

April 25, 2011
Nuclear and Industrial Safety Agency

**Regarding the contaminated water including
radioactive materials with high concentration that
flowed out from Unit 2 of Fukushima Dai-ichi Nuclear
Power Station**

Regarding the contaminated water including radioactive materials with high concentration (hereafter “the contaminated water”) that flowed out from Unit 2 of Fukushima Dai-ichi Nuclear Power Station, Nuclear and Tokyo Electric Power Co. Inc. (TEPCO) submitted the report to Industrial Safety Agency (NISA) on April 21st.

Today, NISA's evaluation on the report is informed as attached.

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Regarding the contaminated water including radioactive materials with high concentration that flowed out from Unit 2 of Fukushima Dai-ichi Nuclear Power Station

April 25th, 2011

Nuclear and Industrial Safety Agency

Regarding the contaminated water including radioactive materials with high concentration (hereafter “the contaminated water”) that flowed out from Unit 2 of Fukushima Dai-ichi Nuclear Power Station, Nuclear and Industrial Safety Agency(NISA)’s evaluation on the report submitted by Tokyo Electric Power Co. Inc. (TEPCO) on April 21st is as follows;

1. Estimates of the amount of the outflow

i. Duration of the outflow

According to the report, TEPCO found that the contaminated water was flowing out to the sea from the vertical part of the Power Cable Trench nearby the Intake Channel of Unit 2 around 9:30 April 2nd and the outflow was stopped around 5:38 April 6th. And in estimating overall amount of the contaminated water flowed out, the duration of outflow was assumed as from April 1st to April 6th for calculation.

As of April 1st, the air dose around sea surface near the Screen of Unit 2 was observed as 1.5mSv/h, which was approximately the same level as the peripheral background level. On the other hand, immediately after the outflow of the contaminated water was found on April 2nd, the air dose of 20mSv/h was observed at almost the same point, above the floor of the Screen of Unit 2 (about 4 m above the sea level).

Considering these above, it is possible to evaluate that a possibility that the contaminated water was flowing out on April 1st was low, and the assumption that the contaminated water lasted to flow out from April 1st to April 6th was sufficiently conservative.

ii. Outflow rate

From the photographs etc. of the situation of outflow, TEPCO estimates as follows;

Distance the flowed-out water dropped: 75cm

Reaching distance to landing surface: 65cm

Caliber of outflow: 3cm

Also, TEPCO applies general calculation formula of dynamics to calculate the outflow rate, resulting in approximately 4.3m³/h.

iii. Concentration of radioactive materials

Regarding the concentration of the contaminated water flowed out, actually measured data of $5.4 \times 10^6 \text{ Bq/cm}^3$ of ¹³¹I (Iodine), $1.8 \times 10^6 \text{ Bq/cm}^3$ of ¹³⁴Cs (Cesium) and $1.8 \times 10^6 \text{ Bq/cm}^3$ of ¹³⁷Cs (Cesium) are adopted.

iv. Estimated overall amount of radioactive materials included in the contaminated water flowed out

TEPCO's estimation of the overall amount of radioactive materials released as $4.7 \times 10^{15} \text{ Bq}$ by multiplying i, ii and iii above can be judged plausible.

2. Evaluation on the environmental impacts etc.

i. Regarding the amount of radioactive materials released

The estimated overall amount of radioactive materials released to the sea is $4.7 \times 10^{15} \text{ Bq}$. This amount is approximately 30,000 times higher than $1.5 \times 10^{11} \text{ Bq}$, which is the amount of radioactive materials released as radioactive waste water with low concentration discharged to the sea for the duration of 10 days from April 4th.

ii. Impacts on the sea etc.

As indicated below, the result of monitoring of the seawater conducted by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) and TEPCO shows that the concentration of radioactive materials included in the sea water temporarily rose and then dropped due to the outflow of the contaminated water.

Furthermore, monitoring conducted so far does not result in any sign of the outflow of the contaminated water with high concentration, including ground water, other than the point confirmed this time.

Regarding the radioactive materials released into the sea, Nuclear Safety Commission (NSC) shows its view that they will be carried along by the current and spread. MEXT considers that, based on the result of spread simulation of radioactive materials into the sea, the sea water including radioactive materials stagnant near the power station will be spread towards the offshore with the complicated current off Fukushima. The result obtained this time is thought to be showing that the effect of the measure to control the outflow conducted by TEPCO and the spread of the radioactive materials by the current, as stated view and consideration above, have contributed to the decrease of the concentration of radioactive materials in the sea water.

① The vicinity of the Water Discharge Canal

During a period after April 1st which includes the time when the contaminated water flowed out according to the TEPCO's report, although a significant rise¹ in the concentration of radioactivity near the Water Discharge Canal of Units 5 and 6 and the Southern Water Discharge Canal was confirmed in Fukushima Dai-ichi Nuclear Power Station (NPS), it has a tendency to decrease gradually.

At present, various measures to control the outflow have also taken effect and the concentration of Iodine 131 and Cesium 137 have decreased to 1.6 to 2.2 times and 1.2 to 1.8 times higher than the concentration limitation in the water outside of the Environmental Monitoring Area. However, further progress needs to be carefully watched through continuous monitoring.

② 15km offshore from the coast near the facilities and the site

Although the sea water sampled from the Iwasawa coast was confirmed to indicate a significant increase² on April 5th, the observation on April 22nd

¹ Maximum of 120Bq/cm³ of ¹³¹I (Iodine)(Approximately 3,000 times higher than the concentration limitation in the water outside the Environmental Monitoring Area (April 1st)) and Maximum of 68Bq/cm³ of ¹³⁷Cs (Cesium) (Approximately 760 times higher (April 7th)) were confirmed. (Both observed near the Water Discharge Canal of Units 5 and 6)

² Maximum of 3.7Bq/cm³ of ¹³¹I (Iodine) (Approximately 93 times higher than the

showed that the concentration of either Iodine 131 or Cesium 137 had decreased to the levels almost the same as the concentration limitation in the water outside of the Environmental Monitoring Area.

Due to the stormy weather, monitoring data necessary to evaluate the impacts has been unable to be gathered at the 15km offshore from the site.

③ 30 km offshore from the site

Regarding the concentration of radioactivity of the sea water at 30km offshore measured by MEXT, although it was confirmed to rise on the surface of sea water³ on April 15th, being presumably resulted from the impact of outflow of the contaminated water, the impact was hardly observed at lower layer.

Thereafter, regarding the concentration of radioactivity on the surface of the sea water, Iodine 131 and Cesium 137 were not detected in the sea water sampled on April 19th at all the observing points except for the observing points [6] and [8]⁴. Neither Iodine 131 nor Cesium 137 was detected in the sea water sampled April 21st at all observing points.

④ Groundwater sampled within and near the site.

Referring to the concentration of radioactivity measured by TEPCO at the Sub Drain (groundwater collected and controlled within the facilities) near the turbine building, although there is no sign of the outflow of the contaminated water with high concentration, the concentrations of radioactivity of Units 1 and 2 have been progressing at relatively high values⁵ since April 13th. Therefore, continuous watch is necessary. On the

concentration limitation in the water outside the Environmental Monitoring Area) and maximum of 1.4Bq/cm³ of ¹³⁷Cs (Cesium)(Approximately 16 times higher alike)

³ At the observing point [4], maximum of 161Bq/L of ¹³¹I (Iodine)(Approximately 4 times higher than the concentration limitation in the water outside the Environmental Monitoring Area) and 181Bq/L of ¹³⁷Cs (Cesium)(Approximately twice higher alike)

⁴ At the observing point [6], 18.8Bq/L of ¹³¹I (Iodine)(Approximately 1/2 times higher than the concentration limitation in the water outside the Environmental Monitoring Area) and 31.6Bq/L of ¹³⁷Cs (Cesium)(Approximately 1/3 times higher alike). At the observing point [8], 15.2Bq/L of ¹³⁷Cs (Cesium)(Approximately 1/6 times higher alike) and no Iodine 131 detected.

⁵ Maximum of 610Bq/cm³ of ¹³¹I (Iodine)(observed at the Sub Drain of Unit 2 on April

other hand, water in the deep well outskirts of the West Gate is not impacted by the contaminated water.

3. Future Actions

1) Strengthening the measures to control the outflow

After confirming the outflow of the contaminated water from Unit 2, TEPCO has taken measures to control the release of radioactive materials to offshore, such as,

- ① Placing steel boards and silt fences on the Inlet Bar Screen of Unit 2
- ② Putting sandbags filled with Zeolite (radioactive material absorbent) in front of the Screen Room of Units 1 to 4, etc.

Hereafter, in addition to the measures above, TEPCO will not only steadily carry out the storage and processing of the stagnant water in order to prevent the outflow of the water contaminated with radioactive materials stagnant in the turbine buildings etc. to the outside, but also consider the measure to prevent the contamination of ground water by proceeding the investigation etc. on geology and ground water. NISA will also make confirmations necessary for its materialization and at the same time, if necessary, give directions to TEPCO about the further measures to control the outflow.

2) Strengthening the monitoring

Responding to the directions etc. from NISA considering the other day's discharge of the waste water with low concentration to the sea, TEPCO has so far taken measures such as adding measuring points one after another. However, based on the events this time, TEPCO intends to further strengthen the monitoring with addition of more measuring points and gathering soil of sea floor, etc.

As for the government, in accordance with the "Regarding the Plan of Strengthening Environmental Monitoring (the Nuclear Emergency Response

13th) and Maximum of 91Bq/cm³ of ¹³⁷Cs (Cesium)(observed at the Sub Drain of Unit 1 on April 20th)

Headquarters, April 22nd 2011)”, related ministries shall cooperatively tackle on the impact assessment of the radioactive materials on the environment by increasing the measuring points in the coastal area and continuously carrying out the spread prediction of the radioactive materials utilizing the current prediction, and announce those results promptly.

3) Processing of the contaminated water with high concentration

A little less than 70,000t of the contaminated water with high-level radioactivity is stagnant on the basement floor of the turbine buildings of Units 1 to 3 of Fukushima Dai-ichi NPS. According to the roadmap announced by TEPCO on April 17th 2011, TEPCO shall secure sufficient storage site and install the Water Processing Facility to decontaminate and give salinity treatment to the contaminated water and then store it in the tank, in order to prevent the contaminated water with high-level radioactivity from flowing out.

NISA will continuously conduct confirmation etc. such as on-the-spot confirmation for any leakage point, in order for a highly reliable Contaminated Water Processing System to be constructed.

<Reference> Evaluation based on the results of monitoring or results of simulation conducted by institutions concerned

According to the result of monitoring of sea water or the result of simulation of radioactivity concentrations in the sea area based on the result of monitoring, radioactive materials released from Fukushima Dai-ichi NPS will gradually spread along by the current and its concentration level will also decrease.

1. Evaluation result by Nuclear Safety Commission (April 21st)

Regarding sea water, the radioactive materials released into the sea will spread by the oceanic current and considered that it will be diluted by the time absorbed by marine organisms, such as fish, algae, etc.

2. Regarding the simulation of radioactivity concentrations in the sea area
(April 11th MEXT)

The oceanic currents off Fukushima are complicated and slow-flowing.

In line with those complicated currents, the water flowing out from Fukushima Dai-ichi NPS spreads in the offshore direction. IF the outflow has stopped since April 12th, there will be no sea surface with the concentration levels of iodine-131 exceeding 40Bq/L, nor with levels of Cesium-137 exceeding 90Bq/L (Cesium) by May.

In particular, the concentration of radioactivity moves towards the open sea while gradually spreading in the offshore direction of Fukushima Dai-ichi NPS. Thus, the radioactivity concentrations in the sea area 30 km off the coast of the NPP are expected to be higher during the period from April 9th till 11h than during the period from April 4th till 7th. (The actual measurements taken in the sea area monitoring conducted by MEXT on April 9th showed such tendency.)

