Events and highlights on the progress related to recovery operations at Fukushima Daiichi Nuclear Power Station

June, 2014

Section 1: Executive summary

(1) The fact sheet uploaded in the link below is a summary of the current situation
http://www.kantei.go.jp/foreign/96_abe/decisions/2014/pdf/140221factsheet.pdf

(2) Information update from the previous fact sheet

The following information was updated from the previous fact sheet: 1) important events that happened after October 2013 were added and 2) examples of "preventive and multi-layered" measures that were additionally adopted in December 2013.

(3) The previous fact sheet is available online at
http://iaea.org/newscenter/news/2014/infcirc_japan0314.pdf

Section 2: Current conditions and forecast onsite

2.1: Relevant information pertaining to issues related to the recovery (including spent fuel and fuel debris management)

(1) New Information

(i) Newly added topics (in the past months since January)

Newly added topics in the past months since January are as follows. For additional details of these issues, please refer to the "related information" section.

- Announcement of Information Session for Request for Proposal (RFP) for Entities to Implement the Subsidy Program "Verification of Technologies for Contaminated Water Management (Demonstration Project for Verification Tests of Tritium Separation Technologies) Project" in the FY 2013 Supplementary Budget (Ministry of Economy, Trade and Industry (METI)) (May 26, 2014)
http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/20140526_01.html
- Bypass of Clean Groundwater to Ocean Starts (Tokyo Electric Power Company (TEPCO)) (May 21, 2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1236566_5892.html
- Location of the Water Leakage from the Unit 3 Reactor Container Identified at Fukushima Daiichi Nuclear Power Station (TEPCO) (May 16, 2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1236458_5892.html
- Announcement of Request for Proposal for Entities to Implement the Subsidy Program "Verification of Technologies for Contaminated Water Management (Demonstration Project for Verification Tests of Tritium Separation Technologies) Project" in the FY 2013 Supplementary Budget (METI) (May 15, 2014)

http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/20140515_01.html

- Pumping up of Groundwater Starts after Agreement with Fishermen (TEPCO) (April 9, 2014)
  http://www.tepco.co.jp/en/press/corp-com/release/2014/1235426_5892.html
- Fukushima Fishermen, TEPCO Reach Important Agreement Allowing Groundwater Discharge (TEPCO) (April 7, 2014)
  http://www.tepco.co.jp/en/press/corp-com/release/2014/1235388_5892.html
- Revision of Comprehensive Radiation Monitoring Plan (Nuclear Regulation Authority (NRA)) (April 1, 2014)
  http://radioactivity.nsr.go.jp/en/list/274/list-1.html
- Establishment of Fukushima Daiichi Decontamination & Decommissioning Engineering Company (March 25, 2014)
  http://www.tepco.co.jp/en/press/corp-com/release/2014/1235009_5892.html
- NRA's Action to TEPCO's Fuel Removal from Unit 4, <Vol. 4> (NRA) (February 14, 2014)
  http://www.nsr.go.jp/english/newsrelease/data/20140214.pdf
- Decommissioning of Units 5 and 6 at Fukushima Daiichi Nuclear Power Station (TEPCO) (January 31, 2014)
  http://www.tepco.co.jp/en/announcements/2014/1233973_5932.html

(ii) Notable topics among recent updates

(a) "Groundwater bypassing" at Fukushima Daiichi Nuclear Power Station started on May 21st

"Groundwater bypassing" is one of the countermeasures to reduce the volume of groundwater flowing into the buildings at TEPCO's Fukushima Daiichi Nuclear Power Station. This countermeasure is to pump out groundwater from wells at the mountainside area beside the reactor buildings and this groundwater will be released to the sea (bypassing) after passing the quality analysis survey. TEPCO and the Government of Japan have been explaining the content, function, and its effect of this countermeasure to the local stakeholders, such as fishermen's unions and Fukushima prefectural government.

In April 2014, the fishermen's unions showed their intention to accept the plan of conducting this groundwater bypassing. In addition, from April 9th, TEPCO has been making effort to prepare for the actual release of the groundwater such as water quality analysis of the groundwater being pumped up. On May 16th, TEPCO and the Government of Japan published water quality analysis results conducted by three different analysis agencies. These results show that the radioactive levels of sampled water are substantially below the operational targets (each of the target is set by TEPCO and these operational targets are set at the very low level compared to the legal discharge limits). As for the detailed analysis results of these three agencies, please refer to the table shown in the following link:

http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/21140514_01a.pdf

Following the fact that TEPCO and the Government of Japan have reported and explained about these detailed analysis results to the local stakeholders, the

Government of Japan decided to announce that the groundwater bypassing would be operated (i.e. groundwater being pumped out will be released to the sea) on May 21st.

