

Extract

May 20, 2011

Nuclear and Industrial Safety Agency

## Seismic Damage Information (the 144th Release)

(As of 15:00 May 20, 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

- Workers entered the reactor building of Unit 1 where they observed the water level and measured the radiation dose. (From 09:30 till 12:15 May 20)
- Fresh water (about 100t) was sprayed over the Spent Fuel Pool of Unit 4 using a Concrete Pump Truck (62m class). (From 16:30 till 19:30 May 19)
- 7 sandbags filled with Zeolite were placed near the Inlet Bar Screen between Units 1 and 2, and 3 sandbags near the Inlet Bar Screen between Units 3 and 4. (From 10:00 till 11:00 May 19)
- 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> in the baseball field, the observation deck, the subcontractor's yard and around the controlled-type landfill site for industrial waste. (From 10:30 till 14:00 May 19)
- Removal of rubble (an amount equivalent to 5 containers) was carried out by remote-controlled heavy machinery. (From 09:00 till 16:00 May 19)

### 2. Actions Taken by NISA

May 20 – NISA instructed TEPCO, pursuant to Article 67, paragraph 1 of the Nuclear Regulation Act, to submit a report regarding the installation of an alternative cooling and clean-up system for the Spent Fuel Pool of Unit 2 of Fukushima Dai-ichi NPS. The report shall include details of the installation plan, the effect of the system on the stable cooling of spent fuel inside the Spent Fuel Pool, and the result of a safety evaluation in connection with the installation of the alternative cooling and clean-up system for the Spent Fuel Pool.

For more information: NISA English Home Page

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



Extract

May 21, 2011

Nuclear and Industrial Safety Agency

## Seismic Damage Information (the 145th Release)

(As of 12:00 May 21, 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 (about 60t) was sprayed over the Spent Fuel Pool of Unit 1 using a Concrete Pump Truck (62m class). (From 15:06 till 16:15 May 20)
- 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 8,250m<sup>2</sup> in the baseball field, the observation deck, the subcontractor's yard and around the Nonflammables Waste Treatment Facility, etc. (From 10:30 till 14:00 May 20)
- Removal of rubble (an amount equivalent to 9 containers) was carried out by remote-controlled heavy machinery. (From 09:00 till 16:00 May 20)
- The Mega-Float entered the port of Fukushima Dai-ichi NPS. (09:35 May 21)

For more information: NISA English Home Page

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

Extract

May 22, 2011

Nuclear and Industrial Safety Agency

## Seismic Damage Information (the 146th Release)

(As of 15:00 May 22, 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

- About 56t of fresh water was injected into the Spent Fuel Pool of Unit 2 via the Fuel Pool Cooling and Clean-up Line. (From 13:02 till 14:40 May 22) (About 1.0m<sup>3</sup> of hydrazine was also injected from 13:04 till 14:03)
- About 130t of fresh water was sprayed over Unit 4 using a Concrete Pump Truck (62m class). (From 16:00 till 19:56 May 21) (About 0.4m<sup>3</sup> of hydrazine was also injected from 16:23 till 19:00)
- About 80m<sup>3</sup> of the accumulated water in the basement of the turbine building of Unit 6 was transferred to a temporary tank. (From 14:00 till 18:00 May 21)
- Removal of rubble (an amount equivalent to 11 containers) was carried out by remote-controlled heavy machinery. (From 09:00 till 16:00 May 21)

