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Atoms for Peace

Fukushima Daiichi Status Report

30 March 2012

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 is the latest information on the accident and the current state of the plant made available by the Japanese authorities?

The [Investigation Committee on the Accident at the Fukushima Nuclear Power Stations](#) was established by the Japanese Government after the accident occurred in March 2011. This committee is currently producing an independent review of the accident and will publish a full document on this topic during the summer of 2012. On 26 December 2011 the committee released an interim report providing their preliminary findings. The interim report is now available in English from [the committee's website](#).

IAEA assessment and comments on the Investigation Committee on the accidents at the Fukushima Nuclear Power Station Interim Report

The IAEA is not able to verify the contents and perform an in-depth technical assessment of the Interim Report in its entirety. We have performed spot checks on specific issues that were identified as potentially benefiting from our analysis and comment. Overall this report is one step in the process of conducting a root cause analysis of the accident and making policy review.

This report affirms the IAEA's Fact Finding Mission conclusions with the provision of additional evidence gathered by the Investigation Committee, e.g. external hazard preparedness, accident management and monitoring, emergency response, regulatory effectiveness. It provides substantial first-hand information from the testimonies of personnel involved, collected plant information and correspondence records. This information is currently still being evaluated by IAEA experts and will provide a basis for identifying additional lessons for consideration under the IAEA action plan, including a comparison with the IAEA Safety Standards to determine future improvements as appropriate.

The IAEA welcomes the final report currently expected to be issued in the summer of 2012 and will provide a more comprehensive assessment of that material at that time if it is appropriate. The accessibility of this information to the National and International Communities will help the industry and the world develop important lessons learned from this event to ensure the safety of nuclear power for the current generation and future ones to come.

Release of updated information from TEPCO concerning 11 March 2011

On 12 March 2012 TEPCO [released](#) supplemental material covering measurements and instrumentation data from the first few days of the accident. This material was originally made available in May 2011 (in Japanese) but has subsequently been revised as more information was gathered.

A document explaining the data is [available online](#). A specific location of the TEPCO website containing this material is [located here](#).

TEPCO Fukushima Daiichi – A One Year Review

TEPCO has opened a new section of its website called the [Fukushima Daiichi – A One Year Review](#), which captures information related to the accident progression and current status of the facility for the public. This part of the website contains a repository of links to many of the documents discussed in previous status summary updates.

Previously TEPCO established their own Fukushima Accident Investigation Committee and the Nuclear Safety and Quality Assurance Meeting Accident Investigation Verification Committee to investigate the accident [*Note: neither committee should be confused with the Investigation Committee on the accidents at the Fukushima Nuclear Power Station which was mentioned previously and acts independently of TEPCO and the Japanese Government*].

In addition to the one year review of the accident TEPCO has made available their [Fukushima Nuclear Accident Analysis Report \(Interim Report\)](#).

International Symposium on the Decommissioning of Fukushima Daiichi

On 14 March 2012 the Government-TEPCO Council of Mid-to-Long-Term Response for Decommissioning, the Agency for Natural Resources (ANRE) and Energy and METI [hosted an International Symposium](#) on the 'Decommissioning of TEPCO's Fukushima Daiichi Nuclear Power Plant (NPP) Unit 1-4' in Tokyo, Japan. The symposium was organised in cooperation with the IAEA and the Organisation for Economic Co-operation and Development Nuclear Energy Agency ([OECD/NEA](#)). The goals of the symposium were to:

- Identify challenges and technical needs for the decommissioning of Fukushima Daiichi NPP Unit 1-4;
- Share relevant practices and experience among domestic and international technical experts;
- Explore possible areas for international cooperation to address these challenges;

Please refer to the [full website](#) of the symposium for information regarding the event.

What are the recent developments at the Fukushima Daiichi nuclear power plant?

