on August 18, we confirmed the instrument reading of transportable monitoring post that was measuring dose rate of main gate of the power station became unreadable. The data transfer was resumed at 4:00 pm on the same day.
- At approximately 10:00 am on September 12, we confirmed the instrument reading of transportable monitoring post that was measuring dose rate of main gate of the power station became unreadable. The data transfer was resumed at 10:30 am on the same day.
- From around at 5:48 pm on December 3, data of monitoring post No.8, monitoring dosage rate at the power station, found disappeared. As the reason was not found and the post was not be able to recovered, an alternative monitoring by monitoring post No.7 and a dose rate meter having additionally monitored around monitoring post No, 8 (which was set to monitor corresponding to nitrogen injection to RPV) was conducted, and the most recent data was not changed from that of the day before (The monitoring post No.7: 92 μSv /hour, around the monitoring post No. 8: 42 μSv /hour (as of 8:00 pm)). The monitoring post No.8 will be maintained hereafter.
- On December 6, the display function of No. 8 monitoring post was retrieved when its board was reinserted. Thereafter, we have restarted the measurement with No. 8 monitoring post as no sign of reoccurrence was confirmed.
- At 0:20 pm on December 6, it was confirmed that the measurement data for 0:00 pm in the monitoring post set at the main gate was missing. The data for 1:00 pm, 1:30 pm, and 2:00 pm were manually measured at the location and the measured data was in the same level as the data before 0:00 pm. Thereafter, we have removed the water accumulated in the cable connector portion of the monitoring post and restarted the measurement by the monitoring post at 2:30 pm.
- At approxi.11:30 am on December 13, we have confirmed that the 11:30 data was not collected from the transportable monitoring post installed at the west gate. Later, we have found out that disconnection of the cables was the cause for this communication error. Therefore, we reconnected the cables and resumed the measurement the transportable monitoring post. As for the data on 12:00 pm, 12:30 pm and 1:00 pm, we actually went to the site to conduct the radiation measurement and confirmed the result to be equivalent to the data collected prior to the disconnection of the cables (approx. 11 μSv/h).

At 10:00 am on December 22, we started to replace the transmission parts of monitoring post No.2 and No.8 which monitor dose rate inside the site. At 11:40 on the same date, we finished the replacement work. In addition, monitoring post No.8 data was unavailable from 11:10 am to 11:40 am, but we confirmed that the other monitoring posts didn't indicate unusual values. Monitoring post No.2 was available during the replacement work due to the replacement parts are different from Monitoring post No.8

[Water]

- On March 21, from March 23 to July 25, from 27 to 31, August 1 to 3, 5, 8 to 9, 11, 17 to 19, 21, 30, September 13, 14, 23, 28 ,29, 30, October 16 20 22, 24 25, 26, 27, 28, 29, 30, 31, November 1, 2, 3, 4, 5, 6, 7, 9, 10,11,12, 13, 14 , 15, 16,17, 18, 19, 20, 21 22, 23, 24, 25, 26, 27,28, 29, 30, December 1, 2, 3, 4, 5, 6, 7,9, 10, 11, 12, 13, 14, 15, 16, 17,18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29 30 and 31, we detected radioactive materials from the seawater around the discharge canal of the station. The data of three detected nuclides (Iodine-131, Cesium-134 and Cesium-137) were reported as fixed data. The valuation results of other nuclides were published based on the improved methods for recurrence prevention prepared in accordance to the strong warning by NISA on April 1.

We detected Strontium 89 and 90 in the Strontium analysis contained in the

seawater in the vicinity of the power station collected on May 9, 16, June 13, 14, July 11, 14, August 15, September 12, October 10, November 14, and December 10.

We detected Tritium in the Tritium analysis contained in the seawater sampled at the water intake on June 13.

We detected Total Beta in the Total Alfa and Total Beta analysis contained in the seawater sampled at the water intake on June 13 and 14.

- We detected radioactive materials contained in the accumulated water in the turbine buildings of Units 1 to 4. As a preparation for treating the water, we conducted water analysis and detected radioactive materials. The analysis of water was carried out in Fukushima Daini Nuclear Power Station with support from other nuclear institutions and companies (Japan Atomic Energy Agency and Japan Nuclear Fuel Limited).
- At approx. 3:30pm, March 27, we found water accumulating in vertical shafts of trenches outside of the turbine buildings for Units 1 to 3. The radiation dose at the surface of the water amounted 0.4 mSv/h (Unit 1) and over 1,000 mSv/h (Unit 2). We could not confirm the amount of the radiation dose as for Unit 3. We keep observing the condition of the water in the vertical shaft. No significant changes in water level of the vertical shafts of the trenches for Units 1 to 3 were confirmed At 11:57 am on July 30, we adjusted the amount of water injection in each Unit to approx. 3.6 m^3/h since we confirmed a decrease in the amount of water injected to reactor in Unit 1 and 2.
- At 11:57 am on July 30, we adjusted the amount of water injection in each Unit to approx. 3.6 m^3/h since we confirmed a decrease in the amount of water injected to reactor in Unit 1 and 2.

- We detected niobium, technetium, ruthenium, silver, tellurium, iodine, cesium, and ruthenium in the water collected at the trench of Unit 1 on March 29. We took samples from the water in the trench of Units 2, 3, 5 and 6 on March 30, and conducted nuclide analysis on them.
- At approx. 9:30am, April 2, we found that there was accumulated water in the shaft (concrete product) for storing power cables near the intake of water for Unit 2, that the airborne radiation was over 1,000mSv/h and that the water spilled into the sea from the crack (approx. 20 cm) on the side of the shaft. Since there is a joint between the trench of Unit 2 and the shaft, based on the possibility that the accumulated water in the turbine building of Unit 2 was spilled into the sea through this joint, we injected fresh concrete to the shaft twice, however, we could not observe any changes in the amount of water flowing into the sea. Therefore, we considered that a new method to stop the water and determined to use the polymer. On April 4th, we injected the tracer from the vertical shaft to examine the flow path. We did not observe reduction of flow or change of color of water leaked. We checked the drawings and confirmed the route. At the same time, we checked the situation of the pit in detail and considered the possibility that the water did not come from the pit, rather, from the joint between the piping upstream of the pit and the duct, then the water seeped through a layer of gravel below the piping. In order to stop that seepage from the layer of gravel, we decided to conduct the water sealing to the bedrock around the piping. We arranged specialists for water shutoff and procured required equipments. On April 5, liquid glass was injected to the bedrock. Tracer was put through the two new holes drilled near the pit to investigate the water flow. At 2:15pm, April 5, it was observed the water with tracer came out from the crack on the concrete wall of the pit. At 3:07pm, April 5, injection of coagulant from the holes was initiated and we confirmed the outflow from the crack on the concrete wall of the pit stopped at approximately 5:38am, April 6. We confirmed the water level has not been rising in the turbine building of Unit 2. On April 6, a countermeasure by using rubber plate and fixer was implemented to prevent discharge of radioactive materials, and we are continuously monitoring for any existence of leakage. We used grout to stop the outflow, and finished the work on April 21. We are also planning to conduct countermeasures to prevent the outflow of accumulated water from the pit.

The amount of high density contaminated water spilled from the screen at the side

of turbine building, Unit 2 is estimated to be about 520 m^3 with $4.7*10^{15}$ Bq, assuming that the water flowed continuously at the same pace from April 1 to April 6.

From 3:00pm April 5, construction of installing large sandbags around the pier to prevent the outflow of the contaminated water from station's port on the south side to the ocean was started. From April 15 to April 17, we threw in ten sandbags including zeolite in front of the screen rooms of Units 1 to 4.

In order to prevent water containing radioactive materials from spilling from a plant's port to the sea, we installed 120 meter wide double silt fences around a breakwater on the south of the station at 10:45am on April 11. On April 12, 13 and 15, we installed a total of 7 iron plates in front of the screen of Unit 2. At 1:50pm on April 13, we installed silt fence (double layered) in front of Unit 3 and 4 screens. In addition, we are thinking about using other measures such as steel sheet pile or radioactive material absorber at around south breakwater.

Iodine and Cesium were detected from the water sampled in the pit and in the sea near the pit. On April 13, Iodine-131, Cesium-134 and Cesium-137 were detected from the water sampled in the pit and in the sea in front of the bar screen near the pit. Other nuclide will be re-evaluated. In addition, from April 2, we implemented sampling at 15km offshore Fukushima Daiichi and Fukushima Daini Nuclear Power Stations. 3 points have been added since April 5. 4 points at 3km offshore Fukushima Daiichi Nuclear Power Station and 2 points at 8km offshore have been newly added since April 17. On April 25, the monitoring at 5 locations at the offshore area of Ibaraki Prefecture was launched by Ministry of Education, Culture, Sports, Science and Technology. As part of its monitoring, Japan Coast Guard has conducted the sampling in seawater on April 29 and May 5. We, Tokyo Electric Power Company, have conducted the nuclide analyses of that seawater. Iodine -131, Cesium -134 and Cesium -137 were detected. We will evaluate these samples comprehensively hereafter. On May 5, we added samplings of upper and lower layers of 3km Souma-city offshore. From May 10 we will carry out the sampling of upper and lower layers at 6 points at 3 km offshore, and interval of the said sampling at 6 points will be changed to two times a week. On May 27, we added samplings of upper, middle and lower layers at 2 points at 30km offshore, and upper and lower layers at 2 points at 5km offshore, and interval of the said sampling at 4 points will be once a week.From June 21, we started to conduct the sampling 6 points at offshore in Miyagi prefecture. From 7:35pm on April 12, we started transferring accumulated water in the vertical shaft of Unit 2 to the condenser. At 11:00am on April 13, we stopped transferring accumulated water to check whether there was water leakage from condenser or not. As we did not find any problem, we restarted transferring at 3:02 pm on the same day, and at 5:04 pm the scheduled transfer was completed.

- At 12:30 pm on May 11, a worker engaged in blocking work of the vertical shaft around the water intake of Unit 3 found some water flowing through the pipes that store power cables into the vertical shaft. At 4:05 pm on the same day, we confirmed that the water outflows out of the shaft into the sea. We therefore inserted cloths into the pipes that lead to the shaft and put some concrete in it and at 6:45 pm, we confirmed the outflow stopped. We will continuously monitor the situation of the water outflow and check the result of sea water samplings around the water intake of Unit 3 and routes of water inflow and outflow.

We estimated that the volume of outflow was approx. $250m^3$ and the radioactive dose is approx. 2×10^{13} Bq on the assumption that it flew at the same rate for approx. 41 hours (from 2:00 am on May 10 to 7:00 pm on May 11). As preventive measures and measures to prevent scattering to the outside of the port, we are planning to block the pits the contaminated water might run flow out from, isolation of pump rooms for Units 1 to 4, installation of sandbags containing zeolite inside of the intakes, and installation of a circular purification equipment to the screen area. In parallel, we will continue monitoring sea water inside and outside of the port and reinforce the monitoring system.

On May 12, we conducted nuclide analysis on water in vertical shaft and neighborhood seawater, we detected Iodine-131, Cesium-134 and Cesium-137 on

May 12th. We will conduct additional nuclide analysis.

At 10:30 on June 9, water flow test of circulating seawater purification facility located in the Unit 2 and 3 screen area was initiated. The test was completed at 3:00 pm.

At approximately 10:00 am on June 13, we started the operation of the circulating seawater purification facility installed at the screen area of Unit 2 and 3. At 10:00 am on June 18, we stopped operation.

- At 10:00 am on June 20, we started operation of the circulating seawater purification facility installed at the screen area, Units 2 and 3. Afterwards, for maintenance, we stop circulating seawater purification facility if necessary.
- We began to blockade each vertical shaft as a countermeasure against Tsunami on May 1, and have finished the work for Unit 2 and 3 on June 2. (We already blockaded the vertical shafts of Unit 4 on April 6.)
- For the seawall of each unit, on June 29, we completed the task to repair the breakage, as the countermeasure against the leakage of accumulated water.
- For the screen pit of each unit, on June 10, we completed the task to blockade 39 pits where the possibility of water leakage can ' t be denied, as the countermeasure against the leakage of accumulated water.
- For the screen rooms of each unit, on June 29, we completed the task to installation of water intake sliding concreate pllate, as the countermeasure against the leakage of accumulated water.
- Since approx. 9:20am, March 31, the water transfer from the vertical shaft of Unit 1 to the reservoir of the centralized environmental facility was conducted. We finished the task around 11:25am of the same day.
- We found the accumulated water at the main process building of the centralized environmental facility. We analyzed and detected approx. 1.2 x 10^1Bq/cm³ of radioactivity in full dose in the Controlled Area and 2.2 x 10^1Bq/cm³ in full dose in the Non-Controlled Area on March 29. On April 2, the transfer of water accumulated in the central environment facility to the turbine building of Unit 4 was started for the purpose of the draining that water.
- From April 3, the water level in the trench of Unit 3 increased by 15 cm. The route is not yet known, but there is a possibility that water in the turbine building of Unit 4 may be running to the trench of Unit 3. To be safe, at 9:22am, April 4, we stopped transferring water to the turbine building of Unit 4. At this moment, the water level in the trench of Unit 3 became stable after stopping the water transfer.
- There is plenty of radioactive wastewater in the turbine buildings. Especially, Unit 2's wastewater is very highly radioactive. To store this stably, it was decided that this needed to be transferred to the Centralized Radiation Waste Treatment Facility. However, in that facility, ten thousand tons of low level radioactive wastewater was already stored. In order to transfer more wastewater, we need to discharge the low level radioactive wastewater. In addition, as low radioactive subsurface water is piling up in sub-drain pits of Units 5 and 6 and a part of subsurface water is running into buildings. We are concerned that important equipment to secure the safety of reactors may be submerged. Hence, based on the Section 1 of the Article 64 of the Nuclear Reactor Regulation Law, we decided to discharge to the sea approx. ten thousand tons of the accumulated low level radioactive water and the low level radioactive subsurface water stored in the sub drain pits of Units 5 and 6 as soon as we get ready. From 7:03pm, April 4, we started discharge of the low level radioactive wastewater stored in the Centralized Radiation Waste Treatment Facility to the ocean from the south of the water discharge canal. The discharge was finished at 5:40 pm, April 10. Total amount of discharged water is approximately 9,070 tons. Also, from 9:00pm, April 4th, we started discharging the low level radioactive wastewater stored in the sub drain pits of Units 5 and 6 to the ocean from the water discharge canal of Units 5 and 6. At 6:52pm, April 9 we finished discharging water. The amount of water was approximately 1,323 tons.

