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## Fukushima Nuclear Accident Update Log

### Updates of 12 April 2011

#### Staff Report

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(<http://domain.com/newscenter/focus/fukushima/emergency.html>)

## IAEA Briefing on Fukushima Nuclear Accident (12 April 2011, 14:30 UTC)

### Presentations:

- [Summary of Reactor Status](http://www.slideshare.net/iaea/summary-of-reactor-unit-status-12-april-2011-1430-utc) (<http://www.slideshare.net/iaea/summary-of-reactor-unit-status-12-april-2011-1430-utc>)
- [Fukushima Radiological Monitoring and Consequences](http://www.slideshare.net/iaea/fukushima-radiological-monitoring-and-consequences-12-april-2011) (<http://www.slideshare.net/iaea/fukushima-radiological-monitoring-and-consequences-12-april-2011>)
- [Fukushima Marine Environment Monitoring](http://www.slideshare.net/iaea/fukushima-marine-environment-monitoring-12-april-2011) (<http://www.slideshare.net/iaea/fukushima-marine-environment-monitoring-12-april-2011>)
- [International Nuclear and Radiological Event Scale \(INES\)](http://www.slideshare.net/iaea/international-nuclear-and-radiological-event-scale-ines-12-april-2011) (<http://www.slideshare.net/iaea/international-nuclear-and-radiological-event-scale-ines-12-april-2011>)
- [Watch Video](http://domain.com/newscenter/multimedia/videos/japan/120411/index.html) (<http://domain.com/newscenter/multimedia/videos/japan/120411/index.html>)

On Tuesday, 12 April 2011, the IAEA provided the following information on the current status of nuclear safety in Japan:

### 1. Current Situation

Overall, the situation at the Fukushima Daiichi plant remains very serious, but there are early signs of recovery in some functions such as electrical power and instrumentation.

#### *Provisional INES Level 7 Rating*

The International Atomic Energy Agency (IAEA) can confirm that the Nuclear and Industrial Safety Agency (NISA) has submitted a provisional International Nuclear and Radiological Event Scale (INES) Level 7 rating for the accident at the Fukushima Daiichi nuclear power plant. This new provisional rating considers the accidents that occurred at **Units 1, 2 and 3** as a single event on INES and uses estimated total release to the atmosphere as a justification. Previously, separate provisional INES Level 5 ratings had been applied for **Units 1, 2 and 3**.

Japanese authorities notified the IAEA in advance of the public announcement and the formal submission of the new provisional rating.

The provisional rating was determined by NISA after it received the results of the analysis conducted by the Japan Nuclear Energy Safety Organization (JNES). NISA then applied the INES assessment methodology to calculate the total estimated release in terms of radiological equivalence to I-131. Based on this provisional assessment, NISA

concluded that the accident would be provisionally rated INES Level 7 as per the definition below, taken from the *INES User's Manual, 2008 Edition* ([http://www-pub.iaea.org/MTCD/publications/PDF/INES-2009\\_web.pdf](http://www-pub.iaea.org/MTCD/publications/PDF/INES-2009_web.pdf)) [pdf]:

### Level 7

*"An event resulting in an environmental release corresponding to a quantity of radioactivity radiologically equivalent to a release to the atmosphere of more than several tens of thousands of terabequerels of I-131."*

NISA estimates that the release of radioactive material to the atmosphere is approximately 10% of the Chernobyl accident, which is the only other accident to have an INES Level 7 rating.

### **Protective Measures**

"On 11 April the Government of Japan announced that they had concluded to establish 'Planned Evacuation Areas' and 'Evacuation prepared Area' in the areas beyond the 20km radius from the Fukushima Daiichi nuclear power plant. The review was conducted because the Government consider the safety of residents its first priority.

The Government of Japan considered the standards recommended by the International Commission on Radiological Protection (ICRP) and the International Atomic Energy Agency (IAEA) as part of the review.

About the 'Planned Evacuation Areas', the Japanese authorities have found that the areas beyond 20 km radius could be exposed to over 20mSv during the course of the next one year, approximately until next March. Therefore the Government of Japan will be consulting with the local communities in terms of planned evacuations, and at this juncture they are hoping that this planned evacuation will be carried out during the next month to come. The Planned Evacuation Areas that have been newly designated for evacuation include Kutsurao village, Namie town, Iitate village, a part of Kawamata town and a part of Minami Souma City.

