

22 MARCH 2011 05:00 UTC



IAEA
International Atomic Energy Agency
Incident and Emergency Centre

Subject: Status of the Fukushima Daiichi nuclear power plant

The Incident and Emergency Centre (IEC) is continuing to monitor the status of the nuclear power plants in Japan following the earthquake.

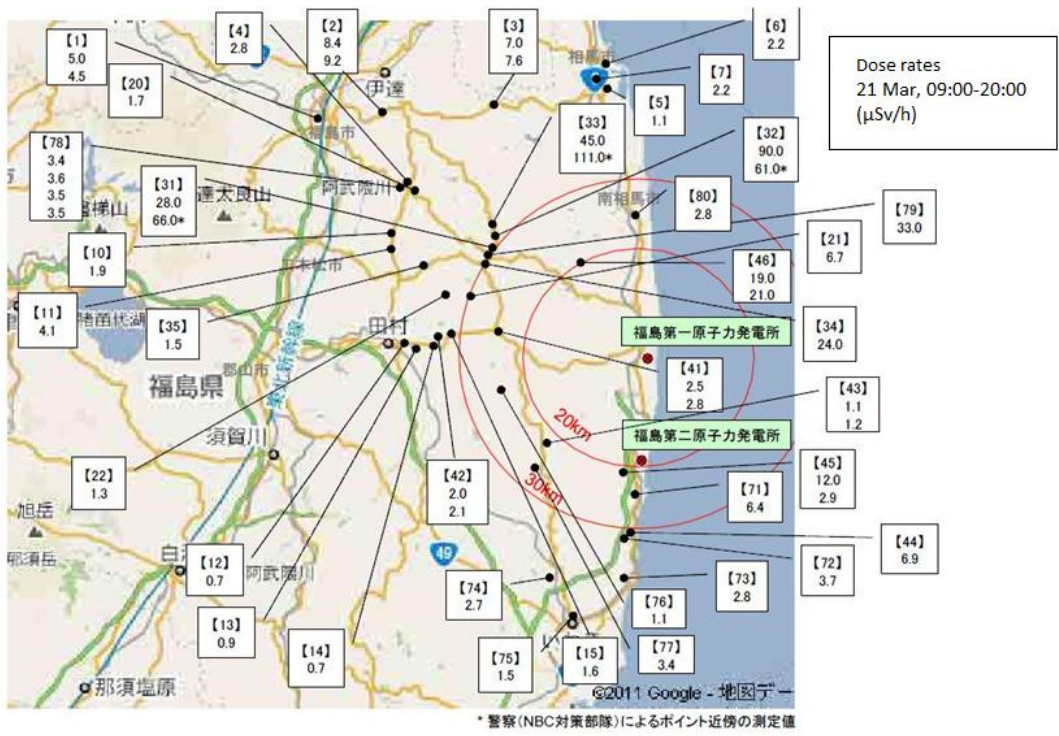
Based on information received by 02:00 UTC on March 22, 2011 the following updated information for the reactor units at the Fukushima Daiichi Nuclear Power Plant is provided:

Radiation Monitoring Data

Off-Site Environmental Radiation Measurements

Dose rates have been provided by Ministry of Education, Culture, Sport, Science and Technology for all 47 prefectures (excluding Fukushima). The data set covers the period from 15 March 08:00 UTC to 21 March 20:00 UTC.

There is an update update provided by MEXT for the environmental measurements carried out at various locations in Fukushima prefecture (see map below). The environmental radiation measurements stay higher in the north of Fukushima prefecture compared with values in the North of Fukushima prefecture, outside of the 30 km exclusion zone.



Radioactivity in food, milk and drinking water

Summary: Highest values of **Iodine in milk** were found in Souma-gun, Iitate-Cho which were 140 times higher than provisional Japanese permissible levels of 300 Bq/kg (note the values for infant of 100 Bq/kg). Second highest values were at Souma-gun, Kunimi-Cho (about 5 times higher) followed by Iwaki about 3 times higher than provisional Japanese permissible levels. Very marginal increase was found in Souma-gun, Shinchi-cho. The **leafy vegetable** in Sano-shi area showed concentration at higher end of provisional limit of Iodine-131 which is 2000 Bq/kg.