The total amount of emitted radioactivity is approximately 1.5*10^{11} Bq. We evaluate approximately 0.6 mSv of effective radioactive doses per year per an

adult as the impact on the discharge of the low radioactive stored water to the ocean if an adult eats adjacent fish and seaweeds every day. The amount (0.6 mSv of effective radioactive doses per year) is one-forth of annual radioactive dose (2.4 mSv) to which the general public is exposed from nature and equivalent to that when we evaluated before discharging the water to the ocean.

On April 7, we knocked holes in the external walls of turbine buildings at Units 2 to 4 for the preparation of draining the accumulated water to the Centralized Radiation Waste Treatment Facility.

On April 18, in terms of the transfer of high level radioactive wastewater to the Centralized Radiation Waste Treatment Facility, measures to prevent leakage in the facility building were completed. After reporting the necessity of the transfer, the assessment of safety and principle of the permanent storage of the wastewater and treatment facility to Minister of Economy, Trade and Industry with the confirmation by Nuclear and Industrial Safety Agency, the wastewater transfer from the vertical shaft of the turbine building of Unit 2 to the Centralized Radiation Waste Treatment Facility was started from 10:08 am on April 19 (after this, please refer to Unit 2 < Draining water from the underground floor of the turbine building >).

- We conducted nuclide analysis on sub drain water near the turbine buildings and detected Iodine-131, Cesium-134 and Cesium-137 on April 6th and 13th. As a radioactive dose of the sample collected on April 13th increased compared to that of April 6th, we received an oral instruction from Nuclear and Industrial Safety Agency to strengthen the monitoring on 7:25 pm on April 14th. In response, we increased the frequency of the sampling of the sub drain water of Units 1 to 6 and a deep well located in the station from once a week to three times a week. We detected Iodine-131, Cesium-134 and Cesium-137 at the sampling survey on April 16, 18, 20, 22 25, 27and 29, May 2, 4, 6, 9, 11, 13, 16, 18, 20, 23, 25, 27 and 30, June 1, 3, 6, 8, 10, 13, 15, 17, 20, 22, 24, 27 and 29 and July 1, 4, 6, 8, 11, 13, 15 18, 20, 22, 25, 27, 29, and on August 1, 3, 5, 8, 10, 12, 15, 17, 19, 22, 24, 26, 29, 31, September 2, 5, 7, 9, 12, 14, 16, 19, 21, 23, 26 ,29, 30, October 3, 5 , 7, 10 12, 14,17,19, 21 24, 26, 28, 31, November 2, 4, 7, 9, 14, 16, 18, 19, 21, 23, 25, 28 , 30, December 2, 5, 7, 9, 12 ,14,16 19, 21, 23, 26, 28 and 30.
- We detected Strontium-89 and Strontium-90 by the sampling survey on May 18, June 13 and July 11. We detected Tritium at the sumpling survey on June 13. We detected Total Beta at the sumpling survey on June 13.
- There were positive findings as a result of analysis conducted on tritium and all beta materials contained in the sub-drain water sampled on September 12, October 10, November 14 and December 12.

[Marine Soil]

- We conducted a nuclide analysis on marine soil collected on April 29 (at 2 points, 3km offshore of Fukushima Daiichi and Daini Nuclear Power Stations and Shallow Draft Quay). As a result, Iodine, Cesium were detected.
- We conducted a nuclide analysis on marine soil collected on June 2 (at 2 points, 3km offshore of Fukushima Daiichi and Daini Nuclear Power Stations). As a result, Cesium, Plutonium, Strontium, Americium, Curium were detected.
- Cesium were detected through a nuclide analysis in the marine soil sampled on June 28, July 14, 17, 26 and August 6, 7, 8, 10, 23 and September 8, 9, 12, 14, 15, 16, 25 to 28 and October 7, 10, 11, 12, 13, 14, 17 and November 7, 9, 10, 11, 14, 18, 21, 22, 25 and December 5, 10, 11, 12, 13, 14, 15 and 16 in Fukushima Prefecture offshore.
- Plutonium and Uranium were detected in the marine soil sampled on September 8, 9, 13, and 25. Strontium was detected in the marine soil sampled on September 12, 13 and 15. Americium was detected in the marine soil sampled on September 8, 9, 12, 13, 15, 25 and November 18. Plutonium and uranium were detected from the marine soil offshore of Fukushima prefecture sampled on November 18.

<Freshwater supply>

- The first barge of the United States Armed Forces with freshwater to be used to

cool down reactors etc. was towed by a ship of Maritime Self-Defense Force and docked at 3:42pm on March 31. At approx. 3:58pm, April 1 we started to replenish filtrate tanks with the freshwater, and finished at 4:25pm. At approx. 10:20am, April 2, we resumed replenishing filtrate tanks with the freshwater, and finished at 4:40pm.

- The second barge of the United States Armed Forces with the freshwater to be used to cool down reactors etc. was towed by the ship of Maritime Self-Defense Force came alongside the pier at approx. 9:10am, April 2.
- We began to transfer fresh water from the second barge to the first barge at 9:52am, April 3 and finished at 11:15am.
- At 11:35am, April 1, a worker fell into the sea while stepping into the ship from the pier during the hose laying work of the barge. Other crew immediately rescued the worker. While he had no injury or contamination, on April 9, we checked him by whole body counter. On April 12, we confirmed that he did not have internal exposure.
- At 10:40 am, May 18, two barge ships of the US military leave for Fukushima Daini Nuclear Power Station to bring the Mega Float for Fukushima Daiichi Nuclear Power Station. The Mega Float reached Fukushima Daini Nuclear Power Station at 1:20 pm on the same day.

<Accumulated water treatment facility>

- At 3:45 am on June 14, we started cesium adsorption unit of water treatment facility, on a trial basis, using low level contaminated water. The test run ended at 2:00 pm.
- From 1:10 pm to 8:35 pm on June 15, test operation of decontamination instruments in the water treatment facilities was conducted with the low-level contaminated water.
- From 10:40 pm on June 15 to 12:20 am on June 16, cesium adsorption instruments and decontamination instruments of water treatment facilities were operated with low-level contaminated water by trial.
- At 12:20 am on June 16, continuous operation of the whole water treatment facilities with low level contaminated water was initiated
- At about 7:20 pm on June 16, the equipment of the facilities automatically stopped. When we checked the equipment, we found a water leakage from cesium absorption equipment. At this moment, we are under a recovery work for the leakage.
- At 10:00 AM on June 17, we completed a repair on the bad condition occurred in the cesium absorption equipment. At 13:00 PM on the same day, we started an operation of pumping of the equipment.
- From 6:40 pm to 7:00 pm on June 17, a test operation of the whole water treatment facilities started for high radiation-level contained water. At 8:00 pm on June 17, a full operation started.

  At 0:54 am on June18, we stopped operation of the facility temporarily due to the radiation dose at surface level measured up to the basis of exchange filter of Cesium adsorption Instruments.
- At 7: 30 pm on June 19 we conducted a water flow test using highly concentrated contaminated water in Cesium adsorption Instruments of the water treatment facility and finished it at 11:25 pm on the same day.
- At 10:25 am on June 20, we conducted a water flow test using highly concentrated contaminated water in Cesium adsorption Instruments of the water treatment facility and finished it at 2:50 pm on the same day.
- At 12:45 am on June 21, we started a water flow test using highly concentrated contaminated water in Cesium adsorption Instruments of the water treatment facility. At approximately 7:20 am on the same day, a pump transferring filtrated water to coagulation settling instrument tripped, and water treatment facility stopped. At approximately 11:30 am on the same day we restarted the pump that had tripped due to overload of high flow rate on the recirculation side. At approximately 12:16 pm on June 21 we resumed the operation of the water treatment facility. At approximately 12:30 pm on the same day it reached the rated capacity. At approximately 10:20 am on June 22, we stopped operation of water treatment facility.

- At 0:43 am on June 23, after implementation of changing filters and flushing system etc. of Cesium adsorption Instruments, we resumed the operation of water treatment system.
- At 10:00 am on June 24, we temporarily stopped the operation of water treatment facilities and replaced Cesium Adsorption Tower. After starting the operation of water desalination facilities for the first time at 12:00 pm, we resumed the operation of water treatment facilities at 12:50 pm.
- On June 25, we temporarily stopped the operation of water treatment facilities and implemted flushing system etc. At 3:00 pm, the operation was resumed. At 3:24 pm, the operation was automatically stopped and was resumed. At 4:10 pm, the operation was automatically stopped again. It was confirmed that this was caused by warning of water level decline in oil separators. After an ultrasonic water glass was bypassed, which was one of water glasses (the other is differential pressure type) installed in the water storage tank at the lower side of oil separators, at 4:35 pm the operation was resumed.
- At 10:00 am on June 26, we temporarily stopped the operation of water treatment facilities and implemted flushing system etc. We resumed operation at 6:10 pm on June 26.
- At 4:20 pm on June 27, we started to use treated water for water injection to reactor for Unit 1, 2 and 3. At 5:55 pm, since we confirmed a leakage from the pipe which supplies water from treated water tank to injection pump of reactor, we stopped supplying treated water.
- At 10:06 am on June 28, we stopped operation of water treatment facilities and conducted flushing of systems etc. At 12:24 pm, we resumed the operation.
- We replaced the pipe with a new one and started to operate the transfer pumps of water treatment system at 2:36 pm, June 28. After confirming no leakage and adjusting water volume, we started to operate circulating injection cooling at 3:55 pm, June 28.
- At around 3:00 pm on June 28, water blot was confirmed at the outlet flange of the processing transfer pump of the accumulated water treatment system, and a saucer was installed at 3:45 pm.
- At around 9:30 am on June 29, water leakage was confirmed at the drain of lower part of the storage tank for water desalinations (concentrated saltwater). We stopped the leakage by installing a closing cap at 10:30 am.
- At 8:10 am on June 29, (two) minute holes were confirmed at the hose for the injection cooling system of the accumulated water treatment system, and operation of the processing transfer pump was stopped at 10:59. After replacing the hose with a new one, we started the processing transfer pump at 1:12 pm. We started to operate circulating injection cooling at 1:33 pm.
- At 10:45 am on June 29, we stopped the accumulated water treatment system due to system flushing etc., and resumed the operation at 2:13 pm. Since an alarm showing water leakage was sounded in the On-site Bunker Building at 2:49 pm, the water treatment system was stopped at 2:53 pm. We are currently confirming the details. Then, after swiping the leaked water and reset the alarm, we restarted the operation at 6:45 pm.
- At 6:54 pm on June 29, we stopped the accumulated water treatment system due to the trouble occurred in the concerted operation of the cesium adsorption instruments and the coagulation settling instruments. As a result of investigation, we confirmed no abnormal issues on the facilities and restarted the operation of the accumulated water treatment system at 9:15 pm.
- At approximately 5:40 on June 29, water leakage was confirmed at the lower part of the closing flange of the storage tank for water desalination (concentrated saltwater). We stopped the leakage and installed a saucer at the lower part of the flange.
- At 9:00 am on June 30, we stopped the water desalination system since receiving tank of treated water of desalination system (concentrated saltwater) became full capacity
- At 10:46 am on June 30, we stopped the Accumulated Water Treatment Facility, for flushing the system. At 1:35 pm on the same day, we restarted the Facility. At 2:36 pm, we re-stopped the Instruments due to the defect of Coagulation Setting Facility. After

adjustment of water level set value of Coagulation Setting Facility treated water tank, at 6:50 pm on the same day, we resumed operation.

- At 7:27 am on July 1, we stopped injecting treated water and started injecting only filtrate water, for the installation of the tank for injection to the reactor (buffer tank) (no change of injection rate). At 6:00pm on July 2. At 6:00 pm on July 2, we started full scale operation of circulating injecting cooling which inject treated water by accumulated water treatment system to the reactor via buffer tank.

- At 3:52 pm on July 1, we have restartd the system, for other receiving tank of treated water is prepared.
- At 10:30 am on July 2, we stopped operation of water treatment system for flushing system etc. At 1:45 pm on the same day, we restarted the water treatment system.
- At 10:39 am on July 3, we stopped operation of water treatment system for flushing system etc. At 0:50 pm on the same day, we restarted the water treatment system.
- At 8:17 am on June 3, we stopped transferring contaminated water due to the buffer tank capacity. Water injection to the reactor and water treatment of accumulated water are ongoing. After that the results of start and stop of the pump are as follows.

  Started at 5:18 pm on July 4 / Stopped at 6:53 am on July 6 / Started at 4:52 am on July 7 / Stopped at 11:30 pm on July 7 / Started at 2:45 am on July 8 / Stopped at 4:44 am on July 8 / Started at 1:51 pm on July 8 / Stopped at 7:35 am on July 9
- At 10:30 am on July 5, we stopped the Accumulated Water Treatment Facility, for flushing the system. At 0:55 pm on the same day, we restarted the Facility. The water injection to the reactor is going.
- At 11:30 pm on July 7, we stopped operation of the desalination facility as the water level of the storage tank at the upstream of the desalination facility went down to the lower limit. At 2:45 on July 8, we restarted operation.