3. Regarding the simulation of the concentration of radioactivity in the area of sea (Second edition)

(April 16th MEXT)

The oceanic current off the coast of the Southern Tohoku, including the coast of Fukushima is where the Japan Current (Black Current), the

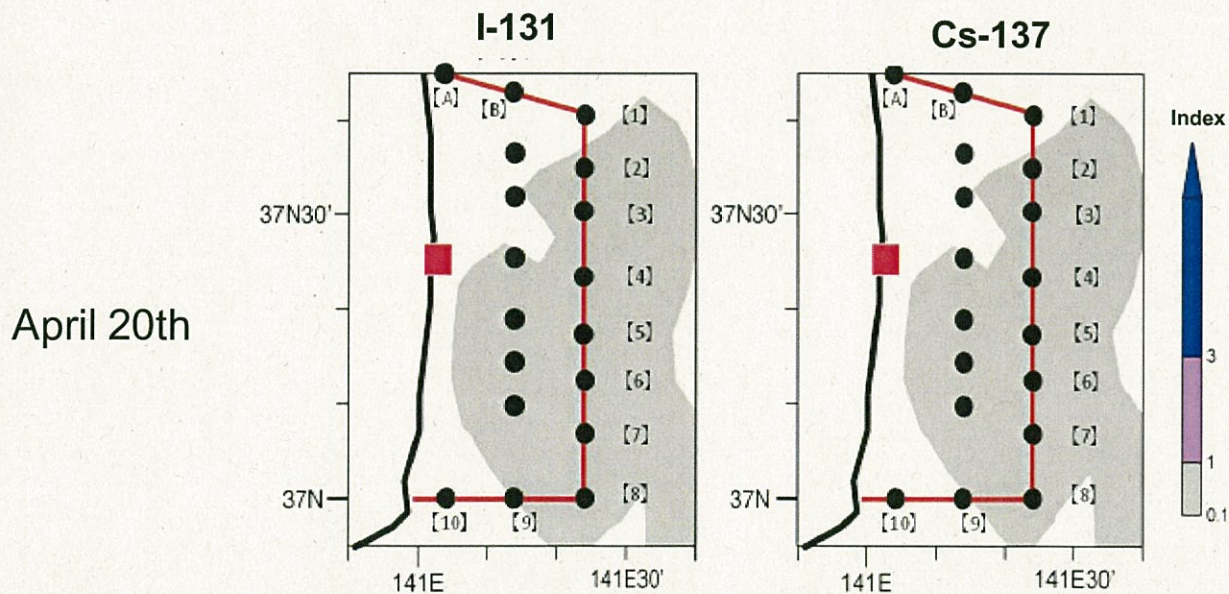
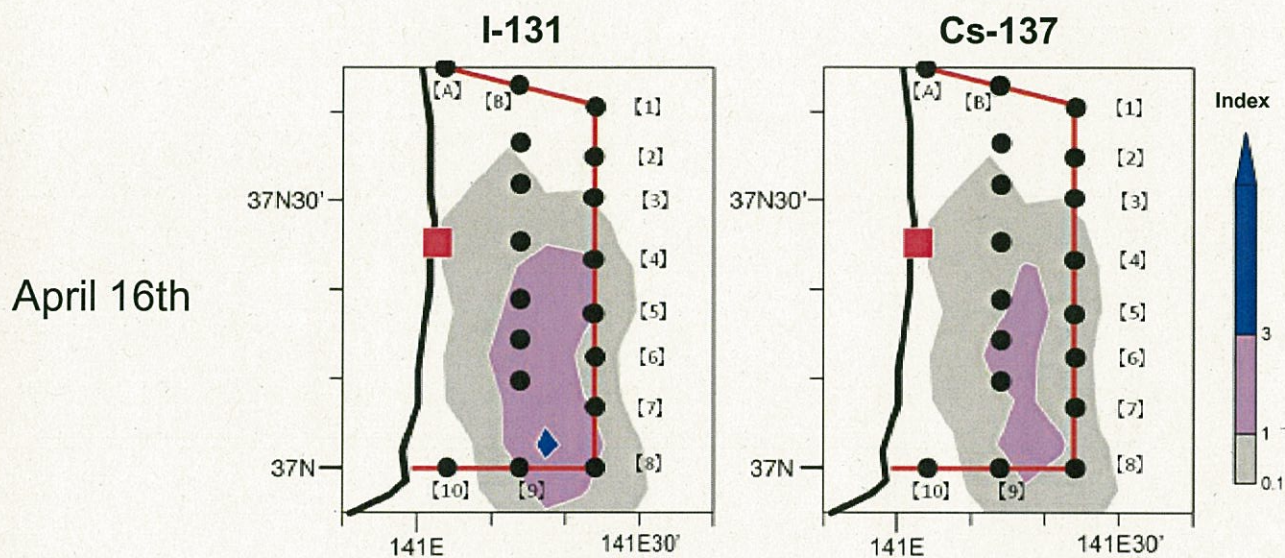
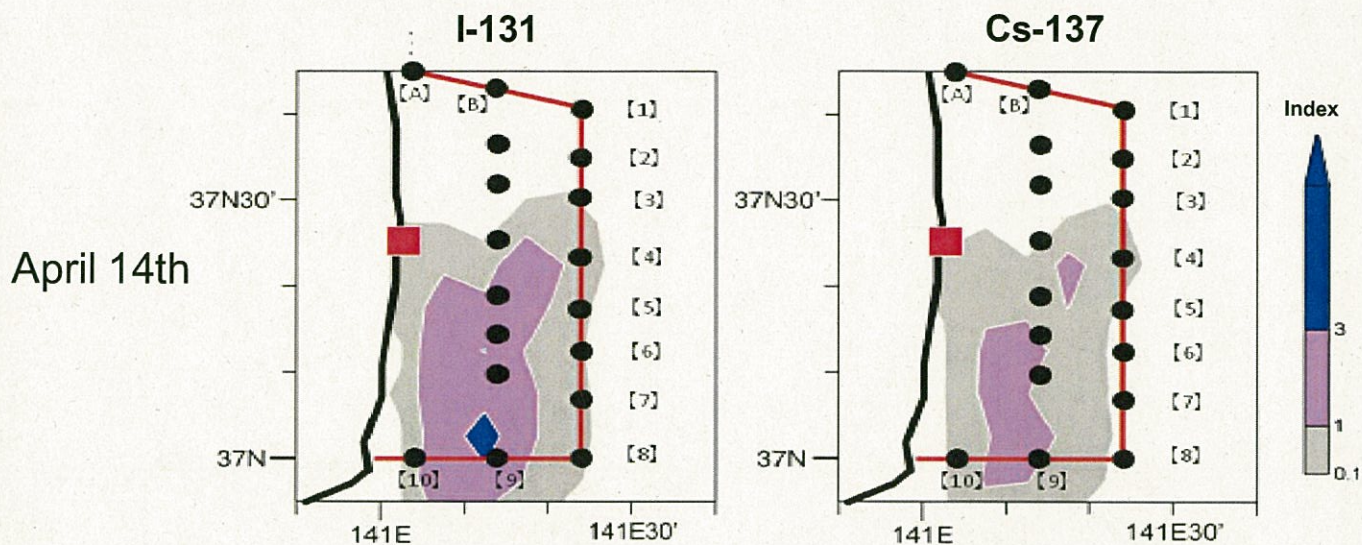
divergent flow of Tsushima Current (Tsugaru Warm Current) and Chishima Current (Oyashio Current) meet, and generate complicated and slow-flowing.

In line with this complicated oceanic current, water containing radioactive materials stagnant near NPS will spread in the offshore direction.

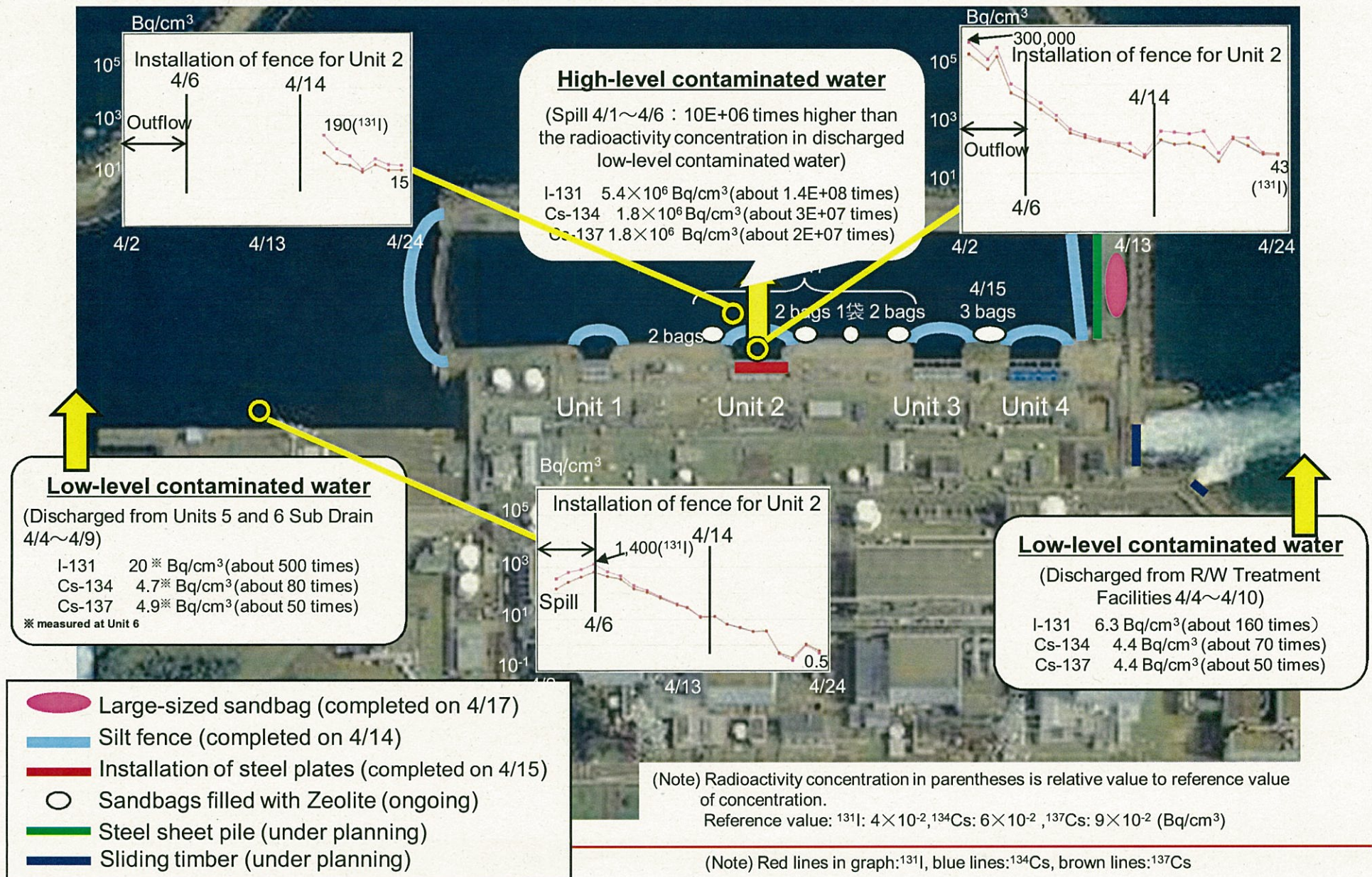
Especially at the offshore of Fukushima Dai-ichi NPS in mid-April, while the water containing radioactive materials are predicted to spread gradually, it is expected to move slightly southerly in the offshore direction extremely slowly. To be more specific, the calculation result shows that the water containing radioactive materials in the vicinity of the sea area 30 km off the coast of the NPS will spread its distribution range slightly southerly towards the offshore direction from April 14th till 20th. (The actual measurements taken in the sea area monitoring conducted on April 15th by TEPCO and MEXT showed such tendency.)