Also the Cesium-137 levels were found to be higher than the provisional limit of 200 Bq/kg in 1 out of 37 samples at Souma-gun, Iitate-Cho.

High levels in **spinach** continue to be reported (see table below). Note that measurements are made available by the Ministry of Health, as provided by the Prefectures or other organisations. No new data on radioactivity in tap water was provided.

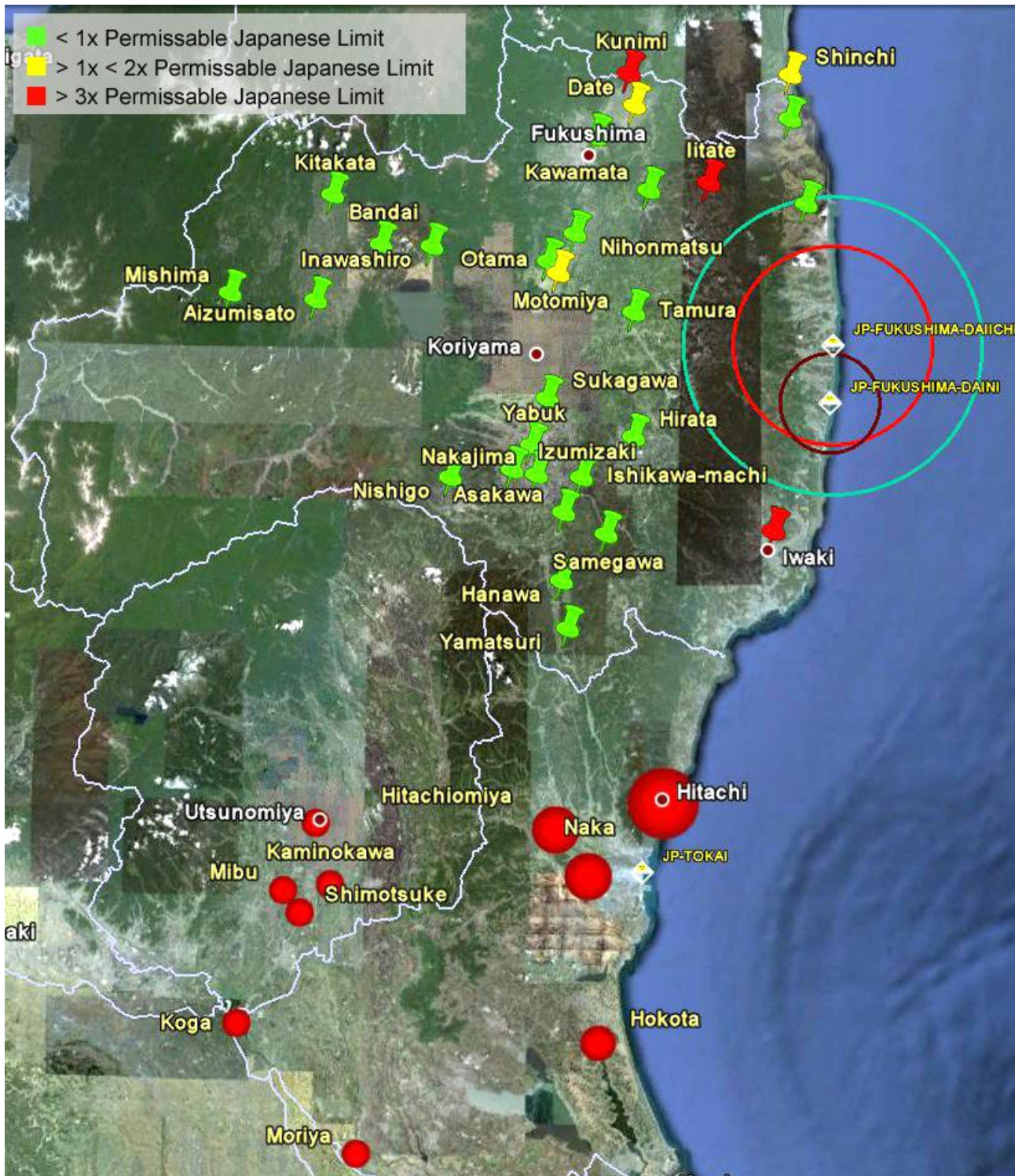
City	Item	Radioactivity Concentration (Bq/kg)	
		Upper: radioactive iodine	Lower: radioactive cesium
Hitachi City	Spinach (Open field)	54100	1931
	Spinach (Open field)	25200	1105
Hitachi Omiya	Spinach (Open field)	19200	1040
	Spinach (Open field)	17800	908
Naka	Spinach (Open field)	16100	911
	Spinach (Open field)	13500	966
Hokota	Spinach (Open field)	7710	407
	Spring onion (Open field)	356	9
Moriya	Spinach (Open field)	2100	121
	Spinach (Open field)	26	Lower than detection limit
	Spinach (Open field)	Lower than detection limit	Lower than detection limit