  At 4:44 am on the same day, we stopped this operation as the water level went down to the lower limit again. The water injection to the reactor and accumulated water treatment are going
- At 10:00 am on July 8, we stopped operation of the water treatment facility to flush the system. At 12:04 pm on the same day, we started the accumulated water treatment facility (cesium absorption facility). At 12:15 pm, we resumed operation of the water treatment facility. We are continuing water injection to Reactor.
- At 4:53 am on July 10, we confirmed the leakage at the chemical injection line of the coagulation settling equipment of the water treatment facility, and stopped the operation of the facility. Afterward, we repaired the leakage point and at 5:06 pm on the same day, we started-up the facility. At 5:40 pm, water treatment was restarted. Water injection into the reactor is continued. Water injection into the reactor is continued.
- At 8:51 am on July 12th, we found some leakage around the connection part at the liquid chemical injection line of coagulation setting devices in accumulated water treatment facilities and therefore stopped the operation of the facilities. We confirmed a corrosion of a metal connector and no diffusion of leaked water. At 4:19 pm, we changed to a corrosive resistant metal connector, flashed the system, and switched cesium adoption unit. We activated accumulated water treatment facilities on 4:28 pm, and restarted facilities on 4:58 pm. However, we have been injecting water into the reactors.
- At 11:00 am on July 13th, water treatment facility was stopped for system flashing. At 1:07 pm, we confirmed the leakage at the chemical injection line of the coagulation settling equipment of the water treatment facility and flashing was paused. Water injection into the reactor is continued. At 12:07 pm on July 14, repairing of the leakage point was completed. At 2:58 pm on the same day, we activated the water treatment facility and at 6:30 pm on the same day, we restarted water treatment.
- At 5:14 am on July 15, we stopped the water treatment facility in order to investigate the causes of decrease in rated flow volume of water treatment. At 2:21 pm on the same day we started the facility. At 2:48 pm on the same day, we resumed water treatment.
- At 10:50 am on July 16, we stopped the water treatment facility in order to flush the system. At 2:38 pm on the same day, we resumed operation of the water treatment facility.

- At 11:00 am on July 19, we stopped the water treatment facility in order to flush the system. At 3:17 pm on the same date, we restarted operation.
- At 8:38 am on July 21, we stopped operation of the water treatment facility due to the change of power sources associated with double circuit installation for offsite power at Unit 5 and 6. At 12: 28 am on July 22, we started the operation of the water treatment facility, resuming water processing at 12:40 am on the same day.
- At 7:10 am on July 22, a circuit braker of bus-line which supplies power to a part of the system of the power station operated due to overload and the water treatment facility stopped operation. At 3:37 pm on the same day, we started up water treatment facility and resumed water treatment at 3:51 pm.
- At 8:45 am on July 23, we stopped operation of water treatment system due to switching power sources for installation of double circuits for offsite power sources for Unit 5 and 6. At 3:26 pm we restarted operation of water treatment facility and resumed water treatment at 4:27 pm.
- At around 11:57 am on July 24, the water desalinations stopped with a warning sign. We replaced the faulty equipment with a spare and started it at 7:19 pm. We supplied water to the buffer tank from the filtrate tank and continuing water injection into the reactors of Units 1 to 3.
- At approximately 10:50 am on July 31, we found the leakage between water desalination facility and primary storage tank of concentrated water of water desalination equipment along the transfer line. At 11:15 am on the same day, we stopped the transferring pumps. At 11:20 am on the same day, we stopped the water desalination facilities. After that, we closed the valves of the transfer line, confirming that the leakage stopped at 0:30 pm on the same day. At 2:00 pm on the same day, we replaced the line material and checked the status of leakage. At 3:02 pm on the same day, we started the water desalination facility again.
- At 5:32 am on August 4, we stopped operation of the water treatment facility in order to improve the flow rate. After the work to improve the flow rate, we started water treatment facility at 3:30 pm on the same day and started water treatment at 4:13 pm.
- At 6:55 pm on August 4, decontamination facility automatically stopped due to the stop of chemical injection pumps for ultra-high speed coagulation sedimentation facility and we stopped water treatment facility. We checked the soundness of the stopped pumps and started water treatment facility at 8:30 pm, and water treatment at 8:50 pm on the same day.
- At 2:12 am on August 5, a process error alarm was generated and we stopped the water treatment facility. We started the water treatment facility at 4:03 am and water treatment at 4:21 am on the same day.
- Around 7:00 pm on August 4, leakage was found from the flange of the hoses to transfer filtrate water which has been used for salt cleansing in the replacement vessel of cesium adsorption facility at On-site Bunker Building. New transfer hoss are installed between cleansing facility to Miscellaneous Solid Waste Volume Reduction Treatment Building (High Temperature Incinerator Building).
- At 6:20 am on August 6, we stopped the water desalination facility and started inspection of the level switch of water tank of the water desalination facility from 8:30 am. We finished the inspection at 2:20 pm, and restarted the water desalination facility at 2:30 pm.
- At 8:07 am on August 7, water treatment facility has stopped as decontamination instrument has automatically stopped due to the trip of chemical injection pump of high speed coagulant facility. At 3:31 pm on the same day, operation for water treatment facility was resumed. After stroke adjustment for chemical injection pump (diaphragm type) was conducted to prevent motors from being overloaded, at 4:54 pm on the same day, we resumed water treatment.
- At 4:11 pm on August 7, we completed commissioning of additional two evaporative concentration apparatuses to the water treatment facility to make freshwater from condensed seawater from desalination facility. We put those additional facilities to full-scale operation.
- At 8:20 pm on August 8, Water Treatment Facility has stopped due to the water level gauge’s error alarm of SPT tank. Subsequently, we confirmed no problems with Water Treatment Facility and the facility has started at 10:22 pm on the same day and resumed operation at 10:45 pm.

- Since SPT waste liquid pump and SPT receiving water transfer pump stopped due to power lost of water glass of SPT tank, an alarm showed low level of water at waste RO supply tank at 1:50 am on August 9 and water desalinations automatically stopped. At 6:57 am, water glass of SPT tank recovered. At 9:35 am on the same day, water desalinations restated as the water level at waste RO supply tank recovered.
- At 12:25 pm on August 11, water treatment facility stopped after a process error alarm was generated due to the water level of the decontamination instrument tank beyond the range measurable by the water level indicator. Later we judged it was a malfunction of the indicator since there was no abnormality such as the leakage. We reactivated it at 12:40 pm using another existing indicator, and then at 12:58 pm resumed the operation of the water treatment.
- At approximately 3:22 am on August 12, an M 6.0 earthquake with the seismic center at offshore of Fukushima prefecture occurred. The boiler for the evaporative concentration apparatus in the water treatment facility stopped. At 3:42 am on the same day, we restarted the boiler and resumed the apparatus
- At 6:17 pm on August 12, a process error alarm was generated in decontamination instruments and water treatment facility was stopped. At 10:59 pm on the same day, we restarted the facility, as we had not found any abnormality of it and estimated temporary abnormality of their control system. At 11:33 pm on the dame day, we resumed water treatment.
- At 7:11 am on August 13, we manually stopped Evaporative Concentration Apparatus (2B) in water desalination facility, as we found a hose injecting chemical to the evaporative apparatus was detached. We continue operating other apparatuses in the facility. After that, we connected the detached hose, inspected connection points of similar hoses, and at 12:01 pm, we resumed operation of Evaporative Concentration Apparatus (2B).
- At 12:04 pm on August 16, we stopped the operation of the water treatment system and started the trial operation of the second cesium adsorption instruments.
- At 2:43 pm on August 18, we started the operation of the water treatment system, and the treatment of accumulated water with highly concentrated radioactive materials utilizing a combination of cesium adsorption instruments, second cesium adsorption instruments and decontamination instruments. At 3:50 pm on the same day, we confirmed that the flow rate had steadied, the water treatment operation was stable, and that there were no operational problems.
- At 2:00 pm on August 19, we stopped the operation of the water treatment system in order to switch to parallel operation of process line from cesium adsorption instruments to decontamination instruments, and another process line of second cesium adsorption instruments. At 3:44 pm on the same day, we started up the process line from cesium adsorption instruments to decontamination instruments. At 3:54 pm, it was confirmed that the rated flow was achieved and there were not any other problems to operation conditions. Afterward, at 7:33 pm on the same day, we started up the process line of second cesium adsorption instruments. At 7:41 pm, the rated flow was achieved and we started parallel operation.
- At 9:30 am on August 21, we started the desalination facility (reverse osmosis type) 1A and 1B. At 10:30 am on the same day, we confirmed stable operation.
- At approximately 4:00 pm August 23, 2011, we confirmed that Water Desalination 1B (Type of Reverse Osmosis Membrane) had stopped. At 6:20 pm on the same day, we restarted it.
- At 2:21 pm on August 26, cesium adsorption instruments stopped automatically due to the overload of transfer pump (A) for cesium adsorption treated water. At 4:54 pm we resumed the instruments by switching to transfer pump (B) for cesium absorption treated water. At 5:45, it reached normal volume of flow.
- At 11:45 pm on August 27, we stopped Water Desalination 1A (Type of Reverse Osmosis Membrane) because its filter needs to be replaced. At 10:54 am on August 28, we restarted the operation after changing the filter.
- At 7:00 am on August 29, we stopped Water Desalination 1B (Type of Reverse Osmosis Membrane) because its filter needs to be replaced.
- In order to modify the software, at 3:32 am on August 30, we stopped the evaporative concentration apparatus 2A. At 4:16 am, we stopped the evaporative concentration

apparatus 2B. After that, at 7:09 am on the same day, we stopped the desalination facility (RO) 1A. At 7:16 am, we stopped the desalination facility (RO) 2. We are continuing water injection to Reactors for Units 1 to 3. We started the desalination facility (RO) 1A at 12:28 pm, and the desalination facility (RO) 2 at 12:42 pm on the same day. We started the evaporative concentration apparatus 2B at 3:44 pm and the evaporative concentration apparatus 2A at 4:34 pm on the same day,

- At 2:00 pm on August 31, we finished commissioning and started full operation of three evaporative concentration apparatuses which we had additionally installed in dissemination devices of water treatment facility.
- At around 3:00 pm on August 31, we confirmed water leakage near the sludge transfer pump (B) for the coagulation settling instruments inside the water treatment system (decontamination instruments). We bypassed a part of the coagulation setting instruments and segregated the pump's surroundings, and then the leakage stopped. The treatment of the accumulated water is continuing.
- Considering the current balance between the storage capacity of fresh water and the amount of water injection to reactors, we stopped all of the evaporative concentration apparatuses of water desalination facilities at 7:44 pm on September 4, while desalination and water injection through desalination facilities (reverse osmosis membrane type) continue.
- At 5:51 am on September 6, the decontamination instruments of Waste Treatment Facility stopped with an alarm indicating a mixer trouble of High Speed Coagulation Settling Facility. We reset and restarted the instruments. However, the same alarm and serious fault alarm went off at 6:21 am, and the decontamination instruments and Cesium adsorption Instruments stopped. As it was confirmed that the current value of overload trip of decontamination instruments was nearly the same level of that for normal operation, we adjusted the value and at 3:13 pm on the same day we restarted the water treatment facility, and at 4:35 pm it reached normal volume of flow.
- At 8:00 am on September 8, Cesium absorption apparatus No.2 at the water treatment facility stopped. As we found out that the cause was erroneous operation, we restarted the apparatus at 12:09 pm on the same day. At 12:12 pm, the facility reached rated flow.
- At 10:06 am on September 12, waste liquid discharge pump (B) in the suppression pool water surge-tank (hereinafter called "SPT") stopped due to overload. At 11:23 am on the same day, SPT waste liquid discharge pump (A) was activated. After that, we inspected SPT waste liquid discharge pump (B) and confirmed that there was no defect in the pump. At 11:53 am on the same day, we restarted SPT waste liquid discharge pump (B) and stopped SPT waste liquid discharge pump (A).
- At 3:58 am on September 13, we stopped Cesium adsorption Instruments and Decontamination instruments for maintenance work of water treatment system. At 6:16 pm on September 14, we started those instruments, and the rated flow was achieved at 7:20 pm.
- We found that the density of radioactive materials is increasing after treatment by decontamination instruments when we check the performance of treatment of water treatment instruments (decontamination instrument and cesium adsorption instrument). In order to find out causes, at 6:22 pm on September 15, we stopped operating the water treatment instruments and at 6:42 pm started to operate only the cesium adsorption instrument and it reached the rated flow (approx. 30 m^3/h) at 6:46 pm. With regard to the second cesium adsorption instrument, it has been in operation.
- Thereafter, in order to purify the water inside waste water tank, at 11:38 am on October 4, we started single circulating operation of decontamination facility. At 2:00 pm on October 16, as the purification of water inside waste water treatment tank was confirmed, single circulating operation of decontamination facility was stopped.
- At 10:54 am on September 16, we could not monitor flow rate and pressure due to the fault of control board of second cesium absorption tower within the water treatment facility, we manually stopped operation of the facility. Thereafter, we replaced the control board and at 2:50 pm on the same day, restart the facility and at 2:57 pm returned to normal flow rate.
- At 2:16 pm on September 16, we stopped the desalination instrument (RO type)

(2) and (3) as water leakage from the instrument (3) was confirmed. After detaching the instrument (3), we restarted the instrument (2) at 2:50 pm on the same day.