The Government also defined a second new area called the 'Evacuation Prepared Area'. This area includes the area previously defined as the 'Indoor Evacuation Area' between 20 and 30 km from Fukushima Daiichi, but excludes those areas designated above as 'Planned Evacuation Areas'.

Within the 'Evacuation Prepared Area' people living in this area should be prepared for indoor evacuation or evacuation (outside of this area) in case of emergency. Voluntary evacuation is recommended within this area. Children, pregnant women, people who require nursing care and those who are hospitalized should not enter this

area. Kindergartens, pre-schools, elementary schools, junior-high schools and high school will be closed within this area."

### ***Earthquake of 11 April***

The IAEA confirms that an earthquake occurred in Japan at 08:16 UTC, 11 April.

The IAEA International Seismic Safety Centre rated it as a 6.6 magnitude, revised from an initial 7.1 magnitude. The epicenter of the earthquake was in Fukushima Prefecture, 68 km from the Daiichi nuclear power plant. The epicenter was inland at a depth of 13.1 km.

The IAEA contacted NISA who confirmed the following regarding the status of the Fukushima Daiichi nuclear power plant:

- No changes were observed on the readings at the on-site radiation monitoring posts;
- Workers were temporarily evacuated to the seismic evacuation shelter;
- Off-site power was lost and water injection pumps for **Units 1, 2 and 3** stopped but were restarted 50 minutes after the earthquake; and
- The injection of nitrogen into **Unit 1** stopped and resumed later.

### ***Changes to Fukushima Daiichi Plant Status***

In **Unit 1** fresh water is being continuously injected into the RPV through the feed-water line at an indicated flow rate of 6 m<sup>3</sup>/h using a temporary electric pump with off-site power. In **Units 2 and 3** fresh water is being continuously injected through the fire extinguisher lines at an indicated rate of 7 m<sup>3</sup>/h using temporary electric pumps with off-site power.

Nitrogen gas is being injected into the **Unit 1** containment vessel to reduce the possibility of hydrogen combustion within the containment vessel. The pressure in this containment vessel is increasing due to the addition of nitrogen. The pressure in the RPV is increasing as indicated on both channels of instrumentation. In **Units 2 and 3** Reactor Pressure Vessel and Drywell pressures remain at atmospheric pressure.

RPV temperatures remain above cold shutdown conditions in all Units, (typically less than 95 °C). In **Unit 1** temperature at the feed water nozzle of the RPV is 221 °C and at the bottom of the RPV is 120 °C. In **Unit 2** the

temperature at the feed water nozzle of the RPV is 155 °C. The temperature at the bottom of the RPV was not reported. In **Unit 3** the temperature at the feed water nozzle of the RPV is 97 °C and at the bottom of the RPV is 111 °C.

There has been no change in status in **Units 4, 5 and 6** and the Common Spent Fuel Storage Facility.

## 2. Radiation Monitoring

On 11 April, deposition of both iodine-131 and cesium-137 was detected in 6 and 8 prefectures respectively. The values reported for iodine-131 ranged from 2.1 to 35 Bq/m<sup>2</sup> and for cesium-137 from 5.2 to 41 Bq/m<sup>2</sup>.

Gamma dose rates are measured daily in all 47 prefectures, the values tend to decrease. For Fukushima, on 11 April a dose rate of 2.1 µSv/h, for the Ibaraki prefecture a gamma dose rate of 0.15 µSv/h was reported. The gamma dose rates in all other prefectures were below 0.1 µSv/h.

Dose rates are also reported specifically for the Eastern part of the Fukushima prefecture, for distances of more than 30 km to Fukushima-Daiichi. On 11 April, the values in this area ranged from 0.2 to 25 µSv/h.

In an additional MEXT monitoring programme, on 11 April measurements were reported for 25 cities in 13 prefectures. In Fukushima City, a value of 0.42 µSv/h was observed. In all other cities, gamma dose rates ranged from 0.04 to 0.13 µSv/h. Typical normal background levels are in the range of 0.05 to 0.10 µSv/h.

