

# Records after August 1, 2011

As of 3:00 pm on September 21, 2011

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.”
- 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 reactor 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<sup>3</sup>/h. At 3:52 am on the same day, we adjusted the rate to 3.9m<sup>3</sup>/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 rad 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

## **[Unit 1]**

- From 5:55 pm to 5:56 pm on August 1, we changed the volume of water injected into the reactor of Unit 1 and Unit 2 to approx. 3.9m<sup>3</sup> / h.
- At 9:02 am on August 5, decrease of water injection volume to Unit 1 reactor was confirmed and it was adjusted to approx. 3.9 m<sup>3</sup>/h.
- At 8:32 am on August 10, we adjusted flow rate of injecting water at approx. 3.8m<sup>3</sup>/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<sup>3</sup>/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<sup>3</sup>/h. At 3:52 am on the same day, we adjusted the rate to 3.9m<sup>3</sup>/h.
- At 7:36 pm on August 13, we adjusted the rate of water injection to Unit 1 reactor to approximately 3.8m<sup>3</sup>/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. 3.8 m<sup>3</sup>/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<sup>3</sup>/h.
- At 2:53 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 approx. 3.8m<sup>3</sup>/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 approx. 3.8m<sup>3</sup>/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 approx. 3.8m<sup>3</sup>/h.
- At 3:41 pm 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. 3.8m<sup>3</sup>/h.
- At 11:40 am on September 21, 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<sup>3</sup>/h.

#### <Water spray to Spent Fuel Pool>

- 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 injecting fresh water to Spent Fuel Pool using Fuel Pool Cooling and Filtering System. At 9:19 am on same day, we finished injecting water.

#### <Treatment of the Accumulating Water>

- At 9:53 am on September 14, we started transfer of the accumulated water from the condenser to the basement of Turbine Building of Unit 1. At 2:35 pm on September 16, we stopped transfer.

#### <Alternative Cooling of Spent Fuel Pool>

- From 10:06 am to 11:15 am 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.

#### < Injection of nitrogen gas into 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,

#### <Others>

- 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, 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.
- From 8:10 am to 2:25 pm on August 28, we conducted dust sampling at the upper part of reactor building of Unit 3 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 9:15 am to 0:10 pm on September 14, we sampled gases in the Reactor Pressure Vessel of Reactor Building, Unit 1

## [Unit 2]

<Water injection to the reactor>

- From 5:55 pm to 5:56 on August 1, we changed the rate of water injection into the reactor of Unit 1 and Unit 2 to approx.  $3.9\text{m}^3/\text{h}$ .
- 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.  $3.8\text{m}^3/\text{h}$ .
- At 8:32 am on August 10, we adjusted flow rate of injecting water at approx.  $3.8\text{m}^3/\text{h}$  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.  $3.8\text{m}^3/\text{h}$  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.  $3.8\text{m}^3/\text{h}$ , 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.  $3.8\text{m}^3/\text{h}$  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.  $3.8\text{m}^3/\text{h}$ , 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.  $3.8\text{m}^3/\text{h}$ , 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.  $3.8\text{m}^3/\text{h}$ , 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.  $3.8\text{m}^3/\text{h}$
- 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.  $3.8\text{m}^3/\text{h}$ .
- 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.  $3.8\text{m}^3/\text{h}$ .
- 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  $3.8\text{m}^3/\text{h}$ .
- 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  $3.8\text{m}^3/\text{h}$ .
- 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  $3.8\text{m}^3/\text{h}$ .
- 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  $3.8\text{m}^3/\text{h}$ .
- At 2:59 pm on September 14, we will start injecting water into the Reactor of Unit 2 through the core spray system. At 3:25 pm on the same day, we adjusted the volume water at  $1.0\text{m}^3/\text{h}$ . 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.  $2.0\text{m}^3/\text{h}$  (the amount from the feeding water system is kept at approx.  $3.8\text{m}^3/\text{h}$ )
- 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.  $2.0\text{m}^3/\text{h}$ .
- At 3:35 pm on September 16, with regard to the injection into the reactor of Unit 2, we adjusted the amount of water injection through the core spray system to approx.  $3.0\text{m}^3/\text{h}$  (injection through feed water system remain at  $3.8\text{m}^3/\text{h}$ ).