- It was confirmed that incorrect adsorption tower (2B) was installed in No.2 cesium adsorption instruments. At 9:47pm on September 20, the instrument was suspended when switching operation was given to the tower. At 10:02pm, the instrument was restarted and reached the regular water flow at 10:10pm.
- At 1:34 pm on September 21, regarding the water desalination equipment (reverse osmosis membrane type) (3), out of its 2 operation system lines, we restarted the instrument (3) with a different line that was not affected by water leakage.
- At 08:50 pm on September 21, a door of the large tent where water desalination equipment (reverse osmosis membrane type) (3) is installed malfunctioned and was subject to an inrush of rainwater due to the typhoon. In response, operations of this equipment have been ceased.
- At 4:53 pm on September 23, we started water treatment at two systems of second cesium adsorption facility. At 5:03 pm on the same day, the flow rate achieved steady state.
- At 9:42 am on September 24, we started operation of desalination facility (reverse osmosis type) (3), which had been stopped due to rain water leakage.
- At approx. 8:30 pm on September 24, the second Cesium adsorption facility of water treatment facility has automatically shut down. Investigations are now underway. Water treatment by Cesium adsorption facility is continuing. As there are sufficient treated water stored in the tank, there is no impact on the water injection into the reactors. After that, we identified that the cause of the shutdown was closure of a valve in the system due to malfunction of an air compressor for valve actuators. After replacing the compressor, at 5:02 pm on September 25, we restarted the 2nd Cesium absorption apparatus and at 5:05 pm, reached the rated flow.
- At approx. 6:17 pm on September 26, one of the pumps (H2-2) of the skid of the Cesium adsorption apparatus has shut down. Through out of the apparatus is decreased approx. from 20 m^3/h to 16 m^3/h. At 11:30 am on September 27, we started pump (SMZ-2) in the Skid for filtering out oil and technetium, and the throughput was adjusted to approx. 20 m^3/h.
- At 10:20 am on September 29, we stopped the desalination instrument (RO type) (2) as water leakage from the flange connection of transferring hose of concentrated water side was confirmed. At 10:45 am on the same day, we confirmed stop of water leakage after stop of the instrument. At 11:40 am on the same day, we restarted the instrument by using another system different from the one that leaked out of 2 systems of process lines. At 11:27 am on September 30, the leaked flange connection was replaced so that the leaked system was resumed.
- At 2:19 pm on September 30, the oil separator treated water transfer pump was tripped due to overload so that the Cesium adsorption apparatus also tripped. At 5:38 pm, the backup pump was initiated and the water treatment by the apparatus was resumed. At 5:50 pm, the flow rate reached normal level. The cause of the overload is currently under investigation.
- At about 9:58 am on October 6, we stopped the operation of the Water Desalinations (reverse osmosis membrane) No2 and No3 because we found stain of leaked water in the water joint at the outlet piping of the Water Desalinations' waste RO supply pump. We fixed the outlet piping and at 1:01 pm on October 6, we restarted the operation of the Water Desalinations(reverse osmosis membrane) No2 and No3.
- A cooperative firm worker discovered leakage from hose for transferring reverse osmosis membrane concentrated water from the Water Desalinations (reverse osmosis membrane) at 11:45 am on October 8. In order to prevent the leakage, we brought a supply pump of the reverse osmosis membrane concentrated water and the water desalinations No. 2and 3 down. After that, we confirmed a leakage stop at 00:40 pm. We will replace the hose. We changed a line, restarted the water pump and at 2:00 pm on the same day, the water desalinations No.2 and 3 restarted operations.

- At 11:45 am on October 9, we finished a trial operation of 3 sets (3A, 3B, and 3C) of the evaporation condensation equipment which we had additionally installed within the water treatment desalination system and we found no trouble in the equipment.
- At 6:09 AM of October 18, the Cesium adsorption apparatus has been suspended due to power works of the water desalinations. At 9:04 am we suspended Unit No,2.
- At around 11:00 am on October 18 we found accumulated water inside the skid, during motor replacement works of the pump (H2-2) inside the skid of the suspended Cesium adsorption apparatus. We are investigating the cause of this.
- At around 11:00 am on October 18 we found approx. 15cm depth of accumulated water (approx. $3m^3$) inside the skid, during motor replacement works of the pump (H2-2) inside the skid of the suspended Cesium adsorption apparatus. We also confirm that leaking stopped when we found. After that we suspended replacement work of relative motor and started to drain of the accumulated water by submersible pump. The cause is currently under investigation.
- At 9:06 pm on October 19, in the water treatment facilities under operation, a SMZ pump of the 4th process line of cesium adsorption apparatus automatically stopped. A pump of the 3rd process line is continuously operated. Water treatment by the cesium adsorption apparatus is also continuously operated at the flow rate approx. $17m^3/h$ (the flow rate before the automatic stop was approx. $20m^3/h$).
- At approximately 7:52 on October 23, the alarm of the water treatment instrument (RO membrane type) 2-1 was generated and the instrument was automatically stopped. (The water treatment instrument (RO membrane type) 2-2 was continuously operated.) After we confirmed that there was no abnormality at the site, the alarm was reset. At approximately 8:06 am, the instrument was restarted. After the restart, we confirmed that there was no abnormality either at indicators or at the site, therefore we continued the operation.
- At around 11:30 am on October 24, we observed the water leakage (about 20 litters) from the axis seal region of the law water pump (for 2-1 skids use) which was a constitution apparatus of the Water Desalination Facility (RO membrane unit) 2 of the water treatment system and we stopped the facility. Afterward, the water leakage was confirmed to be stopped. At 2:30 pm on the same day, we stopped the line connecting to the water pump and started other water desalinations. At 4:20 pm, the rated flow reached $50m^3/h$. Thereafter, on October 27 and 28, we conducted replacement work of relevant pump.
- On October 26, we replaced the hose for transferring reverse osmosis membrane concentrated water in Water Desalinations (reverse osmosis membrane) that liquid spoil was found on October 8.
- At around 11:00 am on November 6, partner companies' workers who went on patrol found that the boiler of evaporative concentration apparatus stopped, and stopped operation of 3B and 3C of the apparatus. Since the operation panel on the site alerted "low water level in boiler supply water tank", we assumed that the boiler stopped due to this reason. After that, we investigated the cause on decrease of supply tank water level. When we tried to start a backup pump for transfer of boiler supply water, the alert stopped. Thus we judged that one pump was a bad condition. Although all the evaporative concentration apparatus stopped, water treatment by the water desalinations (RO membrane system) and water injection to the reactors have been continued. At 2:55 pm on November 7, we started another boiler by using a spare water transfer pump for boiler. Then, we started evaporative concentration apparatus 3B at 5:24 pm and 3C at 6 pm. Causes of the trouble of the water transfer pump for boiler are still under investigation.
- At 2:24 am on November 8, we manually stopped the boiler of evaporative concentration apparatus in the water desalinations since alarm worked and indicated decrease of water level in boiler water supply tank at 2:20 am. Then, we stopped evaporative concentration apparatus 3B at 2:28 am ad 3C at 2:31 am. Although all the evaporative concentration apparatus stopped, water treatment by the water desalinations (RO membrane system) and water injection to the reactors have been continued. Thereafter, as a result of the inspection of inlet strainer of

boiler make up water transfer pumps (A) and (B), plugging was found due to water scale of filtered water attached to inside of the pipe, after removing those contaminations, evaporated concentration apparatus 3B and 3C was restarted at 5:08 pm and at 6:01 pm on the same day respectively. We will conduct cleaning of strainer at appropriate timing.

- At 4:23 am on November 8, as allophone was observed from the motor of cesium adsorption treatment water transfer pump (B), cesium adsorption apparatus was stopped. After switched to (A) pump, at 4:54 pm, it was restarted and reached to normal operation flow (approx. 18m^3/h) at 5:00 pm. We will investigate the cause. As the apparatus stop time was short, there was no significant effect on the water treatment.
- At around 10:50 am on November 17, water leakage from pin holes at one point of freshwater transfer line, and three points at concentrated water transfer line after desalination process, was confirmed by partner companies' worker who was patrolling at desalination apparatus. At around 2:30 pm on the same day, while water transfer was continued through fresh water transfer line, at the same time, running leakage repair (repaired by tapes) was implemented and completed (leakage amount: approx. 1liter). Cesium adsorption apparatus, 2nd adsorption apparatus and concentrated evaporation apparatus continued operation, and therefore there is no major effect with processing accumulated water. Also, concentrated water transfer line is currently not being used, and is isolated. After that we also conducted emergency repair by repair tape on leaking points at concentrated water transfer line, and after checking on site, we confirmed the amount of leaking water by the concentrated water transfer line was 25 liters. And we confirmed the radiation dose in ambient air near the leaking points were not specifically different from surrounding area. As organized the preparation work of change of the hose for condensed water transferring line and desalination transferring line with the water desalinations (reverse osmosis membrane type) which water leak was found on November 17, we had changed the hose from November 22 to 23.
- At 10:47 pm on November 18, alarm occurred indicating high pressure of treated water, and desalination plant (RO) unit 2-2 suspended due to automatic suspend of a high pressure pump and a booster pump. There is no impact for water injection to the reactor because of enough fresh water stock. On November 22, we checked outside of the unit and found no trouble, and so we remove the discharged water in drain line at exit side of the Unit and reset the alarm. At 2:00 pm on the same day, we restarted the Unit. While we had been checking the operation of the Unit, at 9:56 am on November 23, the alarm occurred again indicating the high pressure of treated water at the exit side of Unit2-2, and the unit stopped automatically. Then, through the external inspection of the equipments (on damage or leakage) and the confirmation of operation state based on the indicators we confirmed that it could be operated. At 11:20 am on December 1, we replaced the pressure button which was seemed to be one of the causes of the alarm and restarted the desalination (RO) unit 2-2. We will keep monitoring its operation state.
- At around 0:15 pm on November 23, when we started desalination plant (RO) unit 1A and 1B to check whether water flows the system properly or not, we found exit side of piping of the units broke and leakage of treatment water in dam, and so we immediately stopped operation of the units. The amount of leakage from unit 1A and 1B are about 14 litters and 15 litters respectively, and now it already stopped leaking. We are now investigating the reason of this incident. There is no impact for water injection to the reactor because desalination plant (RO) unit 2-1 and 3-1 are still operating and there are also enough fresh water stock.
- At 10:20 am on November 25, water leak detected at the pipe arrangement between desalination facility and buffer tanks due to the vent valve open. It is assumed that the valve was opened in the construction of attaching lagging material to the pipe.
- At 10:30 am on November 25, water leak detected at the pipe arrangement between desalination facility and buffer tanks. At 10:57 transfer pump suspended for the recovery work. At 12:45 pm water leak detected at other two points. At 2:10 pm transfer pump resumed after the recovery work. No impact to the water

injection to the reactor because of plenty freshwater stock. Radioactivity density of leaked water was below measurable limit.

- At 12:06 pm on November 29, we observed water leakage from a pin hole at the pipe arrangement between the water desalination facility an the buffer tanks (the leakage amount : approximately 500cc). then, we replaced the pipes and confirmed the leakage was stopped. In addition, there is no influence to the water injection into the reactor due to enough desalination water.
- From 11 am to 1 pm on December 2, we confirmed leakage at 7 points in the hose which was used for the water transfer from the desalination facility to the buffer tank (the leakage was at one or two drops per second.). Then we made a tentative repair with water stopping tape and confirmed that the leakage stopped. Since the leaked water was one treated through decontamination and desalination process and the leaked amount was so little, there will be no impact on the environment.
- At 11:33 am on December 4, workers found that there was puddle water inside the barrier around the evaporative condensation apparatus (estimated volume of water was approx. 45 m^3). At 11:52 am, we stopped the apparatus, and at 12:14 pm, workers made visual inspection of the apparatus and the leakage seemed to have stopped. After that, we conducted investigation at 2:30 pm, and found a crack in the concrete barrier, and water leaking from this crack to the gutter (surface dose rate of leaked water: beta ray 110 mSv/h, gamma ray 1.8 mSv/h). We also found water leaking from between the barrier and the base concrete. We are considering measures to stop this leakage to outside of the barrier. The water desalination apparatus (reverse osmosis membrane type) is continuing operation. As we have sufficient volume of desalinated water, there is no impact on the Reactor water injection. At 3:30 pm we confirmed that the leakage had stopped by piling up sandbags between the barrier and base concrete, and in the gutter. From 6:10 pm to 10: 20 pm we sent the leaked water remaining in the barrier to the waste water RO supply tank with a water pump. Since the gutter led to the generally used channel of the power plant, we have taken sea water from the channel around the water desalinations (evaporative concentration apparatus) and the south drain (drain for the generally used channel) and have conducted a nuclide analysis, and we judged that the leaked water has been discharged into the sea from the exit of generally used channel. It was estimated that approx. 150 liter out of leakage water has flew in the channel, and assumed that it has been discharged into the sea through the generally used channel. As a result, the whole amount of radioactivity was approx. 2.6 x 1010 Bq (temporary). As the impact of the discharge water into the sea, in the assumption that we eat fish and seaweeds around the discharge channel every day, the effective zone for an adult is approx. 0.0037 mSv / year, that equals to approx. 1/600 of annual dose from nature for general public (2.4 mSv), so that we evaluate there is almost no impact.
- Afterwards the similar places were inspected, and then the damage of the concrete floor was found around the evaporative condensation apparatus 1A to 1C. On December 6, the repair work of the concrete floor was completed. The leak water detection device will be installed inside the barrier by December 15 as one of the measures for preventing the recurrence of such leakage, in addition to the patrolling six times a day until the device will be installed. Upon the preventing measures are prepared, and considering the water mass balance, the evaporative condensation apparatuses 1B, 1C and 1A were re-started on 2:33 pm, 2:46 pm and 3:50 pm on December 12, respectively.
- At approx. 11:00 am on December 6, leakage at a pin hole on the transfer hose from a buffer tank to a desalination facility (leakage was a drop per second). It was confirmed that leakage stopped after the temporary repair with the water proof tape. The impact on the environment is minimal as the leaked water is desalinated after the treatment by the radioactive material removal facility and the leaked amount is little.
- At 3:48 pm on December 11, we confirmed that the water was accumulated inside the gate in the house the water desalination apparatus (evaporative concentration apparatus) 2 was installed. Leaked water is approx. 5 litters, kept within the gate. We also confirmed that the leakage has been stopped, and that it was leaked from a ventilation pipe at the tank storing the seal water for the evaporative

concentration apparatus 2B. The source of the water is the filtered water (fresh water), and the radiation doses of the surface near the leaked water are 0.12 mSv/h (gamma ray), and less than 1 mSv/h (beta ray), which are the same level as the airborne radiation doses nearby. We will investigate the cause. Desalination apparatus (reverse osmosis membrane apparatus) 2-1 and 2-2 are continuously working, which generate the sufficient desalinated water, therefore, there is no impact on the water injection to the reactors. At approx. 11:00 am on December 12, we confirmed that the remaining water in the hose was oozing from the leakage point (the leakage amount is about 1 drop in 3 seconds). Later we removed the water from the tank for the seal water and from the hose. At approx. 3:00 pm on the same day, we confirmed that the water ceased to ooze.

