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Fukushima Daiichi Status Report

1 December 2011

The IAEA issues regular status reports to the public on the current status of the Fukushima Daiichi Nuclear Power Plant, including information on environmental radiation monitoring, the status of workers, and current conditions on-site at the plant.

The information cited in this report is compiled from official Japanese sources, including the Ministry of Economy, Trade and Industry (METI), the Nuclear and Industrial Safety Agency (NISA), the Ministry of Education, Culture, Sports, Science and Technology (MEXT), the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), the Ministry of Health, Labour and Welfare (MHLW) and the Ministry of Foreign Affairs (MOFA) through the Japanese Permanent Mission in Vienna and the Cabinet's Office of the Prime Minister. Information is also provided by the Tokyo Electric Power Company (TEPCO), the operator of the Fukushima Daiichi Nuclear Power Plant.

Questions on the information provided in this report may be directed to info@iaea.org.

What are the recent developments at the Fukushima Daiichi nuclear power plant?
On 30 November TEPCO in cooperation with Japan Atomic Energy Agency (JAEA) released an updated accident analysis of the core damage in Units 1-3. The document is in Japanese and the IAEA is waiting to receive an official English version of the document from the competent authorities.

The IAEA, however, is aware of reports that TEPCO has informed the media of developments at Unit 1 referenced in this report regarding the deposit of melted fuel at the bottom of the reactor containment vessel, ie., the vessel's concrete floor.

In separate news, TEPCO communicated that, as the water level in the Unit 2 reactor pressure vessel (ie., the steel vessel containing the reactor core and coolant) requires constant water injection to be maintained, and based on that it has concluded that there is likely leakage from the pressure vessel into the containment vessel (ie., the reinforced concrete structure containing the reactor pressure vessel).

TEPCO has decided to inject nitrogen directly into the Unit 2 reactor pressure vessel to remedy the elevated concentrations of hydrogen in the same. Following injection of nitrogen into the reactor pressure vessel it is expected that hydrogen will be flushed out into the primary containment vessel until TEPCO has confirmation that the hydrogen concentration is being maintained safely below 4%, thus eliminating the risk of a hydrogen explosion.

TEPCO has also released a document in which it discusses in detail the evaluation method they are using for estimates of radioactive material being released from the reactors units 1-3.

Table 1: Status of Cooling Water Flow, Temperatures and Pressure at Units 1, 2 and 3

TEPCO's Fukushima Daiichi nuclear power plant station reactors 1, 2 and 3 require circulating water to remove heat from their fuel.

Plant operators are working to bring the reactors into a "cold shutdown condition" defined by TEPCO and the Nuclear Emergency Response Headquarters as:

1) Lowering the coolant water temperature to below 100 degrees centigrade while reducing the pressure inside the reactor vessels to the same as the outside air pressure, or 1 atmosphere (atm); and

2) Bringing release of radioactive materials from primary containment vessel under control and reducing public radiation exposure by additional release (not to exceed 1 mSv/year at the site boundary as a target).

Indications	**Measurement**	**Reactor**		
		Unit 1	Unit 2	Unit 3
Water flow into the reactor[1]	Litres/hour	4200	7500	7900
Reactor vessel pressure	Atm	1.08	1.08	Downscale[2]
Outer containment vessel pressure[3]	Atm	1.16	1.11	1.02
Reactor vessel temperature (feed water nozzle)[4]	°C	43.4	70.3	59.2
Reactor vessel temperature (at bottom of reactor)[5]	°C	44.4	75.5	68.0
Suppression Pool Pressure[6]	Atm	0.77	Below scale[7]	1.86
Date/Time of Data Acquisition		29 Nov 03:00 UTC	29 Nov 03:00 UTC	29 Nov 03:00 UTC

Notes

1. Plant operators are pumping water into Unit 1 through one injection point and through two injections points in Units 2 and 3.
2. "Downscale" means the reading is below the lowest indication the instrument is capable of detecting. This is typically an indication that an instrument has somehow failed.
3. The containment vessel completely surrounds the reactor vessel and support systems. It is designed to prevent the release of radioactive materials following an accident. Japanese plant operators are working to reduce the pressure in the containment vessel to 1 atmosphere, the same as the outside air pressure.
4. The temperature of the coolant water as it is pumped into the reactor vessels.
5. The temperature of the coolant water, measured at the bottom of the reactor vessel.
6. The suppression pool is designed to limit pressure in the containment vessel during an accident by condensing steam from the containment vessel. Japanese workers are aiming to get this pressure down to 1 atmosphere.
7. "Below scale" means the reading is below the lowest indication the instrument is capable of detecting. This is typically an indication that an instrument has somehow failed.