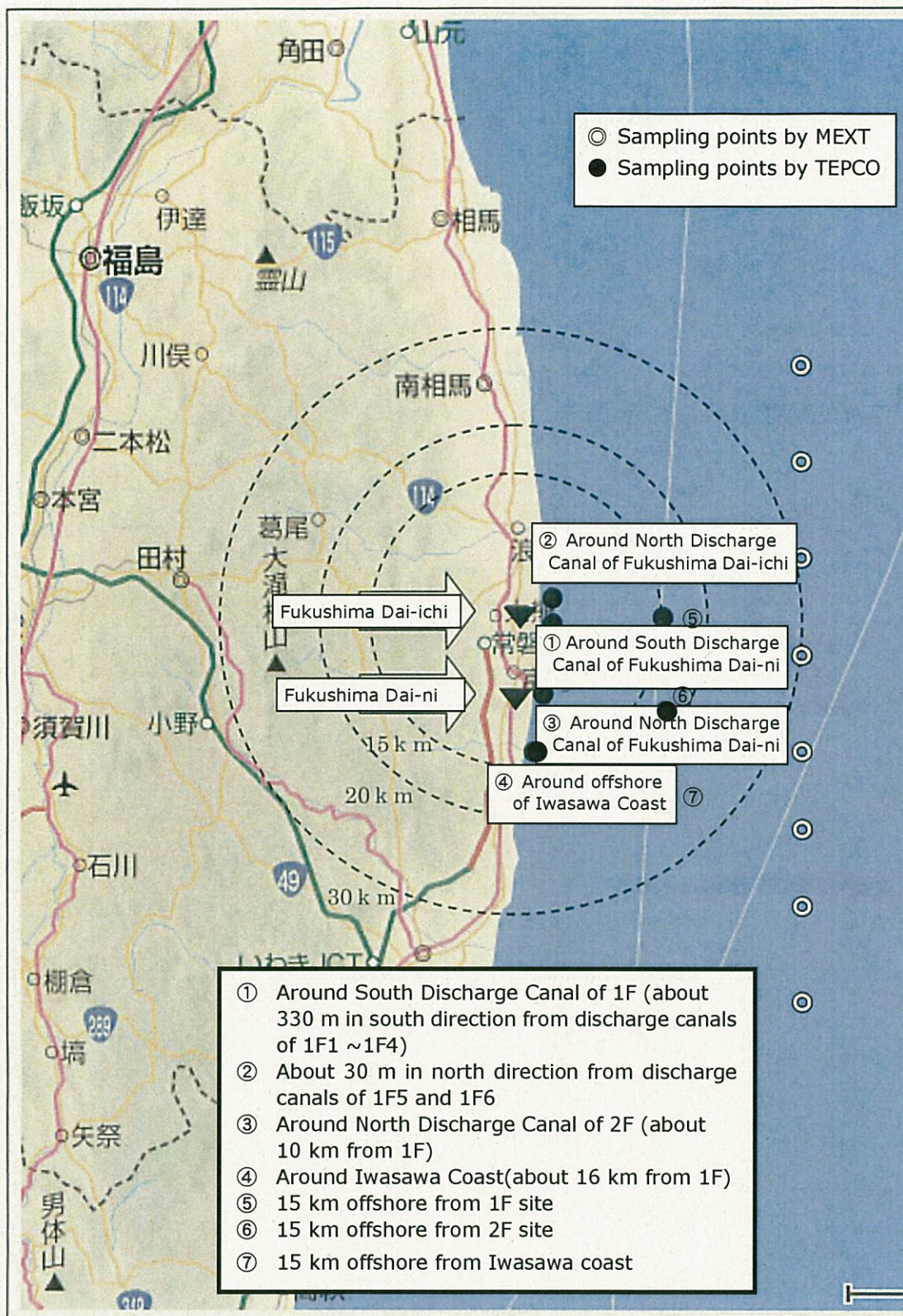
According to the assumed scenario, the concentration levels of Iodine-131 is calculated to fall below 40Bq/L (Maximum concentration level of waste water of Nuclear Plant Facilities) on April 21st and that of Cesium-137 is calculated to fall below 90Bq/L on April 17th.

Concentration Distribution Simulation by Japan Agency for Marine-Earth Science and Technology
(Press Release from Ministry of Education, Culture, Sports, Science and Technology (April 16th))



Measures for preventing spread of the liquid including radioactive materials





Map of investigating location at 15 km and 30 km offshore

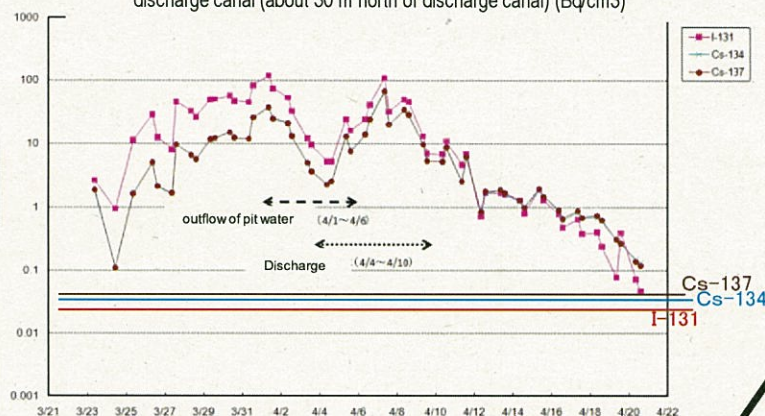
Seawater sampling points as of April 5th (15 points)
(Thereafter, sampling points were sequentially added, and the current total number of sampling points is 28, including MEXT's and TEPCO's ones.)

Results of Radioactivity Concentration Analysis of seawater sampled by TEPCO at coast near the facilities and at 15 km offshore

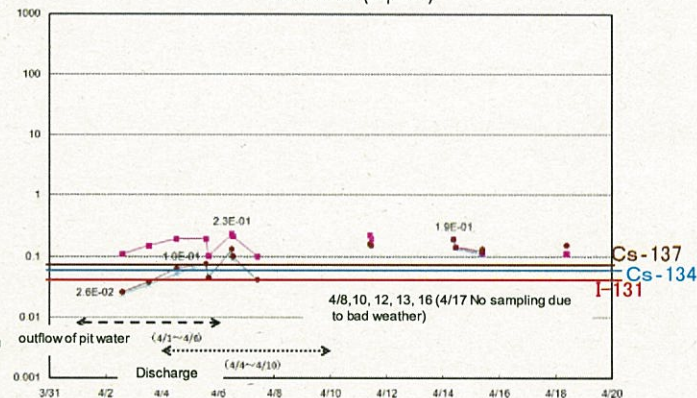
Sampling points



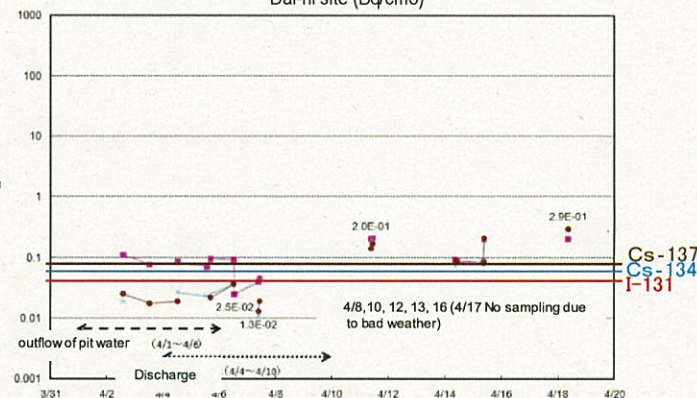
Radioactivity concentration on the north of Fukushima-Daiichi Unit 5 and 6 discharge canal (about 30 m north of discharge canal) (Bq/cm³)



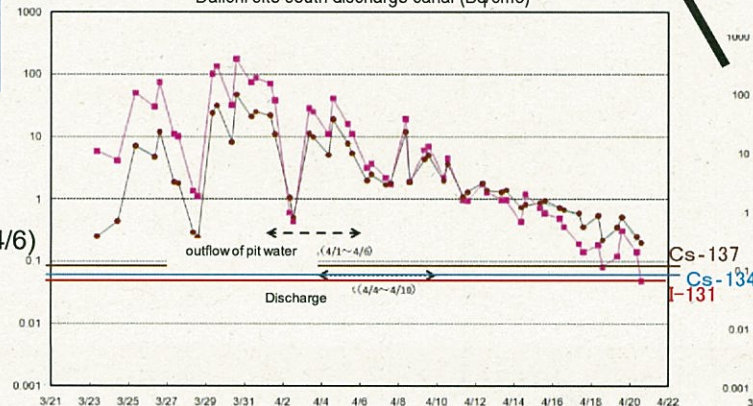
Radioactivity concentration in seawater at about 15 km offshore of Fukushima Dai-ichi site (Bq/cm³)



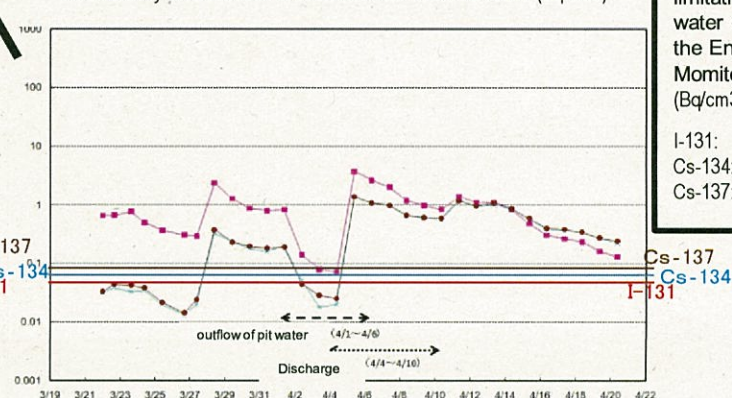
Radioactivity concentration in seawater at about 15 km offshore of Fukushima Dai-ni site (Bq/cm³)



Radioactivity concentration in seawater in the vicinity of Fukushima-Daiichi site south discharge canal (Bq/cm³)



Radioactivity concentration in seawater near Iwasawa coast (Bq/cm³)