### 2. Actions Taken by NISA

< Temporary Access to the Restricted Area >

May 10 (start date), to Kawauchi Village

May 12, to Katsurao Village

May 22, to Tamura City

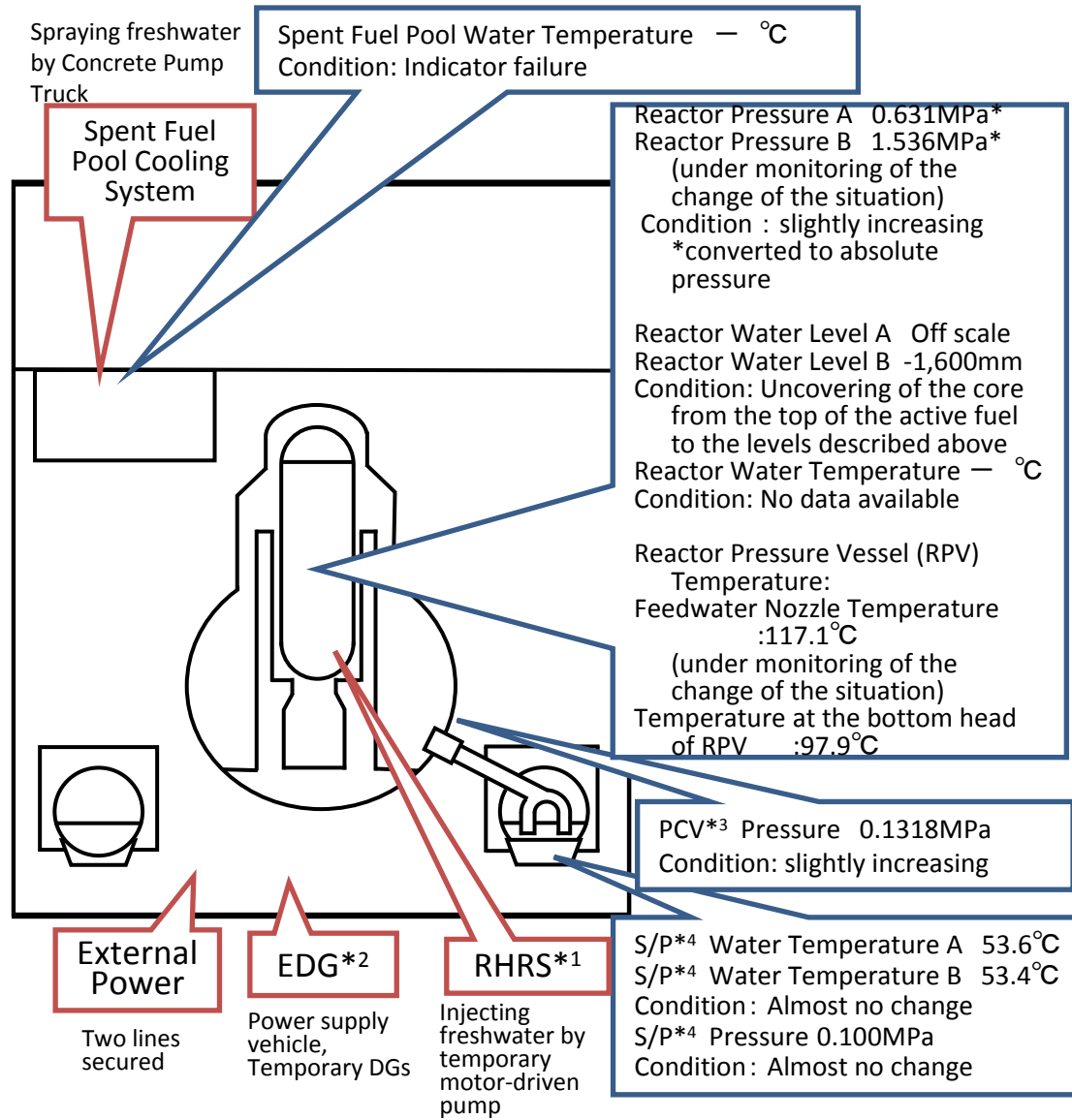
For more information: NISA English Home Page  
<http://www.nisa.meti.go.jp/english/index.html>



