Japan Earthquake Update (19 March 2011, 4:30 UTC)

Summary of conditions at Fukushima Daiichi nuclear power plant

Located on the Eastern coast of Japan, the six nuclear power reactors at Daiichi are boiling water reactors (BWRs). A massive earthquake on 11 March severed off-site power to the plant and triggered the automatic shutdown of the three operating reactors - Units 1, 2, and 3. The control rods in those units were successfully inserted into the reactor cores, ending the fission chain reaction. The remaining reactors - Units 4, 5, and 6 -- had previously been shut down for routine maintenance purposes. Backup diesel generators, designed to start up after losing off-site power, began providing electricity to pumps circulating coolant to the six reactors.

Soon after the earthquake, a large tsunami washed over the reactor site, knocking out the backup generators. While some batteries remained operable, the entire site lost the ability to maintain proper reactor cooling and water circulation functions.

Here is the current status of the six reactors, based on documents and confirmed by Japanese officials (**new information in bold**):

Unit 1

Coolant within Unit 1 is covering about half of the fuel rods in the reactor, leading to fuel damage. High pressure within the reactor's containment led operators to vent gas from the containment. Later, an explosion destroyed the outer shell of the reactor building above the containment on 12 March.

There are no indications of problems with either the reactor pressure vessel or the primary containment vessel.

Efforts to pump seawater into the reactor core are continuing.

On 18 March, Japan assigned an INES rating of 5 to this unit. Further information on the ratings and the INES scale.

Unit 2

Coolant within Unit 2 is covering about half of the fuel rods in the reactor, leading to fuel damage. Following an explosion on 15 March, Japanese officials expressed concerns that the reactor's containment may not be fully intact. **NISA officials reported on 18 March that white smoke continues to emerge from the building.**

Efforts to pump seawater into the reactor core are continuing.

On 18 March, Japan assigned an INES rating of 5 to this unit.

Unit 3

Coolant within Unit 3 is covering about half of the fuel rods in the reactor, leading to fuel damage. High pressure within the reactor's containment led operators to vent gas from the containment. Later, an explosion destroyed the outer shell of the reactor building above the containment on 14 March.

Following the explosion, Japanese officials expressed concerns that the reactor's containment may not be fully intact. **NISA officials reported on 18 March that white smoke continues to emerge from the building.**

Efforts to pump seawater into the reactor core are continuing.

Of additional concern at Unit 3 is the condition of the spent fuel pool in the building. There are indications that there is an inadequate cooling water level in the pool, and Japanese authorities have addressed the problem by dropping water from helicopters into the building and spraying water from trucks. **On 18 March, Japanese Self Defence Forces used seven fire trucks to continue spraying efforts.** There is no data on the temperature of the water in the pool.

On 18 March, Japan assigned an INES rating of 5 to this unit.

Unit 4

All fuel had been removed from the reactor core for routine maintenance before the earthquake and placed into the spent fuel pool. A portion of the building's outer shell was damaged by the explosion at Unit 3 on 14 March, and there have been two reported fires - possibly including one in the spent fuel pool on 15 March -- that extinguished spontaneously, **although smoke remained visible on 18 March.**

Authorities remain concerned about the condition of the spent fuel pool.

On 18 March, Japan assigned an INES rating of 4 to this site.

Unit 5 and 6

Shut down before the earthquake, there are no immediate concerns about these reactors' cores or containment. Instrumentation from both spent fuel pools, however, has shown gradually increasing temperatures. Officials have configured two diesel generators at Unit 6 to power water circulation in the spent fuel pools and **cores of Units 5 and 6.**

Workers have opened holes in the roofs of both buildings to prevent the possible accumulation of hydrogen, which is suspected of causing explosions at other units.

Restoration of Grid

Progress has been achieved in restoring external power to the nuclear power plant, although it remains uncertain when full power will be available.

Evacuation

Japanese authorities have informed the IAEA that the evacuation of the population from the 20-kilometre zone around Fukushima Daiichi has been successfully completed. Japanese authorities have also advised people living within 30 kilometres of the plant to remain inside.

Iodine

On 16 March, Japan's Nuclear Safety Commission recommended local authorities to instruct evacuees leaving the 20-kilometre area to ingest stable (not radioactive) iodine. The pills and syrup (for children) had been prepositioned at evacuation centers. The order recommended taking a single dose, with an amount dependent on age:

Baby	12.5 mg
1 mo.-3 yrs.	25mg
3-13 yrs.	38mg
13-40 yrs.	76mg
40+ yrs.	Not necessary

Radiation Measurements

Radiation levels near Fukushima Daiichi and beyond have elevated since the reactor damage began. However, dose rates in Tokyo and other areas outside the 30-kilometre zone remain far from levels which would require any protective action. In other words they are not dangerous to human health.

At the Fukushima Daiichi nuclear plant, radiation levels spiked three times since the earthquake, but have stabilized since 16 March at levels which are, although significantly higher than the normal levels, within the range that allows workers to continue onsite recovery measures.