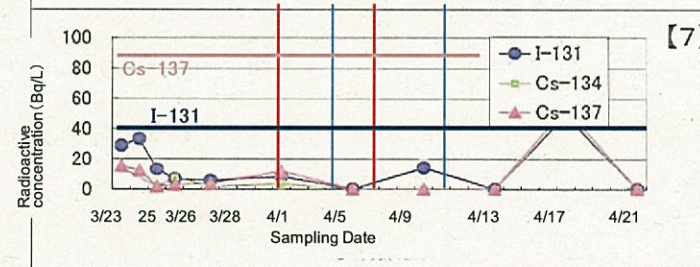
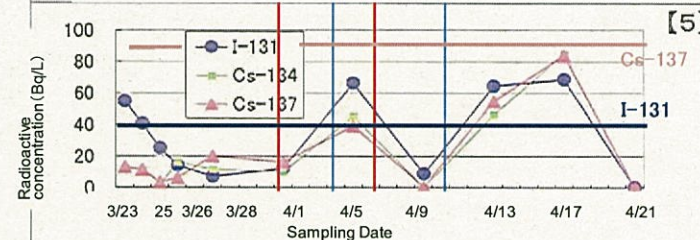
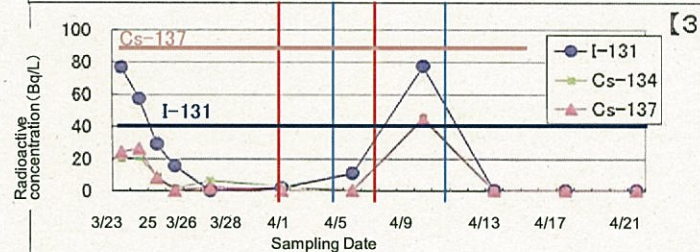
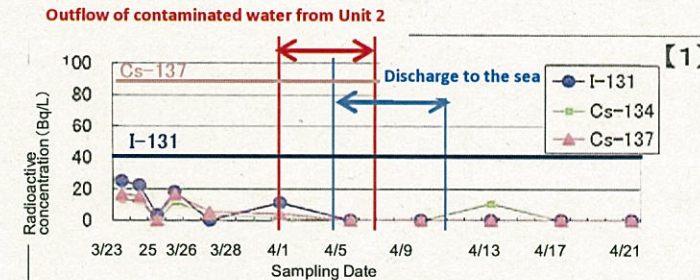
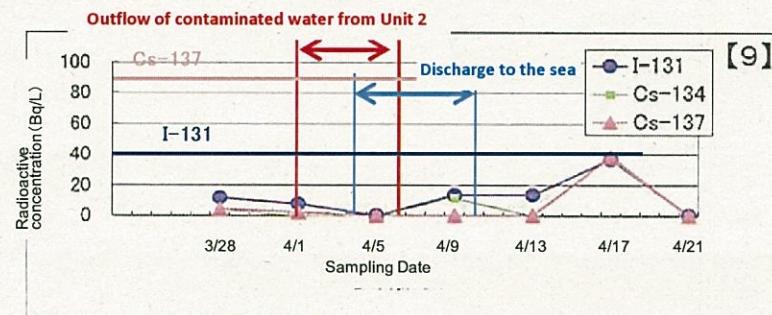
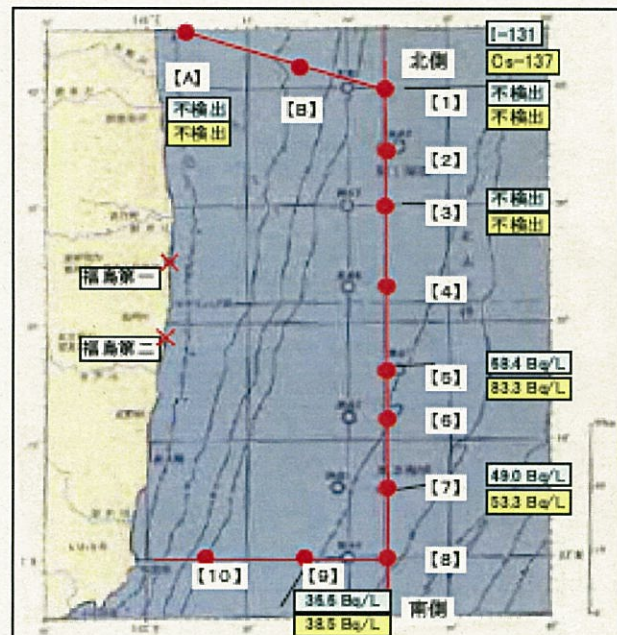
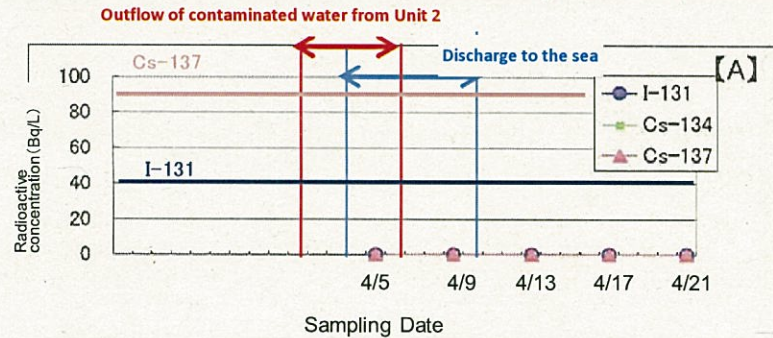


Concentration limitation in the water outside of the Environmental Monitoring Area: (Bq/cm³)

I-131: 4.0×10^{-2}
Cs-134: 6.0×10^{-2}
Cs-137: 9.0×10^{-2}

← - - - - - →
Outflow of pit water(4/1 - 4/6)
← ····· ····· →
Discharge (4/4 - 4/10)

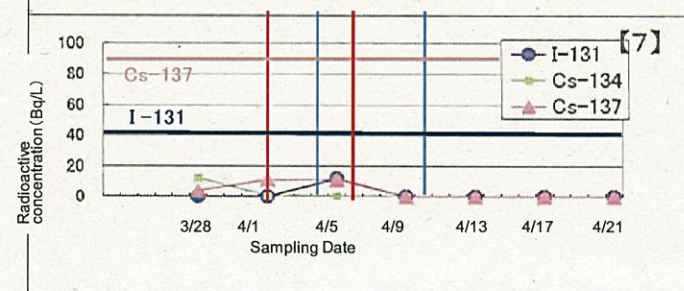
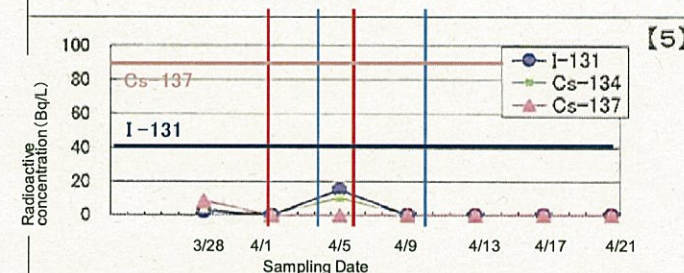
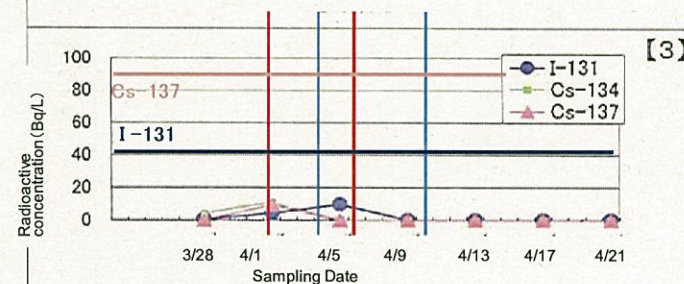
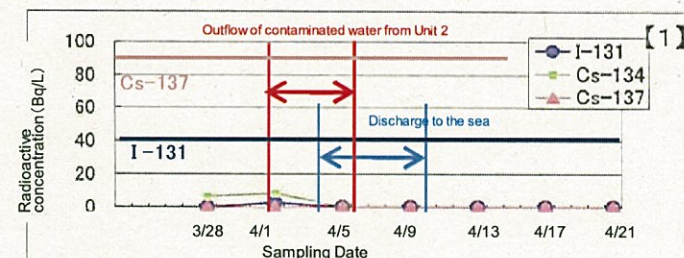
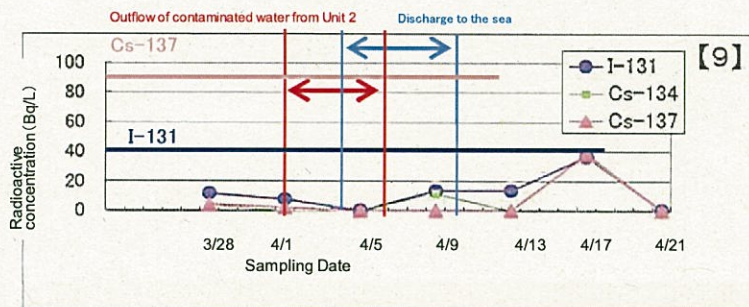
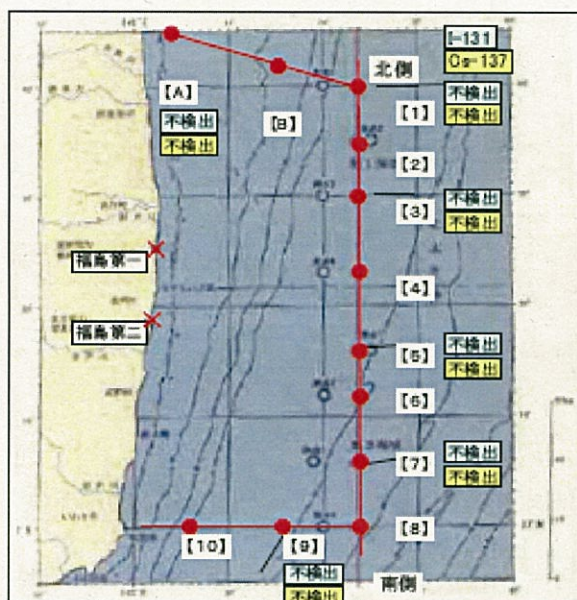
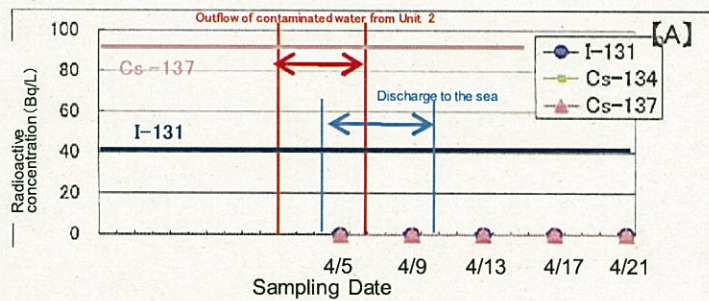
Sea area monitoring around Fukushima Dai-ichi Nuclear Power Station (30 km offshore) Measurement results of radioactivity concentration in the sea water (surface layer) (sampled by MEXT on April 21st)



Concentration limitation
in the water outside of
the Environmental
Monitoring : Bq/L
I-131 : 40
Cs-137 : 90

※ If a measured result is undetectable, it is indicated as 0 Bq/L.

Sea area monitoring around Fukushima Dai-ichi Nuclear Power Station (30km offshore) Measurement results of radioactivity concentration in the sea water (lower layer) (sampled by MEXT on April 21st)