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

(As of 12:00 May 22, 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**

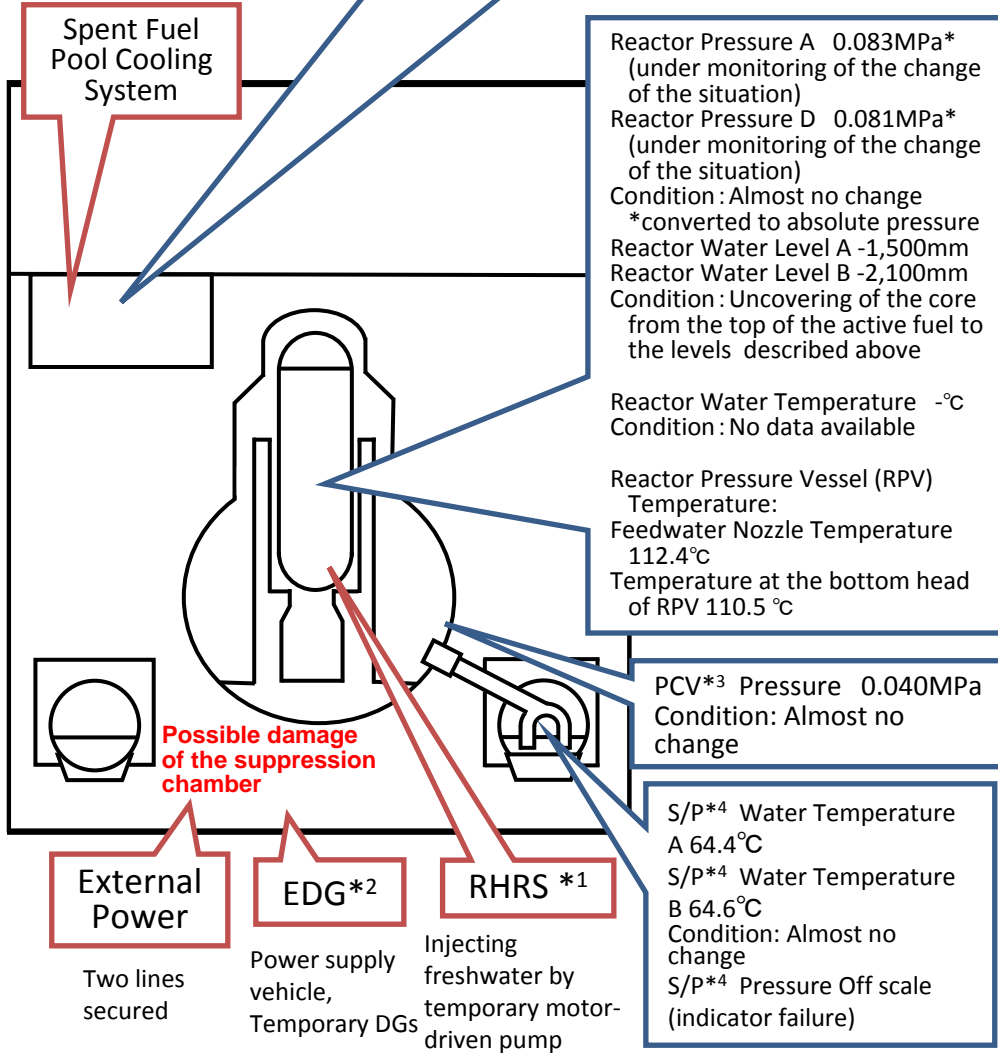
## Major Events after the Earthquake 2/2

- 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

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

( As of 12:00 May 22, 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.

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

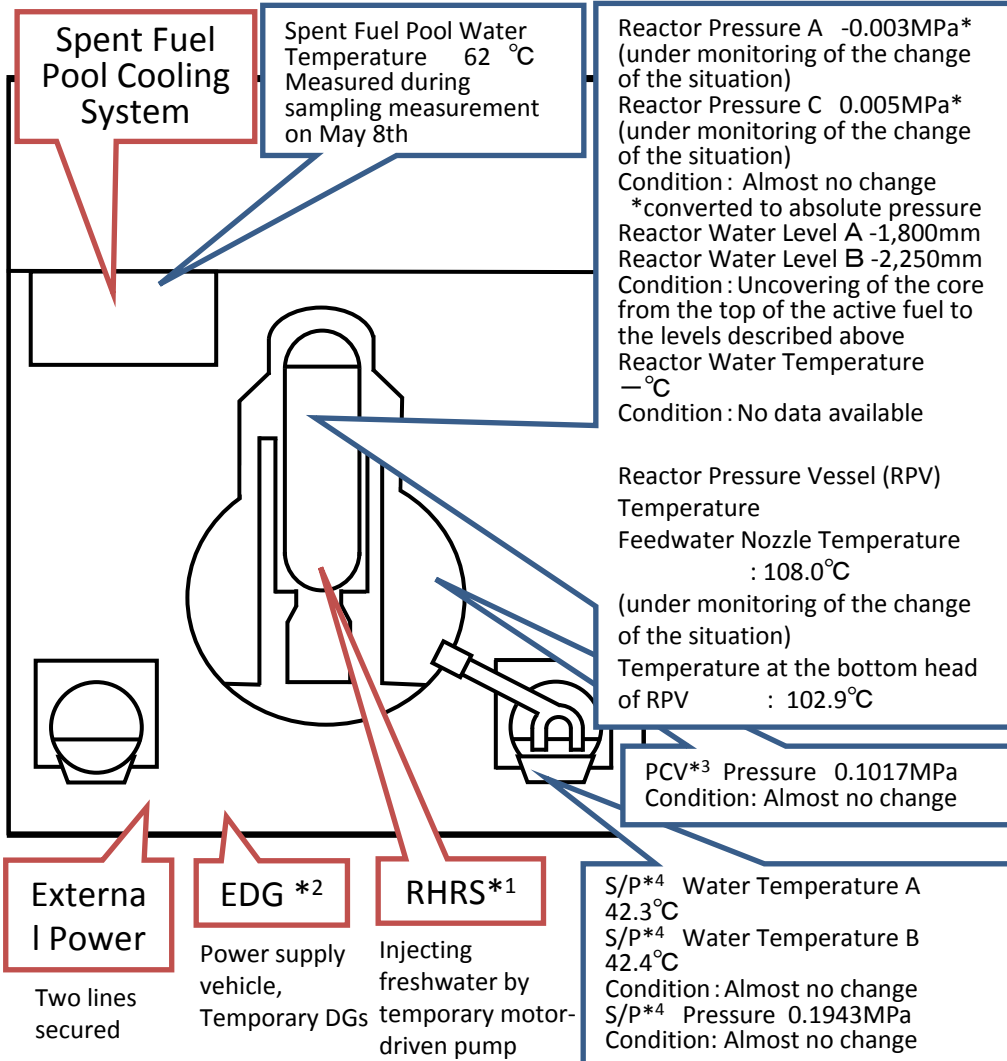
March 20<sup>th</sup> around 15:05~ around 17:20, March 22<sup>nd</sup> 16:07~17:01, March 25<sup>th</sup> 10:30~12:19

