



**Summary of the events reported in Japanese NPPs as a result of the earthquake of Friday 11<sup>th</sup> March – status on Friday 25<sup>th</sup> at 16:00 CET**

**Summary of the current reported status:**

Safety of Fukushima Daiichi NPP remains the main concern. Situation is not stable yet. The availability of the off-site grid has been recovered for all units. However there are still difficulties to energize safety equipment. Equipment check has been temporary stopped at unit 3 as a result of the contamination of 3 workers. Main Control Rooms of units 1 and 3 are supplied by electricity and unit 2 should normally be supplied today.

**Fukushima Daiichi NPP**

Status of Fukushima Daiichi units as of Thursday 25<sup>th</sup> March 16:00 local time (JAIF):

Unit	1	2	3	4	5	6
Core and fuel integrity (loaded fuel assemblies)	Damaged (400)	Damaged (548)	Damaged (548)	No fuel in the reactor	Not Damaged	Not Damaged
Reactor Pressure Vessel Integrity	Unknown	Unknown	Unknown	Not Damaged	Not Damaged	Not Damaged
Containment Integrity	Not Damaged	Damage Suspected	Damage Suspected[*]	Not Damaged	Not Damaged	Not Damaged
Reactor building integrity	Severely Damaged	Slightly Damaged	Severely Damaged	Severely Damaged	Vent hole opened on the rooftop for avoiding hydrogen explosion	
Water injection to core	Continuing (Freshwater)	Continuing (Seawater)	Continuing (Seawater)	Not necessary	Not necessary	Not necessary
Water injection to Containment Vessel	Confirming	to be decided (Seawater)	Confirming	Not necessary	Not necessary	Not necessary
Fuel integrity in the spent fuel pool (Stored fuel assemblies)	Unknown (292)	Unknown (587)	Possibly damaged (514)	Possibly damaged (1331)	Not damaged (946)	Not damaged (876)
Electric power supply	off-site grid available Light in the MCR recovered	off-site grid available	off-site grid available Light in the MCR recovered	off-site grid available	off-site grid available	off-site grid available

[\*] Note: according to information from IRSN, in contradiction to status according to JAIF.

(IRSN) IRSN is concerned by the risks of crystallization of the salt present in sea water within the different reactor pressure vessels. This crystallization could have an impact on core cooling, pressure relief valves operation.

(JAIF) It has been pointed out that the reactor will become eroded if seawater is injected continually. The self defense force and U.S forces made decision to consolidate a system to feed freshwater from a large ship of U.S forces (16:30 local time, March 25). TEPCO would like to switch from seawater to fresh water as fast as possible.



On Thursday, 2 of the 3 workers were taken to hospital after being exposed to 173 to 180 millisieverts of radiation while standing in 15-centimeters of water in the turbine building adjacent to the reactor. A third worker was also exposed to the higher-level radiation but did not require treatment

(JAIF) Ministry of Defense announced that the Self-Defense Force helicopter measured the surface temperatures of Fukushima Daiichi units-1, 2, 3 and 4 from the air by using infrared rays and found that the temperature of each units are below 20 degrees C. Unit 1: 17 degrees C; Unit 2: 13 degrees C; Unit 3: 11 degrees C; Unit 4: 17 degrees C (as of the morning on March 24). Especially, the surface temperature of the spent fuel pool at unit 3 dropped significantly to 31 degrees C, compared to 56 degrees C on the previous day (21:15, local time March 24).

(JAIF) The level of the events at Fukushima Daiichi is now assessed by the Japanese Authorities as follows: INES level 5 at unit 1, unit 2, and unit 3. INES level 3 at unit 4.

#### Unit 1 (shut down due to earthquake)

(TEPCO) At approximately 11:30 am on March 24th, lights in the main control room of unit 1 was restored.

(NISA) White smoke was confirmed to be generated continuously (around 06:20 local time, March 25th).

(JAIF) According to Tokyo Electric Power Co., the reactor surface temperature at unit-1 increased to approx. 400 degrees C once (design assumption maximum 302 degrees C). Today it dropped to 204.5 degrees C (as of 06:00 local time on March 25).

(JAIF) Freshwater injection to the Reactor Pressure Vessel was started at Unit 1 in the afternoon of Mar. 25th.

