Conditions of Fukushima Dai-ichi Nuclear Power Station **Unit 1**  
(As of 7:00 May 2nd, 2011)

**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 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 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)
- March 24th 11:30 Lighting in the Central Control Room was recovered.
- March 25th 15:37 Started to inject fresh water.
- March 29th 08:32 Switched to the water injection to the Reactor Core using the temporary motor-driven pump.
- March 31th 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)
- March 31st 13:03 Started to transfer water from the Condenser to CST.
- 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 9th 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 (at Hamadori in Fukushima Prefecture) 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.
- April 17th 16:00 ~ 17:30 Confirmed the situation in the reactor building using an unmanned robot.
- April 18th 11:50 ~ 12:12 Stopped the water injection into the reactor core to replace the current hose with a new one.
- April 19th 10:23 Completed the work of strengthening connection of the power supplies between Units 3-2 and Units 3-4.
- April 25th 10:57 ~ 18:25 For reinforcement work of the power supply, the power supply to the pump injecting water into the reactor core was temporarily switched from the external power supply to the temporary diesel generator.
- April 25th 14:10 ~ 19:10 Suspended nitrogen injection due to reinforcement work of the power supply.
- April 25th 14:44 ~ 17:38 Implemented reinforcement work of the power supply (connection of the power supplies between Units 1-2 and Units 5-6).
- April 25th 11:35 ~ 13:24(approx.) Observed the situation in the reactor building using unmanned robots.

**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)
April 27th 10:02  Started the operation of gradually changing the amount of water for injection to the Reactor Pressure Vessel, from about 6m3/h to the maximum of about 14m3/h. After carrying out the injection at 10m3/h, the injection rate was changed back to 6m3/h.

April 29th 11:36～14:05  Confirmed the situation in the reactor building using an unmanned robot.
Conditions of Fukushima Dai-ichi Nuclear Power Station

Unit 2

(As of 7:00 May 2nd, 2011)

Major Events after the Earthquake 1/2

March 11th 14:46 Under operation, Automatic shutdown by the earthquake
March 11th 15:12 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 21st 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 16:45~17:15 Transferred the water from the Condense 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(450). 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 using the temporary motor-driven pump.
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. 
April 11th around 17:16 Loss of external power supply due to an earthquake occurred (at Hamadori in Fukushima Prefecture). 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.

Spent Fuel Pool Water Temperature 47.0 °C

Reactor Pressure A  0.078MPa* (under monitoring of the change of the situation)
Reactor Pressure D  0.083MPa* (under monitoring of the change of the situation)
Condition: Almost no change
*No change to absolute pressure
Reactor Water Level A -1,500mm
Reactor Water Level B -2,100mm
Condition: Uncovering of the core from the top of the active fuel to the levels described above

Reactor Water Temperature °C
Condition: No data available

Reactor Pressure Vessel (RPV)
Temperature: Feedwater Nozzle Temperature 117.9 °C
Temperature at the bottom head of RPV: °C (indicator failure)

PCV*3 Pressure  0.070MPa
Condition: Almost no change

S/P*4 Water Temperature A 68.1 °C
S/P*4 Water Temperature B 68.3 °C
Condition: Almost no change
S/P*4 Pressure  ~ MPa
Condition: No data available
(Indicator failure)

Spraying freshwater by temporary motor-driven pump through existing cooling system

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

(From the Editorial committee for Nuclear Energy Handbook, Nuclear Energy Handbook)
Major Events after the Earthquake 2/2

April 12th 19:35～April 13th 17:04 Transfer from the trench of the turbine building to the Condenser.
April 13th 11:00 Suspended the transfer for checking leaks, etc.
April 13th 13:15～14:55 Freshwater injection to SFP via FPC using the temporary motor-driven pump.
April 16th 10:13～11:54 Freshwater injection to SFP via FPC using the temporary motor-driven pump. (The temporary motor-driven pump stopped at 11:39 due to an earthquake that occurred at around 11:19. SFP was confirmed to be filled to capacity through observing a rise of the water level in the Skimmer Tank.)
April 16th around 11:19 An earthquake occurred (in the southern part of Ibaraki Prefecture).
April 18th 10:13～11:54 Freshwater injection to SFP via FPC using the temporary motor-driven pump.