There are 37 samples/locations from which results were provided (see picture below) and these are: Fukushima, Kooriyama, Iwaki, Shirakawa, Sukagawa, Kitakata, Souma, Nihonmatsu, Tamura, Minamisouma, Date Motomiya, Date-gun, Kunimi-cho, Souma-gun, Kawamata-cho, Adachi-gun, Ootama-mura, Iwase-gun, Kagamiishi-machi, Minamiaizu-gun, Minamiaizu-cho, Minamiaizu-gun, Shimogou-cho, Yama-gun, ba0ai-cho, Yama-gun, Inawashiro-cho, Oonuma-gun, Aizumisato-cho, Oonuma-gun, Mishima-cho, Nishishirakawa-gun, Nishigo-mura, Nishishirakawa-gun, Izumizaki-mura, Nishishirakawa-gun, Nakajima-mura, Nishishirakawa-gun, Yabuki-cho, Higashishirakawa-gun, Yamatsuri-machi, Higashishirakawa-gun, Hanawa-machi, Higashishirakawa-gun, Samegawa-mura, Ishikawa-gun, Ishikawa-machi, Ishikawa-gun, Hirata-mura, Ishikawa-gun, Asakawa-cho, Ishikawa-gun, Kodono-cho, Tamura-gun, Miharu-cho, Tamura-gun, Ono-cho, Souma-gun, Shinchi-cho, Souma-gun, Iitate-cho

The provisional Japanese limits are:

Nuclide	I-131	Cs-137
Drinking water and Milk	300 Bq/kg*	200 Bq/kg
Vegetables	2000 Bq/kg	500 Bq/kg

* 100 Bq/kg for infants



Picture to indicate areas of high radioactivity in Milk shown as pins (red > 3 times limit, yellow >1 but <2 times and green <1 time limit). Red circles indicate high level of radioactivity in Spinach, the greater the size, the higher the concentration.

