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Fukushima Daiichi Status Report

2 November 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 1 November, TEPCO detected the possible presence of xenon-133 and xenon-135 gases sampled from inside the Primary Containment Vessel (PCV) of Fukushima Daiichi Unit 2. The presence of these short-lived radionuclides indicates that some nuclear fission may have recently occurred. TEPCO reported that no increases in radiation levels have been observed. According to TEPCO "even if a fission reaction is assumed to be on-going, its scale is extremely small and the reactor is in a stable condition as a whole."

TEPCO responded to this development by injecting 10 tonnes of boric acid solution (water containing 480kg of boric acid) into the reactor from 02:48 to 03:47 local time on 2 November. Boric acid solution is used as a countermeasure to nuclear fission for its ability to absorb neutrons.

Further radionuclide analysis of the gas samples collected from Unit 2 is on-going and will be conducted in collaboration with the Japan Atomic Energy Agency (JAEA).

On 31 October, 10 tons of fresh water was added to the Spent Fuel Pool at Unit 4.

On 27 October, a crack was discovered on the casing for the axle junction of the ceiling crane located in the Common Spent Fuel Pool Building. Under normal operating conditions, the ceiling crane is used to move nuclear fuel elements and other items.

On 28 October, TEPCO announced that the cover for Unit 1 is now considered fully operational and functional (see 14 October photograph of roof panel installation below). The cover has been placed over Unit 1 to reduce the dispersion of radionuclides to the environment. TEPCO has released a video that chronicles its construction and installation.

On 22 October TEPCO released an update of its efforts to manage onsite contaminated water. A video with a detailed discussion of the water treatment process has been made available online.

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	7600	10000	10600
Reactor vessel pressure	atm	1.14	1.08	Downscale
Outer containment vessel pressure[2]	atm	1.24	1.13	1.02
Reactor vessel temperature (feed water nozzle)[3]	°C	50.6	71.5	64.4
Reactor vessel temperature (at bottom of reactor)[4]	°C	53.8	76	70.5
Suppression Pool Pressure[5]	atm	0.9	Below scale[6]	1.88
Date/Time of Data Acquisition		2 Nov 12:00 UTC	2 Nov 12:00 UTC	2 Nov 12:00 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. 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.
3. The temperature of the coolant water as it is pumped into the reactor vessels.
4. The temperature of the coolant water, measured at the bottom of the reactor vessel.
5. 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.
6. "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	22.0	02 November
Unit 2	24.7	02 November
Unit 3	23.1	02 November
Unit 4	31.0	02 November
Unit 5	24.5	02 November
Unit 6	24.5	02 November
Common Spent Fuel Pool	25.0	01 November

What is the latest status regarding workers at Fukushima Daiichi?

TEPCO regularly releases summaries of the radiation exposure (both internal and external) results of its workers. The following table contains the latest results of combined external and internal radiation exposures to workers at Fukushima Daiichi released by TEPCO on 31 October). The figures demonstrate a decrease in the level of exposure to onsite workers over time from March through September.

As of March 15, the effective radiation dose limit for radiation workers at Fukushima Daiichi was raised from 100 mSv to 250 mSv, provided that they are under emergency situations.

Table 3: Combined external and internal radiation doses to workers at Fukushima Daiichi

Dose (mSv)	March	April	May	June	July	August	September
Greater than 250	6	0	0	0	0	0	0
200-250	2	0	0	0	0	0	0
150-200	13	0	0	0	0	0	0
100-150	77	0	0	0	0	0	0
50-100	309	3	0	0	0	0	0
20-50	859	81	19	16	6	0	7
10-20	1041	310	133	96	69	21	28
Less than 10	1434	3214	2854	1997	2043	1080	1011
Total personnel	3742	3608	3017	2111	2118	1101	1046
Max (mSv)	670.36	69.28	41.61	39.62	31.24	18.27	30.81
Average (mSv)	22.58	3.83	2.85	2.26	1.85	1.46	1.80

On 17 October, a TEPCO employee was working with water injection equipment on the second floor of the reactor building for Unit 1. When his work was completed, contamination was discovered around his mouth. However, a whole body counter measurement identified no internal contamination.

