

Extract

May 23, 2011

Nuclear and Industrial Safety Agency

## Seismic Damage Information (the 147th Release)

(As of 12:00 May 23, 2011)

Nuclear and Industrial Safety Agency (NISA) confirmed the current situation of Onagawa NPS, Tohoku Electric Power Co. Inc.; Fukushima Dai-ichi and Fukushima Dai-ni NPSs, Tokyo Electric Power Co. Inc. (TEPCO); Tokai Dai-ni NPS, Japan Atomic Power Co. Inc. as follows:

Major updates are as follows.

### 1. Nuclear Power Stations (NPSs)

#### ● Fukushima Dai-ichi NPS

- The nitrogen injection into Unit 1 was temporarily interrupted after the compressor stopped due to “high temperature”. (Around 14:00 May 21.) The nitrogen injection was resumed by using a back-up device. (17:11 May 21) The nitrogen injection device so far used on Unit 1 was replaced by another one that was intended for usage on Units 2 and 3. (11:23 May 22)
- The work of sampling airborne radioactive materials was conducted at the opening of the reactor building of Unit 1. (From 12:30 till 13:50 May 22)
- Fresh water (about 90t) was sprayed over the Spent Fuel Pool of Unit 1 using a concrete pump truck (62m class). (From 15:33 till 17:09 May 22)
- Removal of rubble (16 felled trees) was carried out using remote-controlled heavy machinery. (From 09:00 till 16:00 May 22)

### <Instructions Regarding Foods and Drinks>

#### ● Lifting of the suspension of shipment

- Shiitake (limited to those grown on raw lumber in open fields) produced in Kawauchi Village, Fukushima Prefecture (excluding the area within 20km radius from Fukushima Dai-ichi NPS).

For more information: NISA English Home Page  
<http://www.nisa.meti.go.jp/english/index.html>



Extract

May 24, 2011

Nuclear and Industrial Safety Agency

## Seismic Damage Information (the 148th Release)

(As of 12:00 May 24, 2011)

Nuclear and Industrial Safety Agency (NISA) confirmed the current situation of Onagawa NPS, Tohoku Electric Power Co. Inc.; Fukushima Dai-ichi and Fukushima Dai-ni NPSs, Tokyo Electric Power Co. Inc. (TEPCO); Tokai Dai-ni NPS, Japan Atomic Power Co. Inc. as follows:

Major updates are as follows.

### 1. Nuclear Power Stations (NPSs)

#### ● Fukushima Dai-ichi NPS

- Fresh water injection into the Spent Fuel Pool of Unit 3 via the Fuel Pool Cooling and Clean-up Line was started. (10:15 May 24)
- The work of sampling airborne radioactive materials was conducted at the opening of the reactor building of Unit 4. (From 14:17 till 14:37 May 23)
- Fresh water (about 100t) was sprayed over the Spent Fuel Pool of Unit 4 using a concrete pump truck (62m class). (From 16:00 till 19:09 May 23) (About 0.3m<sup>3</sup> of hydrazine was also injected from 16:08 till 18:30.)
- The transfer of accumulated water from the basement of the turbine building of Unit 6 to a temporary tank was started. (09:00 May 24)
- Full-scale implementation of spraying an anti-scattering agent to prevent the spread of radioactive materials was carried out by workers in an area of about 8,750m<sup>2</sup> at the observation deck, in the subcontractor's yard, around the Nonflammable Waste Treatment Facility, the Main Office Building and the Main Gate. (From 09:00 till 13:00 May 23)
- Full-scale implementation of spraying an anti-scattering agent to prevent the spread of radioactive materials was carried out using an unmanned crawler dump in an area of about 6,000m<sup>2</sup> on the east side of the turbine building of Unit 3. (From 11:00 till 15:30 May 23)
- Removal of rubble (an amount equivalent to 4 containers) was carried

out using remote-controlled heavy machinery. (From 09:00 till 16:00  
May 23)

## 2. Actions Taken by NISA

(May 23)

- NISA instructed TEPCO to submit a report on the installation of an alternative cooling and clean-up system for the Spent Fuel Pool of Unit 2, Fukushima Dai-ichi NPS pursuant to the provisions of Article 67, paragraph 1 of the Nuclear Regulation Act, in order to verify its validity as an emergency measure prescribed in Article 64, paragraph 1 of said Act. On May 21, the report was received and NISA determined that the installation was unavoidable as an emergency measure.
- Based on the report received from TEPCO on May 20 regarding the actions taken in response to the outflow of contaminated water with high concentration of radioactive materials (hereinafter referred to as “Contaminated Water”) near the Intake Channel of Unit 3, Fukushima Dai-ichi NPS, NISA directed TEPCO to carry out the following items in addition to the measures taken by the company, in order to further reinforce the measures to prevent the recurrence of outflow of the Contaminated Water at the NPS.
  - Conduct an investigation of the situation of the pits and seawall (cracks, etc. on the quay, etc.), which have not been fully confirmed, and for locations where the possibility of outflow cannot be ruled out, outflow prevention measures shall be planned and reported to NISA.
  - If the results of monitoring inside the port indicate a significant increase in the concentration of radioactive materials, an investigation of the surrounding area shall be carried out immediately, such as by visual inspection. If an outflow is confirmed, appropriate measures to stop the water must be taken and the result of the measures shall be reported to NISA.
  - Investigate as much as possible the situation of accumulated water inside the facilities in order to reduce the accumulation of the Contaminated Water, as well as reduce the possibility of the

outflow of the water, and report to NISA about the plans to store and treat the Contaminated Water.

(May 24)

- NISA received a report from TEPCO on May 23 and made the following evaluation based on the report regarding the analysis of operational records and accident records, and the evaluation of the impact at Fukushima Dai-ichi NPS.
  - Each plant shut-down normally when the earthquake occurred and the emergency diesel generators started up normally after losing the external power supply due to the earthquake. It was confirmed that the cooling functions were also working normally. However, due to the arrival of the tsunami, all AC power supply was lost, and in addition, the power supply system such as batteries and distribution boards became wet or submerged in water. Therefore, the power supply was lost for an extended period, which led to the current serious situation.
  - With regard to some electric facilities, it was difficult to verify them at the scene due to the presence of large amounts of radioactive waste water, and although information was limited, NISA determined at this point of time that TEPCO's analysis on these facilities was valid to a certain extent. As a result of making a comprehensive review of records such as plant data, it is estimated that the electric facilities in the NPS were lost their functions by the tsunami.

<Situation of Injuries, etc.>

Around 10:20 am May 23, a subcontractor worker who was unloading a tank for the treatment water near the carry-in gate for large stuff on the 1<sup>st</sup> floor of On-site Bunker Building, injured his left hand. He was examined at the medical office in Fukushima Dai-ichi NPS and re-examined at J-Village. After these medical examinations, at around 0:50pm, he was transferred to Iwaki Kyouritsu General Hospital by an ambulance. There was no contamination on his body.

For more information: NISA English Home Page

<http://www.nisa.meti.go.jp/english/index.html>



Extract

May 25, 2011

Nuclear and Industrial Safety Agency

## Seismic Damage Information (the 149th Release)

(As of 12:00 May 25, 2011)

Nuclear and Industrial Safety Agency (NISA) confirmed the current situation of Onagawa NPS, Tohoku Electric Power Co. Inc.; Fukushima Dai-ichi and Fukushima Dai-ni NPSs, Tokyo Electric Power Co. Inc. (TEPCO); Tokai Dai-ni NPS, Japan Atomic Power Co. Inc. as follows:

Major updates are as follows.