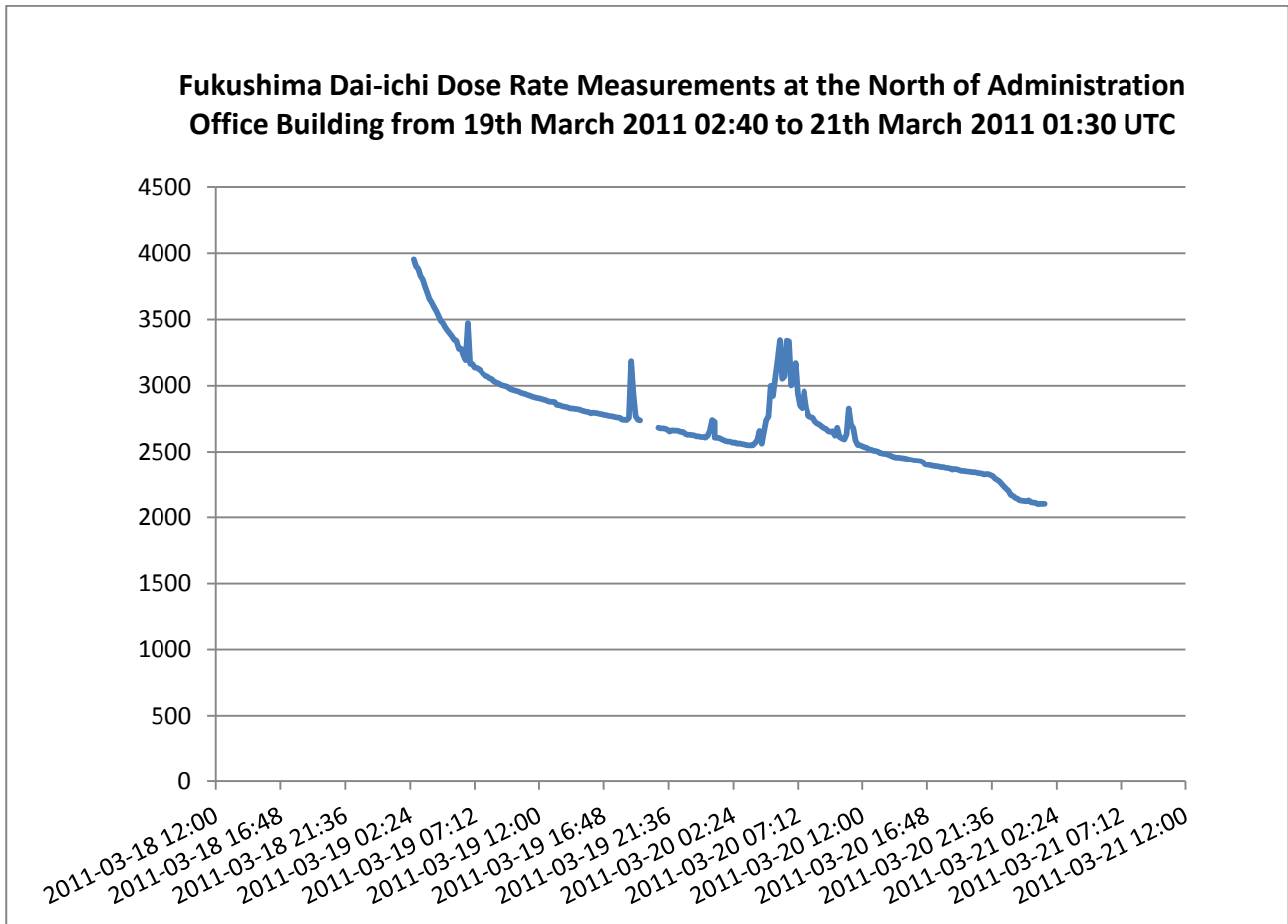
Highest values of Iodine in milk were found in Souma-gun, Iitate-Cho, 140 times higher than provisional Japanese permissible levels of 300 Bq/kg (100 Bq/kg for infants) followed by Souma-gun, Kunimi-Cho about 5 times higher and Iwaki about 3 times higher. Very marginal increase was found in Souma-gun Shinchi-cho.

Deposition Data for Prefectures

Following the previous report, MEXT has published deposition data for all prefectures (excluding Fukushima) for I-131 and Cs-137. Most prefectures report no detection of either Cs-137 or I-131 deposition. But eight prefectures now report significant increase in I-131 or Cs-137 as compared to previous days as indicated in Table below. Depositions range from a few tens to a few tens of thousands of Bq/m².

