Conditions of Fukushima Dai-ichi Nuclear Power Station **Unit 1**
(As of 11:00 April 10th, 2011)

### Major Events after the earthquake

- **11th 14:46** Under operation, Automatic shutdown by the earthquake
- **11th 15:42** Report based on the Article 10 (Total loss of A/C power)
- **11th 16:36** Occurrence of the Article 15 event (Inability of water injection of the Emergency Core Cooling System)
- **12th 01:20** Occurrence of the Article 15 event (Unusual rise of the pressure in PCV)
- **12th 10:17** Started to vent.
- **12th 15:36** Sound of explosion
- **12th 20:20** Started to inject seawater and borated water to the Reactor Core.
- **23rd 02:33** The amount of injected water to the Reactor Core was increased utilizing the Feedwater Line in addition to the Fire Extinguish Line. (2m³/h → 18m³/h)
- **09:00** Switched to the Feedwater Line only. (18m³/h → 11m³/h)
- **24th 11:30** Lighting in the Central Control Room was recovered.
- **25th 15:37** Started to inject fresh water.
- **29th 08:32** Switched to the water injection to the Reactor Core using the temporary motor-driven pump.
- **31st 12:00 ~ 2nd 15:26** Started to transfer the stagnant water from the Condensate Storage Tank (CST) to the Surge Tank of Suppression Pool Water (SPT)
- **31st 13:03 ~ 16:04** Water spray by Concrete Pump Truck (Fresh water)
- **3rd 12:02** The power supply to the temporary motor-driven pump was switched from the temporary power supply to the external power supply.
- **3rd 13:55** Started to transfer the water from the Condenser to CST.
- **6th 22:30** Started the operation for the injection of nitrogen to PCV.
- **7th 01:31** Confirmed starting the injection of nitrogen to PCV.
- **9th 04:10** Started using highly pure nitrogen generator in the injection of nitrogen to PCV.
- **10th 09:30** Completed transferring the water from the Condenser to CST.

### Current Conditions: Fresh water is being injected to the Spent Fuel Pool and the Reactor Core

- Spent Fuel Pool Cooling System
- Reactor Pressure A: 0.514MPa* (converted to absolute pressure: 0.514Mpa)
- Reactor Pressure B: 0.959MPa* (converted to absolute pressure: 0.959Mpa)
- Reactor Water Level A: 1,600mm
- Reactor Water Level B: 1,700mm
- Reactor Water Temperature: -°C
- PCV*3 Pressure: 0.195MPa
- S/P*4 Water Temperature: -°C
- S/P*4 Pressure: 0.160MPa

*1 Residual Heat Removal System
*2 Emergency Diesel Generator
*3 Primary Containment Vessel
*4 Suppression Pool

(Editorial committee for Nuclear Energy Handbook, Nuclear Energy Handbook)
Conditions of Fukushima Dai-ichi Nuclear Power Station Unit 2
(As of 11:00 April 10th, 2011)

Major Events after the earthquake

11th 14:46: Under operation, Automatic shutdown by the earthquake
11th 15:42: Report based on the Article 10 (Total loss of A/C power)
11th 16:36: Occurrence of the Article 15 event (Inability of water injection of the Emergency Core Cooling System)
13th 11:00: Started to vent.
14th 13:25: Occurrence of the Article 15 event (Loss of reactor cooling functions)
14th 16:34: Started to inject seawater to the Reactor Core.
14th 22:50: Occurrence of the Article 15 event (Unusual rise of the pressure in PCV)
15th 00:02: Started to vent.
15th 06:10: Sound of explosion
15th around 06:20: Possible damage of the suppression chamber
20th 15:05~17:20: Approximately 40 ton seawater injection to the Spent Fuel Pool (SFP) via the Fuel Pool Cooling line (FPC)
20th 15:46: Power Center received electricity.
22nd 16:07: Injection of around 18 tons of seawater to SFP
25th 10:30~12:19: Sea water injection to SFP via FPC
26th 10:10: Started to inject fresh water to the Reactor Core.
26th 16:46: Lighting in the Central Control Room was recovered.
27th 18:31: Switched to the water injection to the core using the temporary motor-driven pump.
29th 16:30~18:25: Switched to the temporary motor-driven pump injecting fresh water to SFP.
29th 16:45~17:15: Transferred the water from the Condensate Storage Tank (CST) to the Surge Tank of Suppression Pool Water (SPT)
30th 9:25~23:50: Confirmed malfunction of the temporary motor-driven pump injecting fresh water to SFP (9:45). Switched to the injection using the fire pump Truck, but suspended as cracks were confirmed in the hose. (12:47, 13:10): Resumed injection of fresh water (19:05)
1st 14:56~17:05: Injection of fresh water from FPC to SFP using the temporary motor-driven pump.
2nd around 9:30: The water, of which the dose rate was at the level of more than 1,000μSv/h, was confirmed to be collected in the pit located near the Intake Channel of Unit 2. The outflow from the lateral surface of the pit into the sea was also confirmed.
2nd 17:10: Started to transfer the water from the Condenser to the Condensate Storage Tank (CST)
3rd 12:12: The power supply to the temporary motor-driven pump was switched from the temporary power supply to the external power supply.
3rd 13:47~14:30: 20 bags of sawdust, 80 bags of high polymer absorbent and 3 bags of cutting-processed newspaper were put into the Pit for the Duct.
4th 7:08~7:11: Approximately 13kg of tracer (bath agent) was put in from the Pit for the Duct for Seawater Pipe.
4th 11:05~13:37: Injection of fresh water from FPC to SFP using the temporary motor-driven pump.
5th 14:15: Tracer is confirmed to outflow through the permeable layer around the pit into the sea.
15th 07:00: Started to inject coagulant.
6th around 5:38: The water outflow from the lateral surface of the pit was confirmed to stopped.
7th 13:29~14:34: Freshwater injection to SFP via FPC (Around 36 ton)
9th 13:10: Completed transferring the water from the Condenser to CST.
10th 10:37~12:38: Freshwater injection to SFP via FPC using the temporary motor-driven pump (Around 60 ton).