- At around 4 pm on December 12, it was found the water spilled from the bucket, which was used to collect drain water from sampling line of the evaporative condensation apparatus 3C. The paddle water was spread around 1 meter radius from the bucket (the capacity of the bucket: approx. 7 liters, spilled water: approx. 3 liters), which stayed inside the barrier. At around 7:30 pm, when replaced the bucket to new one, it was confirmed that there was no leakage form the valve of the sampling line. At around 8:30 pm, when patrolling at the site, it was found that the water spilled from the bucket again. The paddle water was then spread around 1.5 meter radius (the capacity of the second bucket: approx. 12 liters, spilled water: 7 liters), which stayed inside the barrier, too. At around 8:50 pm, the valve of the sampling line was tightly closed as it was found that the valve was not completely closed, and it was confirmed there was no water leakage. Around 10:25 pm, the inlet and outlet valve of the pump was closed for pre-caution. The same operation was done for 3A and 3B of the evaporative condensation apparatuses. At around 11:40 pm, it was confirmed that there was no additional leakage at the site.
- At 7:51 am on December 13, we stopped the transfer of 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]) in order to stop power supply to Unit 2 accumulated water transfer pump for power supply enhancing work. With the stoppage of the water transfer, the 2nd Cesium adsorption apparatus was shutdowned for replacing vessels at 8:44 am on December 12, and will be kept outage until December 14 in order to adjust the water level of the centralized radiation waste treatment facility (miscellaneous solid waste Volume reduction treatment building [high temperature incinerator building]). The Cesium adsorption apparatus is continued its operation. Water injection to the Reactors will not be affected since the cooling is continued by using processed water in the buffer tank.
- At 12:25 pm on December 13, recirculation operation for through water desalinations (reverse osmosis membrane) was started to contain the generation of treated concentrated water.
- At 11:38 am on December 16, as we found that there was high vibration at desalination plant (RO) unit 2-2 high pressure pomp, we manually stopped the desalination plant. We confirmed that there is no water leakage at the site. We will study on its countermeasure later. On the other hand, desalination plant (RO) unit 2-1 is in operation. And water injection to the Reactors will not be affected since the cooling is continued by using processed water in the buffer tank.
- At 8:58 am on December 20 we stopped the Cesium adsorption apparatus in order to adjust the water level of each turbine building and the Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste compressing building [high temperature incinerator building] and Process Main Building). At 3:22 pm on January 11, we activated the apparatus. At 3:30 pm on the same day, the flow rate has reached the ordinary level.
- At 1:40 am on December 21, the alarm went off at the desalination facility (reverse osmosis membrane type) 2-2 which showed that the closing of the backwash water drain valve of the multimedia filter was not conducted within the designated time, which led to an automatic shutdown of the unit. We confirmed at the site that there was no water leak. Since we have enough desalinated water this will not influence the water injection. Desalination facility (reverse osmosis membrane

type) 3 can be activated.

Then, as the result of valve activity confirmation investigation, there is no fault in the facilities. Therefore, we considered the phenomenon is transient. At around 10:20 am on the same day, we restarted the unit. We will continue to monitor operation status.

- The second Cesium adsorption apparatus, which had been shut down since 8:44 am on December 12, restarted at 10:37 am on December 27, and reached at rated flow at 10:44 am on the same day. Treatment of accumulated water restarted which has been suspended since December 20.
- At 10:12 am on December 29, TEPCO staff observed a water leakage from the imperceptive leak in a hose around the concentrated water storage area of water desalinations (reverse osmosis membrane) while on patrol. We confirmed that filtrate water*, transferred with the hose from the filtrate tank to the boiler tank of the evaporative concentration apparatus, leaked from the water leakage. Just to be safe, we investigated nuclide analysis for the water, and the nuclide was bellow measurable limit. After that, we stopped transferring filtrate water, and filled the hole with tape, and the leaked water is now an average of a drop every two minutes. We are planning to replace the hose. The leaked filtrate water will not expand around there because there are no street gutters.

<Transferring accumulated water in Centralized Radiation Waste Treatment Facility >

- At 2:15 pm on July 23, we started transferring accumulated water at the Centralized Radiation Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building) to the Centralized Radiation Waste Treatment Facility (Process Main Building) and finished it at 7:00 pm on the same day.
- At 9:59 am on July 26, we started transferring accumulated water from Central Radioactive Waste Treatment Facility (Miscellaneous Solid Waste Volume Reduction Treatment Building) to Central Radioactive Waste Treatment Facility (Process Main Building). Stopped transferring at 4:01 PM on the same day.
- At 10:03 am on July 29, we commenced the accumulated water transferred from Miscellaneous Solid Waste Volume Reduction Treatment Building (High Temperature Incinerator Building) to Centralized Radiation Waste Treatment Facility (Process Main Building).
- At 1:58 pm on July 31, at Centralized Radiation Waste Treatment Facility, we started transferring accumulated water at Miscellaneous Solid Waste Volume Reduction Treatment Building (High Temperature Incinerator Building) to Process Main Building .At 10:21 am on August 1, we stopped the transfer.
- At 9:49 am on August 8, we started transferring accumulated water from miscellaneous solid waste volume reduction treatment building (high temperature incinerator building) to process main building at centralized radiation waste treatment facility. At 6:32 pm on the same day, we stopped the transfer.
- At 10:06 am on August 10, we started transferring accumulated water from On-site Bunker Building to Centralized Radiation Waste Treatment Facility. At 2:19 pm on same day, we stopped transferring.
- In the Centralized Radiation Waste Treatment Facility at 8:50 am on August 17, we started transferring water from Miscellaneous Solid Waste Volume Reduction Treatment Building (High Temperature Incinerator Building) to Process Main Building. At 5:25 pm on the same day, we finished the transfer.
- At 10:20 am on August 21, we started transferring accumulated water from Site bunker building to Process main building at Centralized Radiation Waste Treatment Facility. At 2:31 pm on the same day, we finished the transfer.
- At 10:19 am on September 7, we started transferring accumulated water from Site bunker building to Process main building at Centralized Radiation Waste Treatment Facility. At 4:01 pm on the same day, we stopped transfer.
- At 10:37 am on October 3, in Centralized Radiation Waste Treatment Facility, we started transferring accumulated water at On-site Bunker Building to Process Main Building. The transfer was stopped at 4:00 pm.
- At 9:44 am on October 19, we started transferring accumulated water from the building of waste storage bunker to process main building. At 2:05 pm on the same

day, stopped transferring.

- At 10:00 am on November 4, we started transferring accumulated water from On-site Bunker Building to Centralized Radiation Waste Treatment Facility. At 3:29, the transfer was stopped.
- At 9:31 am on November 24, we started transferring accumulated water from On-site Bunker Building to Centralized Radiation Waste Treatment Facility. At 5:05 pm on the dame day we stopped the transfer.
- At 10:14 am on December 27, we started transfer of accumulated water from site banker to process main building in the centralized radiation waste treatment facility. At 3:18 pm on the same day we stopped the transfer.

< Situation of accumulated water of trench, etc.>

- At 10:00 am on December 18, during the patrol activity, a TEPCO employee found an 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). The depth of the water was estimated to be 50 cm and the amount was to be 125 m^3. The radiation dose at the water surface was 3 mSv/h (provisional value). As no radioactive materials have been detected during the last sampling survey of sub drain water near the trench, the source of the accumulated water is estimated to be the ground water or dew condensation water. After that we found water inflow from cable duct near the ceiling of the trench by detailed survey at site, and we recalculated the amount of the accumulated water and it was estimated to be approx. 230 m^3. And as a result of the sampling, Cesium-134 was approx. $4.2x10^3$ Bq/cm^3, Cesium-137 was approx. $5.4x10^3$ Bq/cm^3 and Iodine-131 was below detection limit regarding the radioactivity density of the accumulated water in the trench, and Cesium-134 was approx. $1.3x10^{-1}$ Bq/cm^3, Cesium-137 was approx. $1.2x10^{-1}$ Bq/cm^3 and Iodine-131 was below detection limit regarding the inflowing water from cable duct. We have conducted water shut-off treatment of the trench and the groundwater level is higher than the water level in the trench, therefore we assumed that there is no possibility of inflow of the accumulated water in the trench to the groundwater. We will conduct investigation continuously and monitor the water level in the trench.
- 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 started to transfer to Miscellaneous Solid Waste Volume Reduction Treatment Building (High Temperature Incinerator Building) from 10:19 am on December 23. At 8:13 pm on the same day, the water transfer was stopped because the planed transfer was completed (transfer volume: about 120 m^3). The volume of accumulated water was estimated at about 230 m^3 from general drawings. However, after confirmation of the structure of the trench in detail, it was estimated at about 220 m^3. In this context, the remaining accumulated water was estimated at about 100 m^3. A method to transfer the remaining water will be planned from now.

<Spraying dust inhibitor>

- From 3:00pm on April 1, we started spraying dust inhibitor in order to prevent diffusion of radioactive materials on a trial basis. (The past results are as follows):

April 1: At the mountain side area of the common spent fuel pool/ Square measure: approx. 500m^2

April 5: At the east and south sides of Unit 4 and the mountain side area of the common spent fuel pool / approx. 600m^2 in total

April 6: At the mountain side area of the common spent fuel pool/ approx. 600m^2

April 8: At the mountain side area of the common spent fuel pool/ approx. 680m^2

April 10: At the mountain side area of the common spent fuel pool/ approx. 550m^2

April 11: At the mountain side area of the common spent fuel pool/ approx. 1,200m^2

April 12: At the mountain side area of the common spent fuel pool/ approx. 700m^2

April 13: At the mountain side area of the common spent fuel pool/ approx. 400m^2

April 14: At the mountain side area of the common spent fuel pool/ approx. 1,600m^2

April 15: At the mountain side area of the common spent fuel pool/ approx. 1,900m^2

April 16: At the mountain side area of the suppression pool water surge-tank/ approx. 1,800m^2

April 17: At around the Centralized Radiation Waste Treatment Facility/ approx. 1,900m^2

April 18: At around the Centralized Radiation Waste Treatment Facility/ approx. 1,200m^2

April 20: At around the Centralized Radiation Waste Treatment Facility/ approx. 1,900m^2

April 21: At the mountain side area of the common spent fuel pool/ approx. 1,300 m^2 /at the mountainside area of the medium voltage switchgear/ approx.5,100 m^2.

April 24: At the mountain side of the nuclear reactor building of Unit 5/ approx. 860 m^2

April 25: At the mountain side of the nuclear reactor building of Unit 5, slope in front of the former Administration Office Building, and gymnasium building / approx. 3,800 m^2

- Since around 1:30 pm, April 26, we have started spraying the dust inhibitor in full swing (the record is shown below).

April 26: spraying to the area on the coastal side of Units 1 to 4 using an unmanned crawler dump truck, approx 5,000 m^2.

April 27: spraying to the area on the seaside of Unit 3 using unmanned crawler dump truck, approx 7,500 m^2

April 28: spraying to the area on the mountain side of the nuclear reactor building of Unit 5 using the conventional method, approx. 4,540 m^2

April 29: spraying to the area on the east side of the turbine building of Unit 4 using the unmanned crawler dump truck, approx. 7,000 m^2

April 29: spraying to the area on the mountain side of the nuclear reactor building of Unit 5 using the conventional method, approx. 5,800 m^2

April 30: spraying to the area on the south side of the turbine building of Unit 4 using the unmanned crawler dump truck, approx. 2,000 m^2

April 30: spraying to the area on slope in front of the former Administration Office Building using the conventional method, approx. 5,400 m^2

May 1: spraying to the area on the south side of the reactor building of Unit 4 using the unmanned crawler dump truck, approx. 1,000 m^2

May 1: spraying to the area on slope in front of the former Administration Office Building using the conventional method (approx. 4,400 m^2).

May 2: spraying to areas on the south and west side of the reactor building of Unit 4 using the unmanned crawler dump truck (approx. 4,000 m^2)

May 2: spraying to areas including a slope in front of the former Administration Office Building using the conventional method (approx. 5,500 m^2)

May 3: spraying to areas on the west side of the reactor building of Unit 3 using the unmanned crawler dump truck (approx. 4,000 m^2)

May 3: spraying to areas including a slope in front of the former Administration Office Building using the conventional method (approx. 5,300 m^2)

May 4: spraying to areas on the west side of the Unit 3 reactor building using the unmanned crawler dump truck (approx. 4,000 m^2)

May 4: spraying to areas including the slope around the former Administration Office Building using the conventional method (approx. 5,200 m^2)

May 5: spraying to areas on the west side of the Unit 2 reactor building using the unmanned crawler dump truck (approx. 4,000 m^2)

May 5: spraying to areas including the mountain side of Shallow Draft Quay using the conventional method (approx. 5,350 m^2)

May 6: spraying to areas on the west side of the Unit 1 reactor building using the unmanned crawler dump truck (approx. 4,000 m^2)

May 6: spraying to areas including the mountain side of Shallow Draft Quay using the conventional method (approx. 5,200 m^2)

May 7: spraying to areas including the west side of Shallow Draft Quay using the conventional method (approx. 5,150 m^2)

May 8: spraying to areas including the west side of Shallow Draft Quay using the conventional method (approx. 5,100 m^2)

May 9: spraying to areas including the west side of Shallow Draft Quay, using the conventional method

May 9: spraying to areas including nearby the solid waste storage facility, using the conventional method (approx. 5,250m^2)

May 10, spraying to the east sides of turbine buildings of Units 1 and 2, using an um-manned crawler dump truck (approx. 6,000 m^2)

May 10, spraying to areas including nearby Solid Waste Storing Facility, using the conventional method (approx. 5,050 m^2)

May 11, spraying to areas including nearby Solid Waste Storing Facility, using the conventional method (approx. 5,250 m^2)

May 12, spraying to areas including nearby Solid Waste Storing Facility, using the conventional method (approx. 5,250 m^2)

May 13, spraying to the area on the north and east sides of the turbine building of Units 1, using an unmanned crawler dump truck (approx. 6,000 m^2)

May 13, spraying to areas including nearby Solid Waste Storing Facility, using the conventional method. (approx. 5,250 m^2)

May 14, spraying to the area on the east sides of the turbine building of Units 2, using an unmanned crawler dump truck (approx. 7,000 m^2)

May 14, spraying to areas including nearby Solid Waste Storing Facility, using the conventional method.