- 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<sup>3</sup>/h. (Water injection amount from Reactor Feed Water System remains approx. 3.8 m<sup>3</sup>/h.)
- At 11:40 am on September 21, as it was confirmed that water injection to Unit 2 reactor by reactor water feed system was decreased. We adjusted the amount of water injection to approximately 4.0 m<sup>3</sup>/h. The amount of water injection by reactor core spray system was also adjusted to approximately 4.0 m<sup>3</sup>/h.

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

- At 4:10 pm on July 30, we started transferring accumulated water at Unit 2 turbine building to Centralized Radiation Waste Treatment Facility. We stopped transfer at 6:49, August 2.
- At 7:09 am on August 4, we started transferring accumulated water from the vertical shaft of Unit 2 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 Unit 2 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 Unit 2 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 9:39 am.

- At 10:11 am on September 6, as it was confirmed that there was a decrease of draining water level at the basement of Unit 2 turbine building, we started transferring accumulated water at 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 at 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]).

< Alternative Cooling of Spent Fuel Pool >

- 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 cooling tower in the second order of circulating cooling system in the spent fuel pool for Unit 2. At 10:42 am on the same day, we resumed its operation.

<Injection of nitrogen gas into 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 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.

<Others>

- From 10:39 am to 11:13 am on August 9, we conducted sampling of gas in the Primary Containment Vessel of Unit 2.
- At 10:35 am on August 24, we started injection of hydrazine to spent fuel pool of Unit 2 through the circulating cooling system. At 12:29 pm on the same day, we stopped injection of hydrazine. (Hydrazine is injected as appropriate.)
- From 10:35 am to 1:20 pm on August 29, we conducted sampling of dust at the openings (blow out panel), Reactor Building, Unit 2.
- 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), Reactor Building, Unit 2.

### [Unit 3]

#### <Water injection to the reactor>

- 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.  $9.0\text{m}^3/\text{h}$ .
- At 4:22 pm on August 10, as we observed fluctuation of reactor water injection rate, we adjusted the rate to approx  $9.1\text{m}^3/\text{h}$ .
- At 7:30 pm on August 12, we adjusted the rate of injecting water at approx.  $9.0\text{m}^3/\text{h}$ , 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.  $8.0\text{m}^3/\text{h}$ .
- At 1:00 pm on August 20, we adjusted the rate of water injection into the reactor at approx.  $7.0\text{m}^3/\text{h}$ .
- 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.  $7.0\text{m}^3/\text{h}$  for injecting from feeding line and at  $1.0\text{m}^3/\text{h}$  for injecting from core spray system.
- At 2:50 pm on September 2, we adjusted flow rate at approx.  $7.0\text{m}^3/\text{h}$  for injecting

from feeding line and at  $2.0\text{m}^3/\text{h}$  for injecting from core spray system.

- At 2:37 pm on September 3, we adjusted the rate of water injection at approx.  $7\text{m}^3/\text{h}$  through reactor feed water system piping arrangement, and at approx.  $3\text{m}^3/\text{h}$  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.  $6.0\text{m}^3/\text{h}$ . (Water injection through core spray system continues at approx.  $3.0\text{m}^3/\text{h}$ .)
- 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.  $5.0\text{m}^3/\text{h}$ . (Water injection through core spray system continues at approx.  $3.0\text{m}^3/\text{h}$ .)
- 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.  $4.0\text{m}^3/\text{h}$ . (Water injection through core spray system continues at approx.  $3.0\text{m}^3/\text{h}$ .)
- 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  $8.0\text{m}^3/\text{h}$  (injection rate from feed water system remain at  $4.0\text{m}^3/\text{h}$ ).

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

- 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).

<Nitrogen Injection into the 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.

<Others>

- 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.