On 27 February the Government-TEPCO Mid-and-long Term Response Council released an updated version of the "[Progress Status of Mid-and-long-Term Roadmap towards the Decommissioning of Fukushima Daiichi Nuclear Power Units 1-4, TEPCO \(Digest Version\)](#)" document. The significant updates and changes that are mentioned in this updated document (many of which have been discussed in previous status summary updates) include the following:

- For Units 1~3's cold shutdown conditions have been maintained; the temperatures at the Reactor Pressure Vessel (RPV) bottom and in the Primary Containment Vessel (PCV) gaseous part have stabilized (between 25 and 60 degrees as of 26 February 2012); in addition, major parameters such as the PCV pressure and radioactive release rate from the PCV have shown no significant changes;
- A deviation from the Limited Conditions for Operation (LCO) was reported in relation to the Unit 2 RPV bottom temperatures (when it indicated a temperature exceeding 80 degrees). The measuring instrument was determined to have malfunctioned based on an assessment of the

instrument's conditions by TEPCO. The corrected initial judgment of the LCO deviation was made effective from 12 February 2012 and the temperatures in Unit 2 have continually been monitored via other instruments;

- Preparation is underway for the construction of a temporary storage facility onsite for rubble and other debris which have been gathered. The storage facility will use sand and sandbag covers as shielding. Figure 1 shows the design of the shielding for the temporary storage facility;

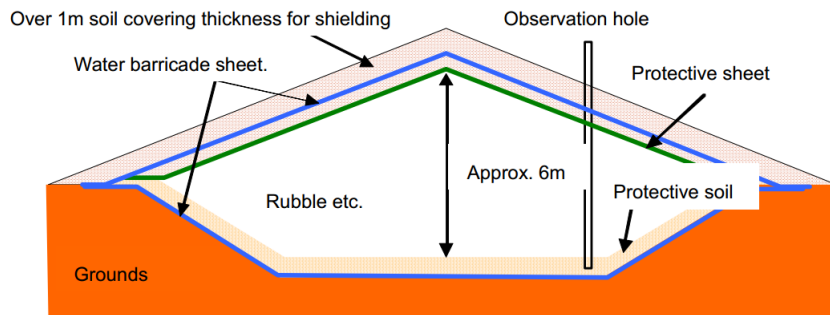


Figure 1: Layout of shielding for the temporary storage facility for rubble onsite

- A second inspection of the PCV of Unit 2 was conducted in order to assess:
 - The water level;
 - The temperature of the accumulated water in the PCV; and
 - And to determine the ambient radiation field inside the PCV to assist with planning future recovery operations.
- Anti-freezing measures have been put in place at various piping locations on site. These measures include the addition of heat insulation materials, the removal of water from piping and/or the forced circulation of water in piping that is not actively in use;
- There are plans to install an Advanced Liquid Processing System (ALPS) to control the radioactivity concentration in the processed water of the current water processing facilities. The initial test show that, out of the target radionuclides (α , β and γ emitting radionuclides), the α and the γ emitting nuclides can be removed to a level below the detectable limit. Furthermore, TEPCO is trying to identify the specific β emitting radionuclides that remain in significant volume for further purification (schedule to be finished in early March);
- Tanks with an additional capacity of approximately 40,000 tons will be installed by April. Additionally TEPCO is considering replacing existing small storage tanks onsite with larger volume tanks and installing an underground water reservoir in those locations where space is too limited for large above ground tanks;
- TEPCO has commenced solidifying the seabed in front of the intake channels to reduce the spread of contaminated soil in the seabed in this area moving out to sea;

- Surveys to identify areas onsite where TEPCO can employ effective decontamination measures to reduce dose to workers are currently in-progress;
- Rubble clearing from the upper part of the reactor buildings of Unit 3 and 4 is on-going;
- Research is currently underway for the design and construction of equipment for the decontamination of the inside of the reactor and turbine buildings and for inspection and repair operations of the PCVs;
- Methods to test the conditions and the structural soundness of the RPVs and PCVs are currently under investigation;
- Treatment and disposal options for the long-term storage of waste generated during water processing are currently being investigated;
- On 1 March TEPCO will reduce the requirement for some protective equipment (such as removing the requirement for disposable coveralls, reducing the filter requirement from charcoal to dust filter) when moving along specific routes onsite that have been determined appropriately free of loose radioactive material;
- A medical evacuation helicopter (named Doctor Helicopter) has been located at 2F onsite. Transportation training is being conducted;
- On 28 February a “Health Consultation Office” will be opened at TEPCO Headquarters; and
- Radiation field reduction measures are currently being implemented at the Main Anti-Earthquake building (such as laying of lead tiles on the floor and walls).