### 1. Nuclear Power Stations (NPSs)

#### ● Fukushima Dai-ichi NPS

- The nitrogen injection to the PCV of Unit 1 was temporarily suspended in order to switch the power supply. (From 09:14 till 09:18 May 25)
- The transfer of accumulated water (contaminated water with high radiation dose) from the trench of the turbine building of Unit 2 to the Radioactive Waste Treatment Facilities was temporarily suspended due to the work of switching the power supply. (09:05 May 25)
- Fresh water (about 100t) was injected into the Spent Fuel Pool of Unit 3 via the Fuel Pool Cooling and Clean-up Line. (From 10:15 till 13:35 May 24) (About 0.8m<sup>3</sup> of hydrazine was also injected from 10:20 till 12:56)
- The transfer of the accumulated water in the basement of the turbine building of Unit 3 to the Radioactive Waste Treatment Facilities was temporarily suspended in order to inspect the transfer lines and buildings. (09:10 May 25)
- The accumulated water (about 400m<sup>3</sup>) in the basement of the turbine building of Unit 6 was transferred to the temporary tank. (From 09:00 till 19:00 May 24)
- The transfer of the accumulated water from the basement of the turbine building of Unit 6 to the temporary tank was started. (09:00 May 25)

- Full-scale implementation of spraying an anti-scattering agent to prevent the spread of radioactive materials was carried out by workers in an area of about 8,750m<sup>2</sup> around the Nonflammable Waste Treatment Facility, in the subcontractor's yard, around the Main Office Building, the Main Gate and the observation deck. (From 09:30 till 13:00 May 24)
- Full-scale implementation of spraying an anti-scattering agent to prevent the spread of radioactive materials was carried out using an unmanned crawler dump in an area of about 6,000m<sup>2</sup> on the east side of the turbine building of Units 2 and 3. (From 11:00 till 14:00 May 24)
- Removal of rubble (an amount equivalent to 2 containers) was carried out using remote-controlled heavy machinery. (From 09:00 till 16:00 May 24)

## <Temporary Access to the Restricted Areas>

May 25 – Temporary access was allowed into Minamisoma City and Tomioka Town.

For more information: NISA English Home Page  
<http://www.nisa.meti.go.jp/english/index.html>

Extract

May 26, 2011

Nuclear and Industrial Safety Agency

## Seismic Damage Information (the 150th Release)

(As of 12:00 May 26, 2011)

Nuclear and Industrial Safety Agency (NISA) confirmed the current situation of Onagawa NPS, Tohoku Electric Power Co. Inc.; Fukushima Dai-ichi and Fukushima Dai-ni NPSs, Tokyo Electric Power Co. Inc. (TEPCO); Tokai Dai-ni NPS, Japan Atomic Power Co. Inc. as follows:

Major updates are as follows.

### 1. Nuclear Power Stations (NPSs)

#### ● Fukushima Dai-ichi NPS

- The nitrogen injection into the PCV of Unit 1 was temporarily suspended in order to switch the power supply. (From 09:14 till 09:18, and from 15:16 till 15:18 May 25)
- It was confirmed that the compressor for supplying nitrogen to Unit 1 had stopped. (15:45 May 25) The injection was restarted after switching to a reserve compressor. (19:44 May 25)
- The transfer of the accumulated water (contaminated water with high radiation dose) in the trench of the turbine building of Unit 2 to the Radioactive Waste Treatment Facilities was temporarily suspended due to the work of switching the power supply. (From 09:05 till 15:30 May 25)
- Fresh water (about 53t) was injected into the Spent Fuel Pool of Unit 2 via the Fuel Pool Cooling and Clean-up Line. (From 10:06 till 11:36 May 26) (Hydrazine was also injected from 10:10 till 11:10)
- Fresh water (about 121t) was sprayed over the Spent Fuel Pool of Unit 4 using a concrete pump truck (62m class). (From 16:36 till 20:04 May 25) (About 0.3m<sup>3</sup> of hydrazine was also injected from 16:42 till 18:49.)
- The accumulated water (about 336m<sup>3</sup>) in the basement of the turbine building of Unit 6 was transferred to the temporary tank. (From 09:00 till 19:00 May 25)

- The transfer of the accumulated water from the basement of the turbine building of Unit 6 to the temporary tank was started. (09:00 May 26)
- Full-scale implementation of spraying an anti-scattering agent to prevent the spread of radioactive materials was carried out by workers in an area of about 8,750m<sup>2</sup> around the Nonflammable Waste Treatment Facility, the Solid Waste Storage, the Main Office Building, near the Main Gate and at the observation deck. (From 09:30 till 13:30 May 25)
- Removal of rubble (an amount equivalent to 3 containers) was carried out using remote-controlled heavy machinery. (From 09:00 till 16:00 May 25)

## 2. Actions Taken by NISA (May 25)

- NISA received a report from TEPCO on May 2 and May 11 titled “On the Investigation of the Cause and Establishment of Recurrence Prevention Measures, etc., Regarding the Exposure Exceeding the Dose Limit of Radiation Workers at Fukushima Dai-ichi NPS”. NISA conducted an evaluation of the reports, and as a result, regrettably found three cases of violation of the law regarding radiation control of radiation workers. NISA strictly alerted TEPCO and directed that the company make further improvements to labor safety, health management, and living conditions of the workers from the standpoint of proper radiation control for radiation workers. In addition, NISA also directed TEPCO to establish measures to properly conduct radiation control for radiation workers and to enforce the compliance with operational safety programs at Fukushima Dai-ichi and Dai-ni NPSs.

### <Temporary Access to the Restricted Areas>

May 26 – Temporary access was allowed into Namie Town and Futaba Town.

### <Instructions Regarding Foods and Drinks>

- Lifting of the Suspension of Shipment and the Restriction of Intake

- Non-head type leafy vegetables (spinach, komatsuna, etc.) and head type leafy vegetables (cabbages, etc.) produced in the Soso District\* of Fukushima Prefecture.

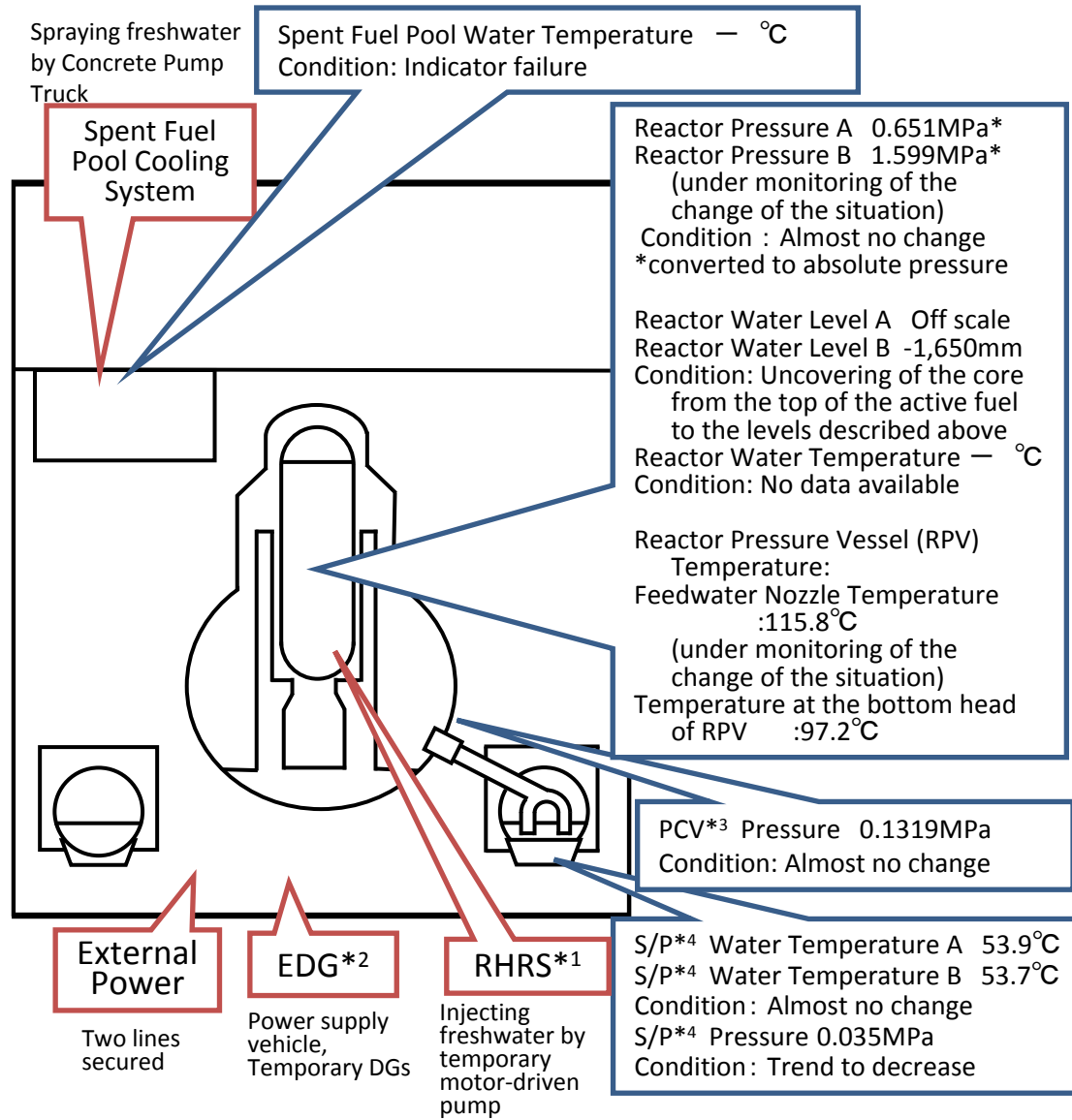
\*Soma City, Minamisoma City (excluding the area within the 20km radius of Fukushima Dai-ichi NPS, and the following locations in Haramachi-ku; Suketsune, Fukiyatoge, Nanamagari, Mori, Karekimori of Takanokura Area; Godaisan, Yokokawa, Yakushitoge of Baba Area; Namezu of Katakura Area and Wadajo of Ohara Area), and Shinchu Town.