<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 12:00 May 22, 2011 )

Spraying freshwater by  
Concrete Pump Truck



- \*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

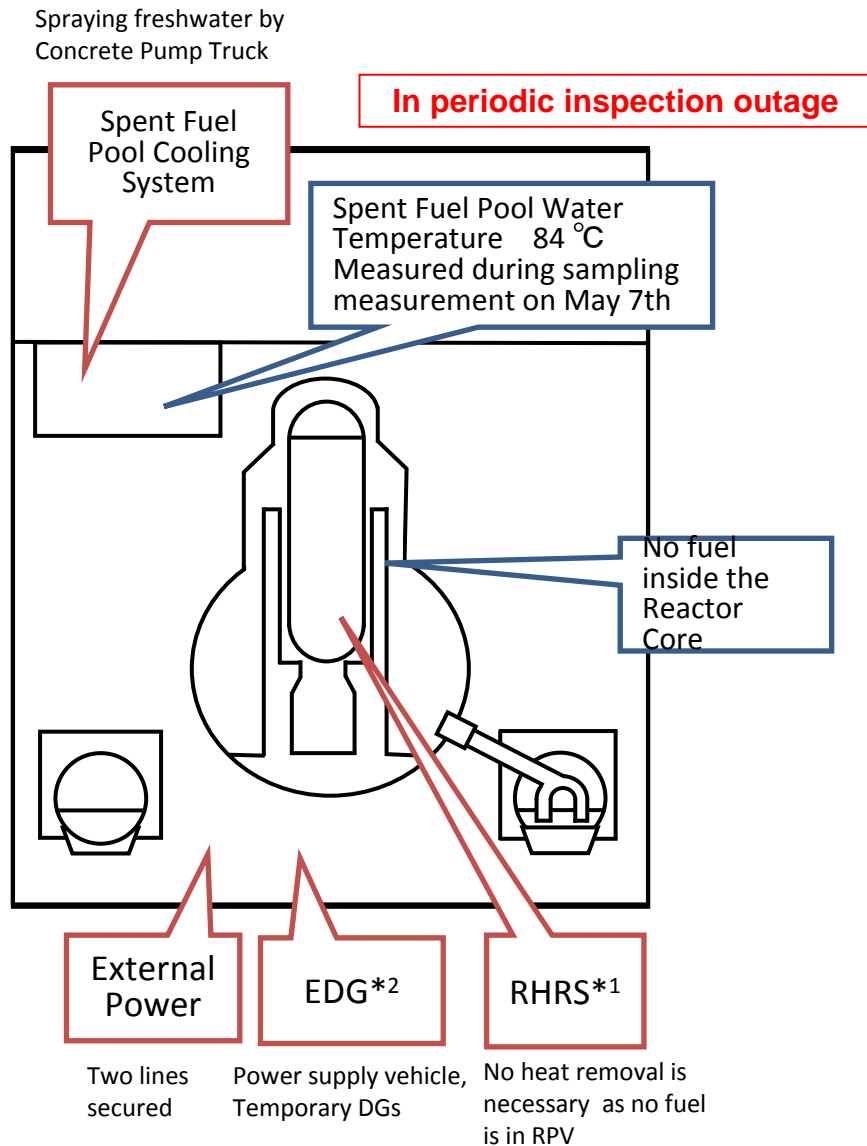
May 18<sup>th</sup> About 10 minutes from around 16:30 Conducted preliminary survey in the Reactor Building.