Whenever TEPCO releases groundwater, government officials (*) will check the entire process of the release. In addition to this, TEPCO and the Government of Japan will publish detailed analysis results of the groundwater being pumped up on a regular basis in order to secure transparency.

* Staff from the Intergovernmental Liaison Office for Decommissioning and Contaminated Water Management near Fukushima Daiichi Nuclear Power Station.

Following this operation, the radioactive analysis of the sea water was conducted by TEPCO (the sea water used for this analysis was sampled during and after the operation at the nearest sea water sampling post from the groundwater releasing point) and no significant change of radioactivity was observed in the analysis. The sea water used for this analysis was sampled during and after the operation at the nearest sea water sampling post from the groundwater release point.

For further detail of the analysis result, please refer to the following TEPCO's website:

http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/gw_drainage_140523-e.pdf

(b) Request for proposal (RFP) for entities to implement with subsidies the "Verification of technologies for contaminated water management" (Demonstration Project for Verification Tests of Tritium Separation Technologies)

The Government of Japan is proceeding with the RFP for "technologies that are potentially effective but require verification before use" and this project will be the fifth RFP.

With regard to the Tritiated Water, the Government of Japan has discussed how to deal with it which arises at TEPCO's Fukushima Daiichi Nuclear Power Station. Under the Committee on Countermeasures for Contaminated Water Treatment, the Task Force for Tritiated Water was set up in order to comprehensively evaluate not only separation technologies, but also risks, environmental impacts, cost-benefit, etc. of long-term storage or release of tritium. The Task Force is clarifying and analyzing previous scientific knowledge, etc. with consideration from the viewpoint of risk assessment, and the Task Force is also considering various options.

"Summary of previous discussions" of the Task Force for Tritiated Water is shown in the following URL.

http://www.meti.go.jp/earthquake/nuclear/pdf/140428/140428_01n.pdf

The purpose of the project is to gather the latest information on tritium separation technology on the basis of the above-mentioned previous consideration. The results of the project will be used as needed for consideration by the task force; therefore reports of the project's progress, results of tentative calculation or data at the time, etc. will be required around four times per year. The data, etc. might be released to the task force as needed. In this case, the information will be released after coordination with the implementing entity and receipt of its assent.

The purpose of the project is (i) to verify separation performance of tritium separation technology, and (ii) to assess construction costs and operating costs needed for installing the equipment in the Fukushima Daiichi Nuclear Power Station and for treating water remaining after treatment through the multi-nuclide removal equipment.

However, the decision whether or not to conduct tritium separation treatment has not yet been made.

Like the RFPs which were previously announced in March, to process the applications for RFP, the Mitsubishi Research Institute, Inc., was selected by the Agency for Natural Resources and Energy (ANRE, METI, Japan), and it is now executing the tasks of the Project Management Office for this RFP. The Mitsubishi Research Institute has commenced to accept the application on May 15th. Regarding the deadline of the application, conditions, application procedure, the information on evaluation and adoption and other relevant information are available in the guidelines uploaded on the following website of the Mitsubishi Research Institute.

http://www.mri.co.jp/tritium_e/

This process is taken in order to respond quickly and appropriately to technical challenges which could not be foreseen at the outset. To fulfill such objective, the Ministry of Economy, Trade and Industry (METI) will strongly support the feasibility studies and technology development for decommissioning and contaminated water management, with the support of the gathering domestic and overseas wisdom of contaminated water issues.

Also, additional RFP for other technologies is under consideration.

(c) The Revision of the "Concepts of Inspection Planning and the Establishment and Cancellation of Items and Areas to which Restriction of Distribution and/or Consumption of Foods concerned Applies"

On March 20th, the Nuclear Emergency Response Headquarters announced revisions to the "Concepts of Inspection Planning and the Establishment and Cancellation of Items and Areas to which Restriction of Distribution and/or Consumption of Foods concerned Applies" concerning radioactive materials in foods.

The revision was made on the basis of the results of inspections carried out in the past one year. Upon the revision, the items subject to inspections were revised based on the results of inspection for about the past one year on food items from which radioactive cesium above the maximum limits has been detected or the food items from which 1/2 of the maximum limits for radioactive cesium has been detected.