Fukushima Daiichi Summary Table - Units 1-6

- Legend
- No Immediate Concern
- Concern
- Severe Condition

Unit	1	2	3	4	5	6
Power	460/1380	784/2381	784/2381	784/2381	784/2381	1100/329

(MWe/th)						3
Type of Reactor	BWR-3	BWR-4	BWR-4	BWR-4	BWR-4	BWR-5
Status at the time of event	In service - auto shutdown following earthquake			Shut down for outage before earthquake		
Core and Fuel	Damaged			No fuel rods	No damage expected	
Containment Integrity	No damage reported	Damage suspected	No information	Outage configuration	No damage expected	
Off-site power	Recovery ongoing		Not available			
Diesel generators	Not available				Two emergency diesel generators powering Units 5 and 6	
Building	Severe damage	Slight damage	Severe damage		No damage reported	
Water level in reactor pressure vessel	About half of fuel assembly				Outage configuration	Above fuel
Pressure of reactor pressure vessel	Stable	Unreliable data	Stabilised	Outage configuration	No information	
Containment Pressure Drywell	No information	Stable	Stable	Outage configuration	No information	
Water injection to reactor pressure vessel	Sea water	Sea water	Sea water	Outage configuration	Not necessary	
Water injection to containment vessel	Not available			Not necessary		
Spent fuel pool temperature	No information				Stabilising	

IAEA Briefing on Fukushima Nuclear Emergency (18 March 2011, 14:00 UTC)

On 18 March 2011, Graham Andrew, Special Adviser to the IAEA Director General on Scientific and Technical Affairs, briefed both Member States and the media on the current status of nuclear safety in Japan. His opening remarks, which he delivered at 14:00 UTC at the IAEA headquarters in Vienna, are provided below:

1. Current Situation

As I reported yesterday, the situation at the Fukushima Daiichi nuclear power plants remains very serious, but there has been no significant worsening since our last briefing.

The situation at the reactors at **Units 1, 2 and 3** appears to remain fairly stable.

Seawater was injected yesterday into **Unit 2** and white smoke was again observed through the blown-out panels.

At **Unit 3**, which was the subject of helicopter water drops yesterday, water cannons have been spraying water on the spent fuel pond and seawater was injected into the reactor pressure vessel.

An important safety concern remains the spent fuel pools at **Units 3 and 4**. Information is lacking on water levels and temperatures at the spent fuel pools.

Efforts are being made to restore electrical power to the whole site. Another positive development is that diesel generators are providing power for cooling for both **Units 5 and 6**.

No problems have been reported at the common spent fuel pool. The spent fuel in the pool is fully covered by water.

The Japanese authorities today issued new ratings for the incidents on the IAEA International Nuclear and Radiological Event Scale - INES.

They assess core damage at the Fukushima Daiichi 1, 2 and 3 reactor Units, caused by the loss of all cooling function, as 5 on the INES scale.

The situation at Unit 4, where cooling and water supply in the spent fuel pool have been lost, is rated 3 by the Japanese authorities.

At the Fukushima Daini nuclear power plant, the loss of cooling functions in Units 1, 2 and 4 has also been rated as 3. All reactor Units at Fukushima Daini are now in a cold shut down condition.

2. Radiation Monitoring

As mentioned yesterday, regular dose rate information is now being received from 47 Japanese cities.

Dose rates in Tokyo and other cities remain far from levels which would require action - in other words they are not dangerous to human health.

First measurements in Tokyo by the Agency's newly arrived radiation monitoring team today showed no indication of Iodine-131 or Caesium-137. A second sampling will be carried out overnight.

3. Agency Activities

As you know, the Director General is in Tokyo, where he met the Prime Minister and other senior government ministers as well as the Vice-President of Tepco. The Director General stressed the importance of providing faster and more detailed information about the situation at the nuclear power plants, including to the international community. He also emphasized the importance of Japan working closely with the international community to resolve the crisis.

There was agreement between the Agency and our Japanese counterparts that the Agency mission would focus on radiation measurements and the identification of Japanese needs for a future environmental monitoring programme.

The Agency has started radiation measurements in Tokyo, as I mentioned, and we will move towards the Fukushima region as soon as possible. The Japanese counterparts confirmed their willingness to further strengthen their cooperation with the Agency and make available measurements made by TEPCO and the Ministry of Education, Culture, Sports, Science and Technology.

The Director General plans to brief the Agency's Board of Governors on his return from Japan.

Following our request yesterday, the CTBTO informed us today that data from its radionuclide monitoring stations will be made available to the Agency with immediate effect. On behalf of the Director General, I express my thanks to CTBTO Executive Secretary, Mr. Tibor Toth.

The International Civil Aviation Organization, in consultation with the Agency and a number of other international organizations, said today that international flight and maritime operations can continue normally into and out of Japan's major airports and sea ports and there is no medical basis for imposing additional measures to protect passengers. This will be kept under review.

Agency staff continue to work around the clock. We intend to hold another Technical Briefing and press conference at the same time tomorrow, Saturday.

→ View Video on YouTube

Presentations:
→ Summary of Reactor Unit Status, *by Graham Andrew*
→ Technical Briefing of Nuclear Safety Aspects of Situation in Japan, *by James Lyons*
→ Technical Briefing on Radiological Situation in Japan, *by Renate Czarwinksi*