For more information: NISA English Home Page  
<http://www.nisa.meti.go.jp/english/index.html>

# Conditions of Fukushima Dai-ichi Nuclear Power Station Unit 1

(As of 6:00 May 26, 2011)

## Major Events after the Earthquake 1/2



- March 11<sup>th</sup> 14:46 Under operation, Automatic shutdown by the earthquake
- March 11<sup>th</sup> 15:42 Report based on the Article 10 (Total loss of A/C power)
- March 11<sup>th</sup> 16:36 Occurrence of the Article 15 event (Inability of water injection of the Emergency Core Cooling System )
- March 12<sup>th</sup> 01:20 Occurrence of the Article 15 event (Unusual rise of the pressure in PCV)
- March 12<sup>th</sup> 10:17 Started to vent.
- March 12<sup>th</sup> 15:36 Sound of explosion
- March 12<sup>th</sup> 20:20 Started to inject seawater and borated water to the Reactor Core.
- March 23<sup>rd</sup> 02:33 The amount of injected water to the Reactor Core was increased utilizing the Feedwater Line in addition to the Fire Extinguish Line. (2m<sup>3</sup>/h →18m<sup>3</sup>/h)
- 09:00 Switched to the Feedwater Line only.(18m<sup>3</sup>/h →11m<sup>3</sup>/h)
- March 24<sup>th</sup> 11:30 Lighting in the Central Control Room was recovered.
- March 25<sup>th</sup> 15:37 Started to inject fresh water.
- March 29<sup>th</sup> 08:32 Switched to the water injection to the Reactor Core using the temporary motor-driven pump.
- March 31<sup>st</sup> 12:00 ~2<sup>nd</sup> 15:26 Started to transfer the stagnant water from the Condensate Storage Tank (CST) to the Surge Tank of Suppression Pool Water (SPT)
- March 31<sup>st</sup> 13:03 ~16:04 Water spray by Concrete Pump Truck (Fresh water)
- April 3<sup>rd</sup> 12:02 The power supply to the temporary motor-driven pump was switched from the temporary power supply to the external power supply.
- April 3<sup>rd</sup> 13:55 Started to transfer the water from the Condenser to CST.
- April 6<sup>th</sup> 22:30 Started the operation for the injection of nitrogen to PCV.
- April 7<sup>th</sup> 01:31 Confirmed starting the injection of nitrogen to PCV.
- April 9<sup>th</sup> 04:10 Started using highly pure nitrogen generator in the injection of nitrogen to PCV.
- April 10<sup>th</sup> 09:30 Completed transferring the water from the Condenser to CST.
- April 11<sup>th</sup> 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 11<sup>th</sup> 17:56 External power supply was recovered.
- April 11<sup>th</sup> 18:04 Resumed injecting water to the Reactor Core.
- April 11<sup>th</sup> 23:19 Restarted operation for injecting nitrogen to PCV.
- April 11<sup>th</sup> 23:34 Confirmed starting injection of nitrogen to PCV.
- April 17<sup>th</sup> 16:00 ~17:30 Confirmed the situation in the reactor building using an unmanned robot.
- April 18<sup>th</sup> 11:50 ~12:12 Stopped the water injection into the reactor core to replace the current hose with a new one.
- April 19<sup>th</sup> 10:23 Completed the work of strengthening connection of the power supplies between Units 1-2 and Units 3-4.
- April 25<sup>th</sup> 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 25<sup>th</sup> 14:10 ~19:10 Suspended nitrogen injection due to reinforcement work of the power supply.
- April 25<sup>th</sup> 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 26<sup>th</sup> 11:35 ~13:24(approx.) Confirmed the situation in the reactor building using an unmanned robot.

\*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

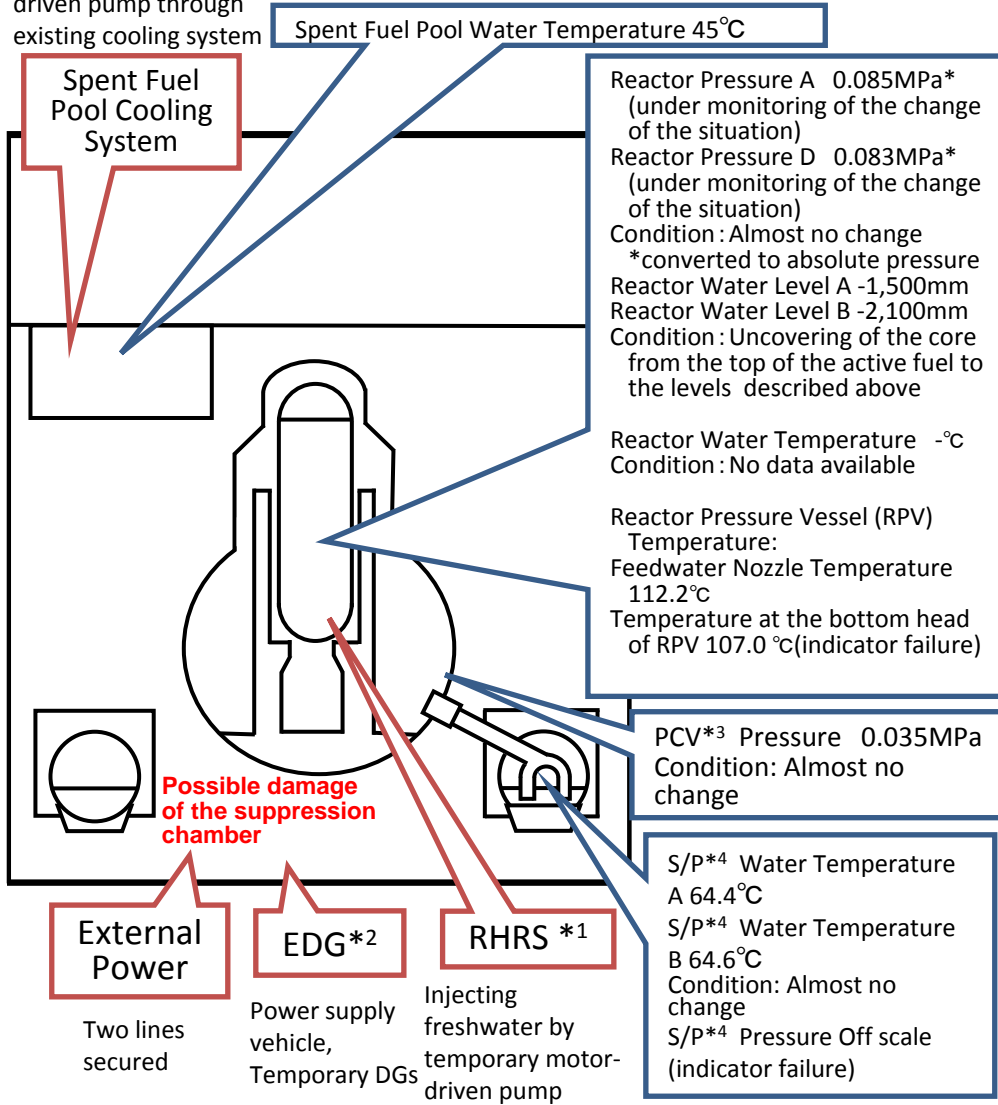
## Major Events after the Earthquake 2/2