The detail of the revision is described in the document "Concepts of Inspection Planning and the Establishment and Cancellation of Items and Areas to which Restriction of Distribution and/or Consumption of Foods concerned Applies" in the following website.

http://www.mhlw.go.jp/english/topics/2011eq/dl/food-140320-2.pdf

【Reference Information】The Nuclear Emergency Response Headquarters has established and publicly announced guidelines on the local governments' formulation of inspection plans for radionuclide in foods, and the handling of the restriction of distribution based on the Act on Special Measures concerning Nuclear Emergency Preparedness.

(iii) Information update on the decommissioning process

Progress status report is made monthly by METI. This report is the summary of the recent progress of the decommissioning made after the last progress status report was publicized. The summary and URL of the progress report is as follows:

- The Progress status report as of February 27, 2014 is available online http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20140227-e.pdf

The report discusses many recent updates to the decommissioning process such as structure investigation of the Unit 3 reactor building and expansion of non full-face mask required area. The following figures show some parts of the recent progress.

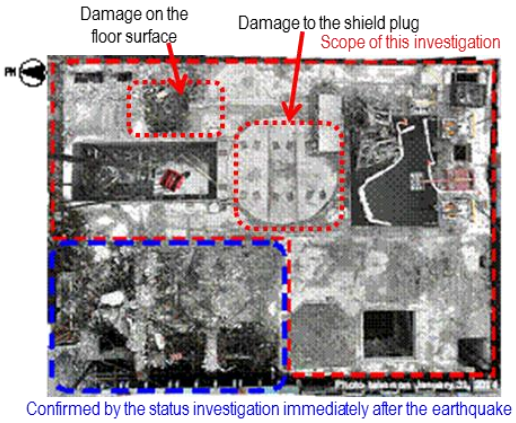

Figure 1: Investigative result of operation floor

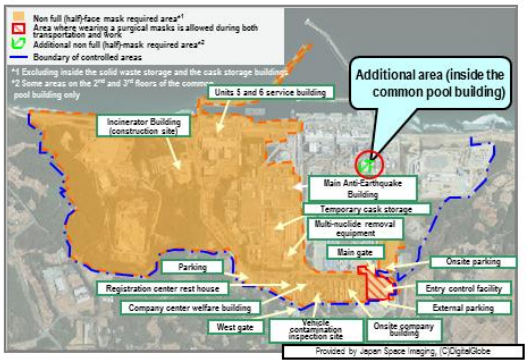

Figure 2: Non full-face mask required area

- The Progress status report as of March 27, 2014 is available online
- http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20140327-e.pdf

The report discusses many recent updates to the decommissioning process such as the implementation of a small-scale freezing test for frozen impermeable walls and a demonstration test of the remote-control decontamination equipment. The following figures show some parts of the recent progress.

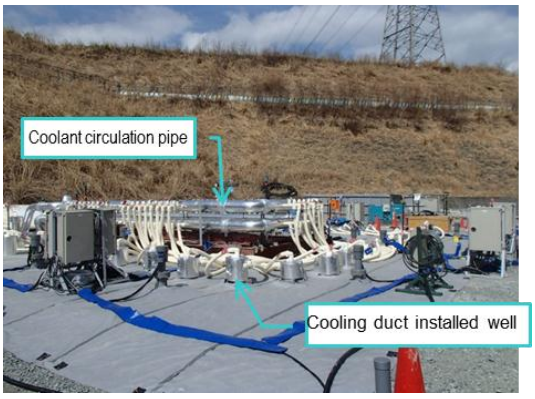

Figure 1: Field implementation status of freezing test

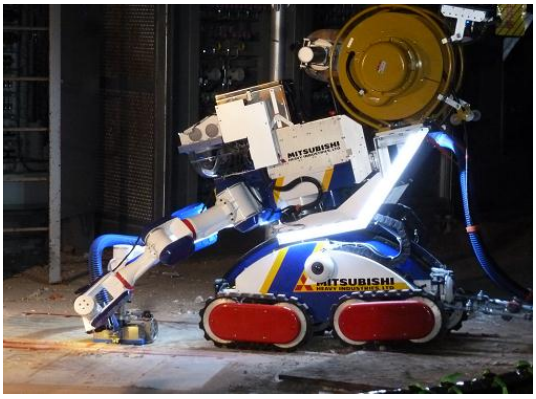

Figure 2: Vacuuming and blast decontamination equipment

- The Progress status report as of April 24, 2014 is available online http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20140424-e.pdf

The report discusses many recent updates to the decommissioning process such as operation of pumping wells for groundwater bypassing and increasing tanks by manufacturing tanks in a factory and transporting them by ship.