## **[Unit 4]**

<Alternative cooling of spent fuel pool>

- 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 rad 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 amount of water leaking from the hose was found at first order system of spent fuel pool alternate cooling system in Unit 4 waste treatment building. The alternate cooling of spent fuel pool is kept operation.

#### <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.

## **[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)

## **[Unit 6]**

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

- Following start of transferring of low radioactive accumulated water from temporary tank to Mega Float, we restarted the transferring of accumulated water at the underground of Unit 6 turbine building to temporary tank, as shown below.

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 16

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 on September 21 -

- We transferred low level radioactive accumulated water, which had been transferred from the turbine building to the temporary tank, from the temporary tank to Mega Float, as shown below.

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

- We transferred accumulated water from the basement of Unit 6 reactor building to the turbine building as shown below.

From 11:05 am to 12:00 pm on September 2

From 8:30 am to 9:55 pm on September 3

From 1:20 pm to 2:45 pm on September 8

From 10:15 am to 11:30 am on September 12

Transfer from September 13 onwards, will be considered depending on the water level at the building.

- 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 5:00 pm on August 13 to 10:00 am on August 14

#### <Others>

- 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.

## [Others]

### <Detection of radioactive materials>

#### [Soil]

- Plutonium was detected in the soil sampled on August 1, 8 and 15 in the site of the Power Station. In addition, as a result of nuclide analysis of the gamma ray contained in the soil, radioactive materials were detected. Strontium 89 and 90 were detected as a result of analysis conducted on strontium contained in the soil sampled on August 15 in the site of the Power Station.

#### [Air]

- We detected radioactive materials in the air collected at the site of Fukushima Daiichi Nuclear Power Station on 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 and 15. 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.

- 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.

#### [Water]

- We detected radioactive materials contained in the sea water near the power station collected on August 1 to 3, 5, 8 to 11, 17 to 19, 21, 30 and September 13 and 14. 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.  
Strontium 89 and 90 were detected as a result of analysis conducted on strontium contained in the seawater sampled on August 15 near the Power Station.
- We detected Iodine-131, Cesium-134 and Cesium-137 in the sampling of sub-drain water near the turbine building conducted on August 1, 3, 5, 8, 10, 12, 15, 17, 19, 22, 24, 26, 29, 31 and September 2, 5, 7, 9, 12, 14, 16 and 19.  
Strontium 89 and 90 were detected as a result of analysis conducted on strontium contained in the sub-drain water sampled on August 15.

#### [Marine soil]

- Cs-134 and Cs-137 were detected through a nuclide analysis in the marine soil sampled on August 6, 7, 8, 10, 23 and September 8, 9, 12, 14, 15 and 16 in Fukushima

Prefecture offshore.

#### <Accumulated water treatment facility>

- 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 hoses 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 restarted 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 same 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 adsorption 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<sup>3</sup>/h) at 6:46 pm. With regard to the second cesium adsorption instrument, it has been in operation.
- 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 01:34 pm on September 21, water desalination instrument (RO type) (3) was restarted by using backup system.

<Transferring accumulated water in Centralized Radiation Waste Treatment Facility >

- 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.

<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.
- At 11:04 am on July 30, we started transferring accumulated water in spent fuel common 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 Spent Fuel Common 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:  $4.7 \sim 7.0 \times 10^0$  [Bq/cm<sup>3</sup>], Cs 137:  $5.4 \sim 8.1 \times 10^0$  [Bq/cm<sup>3</sup>], Co 60:  $1.2 \times 10^0$  [Bq/cm<sup>3</sup>]) 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.

<Injured / ill health> (Latest)

- 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 ambulated 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 taken 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 Daiichi 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 were 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 were 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.

Fukushima Daiichi 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.
- 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

## **[Unit 1]**

## **[Unit 2]**

- 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 transitioned 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.

## **[Unit 3]**

- At 11:53 am on August 31, we completed restoring and started operating Unit 3 emergency diesel generator (A).

## **[Unit 4]**

- 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.

## **[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.

Kashiwazaki Kariwa Nuclear Power Station

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