May 15, spraying dust inhibitor to areas including nearby Solid Waste Storing Facility in a conventional method, approx 7,000 m^2

May 16, spraying to the area on the east sides of the turbine building of Unit 1, using an unmanned crawler dump truck (approx. 3,000 m^2)

May 16, spraying dust inhibitor to areas including nearby Solid Waste Storing Facility using the conventional method, approx. 6,520 m^2

May 17, spraying dust inhibitor to areas including nearby partner companies' yard using the conventional method, approx. 6,520 m^2

May 18, spraying dust inhibitor to areas including nearby partner companies' yard using the conventional method, approx. 8,750 m^2

May 19, spraying dust inhibitor to areas including nearby partner companies' yard using the conventional method, approx. 8,750 m^2

May 20, spraying dust inhibitor to areas including nearby Incombustibles Treatment Facility, approx. 8,250 m^2

May 23, spraying dust inhibitor to areas including nearby Incombustibles Treatment Facility using the conventional method, approx. 8,750 m^2

May 24, spraying dust inhibitor to east side of the turbine buildings of Units 2 and 3 using an um-manned crawler dump truck, approx. 6,000 m^2

May 24, spraying dust inhibitor to areas including nearby Incombustibles Treatment Facility using the conventional method, approx. 8,750 m^2

May 25, spraying dust inhibitor to areas including nearby Incombustibles Treatment Facility using the conventional method, approx. 8,750 m^2.

May 26, spraying dust inhibitor to areas including the north side of Unit 1's reactor building using unmanned crawler dump, approx. 6,000 m^2.

May 26, spraying dust inhibitor to areas including areas surrounding Incombustibles Treatment Facility using the conventional method approx. 7,875 m^2.

May 27, spraying dust inhibitor to the roof and the wall of Unit 1's turbine building using a bending spray tower vehicle. , approx. 6,600 m^2.

May 27, spraying dust inhibitor to areas including areas surrounding Incombustibles Treatment Facility using the conventional method. approx. 8,750 m^2.

May 28, spraying dust inhibitor to areas including areas surrounding Solid Waste Storing Facility using the conventional method, approx 4.375m^2.

May 29, spraying dust inhibitor to areas including areas surrounding Main Gate using the conventional method, approx 8,750m^2.

May 31, spraying dust inhibitor to areas including areas surrounding Main Gate using the conventional method, approx. 8,750 m^2.

June 1, spraying dust inhibitor to the roof and exterior wall of reactor building at Unit 2 whose area is approximately 2,200 m^2 using a bending spray tower vehicle.

June 1, spraying dust inhibitor to areas of approximately 8,750 m^2 including

surrounding Main Gate ones using the conventional method.

June 2, spraying dust inhibitor to the roof and exterior wall of the reactor building of Unit 2 using a bending spray tower vehicle (approx. 7,200 m^2)

June 2, spraying dust inhibitor to areas including near the Main Gate, using the conventional method (approx. 8,525 m^2).

June 3, spraying dust inhibitor to the roof and exterior wall of the reactor building of Unit 3 using a bending spray tower vehicle (approximately 4,800 m^2).

June 3, spraying dust inhibitor to areas including observation point using the conventional method (approx. 8,750 m^2).

June 4, spraying dust inhibitor to the roof and exterior wall of the reactor building of Unit 4 using a bending spray tower vehicle (approximately 7,200 m^2).

June 4, spraying dust inhibitor to areas including observation point using the conventional method (approx. 10,500 m^2).

June 5, spraying dust inhibitor to areas including observation point using the conventional method (approx. 8,750 m^2).

June 6, spraying dust inhibitor to areas including observation point using the conventional method (approx. 8,750 m^2).

June 7, spraying dust inhibitor to areas including observation point using the conventional method (approx. 8,750 m^2).

June 8, using a concrete pumping vehicle, we have implemented spraying dust inhibitor to the roof and the wall of Unit 1's turbine building (approx. 1,000 m^2).

June 8, dust inhibitor was sprayed at observation point area using the conventional method. (approx. 8,750 m^2).

June 9, dust inhibitor was sprayed to the roof and the wall of Unit 1 and 3 turbine buildings using concrete pumping vehicles. (approx. 6,400 m^2) Dust inhibitor was also sprayed near the main gate by ordinary method. (approx. 8,750 m^2)

June 10, dust inhibitor was sprayed to the roof and the wall of Unit 1 and 2 turbine buildings and the wall of Unit 2 reactor building. using concrete pumping vehicles. (approx. 3,000m^2) Dust inhibitor was also sprayed near the welfare building by ordinary method. (approx. 8,750 m^2)

June 11, dust inhibitor was sprayed to the area including near the gym. (approx. 4,735m^2)

June 13, dust inhibitor was sprayed to the area surrounding Main Gate. (approx. 8,750m^2)

June 14, dust inhibitor was sprayed to areas around the UHV Switching Station for Units 5 & 6 etc. by the conventional method (approx. 8,750m^2)

June 15, dust inhibitor was sprayed to areas around the UHV Switching Station for Units 5 & 6 etc. (approx. 7,000m^2)

June 16, dust inhibitor was sprayed at the road around former administrating office building by the conventional method (approx. 6,600m^2).

June 17, dust inhibitor was sprayed in the ground by the conventional method (approx. 7,000m^2).

June 18, dust inhibitor was sprayed to the roof and the wall of Unit 4 turbine buildings. using concrete pumping vehicles. (approx. 3,200m^2)

June 18, dust inhibitor was sprayed around the main gate by the conventional method. (approx. 7,000m^2)

June 19, dust inhibitor was sprayed at the west side area of the reactor building of Unit 2 in conventional method. (approx. 6,810 m^2)

June 20, dust inhibitor was sprayed to yards around Unit 5 by a crawler dump truck. materials yards etc. in a conventional method. (approx. 5,800 m^2)

June 20, dust inhibitor was sprayed at the materials yards, etc in conventional method. (approx. 5,250 m^2)

June 21, dust inhibitor was sprayed to yards approx.5,900m^2 around Unit 5 by a crawler dump truck.

June 21, dust inhibitor was sprayed to materials yards etc. approx.5,250m^2 in a conventional method.

June 22, dust inhibitor was sprayed on the east side of the turbine building of Unit 6 approx.8,300 $m^2$with a crawler dump truck.

June 22, dust inhibitor was sprayed to at the south of protection bank approx.5,250m^2 in a conventional method.

June 23, dust inhibitor was sprayed at the north of UHV switching station of Unit 5 and 6 in conventional method approx 5,160m^2 by a conventional method.

June 24, dust inhibitor was sprayed on the north side of the turbine building of Unit 6 with a crawler dump truck. (approx. 5,400m^2)

June 24, dust inhibitor was sprayed to areas around Main Anti-Earthquake Building in conventional method. (approx. 4,659 m^2)

June 25, dust inhibitor was sprayed on the yard of the Centralized Radiation Waste Treatment Facility with a crawler dump truck. (approx. 2,400m^2)

June 26, dust inhibitor was sprayed on the north side of the turbine building of Unit 6 in conventional method. (approx. 4,490m^2)

June 27, dust inhibitor was sprayed on the west side of the reactor building of Unit 5 and 6 with a crawler dump truck. (approx. 5,300m^2)

June 28, dust inhibitor was sprayed on around filtrate water tank area (approx. 541 m^2)

<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 March 18, regarding the spent fuel in the common spent fuel pool*, we have confirmed that the water level of the pool was secured. At around 10:37am March 21, water spraying to common spent fuel pool has started and finished at approx. 3:30pm. At around 6:05pm, fuel pool cooling pump was activated to cool the 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.

- At 2:34 pm, April 17, the occurrence of a short circuit caused by the lack of repair of the end of the unused cable which is connected parallel to the power of spent fuel common pool caused the circuit breaker of the power side to open resulting in suspended power supply to the spent fuel common pool. However, at 5:30 pm, April 17, the power of the spent fuel common pool was restored after the removal and inspection of the cable.
- We stopped cooling facility for common pool due to switching power souces for installation of double circuits for offsite power sources for Unit 5 and 6 during the following period:
  July 21: from 8:40 am to 2:41 pm / July 23: from 3:46 pm to 9:41am
- At 11:04 am on July 30, we started transferring accumulated water in common spent fuel pool building to the tank located at upper stream of water desalinations (tank located at down stream of suppression pool water surge-tank) and stopped transferring at 5:45 am on August 2.
- At 11:08 am on September 14, the Common Pool's cooling system was shutdown to move a Common Pool Power Center so that we will replace a power panel installed at the basement of Common spent fuel pool. At 5:22 pm on September 19, the transfer of the Common Pool Power Center was completed, Common Pool's cooling was restarted.
- At approximately 11:00 am on September 20, a puddle of water was found at the basement of common spent fuel pool. As a result of nuclide analysis of the water, some radioactive materials (Cs 134: 4.7～7.0×10^0 [Bq/cm^3], Cs 137: 5.4～8.1×10^0 [Bq/cm3], Co 60: 1.2×10^0 [Bq/cm3]) were detected. However we assume that there is no leakage outside because any pipeline connecting to the outside does not exist. We are now investigating sources of the influent water.
- 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.

- In order to change the power board for the common spent fuel pool facility, at 9:28 am on December 9, we stopped cooling the common spent fuel pool (the water temperature of the common spent fuel pool at that time: approx 18.8 Celsius). On the same day, with completion of change work of the power board, at 11:am, we resumed cooling (the water temperature of the common spent fuel pool at that time: approx 19.1 Celsius).

<Dry cask building>

- On March 17, we patrolled buildings for dry casks* and found no signs of abnormal situation for the casks by visual observation. A detailed inspection will be conducted hereafter.

  *dry cask: a measure to store spent fuel in a dry storage casks in storages. Fukushima Daiichi Nuclear Power Station started to utilize the measure from August 1995.

<Injured / ill health> (Latest)

- Approx. 11:10am on April 10, at the yard of Unit 2, a worker who wore an anorak and a full face mask said that he felt sick while he was laying a discharging hose. A medical staff accompanied him from Fukushima Daini Nuclear Power Station to J-Village conducting a course of injections in the car. After that, at 2:27pm, he was sent to Sougou Iwaki Kyoritsu Hospital by an ambulance. No radioactive material attached to his body.
- No injured workers inside of the building were confirmed due to the earthquake which occurred at approximately 5:16pm, April 11.
- On April 27, with regards to the effective radiation doze of 3 months period starting from January 1st of this year for a female employee, who have been in charge for the work after the Tohoku-Chihou Taiheiyou-oki Earthquake, was 17.55 mSvh which is in excess of statutory limit of 5mSv/3months for female. After the medical examination by a doctor it was confirmed that it does not have effect to the health. On May 1, we have confirmed that the effective exposure dose from January 1st, 2011 to March (the 4th quarter of the 2010 fiscal year) of another female employee who has also been in the restoration work after the Tohoku-Chihou-Taiheiyou-Oki Earthquake is 7.49 mSv, which is in excess of statutory dose limits (5 mSv / 3 months). The employee took medical examination on May 2, and the result confirmed that there is no effect on the employee's health.
- At around 11:00 am on May 5, a worker fell from the stepladder and got injured when assembling a temporary rest station at the parking area outside the west gate of the power station. The worker was taken to the Fukushima Rosai Hospital by ambulance. There was no contamination to the body.
- At about 6:50 AM on May 14, a worker of a sub-contractor became a bad health during a carrying work for drainage treatment system in the Centralized Environment Facility. He was carried to a doctor's room of the power station at 7:03 AM and had medical treatment. Since he had lost his consciousness and stopped self breathing, at 7:35 AM he was carried to a doctor in the J Village and the doctor examined his condition. After that, at 8:35 AM, he was carried to Sogo Iwaki Kyoritsu Hospital. Radioactive substances were not attached to the worker. At 2:10 pm, on May 15, we received notification that at 9:33 am, on May 14th, the worker was confirmed dead by the doctor.
- At approximately 10:20 am on May 23, a partner company's worker who was unloading a tank for the treatment water at the carry-in gate for large stuff, the 1st floor of On-site Bunker Building, had his left hand injured. After having diagnoses at the medical room of Fukushima Daiichi Nuclear Power Station and at J village, he was transferred to Iwaki Kyouritsu Hospital by an ambulance. No contamination to his body was confirmed.
- At approximately 1:30 pm on May 31, one of the partner companies' workers who were installing cables at Centralized Radiation Waste Treatment Facility got his right hand forefinger injured. After the intravenous drip at the medical room of the station, he was transferred to J Village at 2:26 pm. Then at 3:35 pm he was transferred from J Village to Fukushima accident Hospital. There was no

contamination to his body.