	Location	(Bq/m ²)		(Bq/m ²)		(Bq/m ²)	
		18-19 March 2011	Cesium-137	19-20 March 2011	Cesium-137	20-21 March 2011	Cesium-137
1.	Iwate(Morioka)	ND	ND	ND	0.24	4800	690
2.	Yamagata(Yamagata)	ND	ND	22	20	58000	4300
3.	Ibaraki	-	-	490	48	93000	13000
4.	Tochigi(Utsunomiya)	1300	62	540	45	5300	250
5.	Gunma(Maebashi)	230	84	190	63	990	87
6.	Saitama(Saitama)	64	ND	66	ND	7200	790
7.	Chiba(Ichihara)	21	ND	44	3.8	160	16
8.	Tokyo(Shinjyuku)	51	ND	40	ND	2900	560

On-Site Environmental Radiation Measurements



Fukushima Daiichi NPP. Dose rate measurements (microSv/h). Since the last status report, there has been little change in reported radiation levels on-site.

Status of the Fukushima Daiichi Nuclear Power Plant

Units 1 to 6

The restoration work of off-site power from the grid operated by TOHOKU EPC is currently in progress. On-site activities for connecting electric cable to Units 3 and 4 were completed. Power Center of Unit 2 is already connected to electricity and the integrity of each load is under confirmation. Work for the recovery of off-site power supply to Units 3 and 4 is being carried out. (It was scheduled to be completed 21 March, but no new information on the status of work is available). Power is restored to the transformer of Units 5 and 6. Power supply for Unit 5 was switched from the emergency diesel generators of unit 6 to external power supply at 02:36 UTC March 21.

Information on cumulative amount of water sprayed into the pools was provided: Unit 2: 40 t, Unit 3: 3742 t and Unit 4: 255 t.

Unit 1

Seawater is continued being injected as of 03:00 UTC, March 19. Drywell pressure indication restored on March 19.

Unit 2

Seawater is being injected to the reactor as of 03:00 UTC March 19. No smoke or vapour was observed coming from the Unit-2 reactor building on the March 19 11:30 UTC (satellite image). Injection of 40t of Seawater to the Spent Fuel Pool of Unit 2 was performed from 6:00 until 18:20

UTC March 20. Power Centre of Unit 2 has received electricity (6:46 UTC March 20th). White smoke has been observed at 09:22 UTC March 21.

Unit 3

The pressure in CV of Unit 3 initially rose to 3.2 atm at 2:00 UTC March 20th. Monitoring continues and shows that the pressure has decreased to 1.1 atm at 08:00 UTC on March 21st. Water spray over the Spent Fuel Pool of Unit 3 by Hyper Rescue Unit of Tokyo Fire Department was started at 1:39 UTC March 20th and finished 18:58 March 20st. Work for the recovery of external power supply is being carried out . (It was scheduled to be completed 21 March, but no new information on the status of work is available). Grey smoke was observed at on March 21 in the Southeast corner of the Unit 3 building and TEPCO order an evacuation of plant personnel. End of smoke emissions confirmed at 8:55 UTC, 21 March. Workers are back to the units as of 24:00 UTC 22 March.

Unit 4

No information is available regarding the spent fuel pool water level. The most recent satellite image (19-March, 01:44 UTC) showed no smoke/vapor coming out from the Unit-4 spent fuel pool area. At 23:20 UTC March 19 spraying to direct water into the spent fuel pool was started. Water spraying over the Spent Fuel Pool of Unit 4 by Self-Defense Force (13 fire engines) was resumed at around 21:37 UTC March 20th and finished at 23:41 UTC March 20th. Works for the recovery of external power supply are being carried out. (It was scheduled to be completed 21 March, but no new information on the status of work is available).

Unit 5

The reactor vessel water level remains stable at approximately 2m above the top of the fuel. Residual Heat Removal system (RHR) was put in service to cool both the reactor and spent fuel pool, using power from diesel generators from unit 6. Reactor is in cold shutdown state as of 05:30 UTC March 20. Spent fuel pool temperature is stabilizing around 42 °C.

Unit 6

The reactor vessel water level is maintained between 1.5 to 2.5 meters above the top of the fuel. RHR system is in service to cool both the reactor and spent fuel pool, using power from the unit's Diesel generators. Unit 6 is in the state of cold shut down (10:27 UTC March 20th). Spent fuel pool temperature was slowly increasing and was 36.5 °C at 08:00 UTC March 21.