Table 2: Most recently reported temperatures in the Fukushima Daiichi Spent Fuel Pools

Spent fuel removed from a nuclear reactor is highly radioactive and generates intense heat. Nuclear plant operators typically store this material in pools of water that cool the fuel and shield the radioactivity. Water in a spent fuel pool is continuously cooled to remove heat produced by spent fuel assemblies.

According to IAEA experts, a typical spent fuel pool temperature is kept below 25 °C under normal operating conditions. The temperature of a spent fuel pool is maintained by constant cooling, which requires a constant power source.

Location	**Water Temperature**	
	Temperature ^{o}C	**Date measured**
Unit 1	17.5	29 November
Unit 2	23.2	29 November
Unit 3	20.5	29 November
Unit 4	28.0	29 November
Unit 5	24.0	29 November
Unit 6	20.0	29 November
Common Spent Fuel Pool	22.0	29 November

What is the latest information regarding protective measures for the public?
On 25 November the Local Nuclear Emergency Response Headquarters established "Specific Spots Recommend for Evacuation" at 13 spots (affecting 15 households) in Date City based on discussions with the Fukushima Prefecture and Date City. On the same date additional "Specific Spots Recommend for Evacuation" were established at 20 spots (affecting 22 households) in Minamisoma City based on discussions with Fukushima Prefecture and Minamisoma City.

What is the latest information regarding radiation monitoring of foodstuffs?
Food monitoring data were reported from 20 to 29 November by the Ministry of Health, Labour and Welfare for a total of 8522 samples collected on 25, 28 and 29 July, 1-5, 7-12, 15-25 and 28-31 August, 1-3, 5-17, 20-27 and 29-30 September, 3-7, 9, 11-14, 16-22, and 24-31 October and 1-4 and 6-29 November in 40 different prefectures (Aichi, Akita, Aomori, Chiba, Ehime, Fukui, Fukushima, Gifu, Gunma, Hokkaido, Hyogo, Ibaraki, Ishikawa, Iwate, Kagoshima, Kanagawa, Kochi, Kyoto, Mie, Miyagi, Miyazaki, Nagano, Nagasaki, Niigata, Okayama, Okinawa, Osaka, Saga, Saitama, Shiga, Shimane, Shizuoka, Tochigi, Tokushima, Tokyo, Tottori, Toyama, Wakayama, Yamagata and Yamanashi). Samples comprised various baby foods, bottled water, cereals and cereal products, dairy products, eggs, fish, fruit and fruit products, meat, mushrooms, nuts, school meals, seafood, tea, vegetables and vegetable products.
Analytical results for 8489 (over 99.5 %) of the 8522 samples indicated that Cs-134 and Cs-137 or I-131 were either not detected or were below the regulation values set by the Japanese authorities. However, 33 samples were found to be above the regulation values for radioactive caesium (Cs-134 and Cs-137), as follows:

- As reported 21 November, eight samples of boar meat collected on 5, 10, 21, 22 and 25 September, 7, 24 and 25 October from Fukushima prefecture;
- As reported on 23 November, five samples of dried shiitake mushroom collected on 10 and 18 November from Fukushima prefecture and one sample of dried nikko maple collected on 18 November (unknown prefecture of collection);
- As reported 24 November, one sample of rockfish taken on 19 November from Fukushima prefecture;
- As reported 25 November, three samples of dried shiitake mushroom collected on 11 October and 10 and 18 November in Tochigi prefecture;
- As reported on 27 November, one sample of dried shiitake mushroom collected on 22 November in Fukushima prefecture;
- As reported on 28 November, nine samples of meat collected from Fukushima prefecture (seven boar samples collected on 15 September, 22 October, 15, 17, 18, 22 and 23 November, one sample of Asian black bear taken on 21 November and one sample of pheasant taken on 20 November); and
- As reported on 29 November, four samples of fish taken on 27 November from Gunma prefecture and one sample of dried shiitake mushroom collected on 24 November in Shizouka prefecture.

Updated information on food restrictions was reported by the Ministry of Health, Labour and Welfare (MHLW) on 25 November indicating that restrictions were placed on the distribution and consumption of boar meat from specific parts of Fukushima prefecture.

The IAEA will continue to issues regular status reports to the public on the current status of the Fukushima Daiichi Nuclear Power Plant.

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