April 19th 10:08～ Started to transfer the stagnant water with high-level radioactivity from the trench of the turbine building to the buildings of radioactive waste treatment facilities.
April 19th 10:23 Completed the work of strengthening connection of the power supplies between Units 1-2 and Units 3-4.
April 19th 16:08～17:28 Injected freshwater to SFP via FPC using the temporary motor-driven pump.
April 22nd 15:55～17:40 Injected freshwater to SFP via FPC using the temporary motor-driven pump.
April 25th 10:12～11:18 Injected freshwater to SFP via FPC using the temporary motor-driven pump.
April 25th 10:57～18:25 For reinforcement work of the power supply, the power supply to the pump injecting water into the reactor core was temporarily switched from the external power supply to the temporary diesel generator.
April 25th 10:12～11:18 Injected freshwater to SFP via FPC using the temporary motor-driven pump.
April 25th 14:44～17:38 Implemented reinforcement work of the power supply (connection of the power supplies between Units 1-2 and Units 5-6).
April 28th 10:15～11:28 Injected freshwater to SFP via FPC using the temporary motor-driven pump.
April 29th 9:16 ～4/30 14:05 Suspended the transfer of stagnant water from the Turbine Building Trench of Unit 2 (Stagnant water with high-level radioactivity) to the Radioactive Waste Treatment Facility in order to carry out inspections, etc. of the transfer facilities.
May 1st 13:35 ～ Started blocking the Trench pit.
May 2nd 10:05～11:40 Injected freshwater to SFP via FPC using the temporary motor-driven pump.
Conditions of Fukushima Dai-ichi Nuclear Power Station

Unit 3

(As of 7:00 May 2nd, 2011)

**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 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.
- **March 14th** 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
- **March 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** 21:36~21:03:58 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.
- **March 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)
- **March 23rd** around 16:20 Black smoke generated and was confirmed to died down at around 23:30 and 24th 04:50.
- **March 24th** 05:35~16:05 Injection of around 120 ton of sea water to SPF via FPC
- **March 25th** 13:28~16:00 Water spray by Kawasaki City Fire Bureau supported by Tokyo Fire Department
- **March 25th** 18:02 Started fresh water injection to the core.
- **March 27th** 12:34~14:36 Water spray by Concrete Pump Truck
- **March 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)
- **March 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.
- **April 11th** around 17:16 Loss of external power supply of Unit 1 and 2 due to an earthquake occurred (at Hamadori in Fukushima Prefecture) 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.
- **April 17th** 11:30~14:00 Confirmed the situation in the reactor building using unmanned robot.
- **April 18th** 12:38~13:05 Stopped the water injection into the reactor core to replace the current hose with a new one.