Spent Fuel Pool Temperature: 47.0 °C

Reactor Pressure A: 0.081MPa*
Reactor Pressure D: 0.076MPa*
Condition: No large fluctuation converted to absolute pressure
Reactor Water Level A: ~1,450mm
Condition: No flooding of top of active fuel to the above level
Reactor Water Temperature: ~ °C
Condition: No data available
Reactor Pressure Vessel (RPV) Temperature: Feedwater Nozzle Temperature 149.6°C
Temperature at the bottom head of RPV: ~ °C (Indicator failure)

Spent Fuel Pool Water Temperature: 149.6 °C

PCV*3 Pressure: 0.095MPa
Condition: No large fluctuation

S/P*4 Water Temperature: ~ °C
Condition: No data available
S/P*4 Pressure: ~ MPa
Condition: Down scale (under survey)

*1 Residual Heat Removal System
*2 Emergency Diesel Generator
*3 Primary Containment Vessel
*4 Suppression Pool

Current Conditions: Fresh water is being injected to the Spent Fuel Pool and the Reactor Core

(EDITORIAL COMMITTEE FOR NUCLEAR ENERGY HANDBOOK, NUCLEAR ENERGY HANDBOOK)
Spent Fuel Pool Water Temperature — °C
Condition: Indicator failure

Reactor Pressure A 0.092MPa
Reactor Pressure C 0.024MPa
Condition: No large fluctuation
*converted to absolute pressure
Reactor Water Level A ~1,900mm
Reactor Water Level B ~2,250mm
Condition: No flooding of top of active fuel to the above level

Reactor Water Temperature — °C
Condition: No data available

PCV Pressure 0.1061MPa
Condition: No large fluctuation

S/P Pressure 0.1717MPa
Condition: No large fluctuation

Spent Fuel Pool Water Temperature — °C
Condition: Indicator failure

Reactor Pressure Vessel (RPV)
Temperature
Feedwater Nozzle Temperature : 91.7°C (under survey)
Temperature at the bottom head of RPV : 110.8°C

Current Conditions: Fresh water is being injected to the Spent Fuel Pool and the Reactor Core

Spent Fuel Pool Cooling System

External Power
EDG *2
RHRS*1

*1 Residual Heat Removal System
*2 Emergency Diesel Generator
*3 Primary Containment Vessel
*4 Suppression Pool

11th 14:46 Under operation, Automatic shutdown by the earthquake
11th 15:42 Report based on the Article 10 (Total loss of A/C power)
13th 05:10 Occurrence of the Article 15 event (Inability of water injection of the Emergency Core Cooling System)
13th 08:41 Started to vent.
13th 13:12 Started to inject seawater and borated water to the Reactor Core.
14th 05:20 Started to vent.
14th 07:44 Occurrence of the Article 15 event (Unusual rise of the pressure in PCV)
14th 11:01 Sound of explosion
16th around 08:30 White smoke generated.
17th 09:48 10:01 Water discharge by the helicopters of Self-Defense Force
17th 19:05 19:15 Water spray from the ground by High pressure water-cannon trucks of Police
17th 19:35 20:09 Water spray from the ground by fire engines of Self-Defense Force
18th before 14:00 14:38 Water spray from the ground by 6 fire engines of Self-Defense Force
18th 14:45 Water spray from the ground by a fire engine of the US Military
19th 00:30 01:10 Water spray by Hyper Rescue Unit of Tokyo Fire Department
19th 14:10 ~ 20th 03:40 Water spray by Hyper Rescue Unit of Tokyo Fire Department
20th 11:00 Pressure of PCV rose (320kPa), Afterward fell.
20th 21:36 ~ 21st 03:58 Water spray by Hyper Rescue Unit of Tokyo Fire Department
21st around 15:55 Grayish smoke generated and was confirmed to be died down at 17:55.
22nd 15:10 ~ 16:00 Water spray by Hyper Rescue Unit of Tokyo Fire Department and Osaka City Fire Bureau.
22nd 22:46 Lighting in the Central Control Room was recovered.
23rd 11:03 13:20 Injection of about 35 ton of sea water to the Spent Fuel Pool (SFP) via the Fuel Pool Cooling Line (FPC)
23rd around 16:20 Black smoke generated and was confirmed to be died down at around 23:30 and 24th 04:50.
24th 05:35 16:05 Injection of around 120 ton of sea water to SFP via FPC
25th 13:28 16:00 Water spray by Kawasaki City Fire Bureau supported by Tokyo Fire Department
25th 18:02 Started fresh water injection to the core.
27th 12:34 14:36 Water spray by Concrete Pump Truck
28th 17:40 31st around 8:40 Transferring the water from the Condensate Storage Tank (CST) to the Surge Tank of Suppression Pool Water (SPT)
28th 20:30 Switched to the water injection to the core using a temporary motor-driven pump.
29th 14:17 18:18, 31st 16:30 19:33, 2nd 09:52 12:54, 4th 17:03 19:19, 7th 06:53 08:53, 8th 17:06 20:00
3rd 12:18 The power supply to the temporary motor-driven pump was switched from the temporary power supply to the external power supply.