Spent Fuel Pools

Latest temperatures of the water in the spent fuel pools in Units 4, 5 and 6 have been measured with the results below:

Unit 4	Unit 5	Unit 6
84°C at 19:08 UTC 13-Mar	66.6 °C at 02:00 UTC19-Mar	66.5 °C at 02:00 UTC19-Mar
Not measurable since 04:08 JST March 14	48.1 °C at 09:00 UTC19-Mar	67.0 °C at 09:00 UTC19-Mar
	37.1 °C At 22:00 UTC 19-Mar	41.0 °C at 22:00 UTC19-Mar
	35.1 °C At 10:00 UTC 20-Mar	28.0 °C at 16:00 UTC20-Mar
	39.5 °C At 5:00 UTC 21-Mar	32.0 °C At 5:00 UTC 21-Mar
	42.3 °C <u>At 8:00 UTC 21-Mar</u>	<u>36.5 °C</u> <u>At 8:00 UTC 21-Mar</u>
	<u>(latest value reported)</u>	<u>(latest value reported)</u>

Note: An information was received first time on Unit 2 spent fuel pool temperature: 50 °C at 13:00 UTC 21-March.

Common Spent Fuel Pool

On March 17th 21:00 UTC it was confirmed that the existing water level in the pool was maintained. Temperature in the pool was 57°C, as of 00:00 UTC March 19 10:52 UTC. No further information on level and temperature are available. Water injection to the pool has been started as of 01:37 UTC, March 21st as a precautionary measure since there is no power supply in the facility.



Florian Baciu
Emergency Response Manager
22-March-2011 05:00 UTC

Units 1, 2, 3, 4, 5 and 6 - Plant Status

Parameter / Indications	Unit	Fukushima Daiichi					
		Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
Reactor Pressure Vessel Pressure	MPa	<u>0.299 (A)</u> <u>0.272 (B)</u>	<u>0.078 (A)</u> <u>0.076 (B)</u>	<u>0.013 (A)</u> <u>0.146 (B)</u>	-	<u>0.108</u>	<u>0.104</u>
	atm	<u>2.98 (A)</u> <u>2.72 (B)</u>	<u>0.78 (A)</u> <u>0.76 (B)</u>	<u>0.12 (A)</u> <u>1.46 (B)</u>	-	<u>1.08</u>	<u>1.04</u>
Reactor Pressure Vessel Level	mm (above the top of active fuel)	-1750 (A) -1750 (B)	-1350 (A) (B) not available	<u>-1550 (A)</u> <u>-2025 (B)</u>	-	<u>2069</u>	<u>1560</u>
Containment Vessel (Drywell) Pressure	kPa	160	120	110	-	-	-
	atm	1.6	1.20	1.1	-	-	-
Suppression Pool Temperature	°C	No Data	No Data	No Data	No Data	No Data	No Data
Suppression Pool Pressure	kPa	<u>155</u>	Below the scale	Below the scale	-	-	-
	atm	<u>1.55</u>					
Adding water to Reactor Pressure Vessel	<ul style="list-style-type: none"> • Adding • Not adding Unknown 	Sea water injection is continued using fire extinguish line into RPV	Sea water injection is continued using fire extinguish line into RPV	Sea water injection is continued using fire extinguish line into RPV	-	Injection to RPV and the Spent Fuel Pool using make up water	Injection to RPV and the Spent Fuel Pool using make up water
Date/Time of Data Acquisition		<u>March 21</u> <u>5:25 UTC</u>	<u>March 21</u> <u>5:25 UTC</u>	<u>March 21</u> <u>5:25 UTC</u>	-	<u>March 21</u> <u>8:00 UTC</u>	<u>March 21</u> <u>8:00 UTC</u>

* All pressures are absolute pressure (pressure including normal atmospheric pressure)

** (A) and (B) refer to two measurement channels