### <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 12:00 May 22, 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),

\*1 Residual Heat Removal System

\*2 Emergency Diesel Generator

\*3 Reactor Pressure Vessel

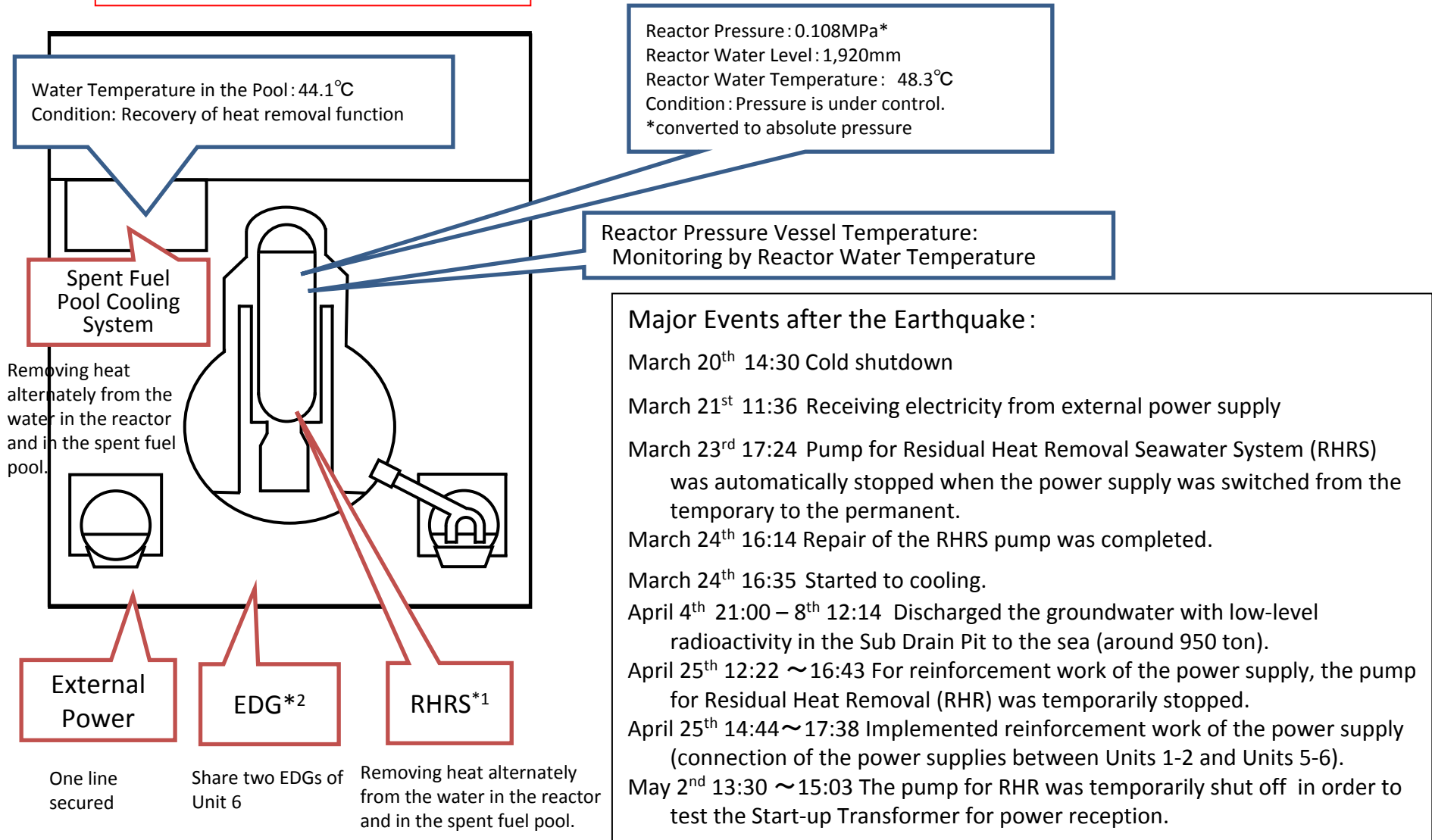
**Current Conditions : No fuel is in RPV\*3.  
Fresh water is being injected to the Spent Fuel Pool.**