Figure 1: Pumping well for groundwater bypassing

Figure 2: Tank transported by ship

- Archives of the status report are available online:

http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/#progress_status

(2) Related information

Information provided in the links below includes the description and the schedule of preventive and multi-layered measures for the contaminated issues in order to remove the source of contamination, isolate groundwater from contamination, and prevent further leakage of contaminated water. A summary and a full report are available on the following links.

(Summary)

http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/131210gaiyou_E.pdf

(Full report)

http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/131210report_E.pdf

As for other relevant issues, “METI’s website for decommissioning” covers various issues in detail:

- METI's website for decommissioning
  http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/index.html
  For NRA’s recent news releases, please see the following link.
- http://www.nsr.go.jp/english/newsrelease/
  For TEPCO’s activities, please see TEPCO’s website.
- TEPCO's website for current situation of Fukushima Daiichi and Daini nuclear power stations
  http://www.tepco.co.jp/en/nu/fukushima-np/index-e.html

2.2 Recent incidents and progress (in the past months since January)

Related information:

- Inappropriate Transfer of Contaminated Water at Fukushima Daiichi Nuclear Power Station (NRA) (April 15, 2014)
  http://www.nsr.go.jp/english/newsrelease/data/20140415.pdf

- Unit 4 Fuel Removal Work Suspended after Power Halt but Restart during the Day: No Rise in Radiation, No Abnormality at the Other Plants (TEPCO) (February 25, 2014)
  http://www.tepco.co.jp/en/press/corp-com/release/2014/1234483_5892.html
- Water was discovered leaking from the upper part of Tank C-1 in H-6 Tank Area (NRA)(February 20, 2014)
  http://www.nsr.go.jp/english/newsrelease/data/20140220.pdf
- Water was discovered leaking from a flange of a water pressure measuring instrument at TEPCO's Fukushima Daiichi Nuclear Power Station (NRA)(February 6, 2014)
  http://www.nsr.go.jp/english/newsrelease/data/20140206.pdf
- A water leakage was identified at first floor of Unit 3 Reactor Building at Fukushima Daiichi Nuclear Power Station (TEPCO) (January 21, 2014)
  http://www.tepco.co.jp/en/press/corp-com/release/2014/1233734_5892.html
- TEPCO provided an explanation on the reported steam generation on the operation floor at Unit 3 at Fukushima Daiichi Nuclear Power Station (TEPCO) (January 10, 2014)
  http://www.tepco.co.jp/en/announcements/2014/1233524_5932.html

Section 3: Monitoring results

3.1: Onsite monitoring results reported by TEPCO

-3.1.1 Radionuclide releases to the atmosphere

(1) Outline of the item

On-going monitoring of the air at the site of the Nuclear Power Station has detected no significant increase in radiation levels.

(2) Noteworthy change in data in the past months (through February to April)

Except for the slight changes in the density of Cs-134, Cs-137 which were nearly negligible, the monitoring result is ND (ND indicates that the measurement result is below the detection limit). In this regard, no announcement has been made by TEPCO for this item.

* Slight changes in the density of Cs-134 were reported on February 1st and 7th, and April 11th.

* Slight changes in the density of Cs-137 were reported on February 1st, 7th, 14th, 21st and 28th, March 5th, 7th, 14th and 19th, and April 11th, 18th and 29th.

(3) Monitoring result data

The monitoring results in the air at the site of the Nuclear Power Station are available in the following webpage (Please see the calendar titled "in the air at the site of Power Station"). This monitoring result is updated every day on this site.

http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/index-e.html

- 3.1.2 Radionuclide releases to the sea (including groundwater monitoring results)

(1) General outline of the item

Results of radioactive nuclide analysis are published for the samples of groundwater at the east side of the Unit 1-4 Turbine Buildings and seawater at the port in order to monitor the source and the extent of the radioactive materials in the groundwater, and to determine whether the materials included in groundwater affect the sea.