A presentation on the Mid-and-Long-Term roadmap is [available online](#).

Developments at Unit 2

On 26 March TEPCO [provided the results](#) from their investigation of the temperature and water level in the Unit 2 PCV via an industrial endoscope. Their measurements of the air inside the Unit 2 PCV confirmed an internal temperature of approximately 45 °C. They measured the accumulated water at the bottom of the PCV to be approximately 48-50 °C. Through their investigation TEPCO discovered that the water level in the Unit 2 PCV was approximately 60 cm in depth. Previously TEPCO had assumed that the water level was approximately 350 – 400 cm. TEPCO is confident they are providing an appropriate amount of cooling to the reactor via the (presently) 8.8 tons of water injected each hour based on their measurement of the temperature of the water. TEPCO also stated that while the accumulated water at the bottom of the PCV was mostly transparent there was sediment material visible in the water in some locations.

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 have brought 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 vessels under control and reducing the 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	6800	8800	6700
Reactor vessel temperature (feed water nozzle) ²	°C	24.1	50.1*	54.5
Reactor vessel temperature (at bottom of reactor) ³	°C	24.7	44.1	49.9
Date/Time of Data Acquisition		28 Mar 02:00 UTC	28 Mar 02:00 UTC	28 Mar 02:00 UTC

*Actual location of the measurement is slightly above the RPV bottom head

More detailed information is [available online](#).

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 temperature of the coolant water as it is pumped into the reactor vessels; and
3. The temperature of the coolant water, measured at the bottom of the reactor vessel.

Recent developments in the Fukushima Daiichi Spent Fuel Pools

Throughout January and February TEPCO had been conducting operations to reduce the radioactive material concentration in the Unit 3 Spent Fuel Pool by a factor of 100. On 2 March TEPCO [summarized](#) their progress on the removal of radioactive material which began on 14 January 2012. This work is a preliminary step before desalination of the water in the Unit 3 Spent Fuel Pool can take place.

The following actions are also being taken:

- An investigation into the current conditions of the Unit 4 Spent Fuel Pool is on-going. This is part of the preparatory work before the Spent Fuel removal process takes place;
- The Common Spent Fuel Pool is being restored as a storage space for the spent fuel to be removed from the other pools. The overhead crane in the building was restored on 26 January 2012;
- In preparation for Spent Fuel removal activities at Unit 2 a robot investigation of the upper floor areas of the Unit 2 Reactor Building is taking place to ascertain its present condition. Information can be found [online here](#) and results from the survey can be [seen here](#).

Current status of evacuation areas

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'. Figure 1 shows the current evacuation areas and the specific sites recommended for evacuation.