(IRSN) The sewer injection flow into the reactor vessel has been put at 10 m<sup>3</sup>/hr to control the temperature in the bottom of the vessel. The pressure measured inside the containment vessel has been stabilized.

#### Unit 2 (shut down due to earthquake)

(JAIF) External AC power to the main control room at unit 2 will be available today.

(TEPCO) From 10:30 am on March 25th, sea water injection through Fuel Pool Cooling and Filtering System was initiated.

#### Unit 3 (shut down due to earthquake).

(JAIF) Ministry of Defense announced that the Self-Defense Force helicopter measurements show that the surface temperature of the spent fuel pool at unit 3 dropped significantly to 31 degrees C, compared to 56 degrees C on the previous day. (21:15 local time, March 24)



(NISA) Around 120t of seawater was injected to the Spent Fuel Pool via the Fuel Pool Cooling Line (From around 5:35 till around 16:05 local time, March 24th). Seawater injection to RPV continues (As of 12:30 local time, March 25th).

(JAIF) As for the coolant of reactors at Fukushima Daiichi, TEPCO would like to switch from seawater to fresh water as fast as possible. The switch will be carried out at unit 3. (04:30 local time, March 25)

(JAIF) In the turbine building at unit 3, drainage work is also in progress (10:45 local time, March 25)

(JAIF) On March 24, 2 workers, who were working to lay electrical cables in turbine building at unit-3, were sent to the hospital. TEPCO suspected that the nuclear fuel in the reactor or spent nuclear fuel at the pool was damaged and water contaminated with high radioactivity was leaked to the workspace. Further investigation is now carrying on. These 2 workers were not wearing boots. Another worker wearing boots is safe (07:15 local time, March 25).

(JAIF) Nuclear and Industrial Safety Agency pointed a possibility that radioactive material from damaged fuel rods would have leaked into the environment based on the fact that water containing high amount of radioactive material was found at unit-3 on March 24. (19:18 local time, March 25)

(IRSN) The containment vessel seems not tight anymore according to pressure indications. This loss of tightness would be at the origin of some "continuous radioactive releases, according to IRSN.

#### Unit 4 (outage due to regular inspection)

(NISA) Spray of around 150t of water using Concrete Pump Truck (50t/h) was carried out (from 17:17 till 20:32 local time, March 22nd). Spray of around 130t of water using Concrete Pump Truck (50t/h) was carried out (From 10:00 till 13:02 local time, March 23rd). Spray of around 150t of water using Concrete Pump Truck (50t/h) was carried out (From 14:36 till 17:30 local time, March 24th). Injection of seawater to the Spent Fuel Pool via the Fuel Pool Cooling Line was carried out (From 06:05 till 10:20 local time, March 25th).

(NISA) White smoke was confirmed to generate continuously. (Around 06:20 local time, March 25th)

#### Unit 5 and 6 (outage due to regular inspection)

(CNSC) The residual heat removal system pump on Unit 5 failed on March 23rd and repairs are underway.