Increased radioactivity has been observed within the port, in an area smaller than 0.3 km^2. However, ongoing monitoring in the surrounding ocean area has detected no significant increase in radiation levels outside the port or in the open sea, and has shown that radiation levels in these areas remain within the standards of the World Health Organizations guidelines for drinking water.

(2) TEPCO's report on radionuclide releases to the sea

TEPCO issued a report which includes progress and status of the ground improvement by sodium silicate. This report is available online: http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_2tb-east-e.pdf

In addition, the historical data of radioactive concentration in the groundwater sampled at the Unit 1-4 bank protection are available online with the csv format. The data from north of Unit 1, between intakes of Units 1 and 2, between intakes of Units 2 and 3, and between intakes of Units 3 and 4 are available at the following sites respectively.

http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/2tb-east-newest02-e.csv

http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/2tb-east-newest03-e.csv

http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/2tb-east-newest04-e.csv

http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/2tb-east-newest05-e.csv

(3) Related information

Analyses regarding radionuclide releases are conducted in different parts of the sea (outside of the port, inside of the port, and inside of the Unit 1-4 water intake channel). Results of these analyses and analysis results of groundwater are as follows (the information is automatically updated everyday).

- Analysis Results of Groundwater (Unit 1-4 Bank Protection)
  http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/tb-east_map-e.pdf
- Analysis Results of Seawater (Outside of the Port)
  http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/seawater_map-e.pdf
- Analysis Results of Seawater (Inside of the Port)
  http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/intake_canal_map-e.pdf
- Analysis Results of Seawater (Inside of Unit 1-4 Water Intake Channel)

http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/2tb-east_map-e.pdf

3.2: Offsite monitoring results

1. Monitoring results of air dose rates in the 20 Km radius zone around Fukushima Daiichi Nuclear Power Station

   (1) Outline of the item

   The monitoring of air dose rates in the 20 Km radius zone around Fukushima Daiichi Nuclear Power Station has been conducted at 50 points in the zone (the types of detectors used for monitoring are NaI scintillation detectors and/or an ionization chamber type survey meters). The air dose rates in the 20 Km radius zone have continuously been decreasing since May 2011 (after the accident at Fukushima Daiichi Nuclear Power Station on March 11, 2011).

   (2) Noteworthy updates in the past months

   As described in (1) above, the air dose rates in the 20 Km radius zone around the Nuclear Power Station have been in a downward trend, and the monitored air dose rates were stable during February to April 2014. Based on these results, any further announcement was not made on this item (e.g., significant increase of air dose rates in the 20 Km radius zone) during February to April 2014.

   (3) Monitoring results

   Each of the following URL leads to the monitoring results of air dose rates in the 20 Km radius zone around Fukushima Daiichi Nuclear Power Station in February, March and April 2014:

   February: http://radioactivity.nsr.go.jp/en/list/239/list-201402.html
   March: http://radioactivity.nsr.go.jp/en/list/239/list-201403.html
   April: http://radioactivity.nsr.go.jp/en/list/239/list-201404.html

   The following URL leads to an archive of monitoring results:
   http://radioactivity.nsr.go.jp/en/list/239/list-1.html

2. Monitoring results of dust in air and soil in the 20 Km radius zone around Fukushima Daiichi Nuclear Power Station

   (1) Dust

   The monitoring results of dust obtained during February to April 2014 show that the concentrations of dust were either ND (ND indicates that the measurement result is below the detection limit) or very low. Based on the results, any further announcement was not made on this item (e.g., significant increase of the concentrations of dust) during February to April 2014.

   The following URL leads to the monitoring results (dated 7 May, 2014) of dust:

   http://radioactivity.nsr.go.jp/en/contents/9000/8382/24/223_20140507.pdf

   (2) Soil

Radiation monitoring of soil is conducted as appropriate. The latest monitoring of soil was conducted during February to April 2014. The following URL leads to the monitoring results (dated May 14, 2014) of soil:

http://radioactivity.nsr.go.jp/en/contents/9000/8419/24/495_20140514.pdf

(3) Previous monitoring results

The following URL provides the previous monitoring results (from April 2011 to the present) of dust in air and soil:

http://radioactivity.nsr.go.jp/en/list/240/list-1.html

3. Estimated values and measured values of environmental radioactivity at 1m height from the ground surface in other prefectures (46 prefectures in total) other than Fukushima Prefecture

(1) Outline

The air dose rates measured using the monitoring stations installed in other prefectures have mostly returned to the equal level of the air dose rates before the accident.