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

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

## ( As of 12:00 May 22, 2011 )

**In periodic inspection outage**



\*1 Residual Heat Removal System

\*2 Emergency Diesel Generator

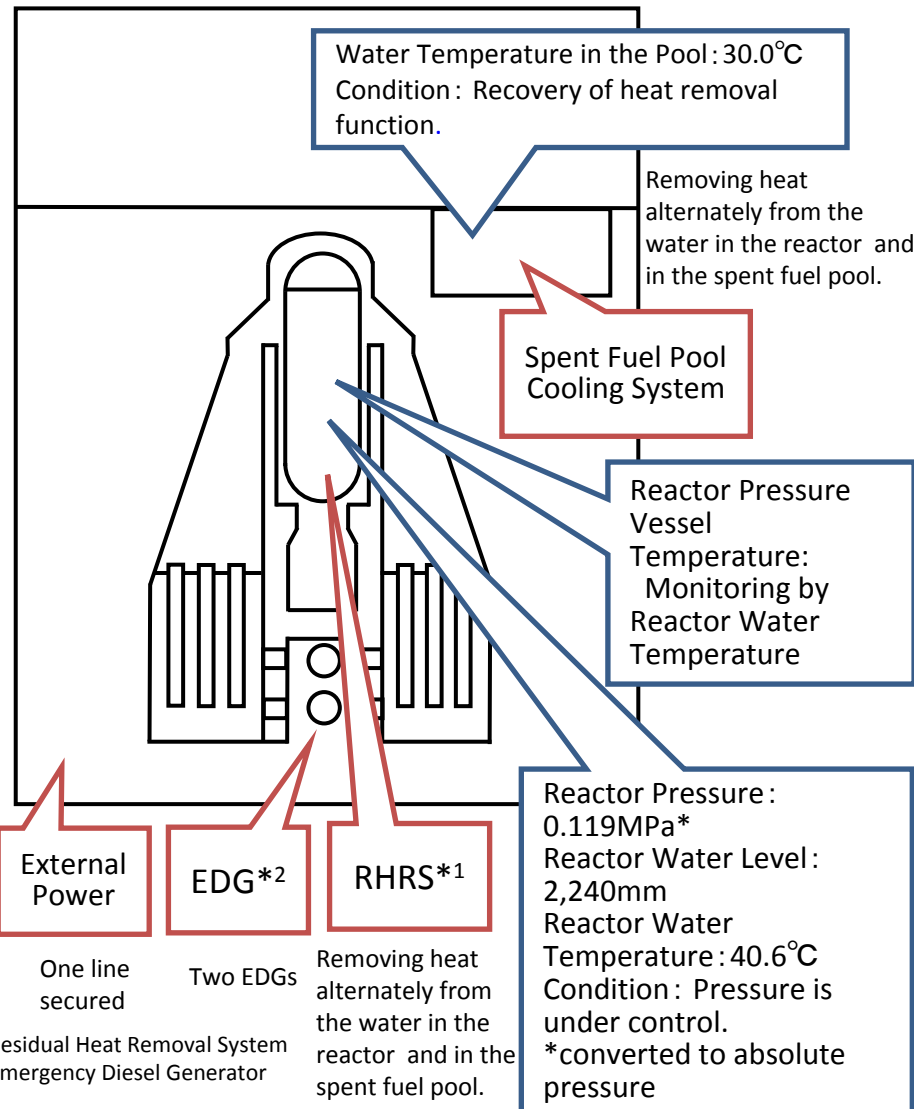
(Editorial committee for Nuclear Energy Handbook, Nuclear Energy Handbook)

# Conditions of Fukushima Dai-ichi Nuclear Power Station **Unit 6**

( As of 12:00 May 22, 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
- 〈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