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

**Reactor Pressure A 0.037MPa**
(under monitoring of the change of the situation)

**Reactor Pressure C 0.012MPa**
(under monitoring of the change of the situation)

**Condition:** Almost no change
*converted to absolute pressure

**Reactor Water Level A -1,850mm**

**Reactor Water Level B -2,250mm**

**Condition:** Uncovering of the core from the top of the active fuel to the levels described above

**Reactor Water Temperature — °C**
Condition: No data available

**Reactor Pressure Vessel (RPV) Temperature**

**Feedwater Nozzle Temperature : 99.2°C**
(under monitoring of the change of the situation)

**Temperature at the bottom head of RPV : 123.6°C**

**PCV#3 Pressure 0.1019MPa**
Condition: Almost no change

**S/P#4 Water Temperature A 40.5°C**

**S/P#4 Water Temperature B 40.5°C**
Condition: Almost no change

**S/P#4 Pressure 0.1790MPa**
Condition: Almost no change

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

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*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)
April 19th 10:23 Completed the work of strengthening connection of the power supplies between Units 1-2 and Units 3-4.
April 22nd 13:40～14:00 Tentatively Injected freshwater to SFP via the Fuel Pool Coolant Purification Line.
April 25th 10:57～18:25 For reinforcement work of the power supply, the power supply to the pump injecting water into the reactor core was temporarily switched from the external power supply to the temporary diesel generator.
April 30th 11:34 Completed reinforcement work of the power supply both Units 3, 4). (Increasing the voltage from 6.6kv to 66kv)

<Water spray by Concrete Pump Truck (Fresh water)>
  March 29th 14:17～18:18, March 31st 16:30～19:33, April 2nd 09:52～12:54, April 4th 17:03～19:19, April 7th 06:53 ～08:53, April 8th 17:06～20:00, April 10th 17:15～19:15, April 12th 16:26～17:16, April 14th 15:56～16:32, April 18th 14:17～15:02, April 22nd 14:19～15:40, April 26th 12:25～14:02
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)
Conditions of Fukushima Dai-ichi Nuclear Power Station **Unit 5**  
(As of 7:00 May 2nd, 2011)

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**In periodic inspection outage**

- Water Temperature in the Pool: 40.1°C  
  Condition: Recovery of heat removal function

- Reactor Water Level: 1,735mm

- Reactor Water Temperature: 39.2°C  
  Condition: Pressure is under control.  
  *converted to absolute pressure

- Reactor Pressure Vessel Temperature: Monitoring by Reactor Water Temperature

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**Spent Fuel Pool Cooling System**

- Removing heat alternately from the water in the reactor and in the spent fuel pool.

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**External Power**

- One line secured

**EDG*2**

- Share two EDGs of Unit 6

**RHRS*1**

- Removing heat alternately from the water in the reactor and in the spent fuel pool.

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**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 25th 12:22 ~ 16:43 For reinforcement work of the power supply, the pump for Residual Heat Removal (RHR) was temporarily stopped.
- April 25th 14:44~17:38 Implemented reinforcement work of the power supply (connection of the power supplies between Units 1-2 and Units 5-6).

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*1 Residual Heat Removal System

*2 Emergency Diesel Generator

(Editorial committee for Nuclear Energy Handbook, Nuclear Energy Handbook)
Conditions of Fukushima Dai-ichi Nuclear Power Station Unit 6
(As of 7:00 May 2nd, 2011)

Water Temperature in the Pool: 32.5°C
Condition: Recovery of heat removal function.

Removing heat alternately from the water in the reactor and in the spent fuel pool.

Spent Fuel Pool Cooling System

External Power

In periodic inspection outage

One line secured

EDG*2

Two EDGs

RHRS*1

Removing heat alternately from the water in the reactor and in the spent fuel pool.

Reactor Pressure: 0.119MPa*
Reactor Water Level: 2412mm
Reactor Water Temperature: 26.4°C
Condition: Pressure is under control.
*converted to absolute pressure

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 19th 11:00~15:00 Transferred stagnant water under the base of the turbine building to the condenser for measuring the amount of it.
April 20th 9:51~15:56 The pump for Residual Heat Removal (RHR) was temporarily stopped in order to change the position of the hose of the temporary RHR Seawater System.
April 25th 14:44~17:38 Implemented reinforcement work of the power supply (connection of the power supplies between Units 1-2 and Units 5-6).
May 1st 14:00 ~ 17:00 Transferred stagnant water of basement of the turbine building to the temporary tank.
May 2nd 10:00 ~ Started the transferring stagnant water to the temporary tank.

(Edited by the Editorial committee for Nuclear Energy Handbook, Nuclear Energy Handbook)