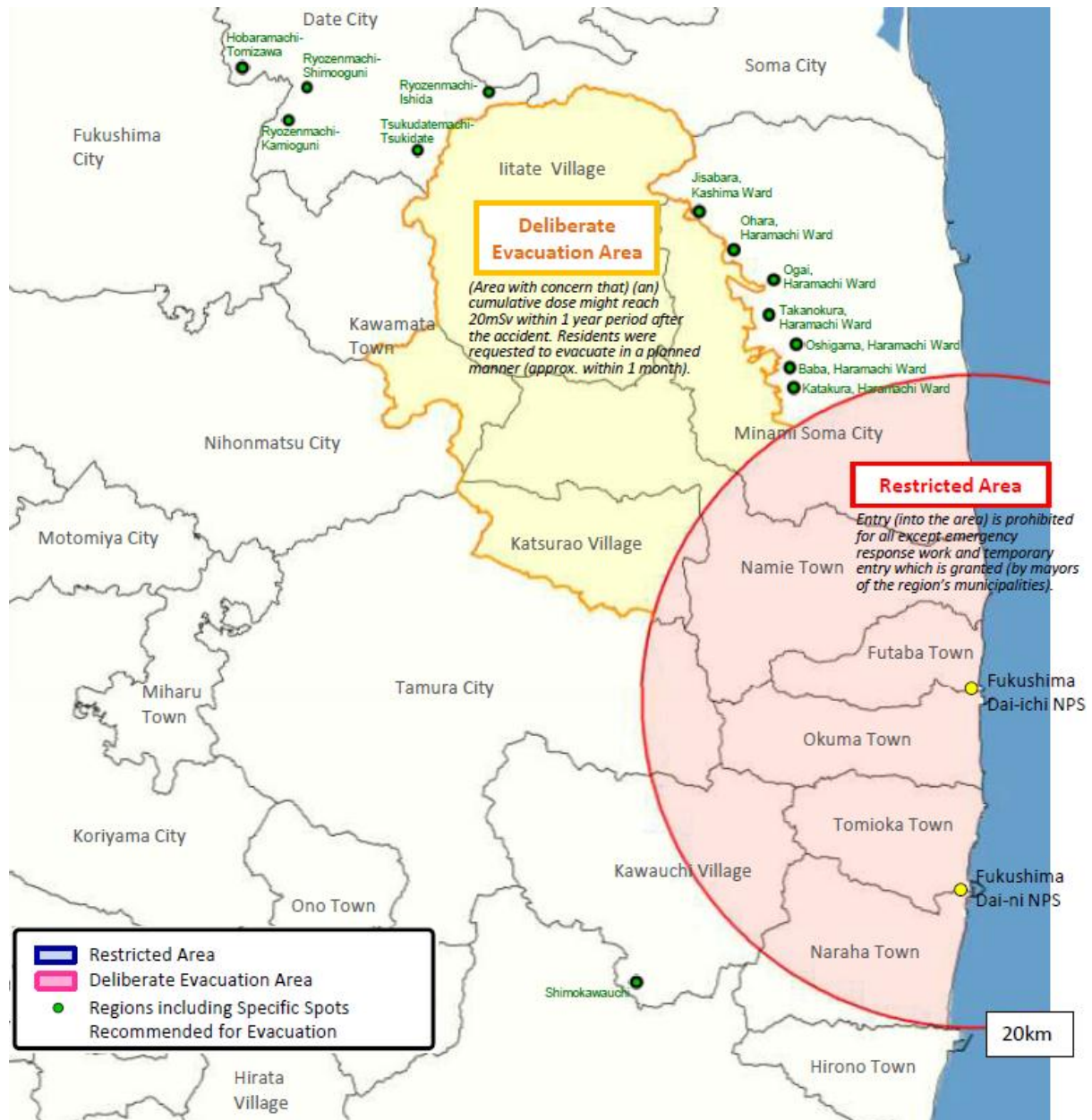


Figure 1: Current evacuation areas (as of 25 November)

The previous map of evacuation areas is available in previous reports and [online](#).

What is the latest information regarding radiation monitoring of foodstuffs?

Food monitoring data were reported on 20 – 24 and 27 – 29 February and 1 – 2, 5 – 9, 12 – 16, 19 and 21– 23 March 2012 by the Ministry of Health, Labour and Welfare for a total of 18835 samples collected from 47 different prefectures in Japan.

Analytical results for 18790 (over 99.5%) of the 18835 samples indicated that Cs-134 and Cs-137 or I-131 were either not detected or were below the provisional regulation values set by the Japanese authorities. However, 45 samples (Table 8) were found to be above the provisional regulation values for radioactive caesium (Cs-134 and Cs-137).

Food restrictions

Updated information was reported by the Ministry of Health, Labour and Welfare (MHLW) on 23 February and 8 and 15 March 2012 placing restrictions on the distribution of outdoor cultivated, log-grown shiitake mushrooms produced in a specific area of Chiba prefecture and in specific areas of Miyagi prefecture.