- April 27<sup>th</sup> 10:02 Started the operation of gradually changing the amount of water for injection to the Reactor Pressure Vessel, (RPV) from about 6m<sup>3</sup>/h to the maximum of about 14m<sup>3</sup>/h. After carrying out the injection at 10m<sup>3</sup>/h, the injection rate was changed back to 6m<sup>3</sup>/h. (April 29<sup>th</sup> 10:14)
- April 29<sup>th</sup> 11:36~14:05 Confirmed the situation in the reactor building using an unmanned robot.
- May 2<sup>nd</sup> 12:58 ~15:03 The pump for the injection of water into the reactor core was temporarily replaced with the Fire Extinguishing Pump in order to install an alarm device in the pump.
- May 5<sup>th</sup> 16:36~May 8<sup>th</sup> 20:02 Operated all ambient filtration systems (a total of 6 units) in order to improve the working environment in the reactor building.
- May 6<sup>th</sup> 10:01 Changed the rate of water injection into the Reactor Core from 6m<sup>3</sup>/h to 8m<sup>3</sup>/h.
- May 8<sup>th</sup> 20:08 Ventilation by cutting of the exhaust air duct
- May 9<sup>th</sup> 04:17 Opening the double-entry doors of the Reactor Building
- May 9<sup>th</sup> 05:10 Disassembly of positive pressure house
- May 10<sup>th</sup> 10:55(approx.) Calibrated the reactor water level gauge
- May 11<sup>th</sup> 08:47~15:55 Due to the restoration of the Okuma No.2 transmission line, the power supply for the pump for injecting water into the reactor was temporarily switched to the temporary diesel generator.
- May 11<sup>th</sup> 08:50~15:58 Due to the restoration of the Okuma No.2 transmission line, the nitrogen injection was temporarily suspended.
- May 11<sup>th</sup> 08:50~11:14 Confirmed the reactor water level of RPV, calibrated reactor pressure gauge of primary containment vessel.
- May 13<sup>th</sup> 16:01 ~17:39 Observed the situation in the Reactor Building using a remote-control robot
- May 14<sup>th</sup> 15:07 ~15:18 Water spray over the Spent Fuel Pool by Concrete Pump Truck(stopped due to strong winds)
- May 15<sup>th</sup> 13:28 Changed the rate of water injection into the Reactor Core from 8m<sup>3</sup>/h to 10m<sup>3</sup>/h.
- May 17<sup>th</sup> 11:50 Changed the rate of water injection into the Reactor Core from 10m<sup>3</sup>/h to 6 m<sup>3</sup>/h.
- May 20<sup>th</sup> 9:30 ~12:15 Enter in the reactor building, confirmed reactor water level and radioactivity.
- May 20<sup>th</sup> 15:06 ~16:15 Water spray over the Spent Fuel Pool by Concrete Pump Truck
- May 22<sup>nd</sup> 15:33 ~17:09 Water spray over the Spent Fuel Pool by Concrete Pump Truck
- May 25<sup>th</sup> 9:14 ~9:18 Nitrogen injection to PCV were suspended for changing power supply.
- May 25<sup>th</sup> 15:16 ~15:18 Nitrogen injection to PCV were suspended for changing power supply.
- May 25<sup>th</sup> 15:45 Confirmed that the compressor for nitrogen supplying was stopped. 19:44 Restart the nitrogen injection after changing to the reserve compressor.

# Conditions of Fukushima Dai-ichi Nuclear Power Station **Unit 2**

( As of 6:00 May 26, 2011 )

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



## Major Events after the Earthquake 1/2

- March 11<sup>th</sup> 14:46 Under operation, Automatic shutdown by the earthquake
- March 11<sup>th</sup> 15:42 Report based on the Article 10 (Total loss of A/C power)
- March 11<sup>th</sup> 16:36 Occurrence of the Article 15 event (Inability of water injection of the Emergency Core Cooling System )
- March 13<sup>th</sup> 11:00 Started to vent.
- March 14<sup>th</sup> 13:25 Occurrence of the Article 15 event (Loss of reactor cooling functions)
- March 14<sup>th</sup> 16:34 Started to inject seawater to the Reactor Core.
- March 14<sup>th</sup> 22:50 Occurrence of the Article 15 event (Unusual rise of the pressure in PCV)
- March 15<sup>th</sup> 00:02 Started to vent.
- March 15<sup>th</sup> 06:10 Sound of explosion
- March 15<sup>th</sup> around 06:20 Possible damage of the suppression chamber
- March 20<sup>th</sup> 15:46 Power Center received electricity.
- March 21<sup>st</sup> 18:22 White smoke generated. The smoke died down and almost invisible at 07:11 March 22<sup>nd</sup>.
- March 26<sup>th</sup> 10:10 Started to inject fresh water to the Reactor Core.
- March 26<sup>th</sup> 16:46 Lighting in the Central Control Room was recovered.
- March 27<sup>th</sup> 18:31 Switched to the water injection to the core using the temporary motor-driven pump.
- March 29<sup>th</sup> 16:45~1<sup>st</sup> 11:50 Transferred the water from the Condensate Storage Tank (CST) to the Surge Tank of Suppression Pool Water (SPT)
- April 2<sup>nd</sup> 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 2<sup>nd</sup> 17:10 Started to transfer the water from the Condenser to the CST.
- April 3<sup>rd</sup> 12:12 The power supply to the temporary motor-driven pump was switched from the temporary power supply to the external power supply.
- April 3<sup>rd</sup> 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 4<sup>th</sup> 7:08~7:11 Approximately 13kg of tracer (bath agent) was put in from the Pit for the Duct for Seawater Pipe.
- April 5<sup>th</sup> 14:15 Tracer is confirmed to outflow through the permeable layer around the pit into the sea. 15:07 Started to inject coagulant.
- April 6<sup>th</sup> around 5:38 The water outflow from the lateral surface of the pit was confirmed to stopped.
- April 9<sup>th</sup> 13:10 Completed transferring the water from the Condenser to CST.
- April 11<sup>th</sup> 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 11<sup>th</sup> 17:56 External power supply was recovered.
- April 11<sup>th</sup> 18:04 Resumed injecting water to the Reactor Core.
- April 12<sup>th</sup> 19:35~April 13<sup>th</sup> 17:04 Transfer from the trench of the turbine building to the Condenser.
- April 13<sup>th</sup> 11:00 Suspended the transfer for checking leaks, etc.
- April 16<sup>th</sup> around 11:19 An earthquake occurred (in the southern part of Ibaraki Prefecture).
- April 18<sup>th</sup> 13:42~ Confirmed the situation in the reactor building using an unmanned robot.
- April 18<sup>th</sup> 12:13~12:37 Stopped the water injection into the reactor core to replace the current hose with a new one.
- April 18<sup>th</sup> 09:30~17:40 Injected coagulant (soluble glass) into the power cable trench.
- April 19<sup>th</sup> 08:00~15:30 Injected coagulant (soluble glass) into the power cable trench.
- April 19<sup>th</sup> 10:08~ Started to transfer the stagnant water with high-level radioactivity from the trench of the turbine building to the Radioactive Waste Treatment Facility.
- April 19<sup>th</sup> 10:23 Completed the work of strengthening connection of the power supplies between Units 1-2 and Units 3-4.