TEPCO had previously reported that 65 personnel (all sub-contractors) who worked at the Fukushima plant during the initial response had not undergone whole body counting. Several have been identified since that time and an investigation to identify remaining personnel is on-going. At present there are 20 persons outstanding from this identification process. Nine of them have been identified as not being applicable for whole body counting, seven are still under investigation to obtain their contact details and four have been unable to be found through their provided contact information.

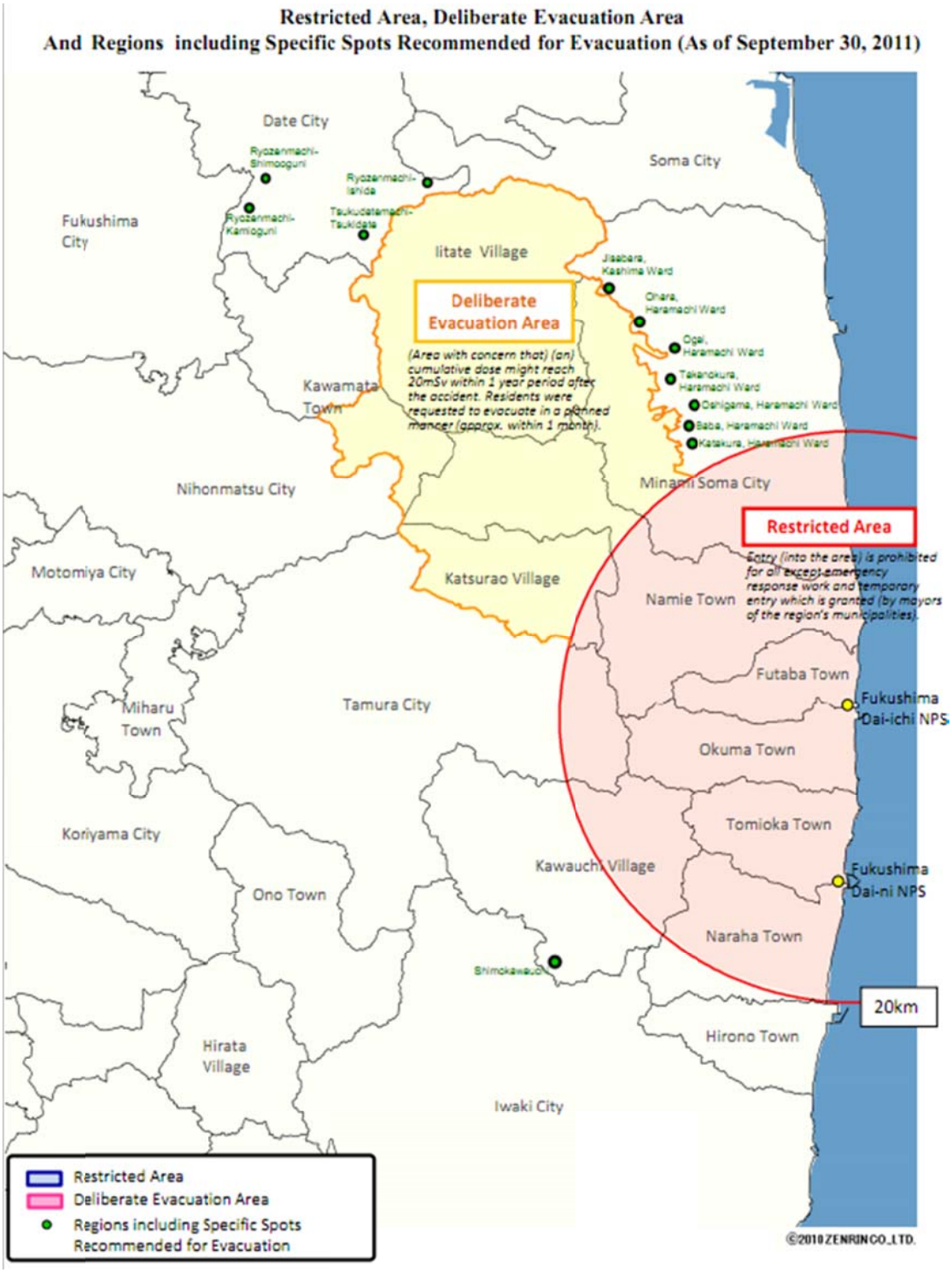
On 29 October two workers were injured onsite. An accident occurred during the disassembly of a crane used to construct the Unit 1 reactor building cover. A bundle of wires fixed by the bank wire on the base released and struck workers engaged in dismantling work. One worker broke both of his legs and the other worker sustained injury to both his shoulders and other areas of his body. The worker with broken legs was transported via helicopter to the Fukushima Medical University Hospital immediately after the accident where he had surgery and was transferred to an Intensive Care Unit. The other worker was transported to the Sogo Iwaki Kyoritsu Hospital approximately 4 hours after first receiving treatment at the medical unit at J-Village. The cause of the accident is currently being investigated.