(2) Updates during February to April 2014

The estimated and measured values were relatively stable during February to April 2014. Based on the results, any further announcement was not made on this item (e.g., significant increase of the estimated and measured values) during February to April 2014.

(3) Monitoring results

The following URL leads to the estimated and measured values, and new monitoring results are uploaded nearly every day:

http://radioactivity.nsr.go.jp/en/list/192/list-1.html

3.3: Marine monitoring results of seawater, sediment and biota

(1) Outline

Marine monitoring results in the area around Fukushima Daiichi Nuclear Power Station have indicated that the radiation levels outside the port or in the open sea have been relatively stable.

(2) Updates during February to April 2014

The marine monitoring results during February to April 2014 were relatively stable as described in (1) above. Based on the results, any further announcement was not made on this item (e.g., significant increase of marine monitoring results) during February to April 2014.

(3) Related information

Sea area monitoring is classified to be conducted in 5 areas (Area 1: Sea area close to TEPCO's Fukushima Daiichi Nuclear Power Station, Area 2: Coastal area, Area 3: Off-shore area, Area 4: Outer sea area, and Area 5: Tokyo bay area), and this information is available under the "Monitoring of Sea Water" section of the NRA webpage entitled "Readings of Sea Area Monitoring". This webpage also includes monitoring results of sediment under the "Monitoring of Marine Soil" section, and it is also classified into 4 areas (Area 1: Sea area close to TEPCO's Fukushima Daiichi Nuclear Power Station, Area 2: Coastal area, Area 3: Off-shore area, Area 4: Tokyo bay area). The NRA has been providing a weekly report on sea area monitoring results. The "Readings of Sea Area Monitoring" webpage covers various issues and the webpage's information is periodically updated several times a week. The following URLs lead to this webpage and the weekly report on sea area monitoring results:

- Readings of Sea Area Monitoring
  http://radioactivity.nsr.go.jp/en/list/205/list-1.html
- Sea Area Monitoring (Weekly Report)
  http://radioactivity.nsr.go.jp/en/list/295/list-1.html

Section 4: Food products

4.1: Summary of testing

Food samples are routinely monitored to ensure that they are safe for all members of the public.

During the month of February 2014, 24,171 samples were taken and analysed. Among these samples, 54 samples were found to be above the limits (Cs-134+Cs-137: 100 Becquerel/kg). This represents 0.22 percent of all samples.

During the month of March 2014, 25,077 samples were taken and analysed. Among these samples, 76 samples were found to be above the limits (Cs-134+Cs-137: 100 Becquerel/kg). This represents 0.30 percent of all samples.

During the month of April 2014, 28,313 samples were taken and analysed. Among these samples, 38 samples were found to be above the limits (Cs-134+Cs-137: 100 Becquerel/kg). This represents 0.13 percent of all samples.

Restrictions are imposed on the distribution of food products, if the level of radioactive contaminants of the food product exceeds the limit (Cs-134+Cs-137: 100 Becquerel/kg). Restrictions are to be removed, when the level of radioactive contaminants of the food product is monitored to be constantly below the limit for a certain period of time. Therefore, the products on which the distribution restrictions are newly imposed are the products whose radioactive contaminant level exceeded the limit in the past month. By the same logic, the products whose restrictions are newly removed are the products whose radioactive contaminant level has been lower than the limit for a certain period of time.

4.2: Results of monitoring food products

(1) The current situation and protective measures

The fact sheet uploaded in the link below is the summary of the current situation and the measures taken by the Government of Japan:
http://www.mhlw.go.jp/english/topics/2011eq/dl/food-130926_1.pdf

(2) Noteworthy updates in the past months (from February to April)

The lists of food products whose status regarding the restriction was changed are as follows.

