Conditions of Fukushima Dai-ichi Nuclear Power Station **Unit 1**
(As of 13:00 April 13th, 2011)

**Major Events after the Earthquake**

- March 11th 14:46 Under operation, Automatic shutdown by the earthquake
- March 11th 15:42 Report based on the Article 10 (Total loss of A/C power)
- March 11th 16:36 Occurrence of the Article 15 event (Inability of water injection of the Emergency Core Cooling System)
- March 12th 01:20 Occurrence of the Article 15 event (Unusual rise of the pressure in PCV)
- March 12th 10:17 Started to vent.
- March 12th 15:36 Sound of explosion
- March 12th 20:20 Started to inject seawater and borated water to the Reactor Core.
- March 24th 11:30 March 25th 15:37
- March 29th 08:32 Switched the water injection to the Reactor Core-driven pump.
- April 3rd 12:02 The power supply to the temporary motor-driven pump was switched from the temporary power supply to the external power supply.
- April 3rd 13:55 Started to transfer the water from the Condenser to CST.
- April 6th 22:30 Started the operation for the injection of nitrogen to PCV.
- April 7th 01:31 Confirmed starting the injection of nitrogen to PCV.
- April 7th 04:10 Started using highly pure nitrogen generator in the injection of nitrogen to PCV.
- April 10th 09:30 Completed transferring the water from the Condenser to CST.
- April 11th around 17:16 Loss of external power supply due to an earthquake occurred and water injection to the Reactor Core and nitrogen injection to PCV were suspended.
- April 11th 17:56 External power supply was recovered.
- April 11th 18:04 Resumed injecting water to the Reactor Core.
- April 11th 23:19 Restarted operation for injecting nitrogen to PCV.
- April 11th 23:34 Confirmed starting injection of nitrogen to PCV.

**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)
Limitation of Summary

As of 13:00 April 13th, 2011

Spent Fuel Pool Water Temperature 45.0 °C

Reactor Pressure A 0.085MPa* (under monitoring of the change of the situation)
Reactor Pressure D 0.081MPa* (under monitoring of the change of the situation)
Condition: No large fluctuation *converted to absolute pressure
Reactor Water Level A 
—1,500mm
Condition: No flooding of top of active fuel to the above level
Reactor Water Temperature °C
Temperature: Feedwater Nozzle Temperature 166.9°C
Temperature at the bottom head of RPV 69.1 °C (under monitoring of the change of the situation)

PCV*3 Pressure 0.095MPa Condition: No large fluctuation

S/P**4 Water Temperature °C
Condition: No data available
S/P**5 Pressure — MPa
Condition: Down scale (under survey)

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

- External Power
- EDG*2
- RHRS *1
- Residual Heat Removal System
- Emergency Diesel Generator
- Primary Containment Vessel
- Suppression Pool

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

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

Major Events after the Earthquake 1/2

March 11th 14:46 Under operation, Automatic shutdown by the earthquake
March 11th 15:42 Report based on the Article 10 (Total loss of A/C power)
March 11th 16:36 Occurrence of the Article 15 event (Inability of water injection of the Emergency Core Cooling System)
March 13th 11:00 Started to vent.
March 14th 13:25 Occurrence of the Article 15 event (Loss of reactor cooling functions)
March 14th 16:34 Started to inject seawater to the Reactor Core.
March 14th 22:50 Occurrence of the Article 15 event (Unusual rise of the pressure in PCV)
March 15th 00:02 Started to vent.
March 15th 06:10 Sound of explosion
March 15th around 06:20 Possible damage of the suppression chamber
March 20th 15:05~17:20 Approximately 40 ton seawater injection to the Spent Fuel Pool (SFP) via the Fuel Pool Cooling Line (FPC)
March 20th 15:46 Power Center received electricity.
March 21 18:22 White smoke generated. The smoke died down and almost invisible at 07:11 March 22nd.
March 22nd 16:07 Injection of around 18 tons of seawater to SFP
March 25th 10:30~12:19 Sea water injection to SFP via FPC
March 26th 10:10 Started to inject fresh water to the Reactor Core.
March 26th 16:46 Lighting in the Central Control Room was recovered.
March 27th 18:31 Switched to the water injection to the core using the temporary motor-driven pump.
March 29th 16:30~18:25 Switched to the temporary motor-driven pump injecting fresh water to SFP.
March 29th 16:45~1:11:50 Transferred the water from the Condensate Storage Tank (CST) to the Surge Tank of Suppression Pool Water (SPT)
March 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)
April 1st 14:56~17:05 Freshwater injection to SFP via FPC using the temporary motor-driven pump.
April 2nd around 9:30 The water, of which the dose rate was at the level of more than 1,000mSv/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.
April 2nd 17:10 Started to transfer the water from the Condenser to the CST.
April 3rd 12:12 The power supply to the temporary motor-driven pump was switched from the temporary power supply to the external power supply.
April 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 Conduit.
April 4th 7:08~7:11 Approximately 13kg of tracer (bath agent) was put in from the Pit for the Duct for Seawater Pipe.
April 4th 11:05~13:37 Freshwater injection to SFP via FPC using the temporary motor-driven pump.
April 5th 14:15 Tracer is confirmed to outflow through the permeable layer around the pit into the sea. 15:07 Started to inject coagulant.
April 6th around 5:38 The water outflow from the lateral surface of the pit was confirmed to stopped.
April 7th 13:29~14:34 Freshwater injection to SFP via FPC (Around 36 ton)
April 9th 13:10 Completed transferring the water from the Condenser to CST.
April 10th 10:37~12:38 Freshwater injection to SFP via FPC using the temporary motor-driven pump (Around 60 ton).
April 11th around 17:16 Loss of external power supply due to an earthquake occurred. Water injection to the Reactor Core was suspended.
April 11th 17:56 External power supply was recovered.
April 11th 18:04 Resumed injecting water to the Reactor Core.
April 12th 19:35  Started to transfer from the trench of the turbine building to the Condenser. Suspended the transfer for checking leaks, etc. (April 11th 11:00).
April 13th 13:15～14:35 Freshwater injection to FPC via FPC using the temporary motor-driven pump.
**Conditions of Fukushima Dai-ichi Nuclear Power Station Unit 3**