On 1 November TEPCO announced that due to the reduction of the airborne concentration of contamination onsite, requirements for wearing facemasks onsite are being reduced. These new rules come into effect on 8 November.

What is the current status of evacuation areas around the Fukushima Daiichi plant?

Based on the '[Basic Approach for Reassessing Evacuation Areas]' the Nuclear Emergency Response Headquarters lifted the restriction of the 'Evacuation Prepared Areas in Case of an Emergency.'

Current evacuation areas are detailed in the following map:



The previous map of evacuation areas is available online.

What measures have been taken to assist residents in the areas around the Fukushima Daiichi plant?

On 17 October METI released an updated version of the "Roadmap for Immediate Actions for the Assistance of Residents Affected by the Nuclear Incident." The main updates added to the document include the following points:

- On 30 September the Nuclear Emergency Response Headquarters lifted the designation of Evacuation Prepared Areas for Cases of Emergency
- Based on the request from the five municipalities previously designated as the Evacuation Prepared Areas in Case of Emergency, as part of the support to recover these areas, detailed monitoring mainly focusing on the roads necessary for living as well as well water and rivers is now under implementation
- "The Municipalities Reconstruction Support Team in response to the Nuclear Accident", now exchanging opinions with the affected municipalities
- Since 19 September a second round of temporary access via private vehicles has been on-going into the restricted areas
- 5435 households (representing 12448 people) have been allowed temporary access into the restricted areas, with 4989 of the households allowed to access via private vehicle
- Meetings are now being held to explain "the Basic Policy for Emergency Decontamination Work" and "Act on Special Measures concerning Handling of Radioactive Pollution" in Fukushima Prefecture and neighbouring prefectures
- Experts have begun visiting municipalities to provide guidance and advice on decontamination
- A large scale thyroid examination has been started since 9 October for residents in Fukushima Prefecture at and under the age of 18 at the time of the accident (approx. 360,000 people)
- Survey of the exposure dose to all the residents in Fukushima Prefecture (approx. 2 million people) is still on-going
- Since 26 August arrangements to protect 320 dogs and 190 cats have been made
- As of 11 October construction of 15787 temporary housing units has started, with approximately 90% of those units having been completed
- As of 7 October 2073 households from Fukushima Prefecture have moved into new or assigned housing – nationwide 16537 households have moved into new houses or been assigned housing (note: this figure also includes those displaced by the earthquake and tsunami)
- As of 5 October, 126 cattle remain in the Deliberate Evacuation Area out of the approximately 9,300 heads subject to evacuation
- Fukushima Prefecture and the Ministry of Agriculture, Forestry and Fisheries were conducting decontamination tests on soil up to the end of August – based on the results from these tests on 14 September methods to decontaminate agricultural soil according to use, classification and concentrations of contaminants were released to the public
- On 30 September the Nuclear Emergency Response Headquarters officially released methods for the decontamination of agricultural soil based on the "Guidelines for Municipal Decontamination Work"
- As of 1 October more than 220,000 people have been screened for contamination – no cases of adverse health effects have been discovered
- Aircraft monitoring is scheduled to be conducted over the entirety of East Japan – it is expected to be complete by the end of 2011

The updated document also includes information released on job creation activities, support to small and medium sized businesses and financial assistance measures that have been and will continue to be given. A summary is also available online.

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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