(i) Products whose distribution was newly restricted in February
- None

(ii) Products whose restrictions were removed in February
- Buckwheat produced in Osaki-shi (limiting to former Ichikuri-mura), Miyagi prefecture
- Panther puffer captured in Sendai bay, Miyagi prefecture

(iii) Products whose distribution was newly restricted in March
- Whitespotted char (excluding farmed fish) captured in Usune river (including its branches), Gunma prefecture
- Rice produced in parts of Fukushima prefecture in 2014 (excluding rice controlled under the concept of management of Fukushima prefecture)
- Hilgendorf saucord captured in Fukushima offshore

(iv) Products whose restrictions were removed in March
- Azuki beans produced in Fukushima-shi (limiting to former Oozasou-mura) and Minamisoma-shi (limiting to former Ishigami-mura), Fukushima prefecture
- Soybeans produced in Koriyama-shi (limiting to former Takano-mura) and Sukagawa-shi (limiting to former Naganuma-machi), Fukushima prefecture
- log-grown shiitakes (outdoor cultivation and hothouse cultivation) that are controlled under the management policy set by Chiba prefecture

(v) Products whose distribution was newly restricted in April
- Wild Japanese butterbur scape produced in Naraha-machi and Katsurao-mura, Fukushima prefecture
- Wild Aralia sprout produced in Nikko-shi, Tochigi prefecture
- Wild Ostrich fern produced in Aizumisato-machi, Fukushima prefecture
- Wild Aralia sprout produced in Kesennuma-shi, Kurihara-shi and Osaki-shi, Miyagi prefecture
- Wild Koshiabura produced in Takanezawa-machi, Tochigi prefecture
- Pteridium aquilinum produced in Naraha-machi, Fukushima prefecture
- Wild Koshiabura produced in Ichikai-machi, Tochigi prefecture

(vi) Products whose restrictions were removed in April
- Buckwheat produced in Morioka-shi (limiting to former Shibutami-mura), Ichinoseki-shi (limiting to former Ohara-machi) and Oshu-shi (limiting to former Koromogawa-mura), Iwate prefecture
- Buckwheatproduced in Kurihara-shi (limiting to former Kannari-mura), Miyagi prefecture
- Littlemouth flounder captured in Fukushima offshore

- Bamboo shoot produced in Marumori-machi (limiting to former Koya-mura), Miyagi prefecture
- Log-grown shiitake (indoor cultivation) produced in Kanuma-shi that is managed based on shipment and inspection policy set by Tochigi prefecture

(3) Monitoring results data

See the link below (new monitoring results are added nearly every day):
http://www.mhlw.go.jp/english/topics/2011eq/index_food_radioactive.html

(4) Information focused on the safety of the fishery products

The information that is provided above in (1)-(3) cover fishery products, but in addition to this information, further detailed information is available on the Fisheries Agency's website

http://www.jfa.maff.go.jp/e/inspection/index.html

(i) Summary of monitoring on fishery products

The first half of the website consists of summary of monitoring on fishery products. For further information and to see the actions taken to ensure the safety of fishery products, please referred to the fact sheet uploaded in the site. This fact sheet is available in English, French, Spanish, Russian, Chinese and Korean.

(ii) Monitoring results data

The second half of the website consists of various monitoring results on radioactivity measured in fishery products.

Section 5: Radiation Protection of Workers

Information pertaining to radiation protection of workers involving TEPCO's Fukushima Daiichi NPP Accident is updated on the following website of the Ministry of Health, Labour and Welfare (MHLW):

http://www.mhlw.go.jp/english/topics/2011eq/workers/index.html

5.1: TEPCO Fukushima Daiichi NPP

The status on the exposure dose, health care management and radiation protection of the workers at TEPCO's Fukushima Daiichi NPP are as follows.

(1) Status of Radiation Exposure

Exposure doses of the workers at TEPCO Fukushima Daiichi NPP are reported to the MHLW once a month. The latest monthly report is available on the following webpage (Updated on April 30, 2014):

http://www.mhlw.go.jp/english/topics/2011eq/workers/irpw/ede_140430.pdf

(2) Radiation Protection

Information on radiation protection of workers including measures to be taken and evaluation of committed effective dose of workers at the affected plant is updated.

"Response and Action Taken by the Ministry of Health, Labour and Welfare of Japan on

Radiation Protection for Workers Involved in the TEPCO Fukushima Daiichi Nuclear Power Plant Accident" is available on the following webpage. (Updated on November 2, 2013)

http://www.mhlw.go.jp/english/topics/2011eq/workers/tepco/rp/irpw.pdf

"Results of the Additional Re-evaluation of Committed Effective Doses of Emergency Workers at TEPCO's Fukushima Daiichi Nuclear Power Plant" is available on the following webpage. (Updated on March 25, 2014)

http://www.mhlw.go.jp/english/topics/2011eq/workers/dr/dr/pr_140325.html

(3) Long-term Health Care

Information on long-term health care of emergency workers including health examination and guidelines is updated on the following webpage.

http://www.mhlw.go.jp/english/topics/2011eq/workers/tepco/index.html#lhc

5.2: Decontamination/Remediation

The status on radiation protection of the workers engaged in decontamination and remediation of contaminated materials derived from Fukushima Daiichi NPP Accident are as follows.