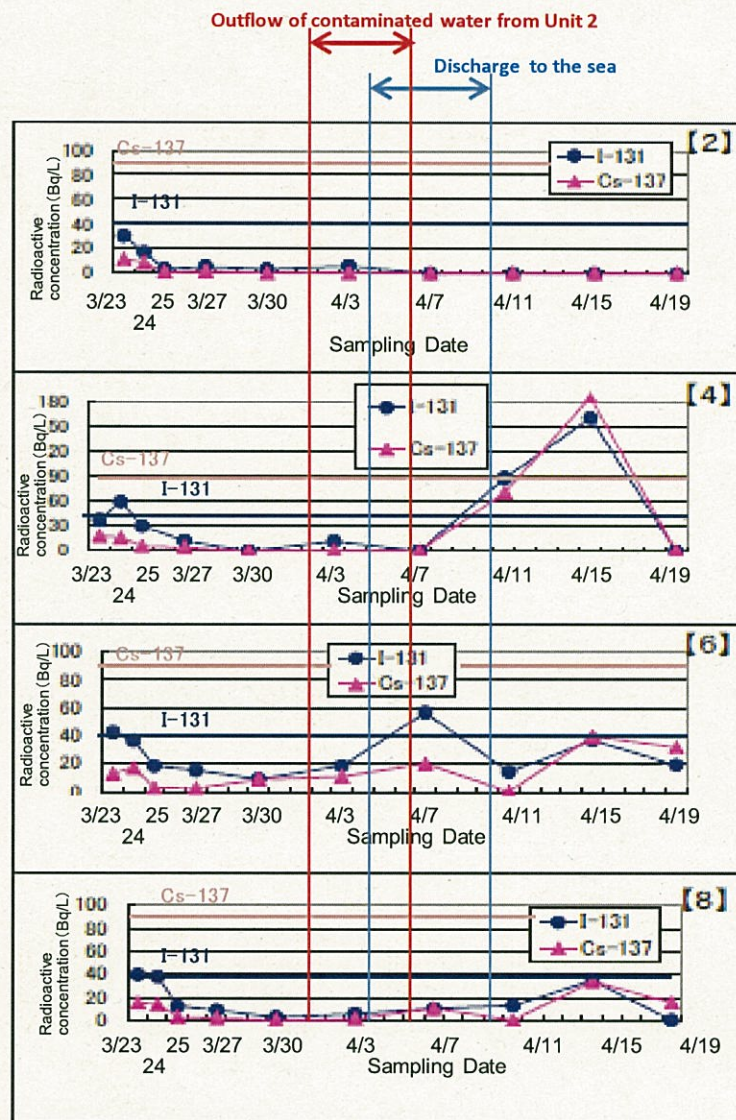
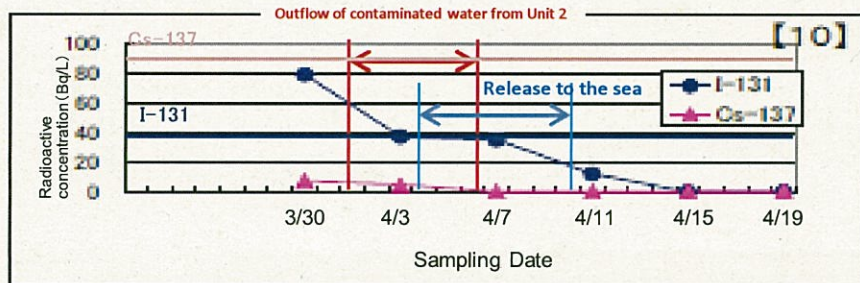
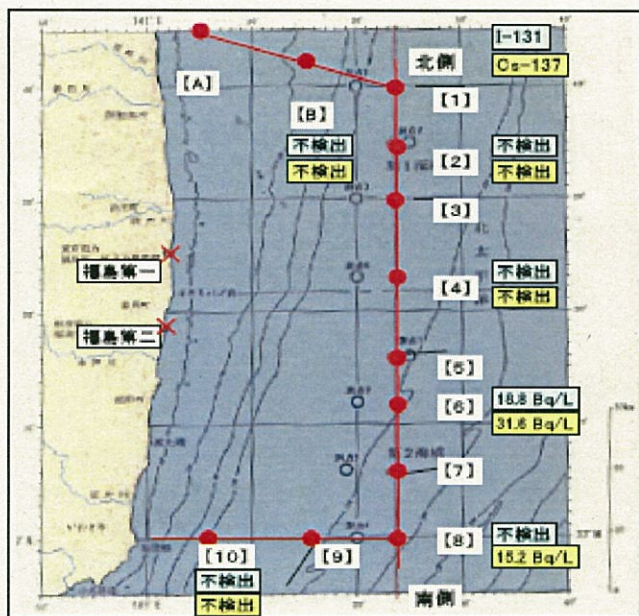
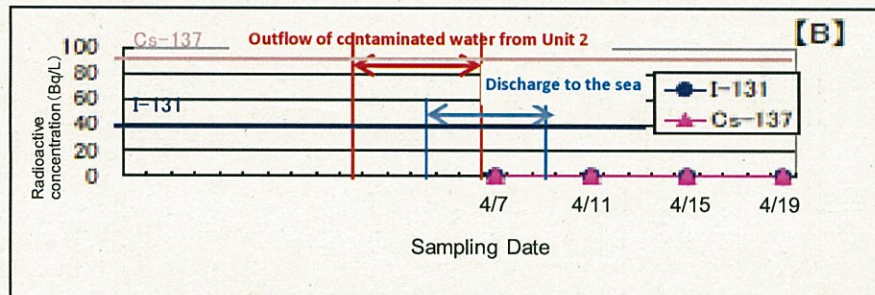


Concentration limitation in the water outside of the Environmental Monitoring Area: Bq/L
I-131: 40
Cs-137: 90

※ If a measured result is undetectable, it is indicated as 0 Bq/L.

Sea area monitoring around Fukushima Dai-ichi Nuclear Power Station (30 km offshore)

Measurement results of radioactivity concentration in the sea water (surface layer) (sampled by MEXT on April 19th)

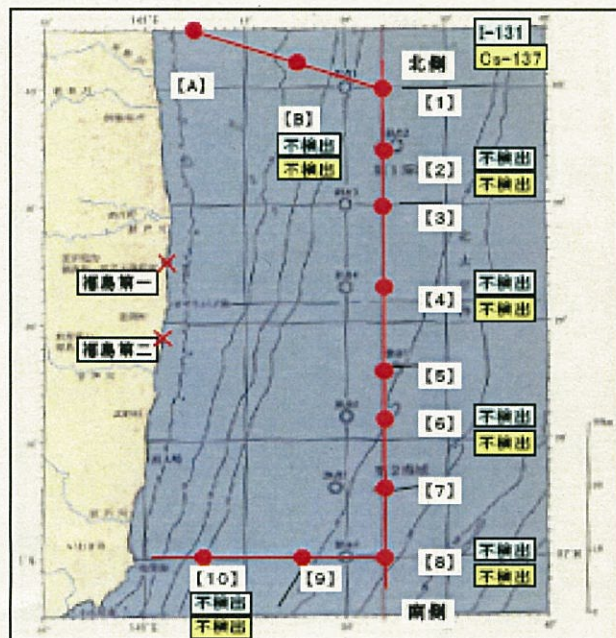
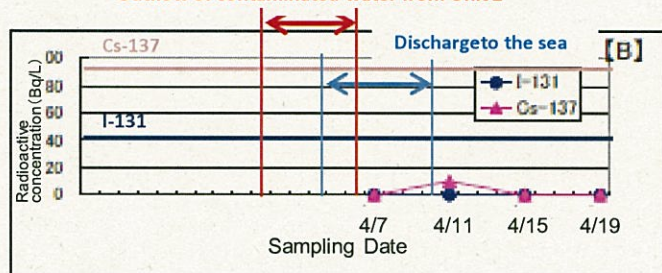


Concentration limitation
in the water outside of
the Environmental
Monitoring : Bq/L
I-131 : 40
Cs-137 : 90

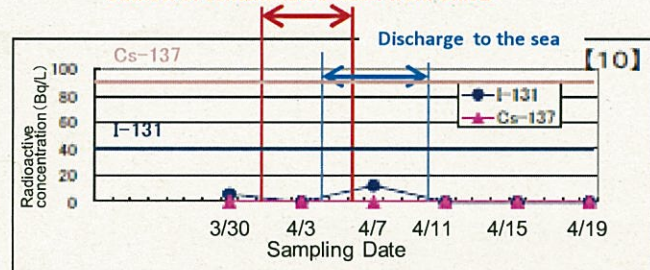
※ If a measured result is not detected, it is indicated as 0 Bq/L.

Sea area monitoring around Fukushima Dai-ichi Nuclear Power Station (30 km offshore) Measurement results of radioactive concentration in the sea water (lower layer) (sampled by MEXT on April 19th)

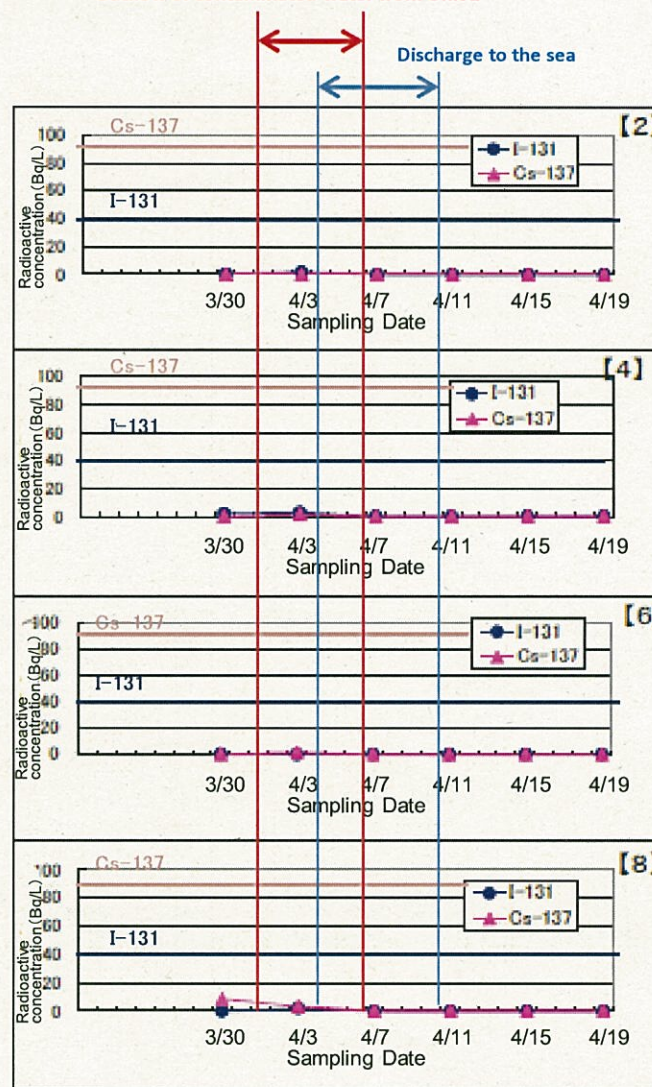
Outflow of contaminated water from Unit 2



Outflow of contaminated water from Unit 2



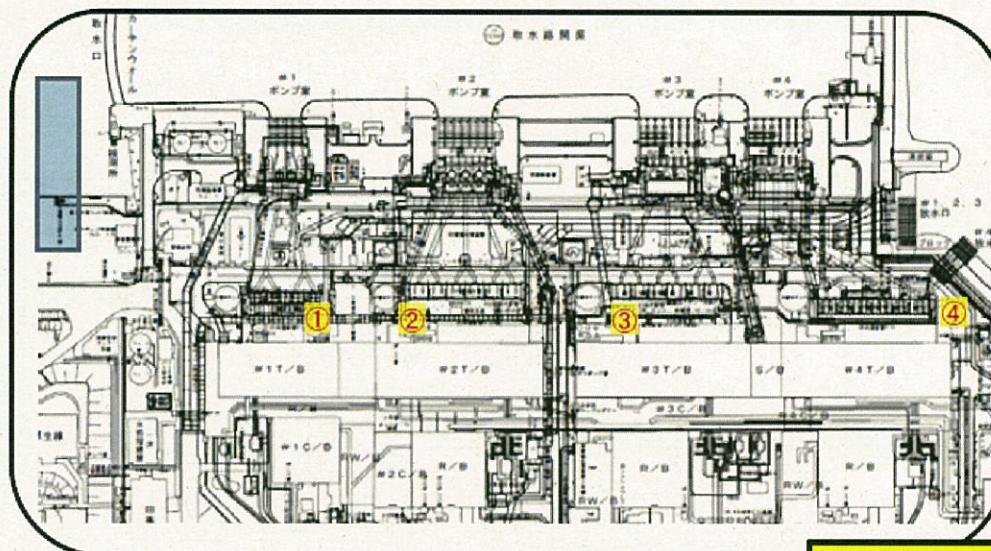
Outflow of contaminated water from Unit 2



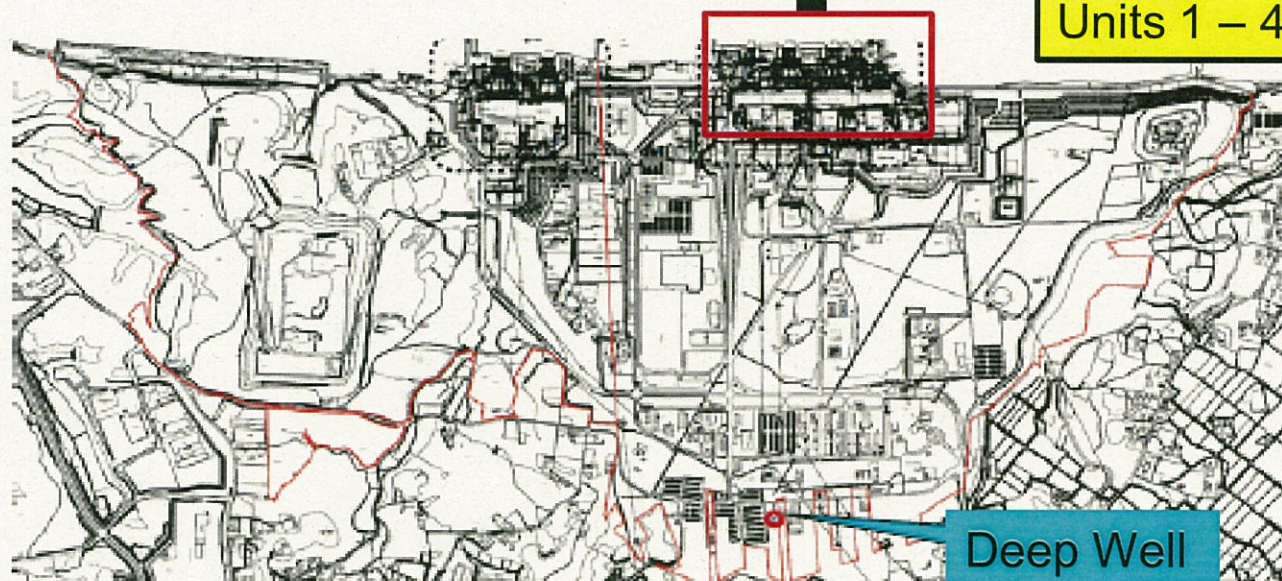
Concentration limitation in the water outside of the Environmental Monitoring Area: Bq/L
I-131: 40
Cs-137: 90

※ If a measured result is undetectable, it is indicated as 0 Bq/L.