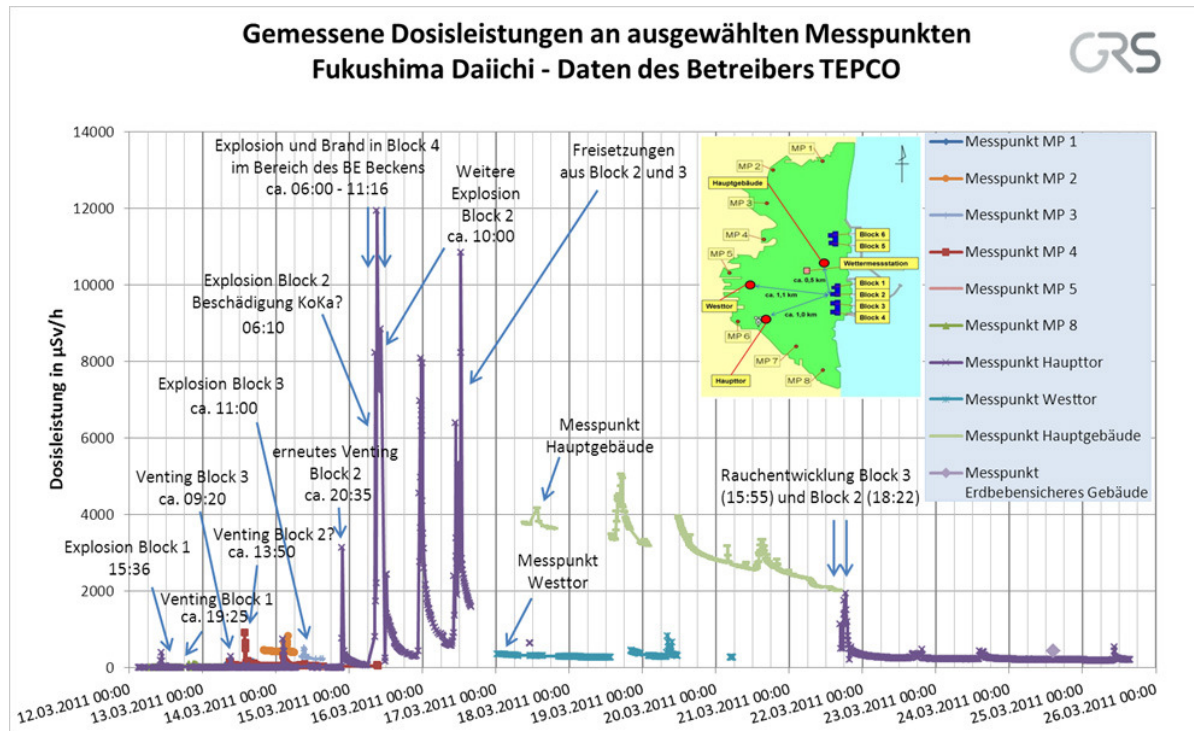
#### Common spent fuel pool

(NISA) At around 3:37 pm local time, March 24th, electricity supply to common spent fuel pool has started from external power source. At around 6:05 pm, fuel pool cooling pump was started to cool the pool. As of 18:40 local time, March 24th, water temperature of the pool was around 73°C.



## Radiological consequences

The graph hereunder shows the dose rates till March 25<sup>th</sup> (source: GRS).



(TEPCO) On March 24, 2011, it was confirmed that 3 workers from contractors who were in charge of cable laying work in the 1st floor and the underground floor of turbine building were exposed to the radiation dose of more than 170 mSv. Two of them were confirmed that their leg skins were contaminated. Although they were decontaminated by laundering, they were transferred to Fukushima Medical University hospital because there is possibility that they get a burn injury by beta ray. After medical examination at Fukushima Medical University Hospital, they were transferred to National Institute of Radiological Sciences in Chiba Prefecture on March 25 for around four days to survey the situation.

(NISA) Concerning the result of survey for the water that those workers stepped in, the dose rate on the surface of the water was about 400 mSv/h and, as a result of gamma ray nuclide analysis of sampled water, the concentration of radioactive nuclide of the sample was about  $3.9 \times 10^6$  Bq/cm<sup>3</sup> in total of each nuclides. Result of gamma-ray nuclide analyses based on sampling of puddle:



location	Puddle in underground floor of turbine building of Unit 3
Name of nuclide	Concentration of sample(Bq/cm <sup>3</sup> )
Cobalt60	Approximately $7.0 \times 10^2$
Technetium99m	Approximately $2.5 \times 10^3$
Iodine131	Approximately $1.2 \times 10^8$
Cesium134	Approximately $1.8 \times 10^5$
Cesium136	Approximately $2.3 \times 10^4$
Cesium137	Approximately $1.8 \times 10^5$
Barium140	Approximately $5.2 \times 10^4$
Lanthanum140	Approximately $9.4 \times 10^3$
Cerium144	Approximately $2.2 \times 10^5$
total	Approximately $3.9 \times 10^5$

TEPCO considers that this incident was caused because the workers regarded radiation dose of working area as low from survey result of radiation dose on March 23 and continued working without recognizing change of working conditions of the day although alarm of their dosimeter rang.

TEPCO also said they thoroughly instruct their employees and workers of contractors to recognize alarm of their dosimeter and evacuate when the alarm rings.

Weather forecast summary for Fukushima Daiichi area: moderate rain (total 10mm), heavier on Fri night, mild temperatures (max 8°C on Fri afternoon, min 1°C on Sat night), Winds decreasing (fresh winds from the NW on Sat morning, calm by Mon morning).

### **Fukushima Daini NPP**

No new important additional information reported.

### **Onagawa NPP and Tokai**

No new important additional information reported.