- At 9:00 am on June 4, one worker from a partner company who was under mission to collect accumulated water at the Centralized Radiation Waste Treatment Facility, Process Main Building 1st Floor, said he felt sick, and therefore was transferred to Iwaki-Kyoritsu Hospital by a helicopter emergency medical service. The worker was diagnosed as “transient unconscious attack and dehydration”.
- Approximately 10 am on June 5, a partner company’s worker (equipped with overalls, Tyvek, and full-face mask) reported that he felt sick during the power-cable installation task near the Wild bird forest in the power plant’s premise. After physical examination at the medical treatment room of Fukushima Daiichi Nuclear Power Station, he was taken to J-VILLAGE by ambulance at approximately 10:37 am. At 11:20 am, a helicopter emergency medical service was requested by J-VILLAGE. After transported to Hirono Central Gymnasium by ambulance, the worker was transported to Iwaki Kyouritsu Hospital by the helicopter service. According to the physical examination, it was explained that he was suspected to suffer from “dehydration,” and needs treatment in the hospital about a week. Besides him, around 10:15 am on the same day, another partner company’s worker (in the same equipment as the one of the above worker) reported that he felt sick during the similar work. After physical examination at the medical treatment room of Fukushima Daiichi Nuclear Power Station, he was transported to J-VILLAGE by ambulance at approximately 12:07 pm because of his serious condition. At 12:40 pm, he was transported to Fukushima accident Hospital from J-VILLAGE by ambulance. After the physical examination, he was diagnosed to suffer from dehydration, and to be requested to keep quiet in bed at home for three days.
- At 7:10 pm, June 6, at Incineration Workshop Building of Centralized Radiation Waste Treatment Facility, a worker of cooperating company has slipped down and hit left breast. After examination and treatment at medical room of power station, at around 8:10 pm he was transferred to J-Village. At 9:22 pm, he was transferred to Iwaki Kyoritsu Hospital by ambulance. No pollution to the body was found. He was diagnosed as “injury to the spleen and a rib fracture.”
- At 11:05 am on June 15, it was confirmed that a worker from a partner company in charge of crane assembling work for the preparing the installation of the cover in Unit 1 reactor building at shallow draft quay was smoking with his full mask off. While the density of radioactive materials in the air at the working place was below the detectable level both for particulate materials and iodine, whole body counter will be implemented later. The evaluation exposure dose is; external exposure---0.13mSv and internal exposure---0.24mSv.
- At approximately 1:30 pm on June 24, we transferred a partner company’s worker, who reported illness during the installation work of temporary tank, to J village by a corporate car. At 3:14 pm, the worker was transferred to Iwaki Kyouritsu Hospital by an ambulance. No body contamination was confirmed. The worker was diagnosed as “heatstroke”.
- At around 11:45 am on June 29, a worker of a partner company found himself wearing a overall mask without a charcoal filter and returned to the Main Anti-Earthquake Building immediately after leaving the Building for inspection of the water treatment system. The result of an examination suggests that the level of internal radioactivity was extremely low enough not to affect his body.
- Around 10:06 am on July 18, a worker of partner company fell from the 3m height during the cable connecting work on the distribution pole near the observatory entrance of the station and he was injured. At 10:50 am, he was transported by survice car to J village. At 11:06 am, we requested the helicopter emergency medical service (called “Doctor Heli”). At 12:22 pm, he was transported from multi purpose sports ground in Hrono town to the Iwaki Kyouritsu Hospital by Doctor Heli. According to the result of physical examination, he was diagnosed as “fracture of distal end of right radius, of left radius head, and left ligamentum collaterale ulnare.”
- At 2:45 PM on July 26, TEPCO’s employee who moved from Fukushima Daini Nuclear Power Station to Fukushima Daiichi Nuclear Power Station and had driven a vehicle in the site with wearing full face mask, noticed that the charcoal filter was not installed on the full face mask when the worker came back to the

Main Anti-Earthquake Building. As the result of dose evaluation of internal exposure, we confirmed that no affect on the body.

- At approximately 9:30 am on August 7, at cooperative firm rest area inside the site, a cooperative firm worker who was managing access control expressed dull feeling in the right knee and he was sent to Iwaki Kyoritsu Hospital by an ambulance. However, the cause was unknown. As a result of medical reexamination at Chiba Social Insurance Hospital, he was diagnosed as “Traumatic right knee synovialis ecchymoma”
- Around 12:05 pm on August 10, one partner company worker who was mowing for curing of water treatment hose at west side of Centralized Radiation Waste Treatment Facility (outside) was injured by sickle and was transferred to the Fukushima Rosai Hospital by the ambulance at 2:11 pm. His body has no contamination. He has been diagnosed as contused wound of lower right thigh.
- At approx. 2:40 on August 26, a worker from a partner company (contractor) was injured while engaged in a preparatory work to remove debris accumulated on Reactor Building, Unit 3. At 4:05 pm, after medically examining and treating at Emergency Medicare Room of Units 5 & 6, we ambulanced him to J Village. At 5:32 pm, he was sent to Fukushima Rosai Hospital, and was diagnosed “a fractured second finger”, but not radioactively contaminated.
- At 9:35 am on August 31, we implemented the drainage work of spent vessels at the temporary storage area for spent vessels for the water treatment system. When workers, who assumed the valve was closed, dismantled the hose, water from the tank and the hose scattered towards two (2) workers from one of our affiliated companies. High-level radiation dose was confirmed by measuring the radiation of the filters of the mask worn by the workers. On the other hand, we confirmed that there was internal exposure dose after checking by WBC.
- On September 8, a worker of co-operating company forgot to bring the full-face mask when that worker commuted from J-Village to Fukushima Daiichi Nuclear Power Station. At 5:55 am, when the worker entered the Main Anti-Earthquake Building, it was found out that the worker did not wear the full-face mask. We evaluated the internal exposure dose of the worker and confirmed that the level was insignificant to cause bodily influence.
- At 12:40 pm on September 14, we found 4 out of 6 partner company workers contaminated when we were decontaminating the full-face masks of the workers who were engaged in maintenance work of the water processing system. By the use of whole body counter, we will check if they have take in radioactive materials. Then, as a result of the measurement by whole body counter, we have evaluated that no one took in radioactive materials.
- At approximately 4 pm on September 14, a TEPCO employee who returned from the patrol on the generators of Units 1 to 4 (outdoors) to Visitors Hall of Fukushima Daini Nuclear Power Station got decontaminated since contamination at his chin and neck was detected. Then as a result of the measurement by whole body counter, we have evaluated that no radioactive materials was taken in.
- At approximately 8:18 am on September 15, we found a partner company worker unequipped with a charcoal filter to the full-faced mask after the worker entered the site of Fukushima Daiichi Nuclear Power Station. Then as a result of the measurement by whole body counter, we have evaluated that no radioactive materials was taken in.
- At approximately 9:40 am on September 20, a hand of a worker of a partner company who was moving the on-house transformer outside hit his own full-face mask, and the filter of his mask came off temporarily. Afterwards, as a result of measurement by the whole body counter, we confirmed that there was no internal exposure.
- One of the staff from the cooperating companies was injured catching his forth finger between the steel stocks in site of the power plant (outdoors) at 11:05 am, September 26. The staff returned to the office outside the site and headed for the emergency medical office with a surgical mask on. As a result of the measurement by whole body counter, we have evaluated that no radioactive materials was taken in Contamination on the surface of the body and the surgical mask is not detected.
- At around 10:30 am on September 29, the worker of the partner company got water from the drain hose to his full-face mask, when conducting the transfer of

the concentrated waste water at the Water Treatment Facility. Since it is confirmed that the part around mouth of the worker was contaminated, we conducted measurement by whole body counter. As the result of the measurement, we have confirmed that the worker did not take in any radioactive materials.

- Radio active contamination was detected from left waist, chin and jugular of one TEPCO's staff who had confirmed the situation of liquid leakage from water desalinations (reverse osmosis membrane type), when he returned to the visitor hall of Fukushima Daini Nuclear Power Station at 4:31 pm on October 8, 2011. He was checked by the whole body counter and according to the result, we evaluated he ingested no radioactive material.
- At around 4:03 PM of October 17, we detected radiation from near the mouth of one of our employees who returned to the visitor's hall of Fukushima-Daini Nuclear Power Plant from cooling water injection works at the second floor of reactor No.1. After a further screening test by a whole body counter we concluded that there was no internal exposure.
- At around 2:20 pm on October 28, one of TEPCO's employee conducting document check at administrative building has removed face mask when that employee felt sick and vomit, We plan to conduct check the intake by whole body counter. We have confirmed there was no contamination on the face. After testing by the whole body counter, we evaluated that he did not have intake of radioactive substances.
- At 8:30 am on October 29, two workers from the cooperating companies were injured during dismantling of the large crane used to install the cover for the Reactor Building, Unit 1 within the site boundary. At 10:35 am on the same day, one worker was transferred to Fukushima Medical University Hospital by a helicopter ambulance and got treatment including surgery. At 2:20 pm on the same day, the other worker was transferred to Iwaki Kyouritsu Hospital by a company car and had an inspection.
- At 0:32 pm on November 14, an alarm went off at the measure (Continuous Dust Monitor) installed in front of the main gate, which had continuously measured the radioactivity concentration in air. The cause of the alarm was assumed to be a defect of the equipment by clogged filters. Around 1:08 pm on the same day, the measure was reset and the monitoring was resumed. The dust concentration near the main gate was measured 6 x 10-6 [Bq/cm^3], which was less than the reference measure for wearing a full face mask, 1 x 10-4 [Bq/cm3]. Although an instruction to wear a full face mask since 0:39 pm was given responding the alarm, around 2:11 pm on the same day it was announced that the workers did not have to wear a full face mask as per normal.
- Approx. at 2:28 pm on November 28, the alarm went off from an indicator installed in front of Main Anti-Earthquake Building to continuously measure airborne radiation dose (continuous dust monitor). In response to the alarm, we instructed to put full face masks on at 2:38 pm accordingly. We are measuring the airborne radiation dose in front of Main Anti-Earthquake Building, and investigating the cause.

  We confirmed that there are no significant changes in the readings of the monitoring posts.
- At 2:50 pm on the same date, we replaced the filter of the monitor, and restarted by reset operation. From the result of the airborne radiation dose measurement in front of Main Anti-Earthquake Building, the airborne radiation dose in front of Main Anti-Earthquake building was less than detection threshold (7.34 x 10-6 [Bq/cm^3]), which was less than the reference measure for wearing a full face mask, 1 x 10-4[Bq/cm^3]. At 4:04 pm on the same date, it was announced that the workers did not have to wear a full face mask as per normal.
- On December, 17, one of the TEPCO's employees serving for restoring work at Fukushima Daiichi Stabilization Center was diagnosed with Norovirus. Up until now, there have been no reports of Norovirus onset other than this employee. We have disinfected the working area etc. of this employee. With advice from doctors, we plan to inform persons/parties concerned of fundamental matters such as strict enforcement of washing hands and gargling, re-enforcement of disinfecting

ways in case of onset, a medical team responding system etc. within this week.

- On December 19 an employee of TEPCO who engaged in repair works at Fukushima Daiichi Stabilizing centre was diagnosed as infected by Noro virus. Other than the two workers (including the employee mentioned above) that were diagnosed as infected by Noro virus so far, another TEPCO employee who engaged in works at the Fukushima Daiichi Power Plant was diagnosed as Gastroenteritis caused by a virus. We disinfected the working office of the two TEPCO employees. We plan to inform persons/parties concerned of fundamental matters such as strict enforcement of washing hands and gargling, re-enforcement of disinfecting ways in case of onset, a medical team responding system etc.
- On December 26, two of TEPCO's employee who were engaged in recovery work at Fukushima Daiichi Nuclear Power Station was diagnosed as influenza. On December 27, one TEPCO's employee who was also engaged in recovery work at Fukushima Daiichi Stabilization Center was newly diagnosed as influenza. We will take countermeasure for infection and escalation prevention by promoting hand washing, gargle, finger disinfecting and cough etiquette and will endeavor to set and use thermometer, finger disinfecting alcohol, mask.

<Others>

- Video recording of Units 1 to 4 reactor buildings and its surrounding area from the air by using an unmanned helicopter:
  From 3:59pm to 4:28pm on April 10 / From 10:17am to 12:25pm on April 14
  From 8:02am to 9:55am on April 15 / From 11:43am to 12:50pm on April 21
- At approximately 7:00 am on June 24, an unmanned helicopter collecting dust from the open part of the reactor building of Unit 2 made an emergency landing on the top of the reactor building of Unit 2. Thereafter, we confirmed no impact made to the reactor building of Unit 2 through the monitoring camera equipped onto the tip of a concrete pumping vehicle.
- April 5 approx. 3:00 pm, "Mega Float" left from Shimizu port and arrived at Yokohama port. Manufacturer of " Mega Float" finished inspection and remodeling work. At 5:20am on May 15, "Mega Float" left from Yokohama port to Onahama port. At around 8:00 am on May 17, it arrived at Onahama port. At 6:20 pm on May 20, it left for Fukushima Daiichi Nuclear Power Station. At 9:35 am on May 21, it arrived at the shallow draft quay in Fukushima Daiichi Nuclear Power Station.
- At 5:00 pm on June 30, the installation of temporary storm surge barrier was completed.

Fukushima Daini Nuclear Power Station

Units 1 to 4: Shutdown due to the earthquake

- The national government has instructed evacuation for those local residents within 10km radius of the periphery.
- In order to achieve cold shutdown, reactor cooling function was restored and cooling of reactors was conducted. As a result, all reactors achieved cold shutdown; Unit 1 at 5:00pm, March 14, Unit 2 at 6:00pm, March 14, Unit 3 at 12:15pm, March 12, and Unit 4 at 7:15am, March 15.
- At 2:30pm on March 30, the power source of the residual heat removal system (B) to cool the reactor of Unit 1 was secured from an emergency power source in addition to an offsite power. This means that all the units secure backup power sources (emergency power sources) for the residual heat removal system (B).
- As radiation dose measured at site boundary exceeded the threshold amount, it was determined on March 14 and 15 that a specific incident stipulated in article 10, clause 1(increase of radiations dose at site boundary) occurred. However, the measured amount has been below the threshold amount of 5μSv/h afterwards. Site will be under continuous surveillance.
- At approximately 10:01 am on May 27, a fire broke out at the distribution panel for lighting at power supply room for High Pressure Core Spray System on the 1st

basement floor of Unit 1's reactor building annex. At 10:04 am on the same day, workers of a partner company extinguished the fire, and TEPCO's employee confirmed the fire had been extinguished. We report the incident to the fire station at 10:08 am on the same day. At 11:19 am on the same day, the fire station staff confirmed at the site that the fire had been extinguished. This incident has been judged as a small fire of building.