Locations of Sub Drain Pits of Fukushima Dai-ichi NPPs Units 1 – 4 and Deep Well



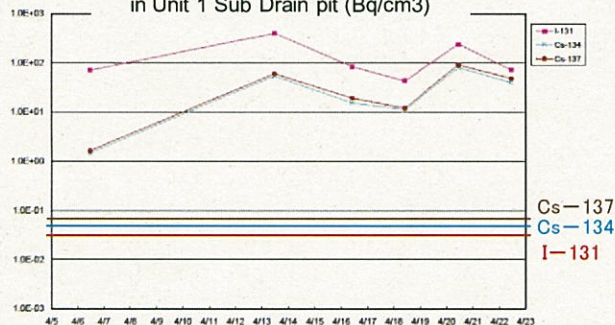
Units 1 – 4 Sub Drain Pits



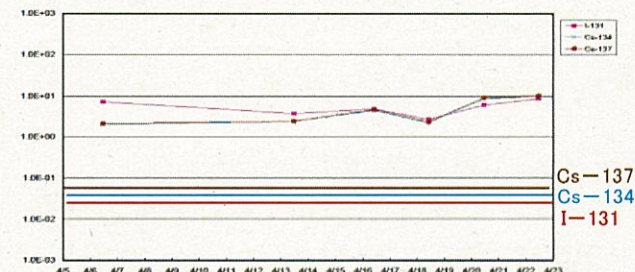
Deep Well

Results of radioactivity concentration measurement of Fukushima Dai-ichi Units 1 – 4 Sub Drain Pits and Deep Well

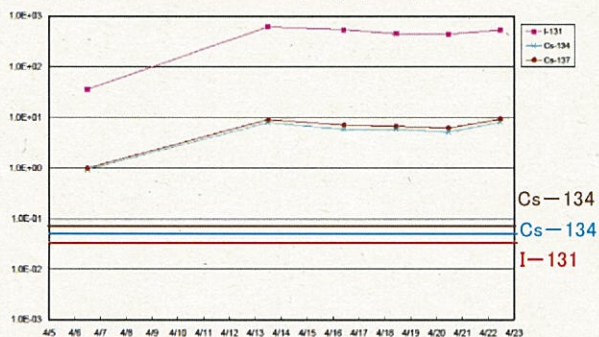
Radioactivity concentration
in Unit 1 Sub Drain pit (Bq/cm³)



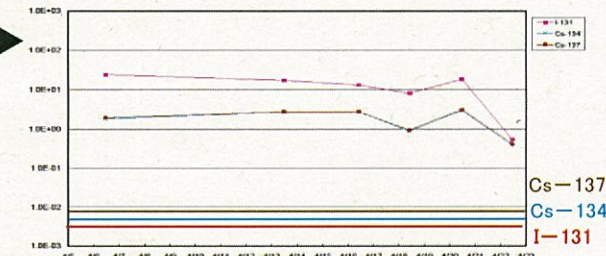
Radioactivity concentration
in Unit 3 Sub Drain pit (Bq/cm³)



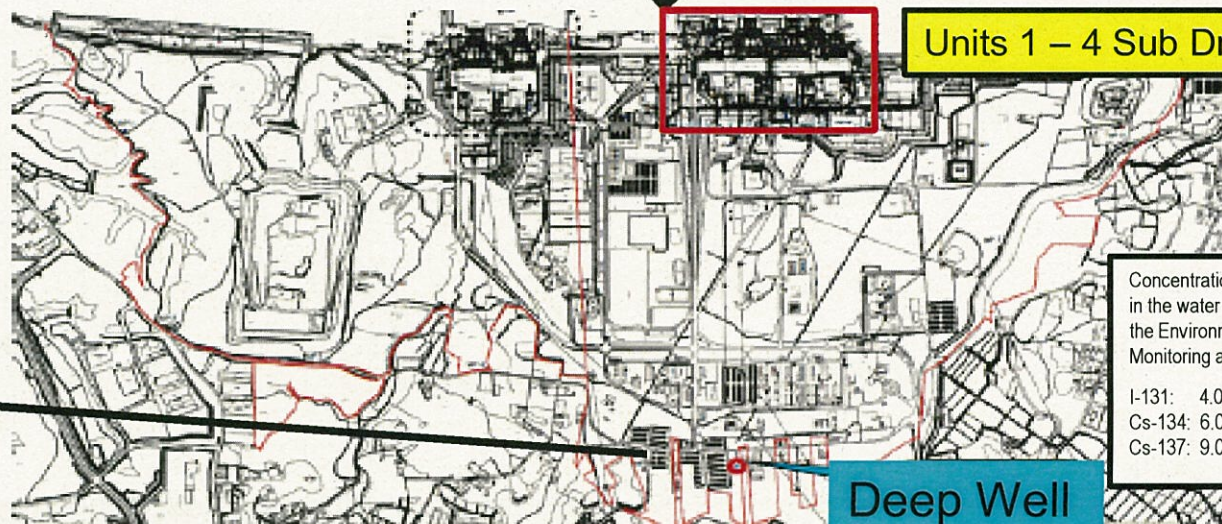
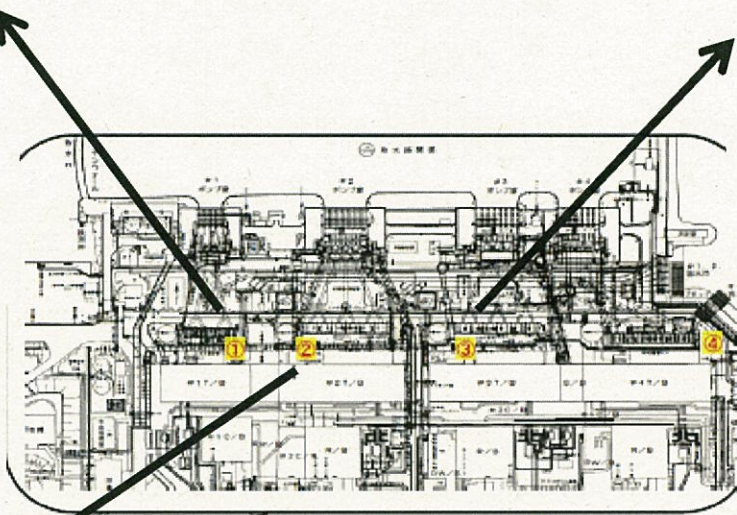
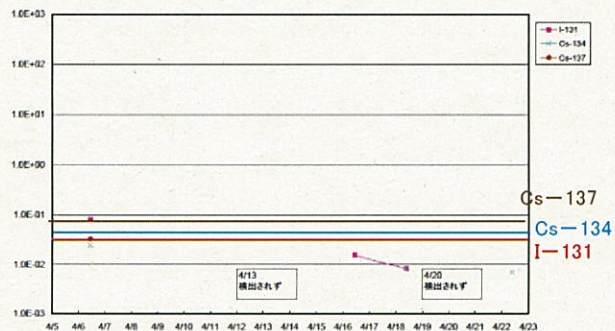
Radioactivity concentration
in Unit 2 Sub Drain pit (Bq/cm³)



Radioactivity concentration
in Unit 4 Sub Drain pit (Bq/cm³)



Radioactivity concentration
in deep well (Bq/cm³)



Units 1 – 4 Sub Drain Pits

Deep Well

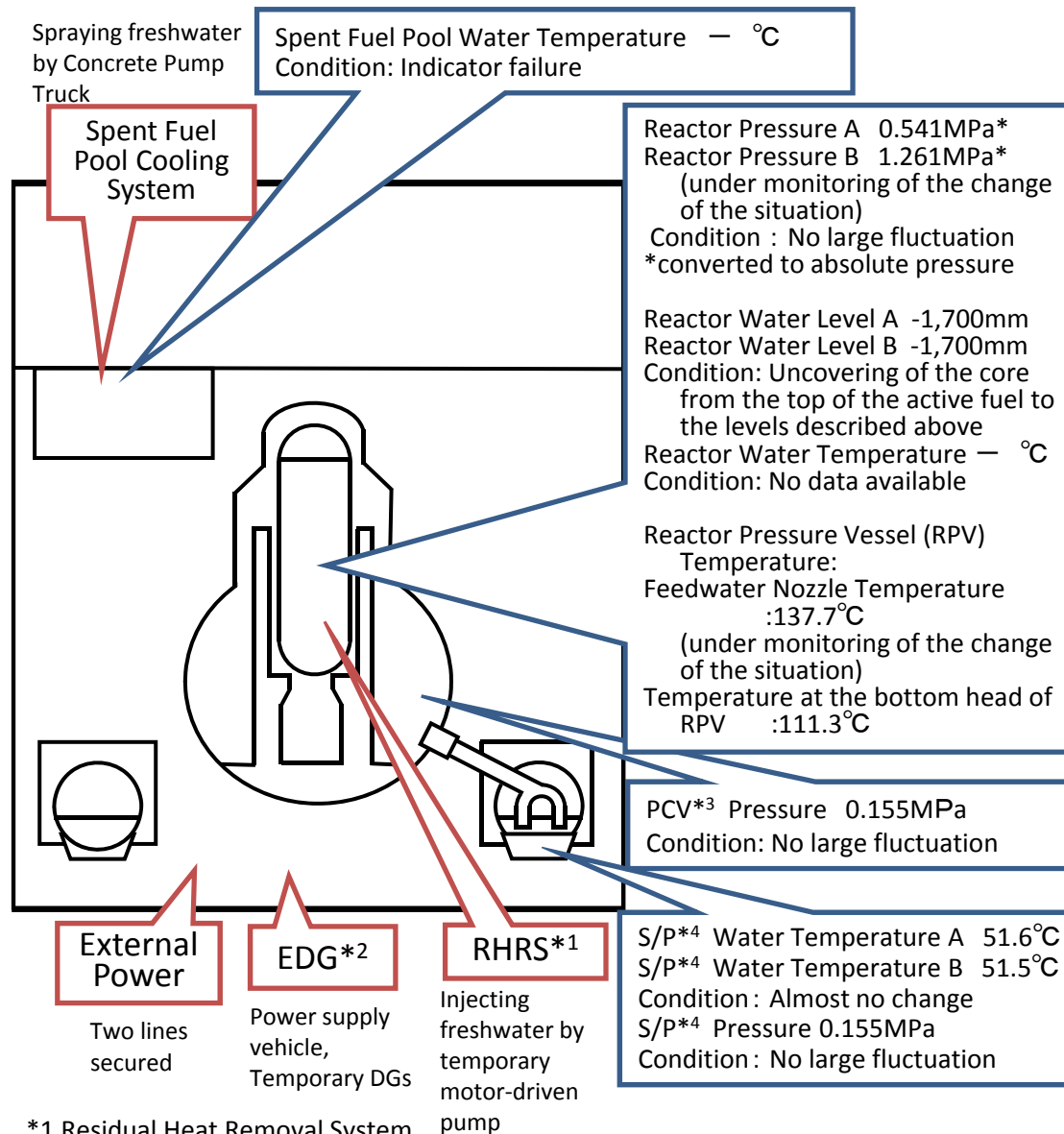
Concentration limitation
in the water outside of
the Environmental
Monitoring area (Bq/cm³)