\*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**

## Major Events after the Earthquake 2/2

- April 25<sup>th</sup> 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 25<sup>th</sup> 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 29<sup>th</sup> 9:16 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. The transfer was resumed. (From 14:05 April 30<sup>th</sup>)
- May 1<sup>st</sup> 13:35~ Started blocking the vertical shafts of Trench pit.
- May 2<sup>nd</sup> 12:58~15:03 The pump for the injection of water into the reactor core was temporarily replaced with the Fire Extinguishing Pump in order to install an alarm device in the pump.
- May 7<sup>th</sup> 9:22 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 piping work of Reactor Feedwater System for Unit3. The transfer was resumed. (From 16:02 May 7<sup>th</sup>)
- May 10<sup>th</sup> 9:01 ~ May 12<sup>th</sup> 15:20 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 lay the water transfer pipes from the Turbine Building of Unit 3 to the Radioactive Waste Treatment Facility.
- May 11<sup>th</sup> 8:47~15:55 Due to the restoration of the Okuma No.2 transmission line, the power supply for the pump for injecting water into the reactor was temporarily switched to the temporary diesel generator. (After the restoration, the power supply is partially received from this line.)
- May 18<sup>th</sup> 9:24~9:38 Conducted preliminary survey in the Reactor Building.
- May 25<sup>th</sup> 9:05~15:30 Suspended the transfer of high stagnant water with high-level radioactivity from the Turbine Building Trench to the Radioactive Waste Treatment Facility in order to change power supply.

### <Sea water injection to SFP via FPC (using the fire engine pump)>

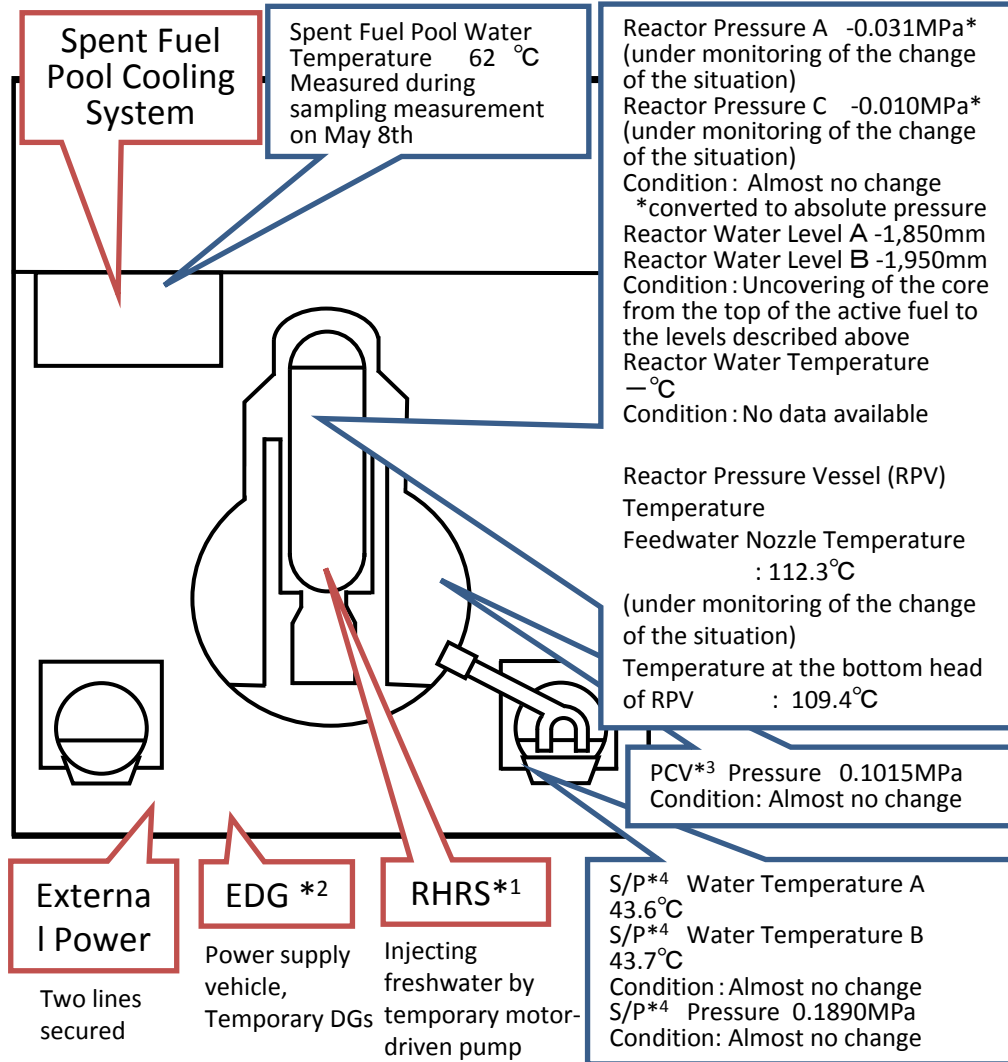
March 20<sup>th</sup> around 15:05~ around 17:20, March 22<sup>nd</sup> 16:07~17:01, March 25<sup>th</sup> 10:30~12:19

### <Fresh water injection to SFP via FPC (using the temporary motor-driven pump) >

March 29<sup>th</sup> 16:30~18:25, March 30<sup>th</sup> 09:25~23:50 \*Including interruption by pump malfunction and damage to the hose, April 1<sup>st</sup> 14:56~17:05, April 4<sup>th</sup> 11:05~13:37, April 7<sup>th</sup> 13:29 ~14:34, April 10<sup>th</sup> 10:37~12:38, April 13<sup>th</sup> 13:15~14:55, April 16<sup>th</sup> 10:13~11:54, April 19<sup>th</sup> 16:08~17:28, April 22<sup>nd</sup> 15:55~17:40, April 25<sup>th</sup> 10:12~11:18, April 28<sup>th</sup> 10:15~11:28, May 2<sup>nd</sup> 10:05~11:40, May 6<sup>th</sup> 09:36~11:16, May 10<sup>th</sup> 13:09~14:45(13:19 ~14:35 Hydrazine was also injected), May 14<sup>th</sup> 13:00~14:37(13:08 ~14:02 Hydrazine was also injected), May 18<sup>th</sup> 13:10~14:40(13:15 ~14:30 Hydrazine was also injected), May 22<sup>nd</sup> 13:02~14:40(13:04~14:03 Hydrazine was also injected),

# Conditions of Fukushima Dai-ichi Nuclear Power Station Unit 3 ( As of 6:00 May 26, 2011 )

Spraying freshwater by temporary driven pump through existing cooling system



- \*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)

