

# Records after August 1, 2011

\* As at 3:00 pm, August 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 around 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 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 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 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.

## **[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 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.

#### <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.

#### <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 Vessel 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.

## [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. 3.9m<sup>3</sup> / 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 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 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<sup>3</sup>/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<sup>3</sup>/h, as we confirmed the increasein 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<sup>3</sup>/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<sup>3</sup>/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 m<sup>3</sup>/h, as we confirmed decrease in it.

#### < 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 transfting
- 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).

<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 to 11:13 am on August 9, we conducted sampling of gas in the Primary Containment Vessel of 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.  $7.0\text{m}^3/\text{h}$ .

< 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 at the underground floor, turbine building, Unit 3 to Miscellaneous Solid Waste Volume Reduction Treatment Building (High temperature incinerator facility).

<Nitrogen Injection into the 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

## **[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.

<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.

## **[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 turbing 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

- We transferred low radioactive accumulated water, which had been transferred from the turbine building to the temporary tank, from outdoor 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

- 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 transferring 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, August 9, we conducted plumbing between temporary pump and residual heat removal system pump (A) to enforce the connection method. We stopped the power source of residual heat removal system pump (B) during this work. Even though cooling of a reactor and a spent fuel pool were temporarily suspended, there are no safety issues regarding this. At 2:01 pm, we restarted cooling a reactor and a spent fuel pool.

## **[Others]**

<Detection of radioactive materials>

[Soil]

- Plutonium was detected in the soil sampled on August 1 in the site of the Power Station. In addition, as a result of nuclide analysis of the gamma ray contained in the soil, cesium, silver and others were detected.

[Air]

- We detected radioactive materials in the air collected at the site of Fukushima Daiichi Nuclear Power Station on August 2, 3, 6, 8 to 10, 12, 14, 15, 17 and 18. 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.

[Water]

- We detected radioactive materials contained in the sea water near the power station collected on August 1 to 3, 5, 8 to 11 and 17 to 19. 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 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 detected Iodine-131, Cesium-134 and Cesium-137 in the sampling of water near the turbine building conducted on August 1, 5, 8, 10, 12, 15, 17 and 19.

<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 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 calcinator).
- 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 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.

<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.

<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.

<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.

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.
- 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 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).

### **[Unit 3]**

### **[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.

Kashiwazaki Kariwa Nuclear Power Station

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

- The 16th Periodical Maintenance of Unit 1 was started on August 6.