On 11 April, the IAEA Team made measurements at 9 different locations in the Fukushima area at distances of 30 to 58 km, West to Northwest from the Fukushima nuclear power plant. At these locations, the dose rates ranged from 0.1 to 2.2 µSv/h. At the same locations, results of beta-gamma contamination measurements ranged from 0.01 to 0.28 Megabecquerel/m<sup>2</sup>.

Analytical results related to food contamination were reported by the Japanese Ministry of Health, Labour and Welfare on 11 April, and covered a total of 21 samples taken on 8 April and 10 to 11 April. Analytical results for all of the samples of various vegetables, spinach and other leafy vegetables, fruit (strawberries), various meats (chicken, beef and pork), seafood and unprocessed raw milk in eight prefectures (Fukushima, Gunma, Hyogo, Ibaraki, Miyagi, Niigata, Saitama and Yamagata) indicated that I-131, Cs-134 and/or Cs-137 were either not detected or were below the regulation values set by the Japanese authorities.

### 3. Marine Monitoring

#### *TEPCO Monitoring Programme*

TEPCO is conducting a programme for seawater (surface sampling) at a number of near-shore and off-shore monitoring locations.

Until 3 April a general decreasing trend was observed at the sampling points TEPCO 1 to TEPCO 4. After the discharge of contaminated water on 4 April, a temporary increase has been reported.

On 12 April no new data for TEPCO 1 - 10 sampling points have been reported.

#### *MEXT Off-shore Monitoring Programme*

As reported in the brief of 8 April MEXT initiated the off-shore monitoring program on 23 March and subsequently points 9 and 10 were added to the off-shore sampling scheme. On 4 April, MEXT added two sampling points to the north and west of sampling point 1. These are referred to as points A and B.

On 12 April no new data for all MEXT sampling points have been reported.

### 4. IAEA Activities

In addition to countries that have already been identified in previous briefs, the Philippines and the Republic of Korea have also provided monitoring data and/or links to their websites.

The team of three Agency experts in BWR technology is due back in Vienna today.

#### [Fukushima Nuclear Accident Update \(12 April 2011, 04:45 UTC\)](#)

The Japanese Nuclear and Industrial Safety Agency (NISA) today issued a new provisional rating for the accident at the Fukushima Daiichi nuclear power plant on the IAEA International Nuclear and Radiological Event Scale (INES).

The nuclear accident at Fukushima Daiichi is now rated as a level 7 "Major Accident" on INES. Level 7 is the most serious level on INES and is used to describe an event comprised of "A major release of radioactive material with widespread health and environmental effects requiring implementation of planned and extended countermeasures".

Japanese authorities notified the IAEA in advance of the public announcement and the formal submission of the new provisional rating.

The new provisional rating considers the accidents that occurred at Units 1, 2 and 3 as a single event on INES. Previously, separate INES Level 5 ratings had been applied for Units 1, 2 and 3. The provisional INES Level 3 rating assigned for Unit 4 still applies.

The re-evaluation of the Fukushima Daiichi provisional INES rating resulted from an estimate of the total amount of radioactivity released to the environment from the nuclear plant. NISA estimates that the amount of radioactive material released to the atmosphere is approximately 10% of the 1986 Chernobyl accident, which is the only other nuclear accident to have been rated a Level 7 event.

Earlier ratings of the nuclear accident at Fukushima Daiichi were assessed as follows:

On 18 March, Japanese authorities rated the core damage at the Fukushima Daiichi 1, 2 and 3 reactor Units caused by loss of all cooling function to have been at Level 5 on the INES scale. They further assessed that the loss of cooling and water supplying functions in the spent fuel pool of the Unit 4 reactor to have been rated at Level 3.

Japanese authorities may revise the INES rating at the Fukushima Daiichi nuclear power plant as further information becomes available.

INES is used to promptly and consistently communicate to the public the safety significance of events associated with sources of radiation. The scale runs from 0 (deviation) to 7 (major accident).

Further information on the INES scale: <http://www-ns.iaea.org/tech-areas/emergency/ines.asp> (<http://www-ns.iaea.org/tech-areas/emergency/ines.asp>) .

Further details regarding this development can be found in the [NISA Press Release \(http://www.nisa.meti.go.jp/english/files/en20110412-4.pdf\)](http://www.nisa.meti.go.jp/english/files/en20110412-4.pdf) [pdf].

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