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

## Major Events after the Earthquake 1/2

- March 11<sup>th</sup> 14:46 Under operation, Automatic shutdown by the earthquake
- March 11<sup>th</sup> 15:42 Report based on the Article 10 (Total loss of A/C power)
- March 13<sup>th</sup> 05:10 Occurrence of the Article 15 event (Inability of water injection of the Emergency Core Cooling System)
- March 13<sup>th</sup> 08:41 Started to vent.
- March 13<sup>th</sup> 13:12 Started to inject seawater and borated water to the Reactor Core.
- March 14<sup>th</sup> 05:20 Started to vent.
- March 14<sup>th</sup> 07:44 Occurrence of the Article 15 event (Unusual rise of the pressure in PCV)
- March 14<sup>th</sup> 11:01 Sound of explosion
- March 16<sup>th</sup> around 08:30 White smoke generated.
- March 17<sup>th</sup> 09:48 ~ 10:01 Water discharge by the helicopters of Self-Defense Force
- March 17<sup>th</sup> 19:05 ~ 19:15 Water spray from the ground by High pressure water-cannon trucks of Police
- March 17<sup>th</sup> 19:35 ~ 20:09 Water spray from the ground by fire engines of Self-Defense Force
- March 18<sup>th</sup> before 14:00 ~ 14:38 Water spray from the ground by 6 fire engines of Self-Defense Force
- March 18<sup>th</sup> ~ 14:45 Water spray from the ground by a fire engine of the US Military
- March 19<sup>th</sup> 00:30 ~ 01:10 Water spray by Hyper Rescue Unit of Tokyo Fire Department
- March 19<sup>th</sup> 14:10 ~ 20<sup>th</sup> 03:40 Water spray by Hyper Rescue Unit of Tokyo Fire Department
- March 20<sup>th</sup> 11:00 Pressure of PCV rose(320kPa).Afterward fell.
- March 20<sup>th</sup> 21:36 ~ 21<sup>st</sup> 03:58 Water spray by Hyper Rescue Unit of Tokyo Fire Department
- March 21<sup>st</sup> around 15:55 Grayish smoke generated and was confirmed to be died down at 17:55.
- March 22<sup>nd</sup> 15:10 ~ 16:00 Water spray by Hyper Rescue Unit of Tokyo Fire Department and Osaka City Fire Bureau.
- March 22<sup>nd</sup> 22:46 Lighting in the Central Control Room was recovered.
- March 23<sup>rd</sup> 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 23<sup>rd</sup> around 16:20 Black smoke generated and was confirmed to died down at around 23:30 and 24<sup>th</sup> 04:50.
- March 24<sup>th</sup> 05:35 ~ 16:05 Injection of around 120 ton of sea water to SFP via FPC
- March 25<sup>th</sup> 13:28 ~ 16:00 Water spray by Kawasaki City Fire Bureau supported by Tokyo Fire Department
- March 25<sup>th</sup> 18:02 Started fresh water injection to the core.
- March 27<sup>th</sup> 12:34 ~ 14:36 Water spray by Concrete Pump Truck
- March 28<sup>th</sup> 17:40 ~ 31<sup>st</sup> around 8:40 Transferring the water from the Condensate Storage Tank (CST) to the Surge Tank of Suppression Pool Water (SPT)
- March 28<sup>th</sup> 20:30 Switched to the water injection to the core using a temporary motor-driven pump.
- April 3<sup>rd</sup> 12:18 The power supply to the temporary motor-driven pump was switched from the temporary power supply to the external power supply.
- April 11<sup>th</sup> 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 11<sup>th</sup> 18:04 External power supply of Units 1 and 2 recovered (April 11<sup>th</sup> 17:56). Resumed injecting water to the Reactor Core.
- April 17<sup>th</sup> 11:30 ~ 14:00 Confirmed the situation in the reactor building using unmanned robot.
- April 18<sup>th</sup> 12:38 ~ 13:05 Stopped the water injection into the reactor core to replace the current hose with a new one
- April 19<sup>th</sup> 10:23 Completed the work of strengthening connection of the power supplies between Units 1-2 and Units 3-4.
- April 22<sup>nd</sup> 13:40 ~ 14:00 Tentatively Injected freshwater to SFP via the Fuel Pool Coolant Purification Line.
- April 25<sup>th</sup> 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 30<sup>th</sup> 11:34 Completed reinforcement work of the power supply both Units 3, 4). (Increasing the voltage from 6.6kv to 66kv)

## Major Events after the Earthquake 2/2

May 2<sup>nd</sup> 12:58 ~ 15:03 The pump for the injection of water into the reactor core was temporarily replaced with the Fire Extinguishing Pump in order to install an alarm device in the pump.

May 8<sup>th</sup> 12:10 ~ 14:10 Injected freshwater to SFP via FPC using the temporary motor-driven pump.

May 8<sup>th</sup> 16:18 ~ 10<sup>th</sup> 5:41 Transferred of water in the Condenser to the underground of the Turbine Building in order to carry out piping work of Reactor Feedwater System.

May 9<sup>th</sup> 12:14 ~ 15:00 Injected freshwater to SFP via FPC using the temporary motor-driven pump. (12:39 ~ 14:36 Hydrazine was also injected)

May 11<sup>th</sup> 8:47 ~ 15:55 Due to the restoration of the Okuma No.2 transmission line, the power supply for the pump for injecting water into the reactor was temporarily switched to the temporary diesel generator.

May 11<sup>th</sup> around 12:30 Confirmed the water flow into the pit around intake of sea water through conduit pipe of electric power cables → 16:05 Confirmed the water leakage from the pit to the sea → 18:45 Stopped the water leakage by casting concrete into the pit.

May 12<sup>th</sup> 16:53 In addition to the plumbing pro-fire extinguishing, started core flooding from the plumbing pro-water supply.

May 15<sup>th</sup> 14:33 ~ 17:00 Injected borated water to the Reactor Core.

May 16<sup>th</sup> 15:00 ~ 18:32 Injected freshwater to SFP via FPC using the temporary motor-driven pump. (15:10 ~ 17:30 Hydrazine was also injected)

May 17<sup>th</sup> 18:04 ~ Started transfer of stagnant water in the basement of the Turbine Building to the Radioactive Waste Treatment Facility

May 18<sup>th</sup> from around 16:30 Conducted preliminary survey in the Reactor Building for about 10 minutes.

May 24<sup>th</sup> 10:15 ~ 13:35 Injected freshwater to SFP via FPC using the temporary motor-driven pump. (10:20 ~ 12:56 Hydrazine was also injected)

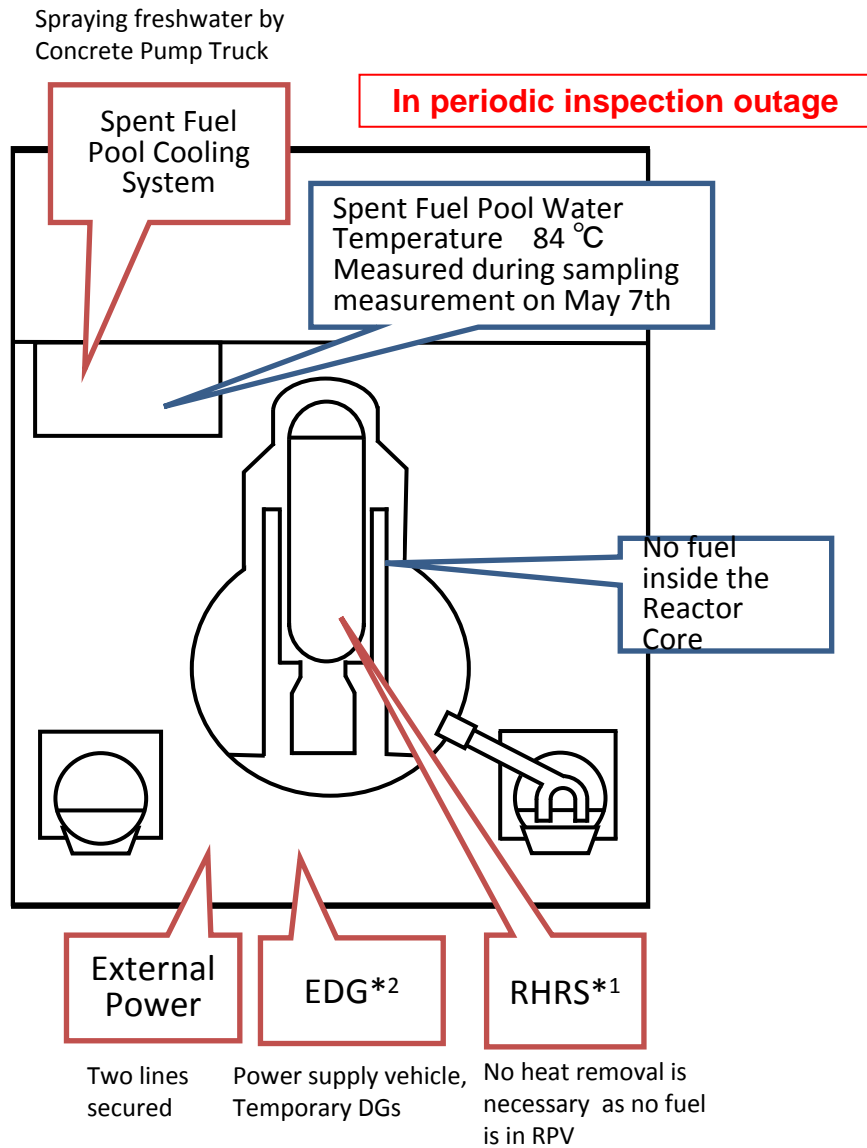
May 25<sup>th</sup> 9:10 Suspended transfer of stagnant water in the basement of the Turbine Building to the Radioactive Waste Treatment Facility in order to check the transfer line and in the Turbine Building.