I-131: 4.0×10^{-2}
Cs-134: 6.0×10^{-2}
Cs-137: 9.0×10^{-2}

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

(As of 2:00 April 25th, 2011)

Major Events after the Earthquake



March 11th 14:46 Under operation, Automatic shutdown by the earthquake
 March 11th 15:42 Report based on the Article 10 (Total loss of A/C power)
 March 11th 16:36 Occurrence of the Article 15 event (Inability of water injection of the Emergency Core Cooling System)
 March 12th 01:20 Occurrence of the Article 15 event (Unusual rise of the pressure in PCV)
 March 12th 10:17 Started to vent.
 March 12th 15:36 Sound of explosion
 March 12th 20:20 Started to inject seawater and borated water to the Reactor Core.
 March 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 31st 12:00 ~2nd 15:26 Started to transfer the stagnant water from the Condensate Storage Tank (CST) to the Surge Tank of Suppression Pool Water (SPT)
 March 31st 13:03~16:04 Water spray by Concrete Pump Truck (Fresh water)
 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 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

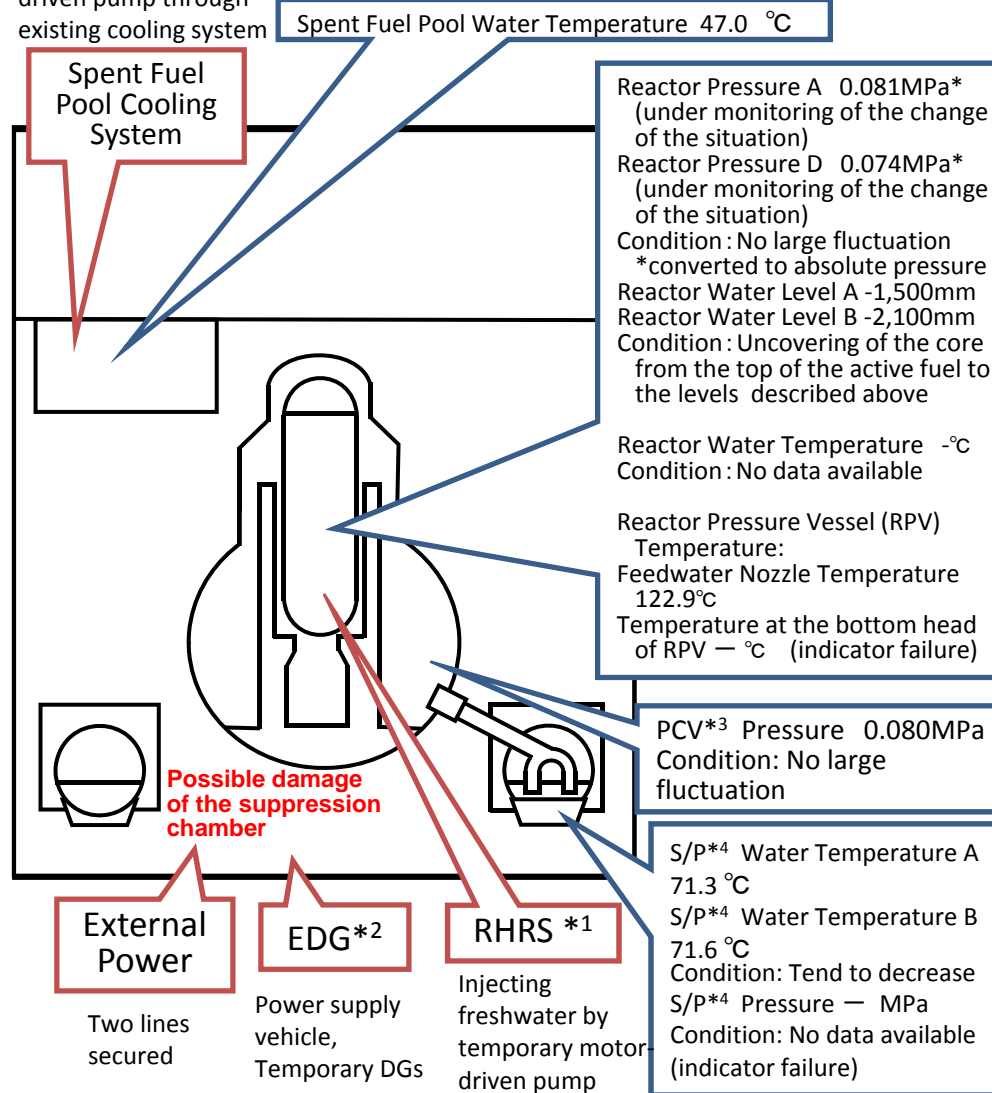
(Editorial committee for Nuclear Energy Handbook, Nuclear Energy Handbook)

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

(As of 2:00 April 25th, 2011)

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

Major Events after the Earthquake 1/2



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

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

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

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

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 13:42 ~ Confirmed the situation in the reactor building using an unmanned robot.

April 18th 12:13 ~ 12:37 Stopped the water injection into the reactor core to replace the current hose with a new one.

April 18th 09:30 ~ 17:40 Injected coagulant (soluble glass) into the power cable trench.

April 19th 08:00 ~ 15:30 Injected coagulant (soluble glass) into the power cable trench.

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.

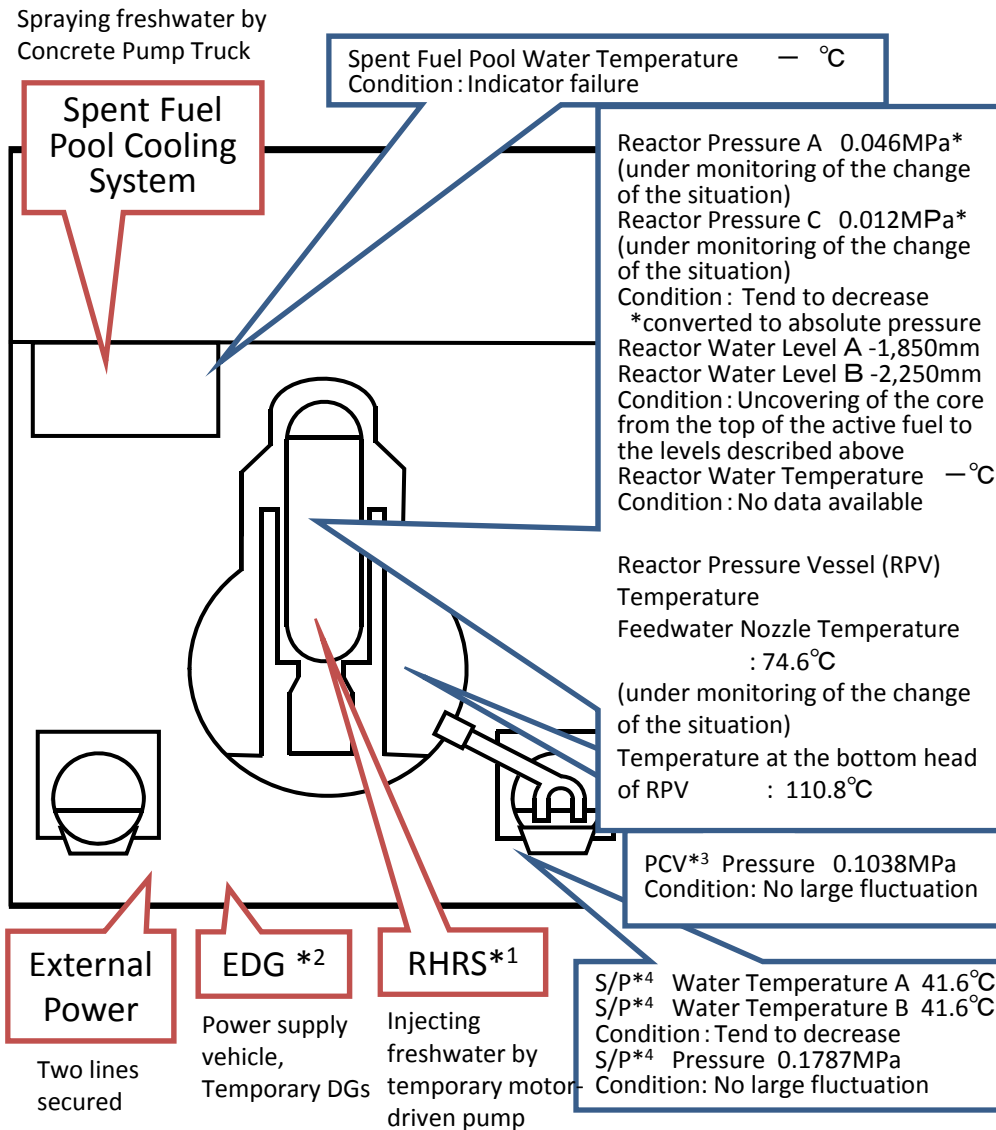
April 19th 16:08 ~ 17:28 Injected freshwater to SFP via FPC using the temporary motor-driven pump.

April 22nd 15:55 ~ 17:40 Injected freshwater to SFP via FPC using the temporary motor-driven pump.

Conditions of Fukushima Dai-ichi Nuclear Power Station **Unit 3**

(As of 2:00 April 25th, 2011)

Major Events after the Earthquake 1/2



- *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

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 ~ 20th 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 ~ 21st 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 SFP 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
 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.