(Short cut)
Major events after the earthquake

In periodic inspection outage when the earthquake occurred
14th 04:08 Water temperature in the Spent Fuel Pool (SFP), 84°C
15th 06:14 Confirmed the partial damage of wall in the 4th floor.
15th 09:38 Fire occurred in the 3rd floor. (12:25 extinguished)
16th 05:45 Fire occurred. TEPCO couldn’t confirm any fire on the ground. (06:15)
20th 08:21~09:40 Water spray over SFP by Self-Defense Force
20th around 18:30~19:46 Water spray over SFP by Self-Defense Force
21st 06:37~08:41 Water spray over SFP by Self-Defense Force
21st around 15:00 Work for laying cable to Power Center was completed.
22nd 10:35 Power Center received electricity.

<Water spray by Concrete Pump Truck>
5th 06:05~10:20 Sea water injection to SFP via the Fuel Pool Cooling Line (FPC)
29th 11:50 Lighting in the Central Control Room was recovered.

<Water spray by Concrete Pump Truck (Fresh water)>

Spent Fuel Pool Water Temperature — ℃ Condition: Indicator failure

No fuel is inside the Reactor Core

Current Conditions: No fuel is in RPV*3. Fresh water is being injected to the Spent Fuel Pool.

(�ditorial committee for Nuclear Energy Handbook, Nuclear Energy Handbook)
Conditions of Fukushima Dai-ichi Nuclear Power Station Unit 5
(As of 11:00 April 10th, 2011)

Water Temperature in the Pool: 36.4°C
Condition: Recovery of heat removal function

Reactor Pressure: 0.108MPa*
Reactor Water Level: 2,057mm
Reactor Water Temperature: 36.4°C
Condition: Pressure is under control.
*converted to absolute pressure

Spent Fuel Pool Cooling System

Reactor Pressure Vessel Temperature: Monitoring by Reactor Water Temperature

※Heat removal was carried out alternately with the water in the Reactor Core and in the Spent Fuel Pool.

Current Conditions:
20th 14:30 Cold shutdown
21st 11:36 Receiving electricity from external power supply
23rd 17:24 Pump for Residual Heat Removal Seawater System (RHRS) was automatically stopped when the power supply was switched from the temporary to the permanent.
24th 16:14 Repair of the RHRS pump was completed.
24th 16:35 Started to cooling.
4th 21:00 – 8th 12:14 Discharged the groundwater with low-level radioactivity in the Sub Drain Pit to the sea (around 950 ton).

*1 Residual Heat Removal System

(Editors' Committee for Nuclear Energy Handbook, Nuclear Energy Handbook)
Conditions of Fukushima Dai-ichi Nuclear Power Station Unit 6
(As of 11:00 April 10th, 2011)

External Power

Spent Fuel Pool

Cooling System

Water Temperature in the Pool: 31.0°C
Condition: Recovery of heat removal function.

Current Conditions:
20th 19:27 Cold shutdown
22nd 19:17 Receiving electricity from external power supply
4th 21:00 ~ 9th 18:52 Discharged the groundwater with low-level radioactivity in the Sub Drain Pit to the sea (around 373 ton).

Reactor Pressure: 0.117MPa*
Reactor Water Level: 2,502mm
Reactor Water Temperature: 22.2°C
Condition: Pressure is under control.
*converted to absolute pressure

Reactor Pressure Vessel Temperature:
Monitoring by Reactor Water Temperature

※Heat removal was carried out alternately with the water in the Reactor Core and in the Spent Fuel Pool.

*1 Residual Heat Removal System

(Editorial committee for Nuclear Energy Handbook, Nuclear Energy Handbook)