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

March 29<sup>th</sup> 14:17 ~ 18:18, March 31<sup>st</sup> 16:30 ~ 19:33, April 2<sup>nd</sup> 09:52 ~ 12:54, April 4<sup>th</sup> 17:03 ~ 19:19, April 7<sup>th</sup> 06:53 ~ 08:53, April 8<sup>th</sup> 17:06 ~ 20:00, April 10<sup>th</sup> 17:15 ~ 19:15, April 12<sup>th</sup> 16:26 ~ 17:16, April 14<sup>th</sup> 15:56 ~ 16:32, April 18<sup>th</sup> 14:17 ~ 15:02, April 22<sup>nd</sup> 14:19 ~ 15:40, April 26<sup>th</sup> 12:25 ~ 14:02

# Conditions of Fukushima Dai-ichi Nuclear Power Station **Unit 4**

## ( As of 6:00 May 26, 2011 )



### Major Events after the Earthquake

In periodic inspection outage when the earthquake occurred

March 14<sup>th</sup> 04:08 Water temperature in the Spent Fuel Pool (SFP), 84°C

March 15<sup>th</sup> 06:14 Confirmed the partial damage of wall in the 4<sup>th</sup> floor.

March 15<sup>th</sup> 09:38 Fire occurred in the 3<sup>rd</sup> floor. (12:25 extinguished)

March 16<sup>th</sup> 05:45 Fire occurred. TEPCO couldn't confirm any fire on the ground. (06:15)

March 20<sup>th</sup> 08:21 ~ 09:40 Water spray over SFP by Self-Defense Force

March 20<sup>th</sup> around 18:30 ~ 19:46 Water spray over SFP by Self-Defense Force

March 21<sup>st</sup> 06:37 ~ 08:41 Water spray over SFP by Self-Defense Force

March 21<sup>st</sup> around 15:00 Work for laying cable to Power Center was completed.

March 22<sup>nd</sup> 10:35 Power Center received electricity.

March 25<sup>th</sup> 06:05 ~ 10:20 Sea water injection to SFP via the Fuel Pool Cooling Line (FPC)

March 29<sup>th</sup> 11:50 Lighting in the Central Control Room was recovered.

April 11<sup>th</sup> around 17:16 An earthquake occurred (at Hamadori in Fukushima Prefecture).

April 12<sup>th</sup> 12:00 ~ 13:04 Sampled the water in SFP.

April 19<sup>th</sup> 10:23 Completed the work of strengthening connection of the power supplies between Units 1-2 and Units 3-4.

April 22<sup>nd</sup> Measured the water level of SFP by a gauge hung on Concrete Pump Truck (62m class).

April 30<sup>th</sup> 11:34 Completed reinforcement work of the power supply both Units 3, 4. (Increasing the voltage from 6.6kv to 66kv)

May 9<sup>th</sup> Started installation work of the supporting structure for the floor of SFP

#### <Water spray by Concrete Pump Truck (Seawater)>

March 22<sup>nd</sup> 17:17 ~ 20:32, March 23<sup>rd</sup> 10:00 ~ 13:02, March 24<sup>th</sup> 14:36 ~ 17:30, March 25<sup>th</sup> 19:05 ~ 22:07, March 27<sup>th</sup> 16:55 ~ 19:25

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

March 30<sup>th</sup> 14:04 ~ 18:33, April 1<sup>st</sup> 08:28 ~ 14:14, April 3<sup>rd</sup> 17:14 ~ 22:16, April 5<sup>th</sup> 17:35 ~ 18:22, April 7<sup>th</sup> 18:23 ~ 19:40, April 9<sup>th</sup> 17:07 ~ 19:24, April 13<sup>th</sup> 0:30 ~ 6:57, April 15<sup>th</sup> 14:30 ~ 18:29, April 17<sup>th</sup> 17:39 ~ 21:22, April 19<sup>th</sup> 10:17 ~ 11:35, April 20<sup>th</sup> 17:08 ~ 20:31, April 21<sup>st</sup> 17:14 ~ 21:20, April 22<sup>nd</sup> 17:52 ~ 23:53, April 23<sup>rd</sup> 12:30 ~ 16:44, April 24<sup>th</sup> 12:25 ~ 17:07, April 25<sup>th</sup> 18:15 ~ April 26<sup>th</sup> 0:26, April 26<sup>th</sup> 16:50 ~ 20:35, April 27<sup>th</sup> 12:18 ~ 15:15, May 5<sup>th</sup> 12:29 ~ 20:46, May 6<sup>th</sup> 12:38 ~ 17:51, May 7<sup>th</sup> 14:05 ~ 17:30, May 9<sup>th</sup> 16:05 ~ 19:05 (16:11 ~ 18:38 Hydrazine was also injected), May 11<sup>th</sup> 16:07 ~ 19:38 (16:14 ~ 19:36 Hydrazine was also injected), May 13<sup>th</sup> 16:04 ~ 19:04 (16:20 ~ 18:41 Hydrazine was also injected), May 15<sup>th</sup> 16:25 ~ 20:25 (16:26 ~ 18:30 Hydrazine was also injected), May 17<sup>th</sup> 16:14 ~ 20:06 (16:40 ~ 18:35 Hydrazine was also injected), May 19<sup>th</sup> 16:30 ~ 19:30, May 21<sup>st</sup> 16:00 ~ 19:56 (16:23 ~ 19:00 Hydrazine was also injected), May 23<sup>rd</sup> 16:00 ~ 19:09 (16:08 ~ 18:30 Hydrazine was also injected) May 25<sup>rd</sup> 16:36 ~ 20:04 (16:42 ~ 18:49 Hydrazine was also injected)

\*1 Residual Heat Removal System

\*2 Emergency Diesel Generator

\*3 Reactor Pressure Vessel

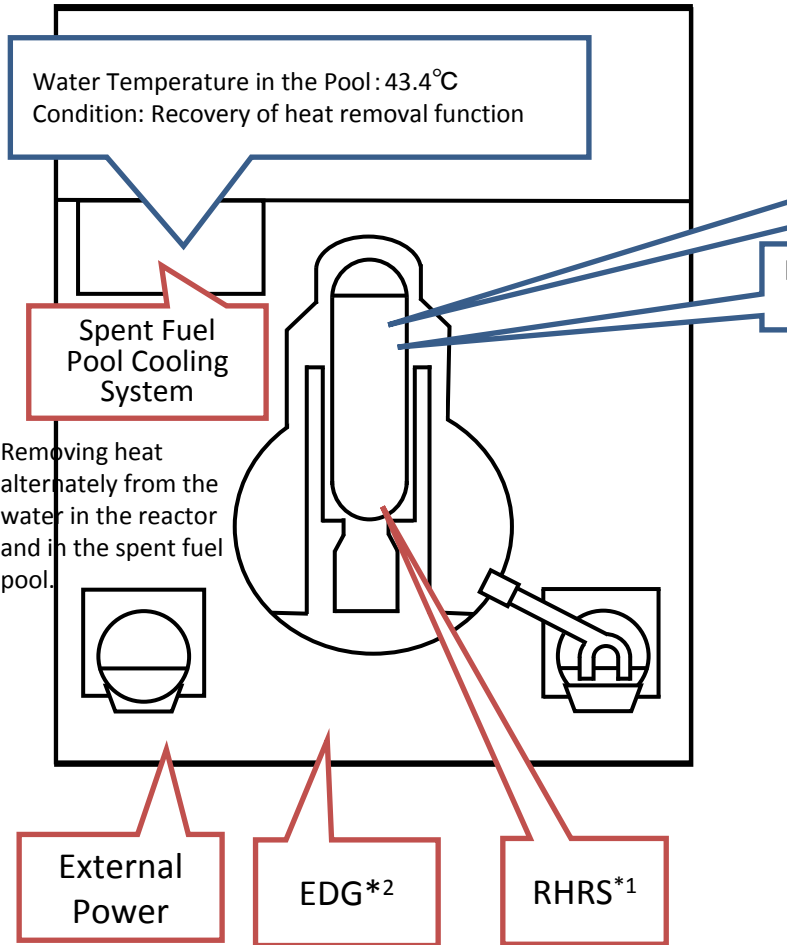
**Current Conditions : No fuel is in RPV\*3.  
Fresh water is being injected to the Spent Fuel Pool.**