(As of 13:00 April 13th, 2011)

**Spent Fuel Pool Water Temperature**
- °C
  - Condition: Indicator failure

**Reactor Pressure A** 0.078MPa*
- (under monitoring of the change of the situation)

**Reactor Pressure C** 0.018MPa*
- (under monitoring of the change of the situation)

**Reactor Water Level A** -1,750mm

**Reactor Water Level B** -2,200mm
- 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**
- 92.2°C
  - (under monitoring of the change of the situation)

**Temperature at the bottom head of RPV**
- 117.3°C

**PCV**
- Pressure 0.1036MPa
  - Condition: No large fluctuation

**S/P**
- Water Temperature
d- °C
  - Condition: No data available
  - Condition: No large fluctuation

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

**Major Events after the Earthquake**

- March 11th 14:46 Under operation, Automatic shutdown by the earthquake
- March 11th 15:42 Report based on the Article 10 (Total loss of A/C power)
- March 13th 05:10 Occurrence of the Article 15 event (Inability of water injection of the Emergency Core Cooling System)
- March 13th 08:41 Started to vent.
- March 13th 13:12 Started to inject seawater and borated water to the Reactor Core.

**March 14th**
- 05:20 Started to vent.
- 07:44 Occurrence of the Article 15 event (Unusual rise of the pressure in PCV)

- March 14th 11:01 Sound of explosion
- March 16th around 08:30 White smoke generated.

- March 17th 09:48～10:01 Water discharge by the helicopters of Self-Defense Force
- March 17th 19:05～19:15 Water spray from the ground by High pressure water-cannon trucks of Police
- March 17th 19:35～20:09 Water spray from the ground by fire engines of Self-Defense Force

**March 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

**March 19th**
- 00:30～01:10 Water spray by Hyper Rescue Unit of Tokyo Fire Department

- March 19th 14:10～20:03:40 Water spray by Hyper Rescue Unit of Tokyo Fire Department
- March 20th 11:00 Pressure of PCV rose(320kPa). Afterward fell.
- March 20th 21:36～21:58 Water spray by Hyper Rescue Unit of Tokyo Fire Department
- March 21st around 15:55 Grayish smoke generated and was confirmed to be died down at 17:55.

**March 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.

**March 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

**March 28th**
- 17:40～23:15 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.

**April 3rd**
- 12:18 The power supply to the temporary motor-driven pump was switched from the temporary power supply to the external power supply.
- 11th around 17:16 Loss of external power supply of Unit 1 and 2 occurred and water injection to the Reactor Core was suspended.

**April 11th**
- 18:04 External power supply of Units 1 and 2 recovered (April 11th 17:56). Resumed injecting water to the Reactor Core.