New Standard Limits for Radionuclides in Food

New standard limits for radionuclides in food were announced in early March 2012 by the Ministry of Health, Labour and Welfare, with an enforcement date of 1 April 2012 (transitional measures apply to some commodities). Please see detailed information at the [following location online](#).

Samples above the Japanese Provisional Regulation Values as Reported by the Ministry of Health, Labour and Welfare between 20 February and 23 March 2012

Date Reported	Prefecture	Date Sampled	Food Product	Cs-137+Cs-134 (Bq/kg)
22-Feb-12	Chiba	20-Feb-12	log-grown shiitake (outdoor)	993
22-Feb-12	Fukushima	20-Feb-12	greenling	1190
22-Feb-12	Fukushima	20-Feb-12	greenling	880
22-Feb-12	Fukushima	20-Feb-12	greenling	1130
22-Feb-12	Fukushima	20-Feb-12	jacopever	1340
22-Feb-12	Fukushima	20-Feb-12	common skate	980
22-Feb-12	Fukushima	20-Feb-12	slime flounder	1170
24-Feb-12	Fukushima	10-Feb-12	boar meat	949
24-Feb-12	Fukushima	04-Feb-12	boar meat	875
24-Feb-12	Fukushima	14-Feb-12	boar meat	507
24-Feb-12	Fukushima	04-Feb-12	boar meat	662
29-Feb-12	Fukushima	22-Feb-12	fox jacopever	970
29-Feb-12	Fukushima	22-Feb-12	japanese seabass	660
29-Feb-12	Fukushima	21-Feb-12	lefteye flounder	520
07-Mar-12	Miyagi	01-Mar-12	log-grown shiitake	1600
07-Mar-12	Fukushima	27-Feb-12	common skate	690
07-Mar-12	Fukushima	27-Feb-12	poacher	940
07-Mar-12	Fukushima	27-Feb-12	poacher	1210
07-Mar-12	Fukushima	04-Mar-12	greenling	840
07-Mar-12	Fukushima	02-Mar-12	japanese seabass	660
09-Mar-12	Fukushima	20-Jan-12	boar meat	836
09-Mar-12	Fukushima	28-Jan-12	boar meat	859
09-Mar-12	Fukushima	28-Jan-12	boar meat	1050
09-Mar-12	Fukushima	04-Feb-12	boar meat	845

Date Reported	Prefecture	Date Sampled	Food Product	Cs-137+Cs-134 (Bq/kg)
09-Mar-12	Fukushima	11-Feb-12	boar meat	1220
09-Mar-12	Fukushima	18-Feb-12	boar meat	603
09-Mar-12	Fukushima	22-Feb-12	boar meat	843
09-Mar-12	Fukushima	04-Mar-12	boar meat	644
14-Mar-12	Miyagi	08-Mar-12	log-grown shiitake	664
14-Mar-12	Miyagi	12-Mar-12	log-grown shiitake	518
14-Mar-12	Yamagata	11-Mar-12	hare meat	560
14-Mar-12	Fukushima	08-Mar-12	greenling	540
14-Mar-12	Fukushima	08-Mar-12	righteye flounder	550
14-Mar-12	Fukushima	04-Mar-12	cherry salmon	760
14-Mar-12	Fukushima	08-Mar-12	cherry salmon	1130
21-Mar-12	Fukushima	19-Mar-12	common skate	720
21-Mar-12	Fukushima	19-Mar-12	poacher	750
21-Mar-12	Fukushima	19-Mar-12	poacher	1110
21-Mar-12	Fukushima	19-Mar-12	righteye flounder	660
21-Mar-12	Fukushima	19-Mar-12	greenling	1140
21-Mar-12	Fukushima	19-Mar-12	goldeye rockfish	590
21-Mar-12	Fukushima	19-Mar-12	common skete	520
21-Mar-12	Fukushima	19-Mar-12	slime flounder	1000
21-Mar-12	Fukushima	19-Mar-12	cherry salmon	760
22-Mar-12	Iwate	21-Mar-12	beef	518

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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