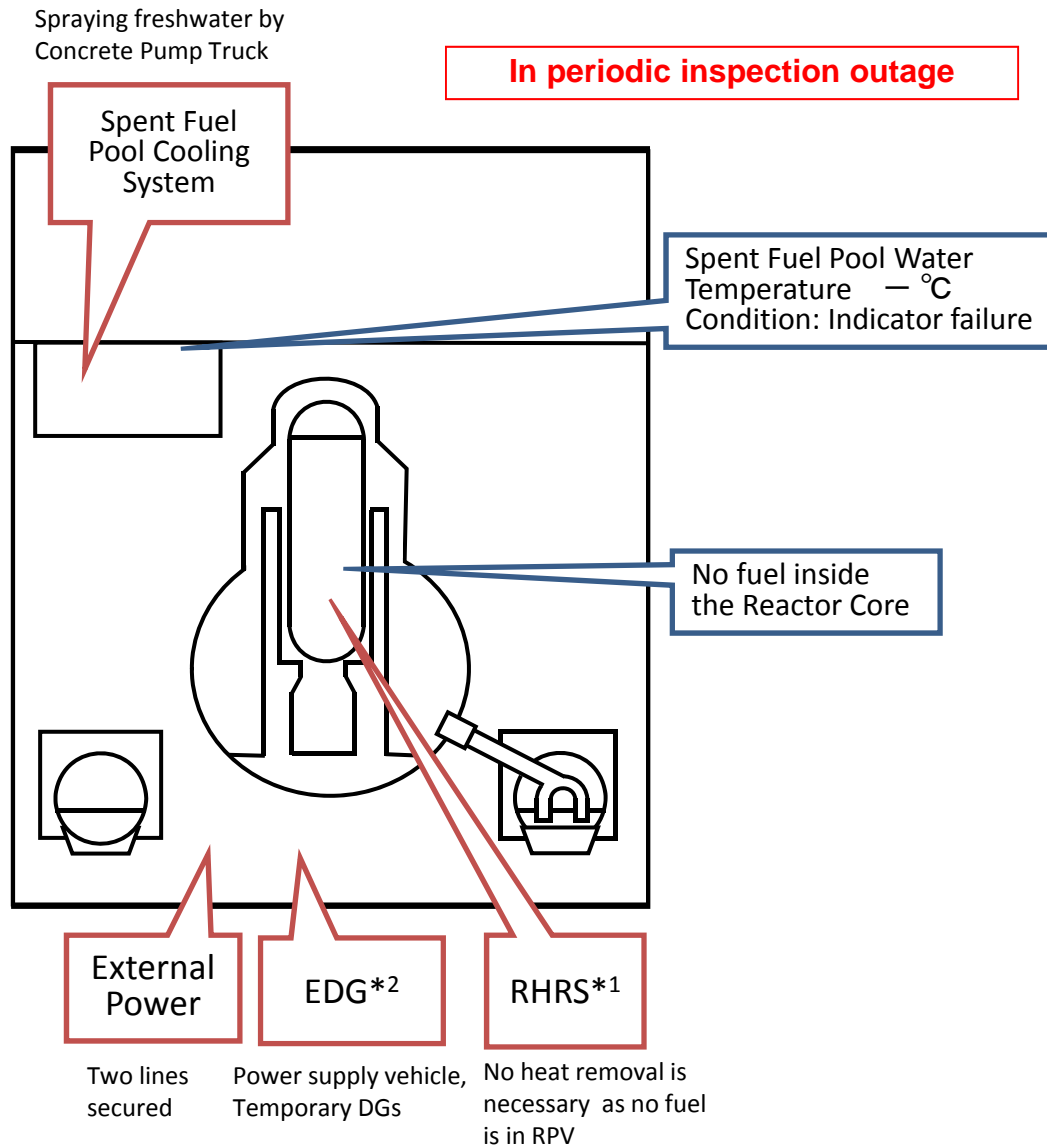
Major Events after the Earthquake 2/2

<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

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

(As of 2:00 April 25th, 2011)



Major Events after the Earthquake

In periodic inspection outage when the earthquake occurred

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

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

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

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

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

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

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

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

March 22nd 10:35 Power Center received electricity.

<Water spray by Concrete Pump Truck (Seawater)>

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

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

March 29th 11:50 Lighting in the Central Control Room was recovered.

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

April 12th 12:00~13:04 Sampled the water in SFP.

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

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

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

March 30th 14:04~18:33, April 1st 08:28~14:14, April 3rd 17:14~22:16, April 5th 17:35~18:22, April 7th 18:23~19:40, April 9th 17:07~19:24, April 13th 0:30~6:57, April 15th 14:30~18:29, April 17th 17:39~21:22, April 19th 10:17~11:35, April 20th 17:08~20:31, April 21st 17:14~21:20, April 22nd 17:52~23:53, April 23rd 12:30~16:44, April 24th 12:25~17:07

**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)

*1 Residual Heat Removal System

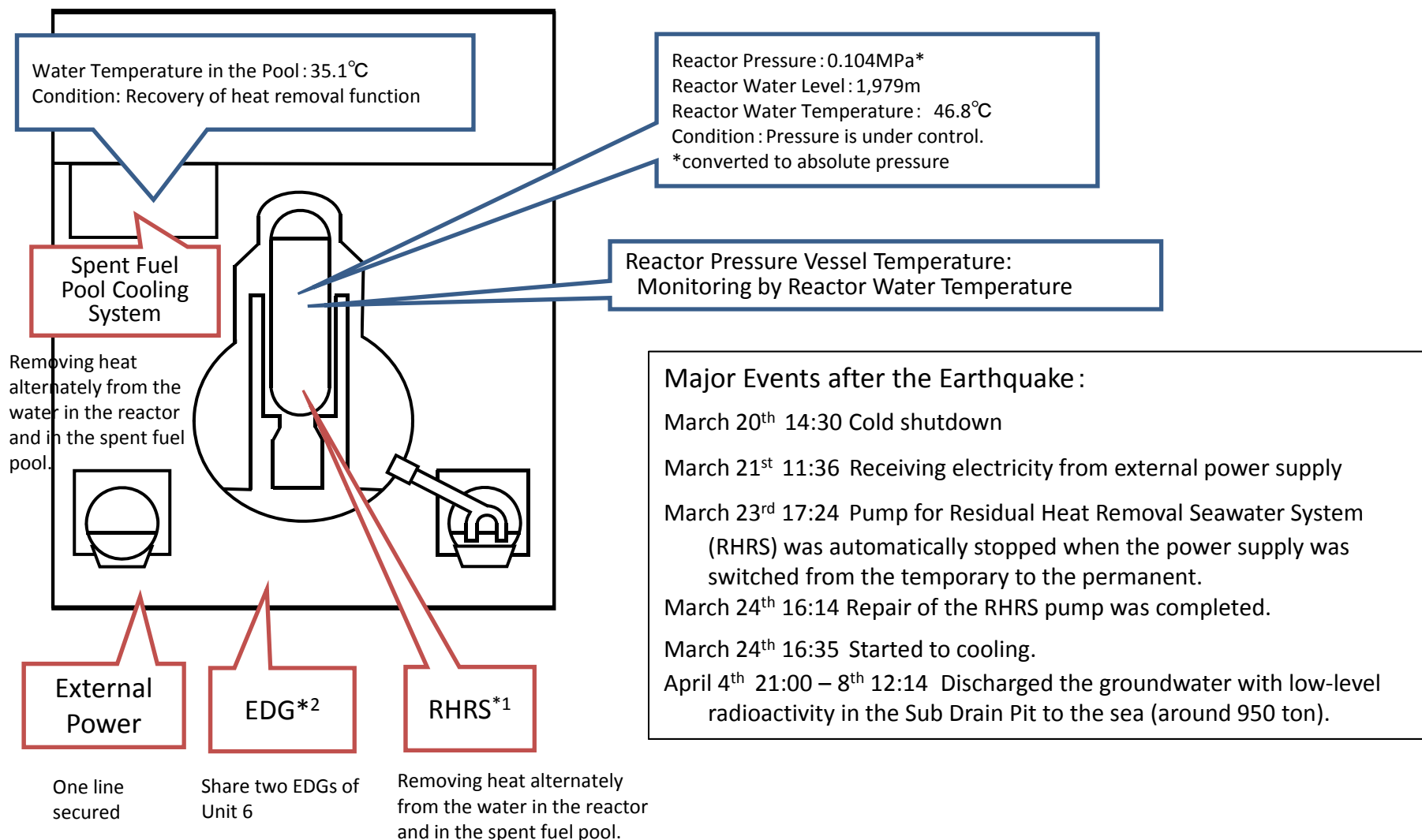
*2 Emergency Diesel Generator

*3 Reactor Pressure Vessel

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

(As of 2:00 April 25th, 2011)

In periodic inspection outage



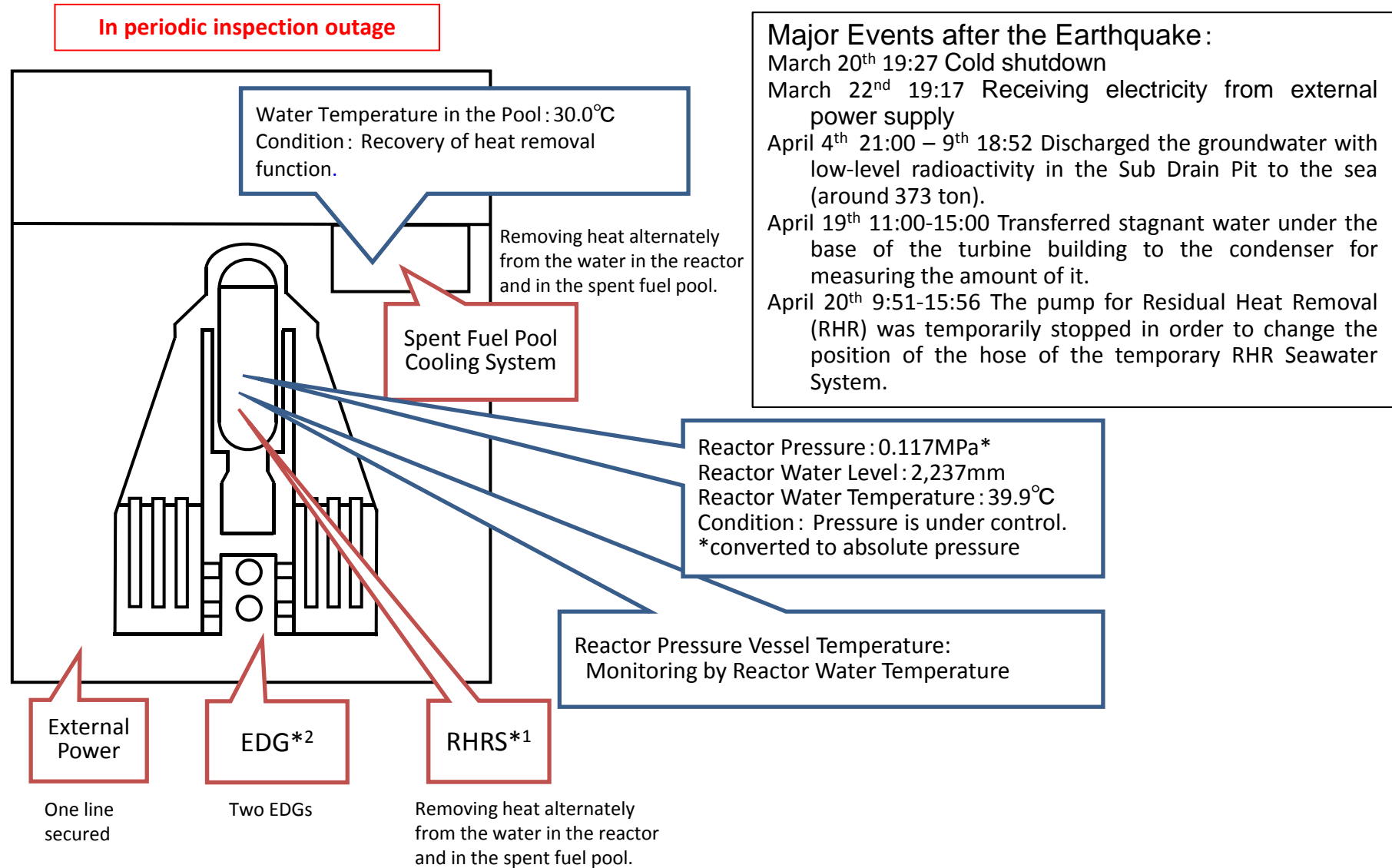
*1 Residual Heat Removal System

*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 2:00 April 25th, 2011)



*1 Residual Heat Removal System

*2 Emergency Diesel Generator

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

April 24, 2011

Nuclear and Industrial Safety Agency

Seismic Damage Information (the 111th Release)
(As of 15:00 April 24th, 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 spray of around 140t over the Spent Fuel Pool of Unit 4 using Concrete Pump Truck (62m class) was carried out. (From 12:30 till 16:44 April 23rd)
 - Fresh water spray over the Spent Fuel Pool of Unit 4 using Concrete Pump Truck (62m class) was started. (From 12:25 April 24th)

For more information:

NISA English Home Page

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

April 25, 2011

Nuclear and Industrial Safety Agency

Seismic Damage Information (the 112th Release)
(As of 08:00 April 25th, 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 spray of around 165t over the Spent Fuel Pool of Unit 4 using Concrete Pump Truck (62m class) was carried out. (From 12:25 till 17:07 April 24th).
- The test implementation of spraying anti-scattering agent to prevent the spread of radioactive materials on the ground surface was carried out in the area of about 860m² on the mountain-side of the reactor building for Unit 5 (From 11:30 till 13:00 April 24th).
- Removal of rubble (Amount equivalent to 3 containers) using remote-control heavy machineries was carried out. (From 9:00 till 16:00 April 24th)

For more information:

NISA English Home Page

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