- At around 6:10 pm on June 8, during the work of draining water stored in the tank, for the purpose of inspection of emergency underground tanks of High-voltage Start-up Transformer, a TEPCO employee found and confirmed oil leakage to the sea surface around the water discharge canal of Unit 3 and 4, Fukushima Daini Nuclear Power Station. Draining the stored water was suspended and oil adsorption mattresses were utilized to prevent the spread of oil. At 9:50 pm on June 8, oil fence barriers were installed and extremely thin oil layer inside the oil fence was observed. Maximum amount of leaked oil was estimated to be 0.5 m^3. The cause of leakage is under investigation. Discharged water is all rain water, and discharge was done through a duct, thus there is no discharge of radioactive materials to the sea.
- At 2:45 pm on June 23, at check point of service building of Unit 1 and Unit 2, a security agent, who attended materials taking out, caught his clothing to the fire extinguisher on the wall and dropped to injure right foot little finger. The security agent was transferred to the J-village and arrived at 3:58 pm. After treatment of doctor, transferred at 4:30 pm to Sogo Iwaki Kyoritsu Hospital by ambulance. After the treatment, he went home. No contamination was found due to the body survey. As a result of another diagnosis on June 24, he has been diagnosed as laceration of the fifth finger on right foot, fracture of distal phalanx and needs about 4 weeks for outpatient treatment.
- At 2:05 pm on July 7, we received a report as follows: "Workers from our partners' companies were checking the power board for the High Pressure Core Spray System located at B1, auxiliary building to R/B, Unit 1. They found sparks from a circuit breaker in that power board." At 2:30 pm on the same day, TEPCO employees checked the power board.

  At 5:37 pm on the same day, we stopped the Residual Heat Removal System Pump (B) due to check the power board. From 5:44 pm to 8:46 pm on the same day, we finished check of the power board. At 9:15 pm on the same day, we restarted the Residual Heat Removal System Pump (B)
- We conducted cleaning the inside of the cover for the sensor and the lower part of the pole of a monitoring post installed in the power station site.

  No.1: From 4:05 pm to 5:15 pm on July 11

  No.2: From 3:05 pm to 4:05 pm on July 12

  No. 3: From 4:05 pm to 5:00 pm on July 13

  No. 4: From 3:05 pm to 3:55 pm on July 14

  No. 5: From 3:05 pm to 4:00 pm on July 15
- From July 29, we are conducting major inspections of 6 Monitoring Posts located (No. 1 to 6) at the boundary of power station's premise out of 7 Monitoring Posts.

  (Regular inspection)

  MP No. 6: regular inspection from 9:31 am to 6:30 pm on July 29.

  MP No. 1: regular inspection from 9:31 am on August 2 to 2:30 pm on August 3.

  MP No. 3: regular inspection from 9:31 am to 6:00 pm on August 4.

  MP No. 4: regular inspection from 9:31 am to 5:40 pm on August 5.

  MP No. 5: regular inspection from 9:31 am to 8:00 pm on August 8

  MP No. 2: regular inspection from 9:31 am to 5:40 pm on August 9
- Out of 7 monitoring posts set at the boundary of the plant site, we started the replacement work of No.6 for the purpose of the preventive measure. The work is planned to be conducted from Oct 11 to 21. This monitoring post won't be able to measure airborne radiation dose temporarily during the work, however, we will measure and the dose by the other 6 monitoring posts. At 7:00 pm on Oct. 21, replacement work was completed. While replacement work was under way, the data for the monitoring post was not recorded. However, we have confirmed that there have been no significant changes to the data taken from other monitoring posts.
- 7 monitoring posts have been installed at the border of the power station site. We

started construction (planned from October 25 to December 20) of a permanent building for the measurement equipment, etc. of No.7 which had been installed in the temporary building. On December 20 this structure was completed as scheduled and until December 21 this monitoring post will temporarily be out of order due to removal of detectors and other measurement apparatus, but the six other posts will continuously monitor the radioactive material in the air.

MP No. 6: regular inspection from 9:31 am to 6:30 pm on July 29.

・ 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】

- As it was confirmed that the temperature of the Emergency Equipment Cooling Water System * was increasing, at 3:20pm on March 15, we stopped the Residual Heat Removal System (B) for the inspection. Subsequently, failure was detected in the power supply facility associated with the pumps of the Emergency Equipment Cooling Water System. At 4:25pm on March 15, after replacing the power facility, the pumps and the Residual Heat Removal System (B) have been reactivated.
  (*Emergency Equipment Cooling Water System: an emergency line that circulates cooling water (purified water) that exchanged heat with seawater in order to cool pump bearings, heat exchangers etc)
- At 3:09 pm on July 15, we finished inspection and repair of Emergency Diesel Generator (B), Unit 1 and put back into operation.
- At 11:11 am on July 16, Reactor Coolant Cleanup System for Unit 1 has been restored.
  *Reactor Coolant Cleanup System: this is to remove impurities from reactor water and maintain water quality. This is also used to discharge redundant water in the reactor in order to control water level during maintenance outage and reactor shutdown
- Unit 1 residual heat removal system (B) was stopped at 6:25 am, September 26 in order to transfer the power supply cable (temporarily installed) to the residual heat removal systems (B) of Units 1 and 2. We restarted the residual heat removal system (B) at 4:15 pm on the same day.
- At 6:00 pm on September 30, grease oozing was confirmed at the joint connecting the pump for residual heat removal system (B) and the motor. At 9:58 am on October 1, the residual heat removal system (B) was stopped to conduct an inspection. As a result of inspection, we assumed grease oozing was occurred due to excessive grease filling to the joint connecting. After that, we adjusted fill ration of grease. At 4:21 pm on the same day, we resumed cooling reactor by residual heat removal system (B).
- As to residual heat removal system A of Unit 1 which was unable to use due to Tsunami effect of Mar. 11, on November 17, the trial run was conducted in order to investigate soundness. At 3:35 pm on the same day, it was restored to stand-by status. At 5:15 pm on the same day, we switched residual heat removal system B to residual heat removal system A. At 5:29 on the same day, the system A started to operate

  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.

【Unit 2】

- At 11:40 am on July 17, the Clean up Water System of Unit 2 has been restored.
- From 2:22 pm to 3:02 pm on August 6, we conducted commissioning of Residual Heat Removal (RHR) system (A) of Unit 2, which had been stopped due to tsunami and it

has transited to stand by mode.

- At 1:57 pm on August 8, we stopped residual heat removal system (B) due to the switching of temporary power cables in the heat exchanger building of Unit 2. At 2:29 pm, we activated residual heat removal system (A).
- At 12:59 pm on August 30, while operating High Pressure Core Spray Component Cooling System*1 and High Pressure Core Spray Component Cooling Sea Water System*2 in order to adjust the water quality in High Pressure Core Spray Component Cooling System, the motor of High Pressure Core Spray Component Cooling Sea Water System Pump stopped. Later, we confirmed a defect in insulation resistance at the site. As Unit 2 is in cold shutdown and necessary functions of water injection are secured, it satisfies obligations under the safety provisions for security management.
- At 10:57 am on September 25, we stopped residual heat removal system (B) of Unit 2 due to the replacement work of temporary power cables for the residual heat removal system (B) of unit 1 and 2. At 11:11 am, we activated residual heat removal system (A). At 6:25 am on September 26, we stopped Residual Heat Removal System (B) of Unit 1.
- At 10:57 am on October 4, Residual Heat Removal System (A) has stopped due to the replacement of cable (temporary) to Residual Heat Removal System (A) of Unit 2. At 11:18 am on the same day, Residual Heat Removal System (B) has started.
- At 11:25 am on October 7, we stopped Residual Heat Removal system (B) regarding switching work from Residual Heat Removal system (B) to (A), and started operation of Residual Heat Removal system (A) at 11:42 am on the same day.
- At 2:44 pm on December 6, along with the switching work from Unit 2 the residual heat removal system (A) to (B), the (A) system was stopped. At 3:11 pm. (B) system was activated.

【Unit 3】

- At 2:05pm on June 6, the Clean Up Water System* of Unit 3 has been restored.
  *Clean Up Water System. The system removes impurities in the reactor water and maintains the water quality. The system is also used to control reactor water level by discharging redundant water from the reactor during regular inspection or reactor shutdown.
- At 11:53 am on August 31, we completed restoring and started operating Unit 3 emergency diesel generator (A).
- At 2:00 pm on August 8, we stopped a residual heat removal system of Unit 3 (B) and activated Unit 3 (A) at 2:26 pm on the same day in order to switch the operation from (B) to (A).
- At 2:08 pm on December 1, Residual Heat Removal System (A) in Unit 3 was stopped in order to switch operation from system (A) to (B). At 2:19, System (B) was activated.

【Unit 4】

- As it was confirmed that the pressure at the outlet of the pumps of the Emergency Equipment Cooling Water System* was decreased, at 8:05pm, March 15, we stopped the Residual Heat Removal System (B) for the inspection. Subsequently, failure was detected in the power supply facility associated with the pumps of the Emergency Equipment Cooling Water System. At 9:25pm, March 15, after replacing the relevant facility, the pumps and the Residual Heat Removal System (B) have been reactivated.
  *: emergency water system in which cooling water (pure water) circulates which exchanged the heat with sea water in order to cool down bearing pumps and/or heat exchangers etc.
- At 10:00am on June 4th, the Clean Up Water System* of Unit 3 has been restored.
- At 4:00 pm on June 7, air leak was found at the weld zone of unit 4's main emission duct by TEPCO employee. (10cm×3cm 2 places). Radioactive materials in the air were below measurable limits. No outlier at main emission monitor and monitoring

post. The repair work will be implemented soon.

- At 6:32 am on July 31, air leak was found at the weld zone of unit 4's main emission duct by TEPCO employee. Radioactive materials in the air were below measurable limits. No outlier at main emission monitor and monitoring post. This is the same place repaired on June 7. The repair work will be implemented. At 4:46 pm on August 5, we finished repair work of the leakage.
- From 11:54 am to 12:24 pm on August 2, we conducted a test run of the residual heat removal system (A) of Unit 4, which was stopped due to the influence of tsunami and then it has been kept in standby condition.
- At 10:33 pm on August 3, we stopped operation of Residual Heat Removal System due to switching from the Residual Heat Removal System (A) to the Residual Heat Removal System (B) with switching the temporary cable of heat exchanger building of Unit 4. At 11:00 pm on the same day, we restarted the operation.
- At 10:15 am on 29th August, in order to investigate soundness of reactor containment vessel and inside facilities, we have opened airlock for site workers (hatch to enter into the primary containment vessel), and we started investigation. On September 7, we implemented the cleaning and decontamination. Since November 21, we had been conducted the visual inspection of the reactor containment vessel and inside facilities and finished the inspection today. In the result, there were no reactor coolant leakages and no damages of facilities, equipments and pipes. Therefore, we have confirmed that there are no harmful effects for cold shutdown. Although there were some removal of paints of equipments due to high temperature and humidity, we estimated it has no direct impact on the cold shutdown. We will conduct detail inspection of the reactor containment vessel including inside facilities.
- At 3:43 pm on October 4, Residual Heat Removal System (A) has stopped due to the replacement of cable (temporary) to Residual Heat Removal System (A) of Unit 4. At 3:53 pm, Residual Heat Removal System (B) has started. As the replacement was finished, the Residual Heat Removal System (B) of Unit 4 has stopped at 5:01 pm on October 5, and the Residual Heat Removal System (A) has started at 5:08 pm.
- On November 7, 2011, we started inspection work of the main turbine in order to confirm the facilities' status after the quake for Unit 4.

【Others】

- On August 29, in the heater building of Unit 4, condition of a site worker of co-operating company who was in charge of rerouting the temporary cable got worse. At around 10:50 am, as heat stroke was suspected, we treated the patient with drip infusion and at 11:26 am, we transferred to J-Village by our ambulance. At 11:58 am, the patient was transferred to Iwaki Kyoritsu Hospital by ambulance. No radioactive material attached to the body was found. The doctor examined and confirmed that the patient had heat stroke.
- At around 2:50 pm on October 17, we confirmed that a worker of partner company who was engaged in cleaning inside of Primary Containment Vessel of Unit 4 was exposed to radiation 1.58mSV, which is excess to the planned radiation 0.9mSV. After the result of the investigation, we guessed that the radiation administrator set the working time without featuring the work of near the high radiation place, because he missed the high radiation dose which was confirmed by pre-measurement. Furthermore, the worker was not aware of the sound of his APD and kept the work, since he had on his hood mask and was using a cleaner.
- Installation work of seismic isolation system in the exhaust stack started from November 2010 has been suspended since the occurrence of injury incident in the tower crane room due to the damage in the fixed portion of construction tower crane from the earthquake. As the implementation of safety countermeasure is completed, on October 31 heavy equipments were brought into the site for the replacement of the tower crane and installation work has restarted.
- On December 26, one of TEPCO's employee who was worked at Fukushima Daini Nuclear Power Station was newly diagnosed as Noro virus. Disinfecting of the working environment was conducted. We will continuously promote hand washing and gargle, The basic issues such as disinfection method and response of medical

team will be reminded.

Kashiwazaki Kariwa Nuclear Power Station

Units 5, 6 : Normal operation (Units 1 to 4, 7: Outage due to regular inspections)

- The 16th regular inspection of Unit 1 started on August 6.
- The 10th regular inspection of Unit 7 started on August 23.