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

# Conditions of Fukushima Dai-ichi Nuclear Power Station **Unit 5**

( As of 6:00 May 26, 2011 )

**In periodic inspection outage**



Water Temperature in the Pool: 43.4°C  
Condition: Recovery of heat removal function

Reactor Pressure: 0.108MPa\*  
Reactor Water Level: 2,082mm  
Reactor Water Temperature: 47.4°C  
Condition: Pressure is under control.  
\*converted to absolute pressure

Reactor Pressure Vessel Temperature:  
Monitoring by Reactor Water Temperature

**Major Events after the Earthquake :**

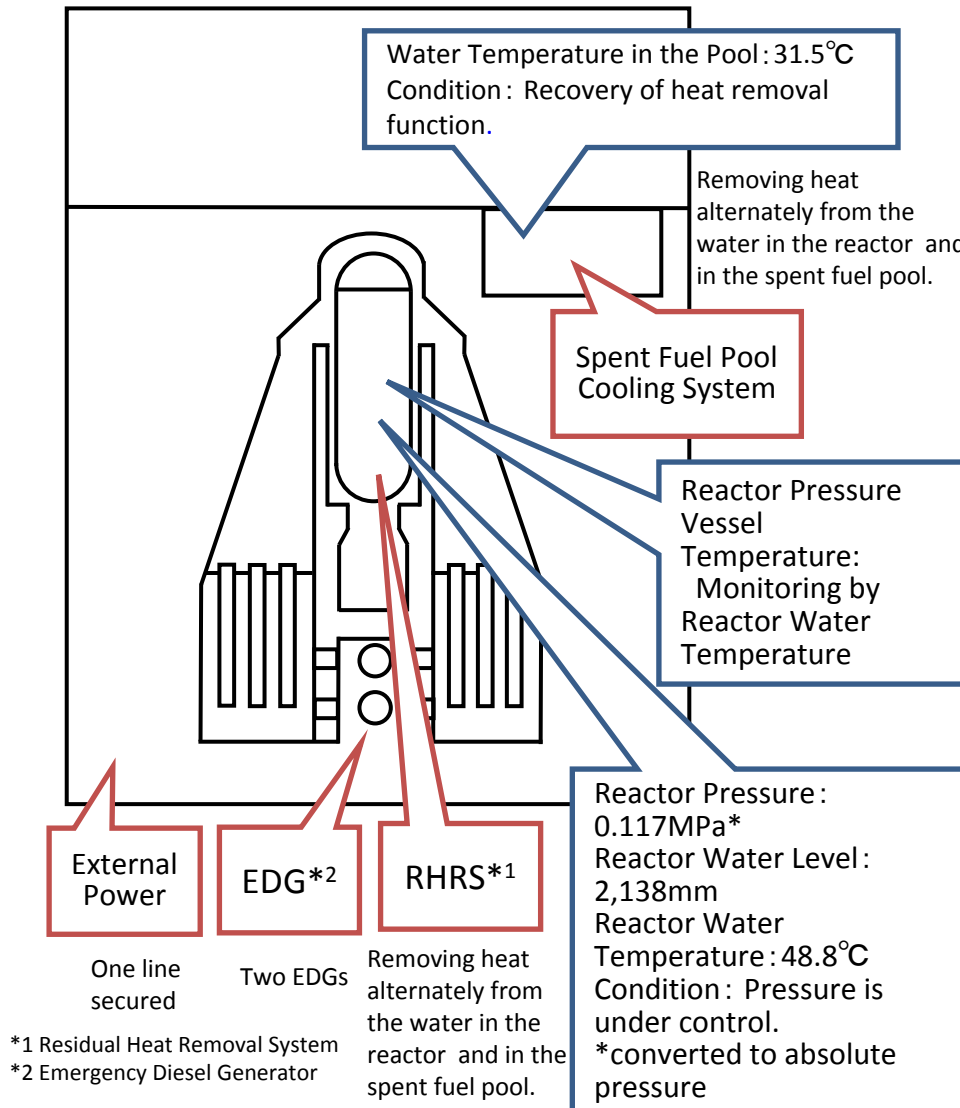
- March 20<sup>th</sup> 14:30 Cold shutdown
- March 21<sup>st</sup> 11:36 Receiving electricity from external power supply
- March 23<sup>rd</sup> 17:24 Pump for Residual Heat Removal Seawater System (RHRS) was automatically stopped when the power supply was switched from the temporary to the permanent.
- March 24<sup>th</sup> 16:14 Repair of the RHRS pump was completed.
- March 24<sup>th</sup> 16:35 Started to cooling.
- April 4<sup>th</sup> 21:00 – 8<sup>th</sup> 12:14 Discharged the groundwater with low-level radioactivity in the Sub Drain Pit to the sea (around 950 ton).
- April 25<sup>th</sup> 12:22 ~ 16:43 For reinforcement work of the power supply, the pump for Residual Heat Removal (RHR) was temporarily stopped.
- April 25<sup>th</sup> 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 2<sup>nd</sup> 13:30 ~ 15:03 The pump for RHR was temporarily shut off in order to test the Start-up Transformer for power reception.

\*1 Residual Heat Removal System  
\*2 Emergency Diesel Generator

# Conditions of Fukushima Dai-ichi Nuclear Power Station **Unit 6** ( As of 6:00 May 26, 2011 )

**In periodic inspection outage**

**Major Events after the Earthquake**



March 20<sup>th</sup> 19:27 Cold shutdown  
 March 22<sup>nd</sup> 19:17 Receiving electricity from external power supply  
 April 4<sup>th</sup> 21:00 – 9<sup>th</sup> 18:52 Discharged the groundwater with low-level radioactivity in the Sub Drain Pit to the sea (around 373 ton).  
 April 19<sup>th</sup> 11:00~15:00 Transferred stagnant water under the base of the turbine building to the condenser for measuring the amount of it.  
 April 20<sup>th</sup> 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 25<sup>th</sup> 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 2<sup>nd</sup> 11:03 ~14:53 The pump for RHR was temporarily shut off in order to test the Start-up Transformer for power reception.

〈Transferred stagnant water on the basement floor of the turbine building to the temporary tank〉.  
 May 1<sup>st</sup> 14:00 ~17:00 , May 2<sup>nd</sup> 10:00 ~ 16:00 , May 3<sup>rd</sup> 14:00 ~17:00 ,  
 May 6<sup>th</sup> 14:00 ~ 17:00 , May 7<sup>th</sup> 10:00 ~ 15:00 , May 9<sup>th</sup> 14:00 ~ 17:00 ,  
 May 10<sup>th</sup> 10:00 ~ 16:00 , May 11<sup>th</sup> 10:00 ~ 16:00 , May 12<sup>th</sup> 10:00 ~16:00 ,  
 May 13<sup>th</sup> 10:00 ~ 15:00 , May 14<sup>th</sup> 10:00 ~ 15:00 , May 15<sup>th</sup> 10:00 ~15:00 ,  
 May 16<sup>th</sup> 10:00 ~ 14:00 , May 17<sup>th</sup> 10:00 ~ 14:00 , May 18<sup>th</sup> 10:00 ~14:00 ,  
 May 21<sup>st</sup> 14:00 ~ 18:00  
 May 24<sup>th</sup> 9:00 ~ 19:00 , May 25<sup>th</sup> 9:00 ~ 19:00

〈Transferred stagnant water on the basement floor of the reactor building to the Radioactive Waste Treatment〉  
 May 10<sup>th</sup> 11:00 ~ 12:30 , May 11<sup>th</sup> 11:00 ~ 12:30 , May 12<sup>th</sup> 10:30~12:30 ,  
 May 13<sup>th</sup> 11:30 ~12:15 , May 18<sup>th</sup> 10:30 ~12:30