- <Water spray by Concrete Pump Truck (Fresh water)> [Editorial committee for Nuclear Energy Handbook, Nuclear Energy Handbook]
Conditions of Fukushima Dai-ichi Nuclear Power Station Unit 4  
(As of 13:00 April 13th, 2011)

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

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

**In periodic inspection outage**

- Spent Fuel Pool Water Temperature $-^{\circ}$C  
  Condition: Indicator failure

**No fuel is inside the Reactor Core**

**Major Events after the Earthquake**

- In periodic inspection outage when the earthquake occurred  
  - March 14th 04:08 Water temperature in the Spent Fuel Pool (SFP), 84$^{\circ}$C  
  - March 15th 06:14 Confirmed the partial damage of wall in the 4th floor.  
  - March 15th 09:38 Fire occurred in the 3rd floor. (12:25 extinguished)  
  - March 16th 05:45 Fire occurred. TEPCO couldn’t confirm any fire on the ground. (06:15)

- March 20th 08:21~09:40 Water spray over SFP by Self-Defense Force
- March 20th around 18:30~19:46 Water spray over SFP by Self-Defense Force
- March 21st 06:37~08:41 Water spray over SFP by Self-Defense Force
- March 21st around 15:00 Work for laying cable to Power Center was completed.
- March 22nd 10:35 Power Center received electricity.

- Water spray by Concrete Pump Truck (Fresh water)  

- March 25th 06:05~10:20 Sea water injection to SFP via the Fuel Pool Cooling Line (FPC)
- March 29th 11:50 Lighting in the Central Control Room was recovered.
- April 11th around 17:16 An earthquake occurred.
- April 12th 12:00~13:04 Sampled the water in SFP.

- Water spray by Concrete Pump Truck (Seawater)  

- March 25th 06:05~10:20 Sea water injection to SFP via the Fuel Pool Cooling Line (FPC)
- March 29th 11:50 Lighting in the Central Control Room was recovered.
- April 11th around 17:16 An earthquake occurred.
- April 12th 12:00~13:04 Sampled the water in SFP.

- Water spray by Concrete Pump Truck (Seawater)  

- March 25th 06:05~10:20 Sea water injection to SFP via the Fuel Pool Cooling Line (FPC)
- March 29th 11:50 Lighting in the Central Control Room was recovered.
- April 11th around 17:16 An earthquake occurred.
- April 12th 12:00~13:04 Sampled the water in SFP.

- Water spray by Concrete Pump Truck (Seawater)  

- March 25th 06:05~10:20 Sea water injection to SFP via the Fuel Pool Cooling Line (FPC)
- March 29th 11:50 Lighting in the Central Control Room was recovered.
- April 11th around 17:16 An earthquake occurred.
- April 12th 12:00~13:04 Sampled the water in SFP.

- Water spray by Concrete Pump Truck (Seawater)  

- March 25th 06:05~10:20 Sea water injection to SFP via the Fuel Pool Cooling Line (FPC)
- March 29th 11:50 Lighting in the Central Control Room was recovered.
- April 11th around 17:16 An earthquake occurred.
- April 12th 12:00~13:04 Sampled the water in SFP.
Conditions of Fukushima Dai-ichi Nuclear Power Station Unit 5
(As of 13:00 April 13th, 2011)

In periodic inspection outage

Water Temperature in the Pool: 35.1℃
Condition: Recovery of heat removal function

Reactor Pressure: 0.104MPa*
Reactor Water Level: 1,590mm
Reactor Water Temperature: 43.4℃
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.

External Power

Spent Fuel Pool Cooling System

RHRS※1

※1 Residual Heat Removal System

Major Events after the Earthquake:
March 20th 14:30 Cold shutdown
March 21st 11:36 Receiving electricity from external power supply
March 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.
March 24th 16:14 Repair of the RHRS pump was completed.
March 24th 16:35 Started to cooling.
April 4th 21:00 – 8th 12:14 Discharged the groundwater with low-level radioactivity in the Sub Drain Pit to the sea (around 950 ton).
April 11th around 17:16 An earthquake occurred.

(Editorial committee for Nuclear Energy Handbook, Nuclear Energy Handbook)
Conditions of Fukushima Dai-ichi Nuclear Power Station Unit 6
(As of 13:00 April 13th, 2011)

External Power

Water Temperature in the Pool: 23.0°C
Condition: Recovery of heat removal function.

Spent Fuel Pool Cooling System

Major Events after the Earthquake:
March 20th 19:27 Cold shutdown
March 22nd 19:17 Receiving electricity from external power supply
April 4th 21:00 – 9th 18:52 Discharged the groundwater with low-level radioactivity in the Sub Drain Pit to the sea (around 373 ton).
April 11th around 17:16 An earthquake occurred.

RHRS*1

Reactor Pressure: 0.117MPa*
Reactor Water Level: 2,365mm
Reactor Water Temperature: 34.2°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)