(1) Decontamination/Remediation

Information on decontamination and remediation including guidelines and results of labour inspection is updated. The latest press released document, "Results of supervision/instructions to employers of decontamination works", is available on the following webpage. (Updated on March 12, 2014)

http://www.mhlw.go.jp/english/topics/2011eq/workers/dr/dr/pr_140312.html

(2) Waste Disposal

A Ministerial Ordinance for Preventing Radiation Hazards of workers engaged in the disposal of accident-derived waste, etc. was put into effect on July 1, 2013. Information on waste disposal work including guidelines is updated on the following webpage.

http://www.mhlw.go.jp/english/topics/2011eq/workers/dr/index.html#wd

(3) Other Related Topics

Other related information on waste disposal work is updated. Employers' driven database systems to accumulate radiation exposure doses of decontamination workers has established since April 1, 2014. The related information is updated on the following webpage.

http://www.mhlw.go.jp/english/topics/2011eq/workers/dr/ort/ri_1226_17.html

5.3: Related Information

(1) Press Releases

Press releases from the MHLW on radiation protection of workers are updated on the following webpage.

http://www.mhlw.go.jp/english/topics/2011eq/workers/ri/index.html#pr

(2) Guidelines/Notifications

Guidelines and notifications from the MHLW on radiation protection of workers are available on the following webpage.

http://www.mhlw.go.jp/english/topics/2011eq/workers/ri/index.html#gn

(3) Regulations/Legislations

Regulations and legislations of the MHLW on radiation protection of workers are available on the following webpage.

http://www.mhlw.go.jp/english/topics/2011eq/workers/ri/index.html#rl

(4) Governmental reports

Governmental reports issued by the MHLW are available on the following webpage.

http://www.mhlw.go.jp/english/topics/2011eq/workers/ri/index.html#gr

(5) Leaflets/Brochures

Leaflets and brochures published by the MHLW on radiation protection of workers are available on the following webpage.

http://www.mhlw.go.jp/english/topics/2011eq/workers/ri/index.html#lb

Section 6: Actions taken by the Japanese Government

6.1: Currently implemented public protective actions in place (i.e., food restrictions)

1. Actions have been taken regarding food safety during February to April, 2014
   Actions to restrict food distribution or removal of these restrictions are taken based on monitoring results. For the products whose distribution was newly restricted or whose restrictions were removed during February to April, please refer to 4.2(2)

2. Further information on this topic is available online:
   http://www.mhlw.go.jp/english/topics/2011eq/index_food_press.html

3. Supplementary note (explanation for fishery products)
   The scope of the protective actions covers not only agricultural products but also fishery products. For further information about the monitoring result of the fishery products, please refer to Section 4.2(4).

6.2: Measures implemented to improve public communication

1. Information from the last months

The Government of Japan has actively been strengthening its communication process to ensure timely dissemination of accurate information on the current status of activities onsite in multiple languages for the international community. In 2014 Japan provided updates in January on 9, 15, 22 and 30, in February on 5, 17, 21, 26 and 28, in March on 4, 8, 11, 18 and 20, in April on 1, 8, 16, 18 and 23, in May on 2, 8, 13, 14, 20, 21, 26, 27 and 30, and so far in June on 2, 3, 12 and 17. All of the updates provided to the IAEA are available on this webpage:
http://www.iaea.org/newscenter/news/2013/japan-basic-policy-full.html

2. Relevant activities in disseminating information to the public

(1) Press Conference

Recovery operations at Fukushima Daiichi Nuclear Power Station including contaminated water issues are one of the major issues which the Government of Japan has been focusing on. Since progress has been made frequently, there are updates arising on a daily basis. To explain the updates to the public, the Government of Japan disseminates the relevant information through press conferences. The Chief Cabinet Secretary and the Minister of Economy, Trade and Industry are the main briefers of the press conference, but other ministers or press secretaries may also be the briefer, depending on the subject.

(2) Information delivery to media

The government has been providing relevant information for both the domestic and the foreign press including that stationed in Tokyo and for other media, using various means such as press conferences, press briefings, press tours and press releases. For example, the Fisheries Agency has conducted a media tour to a radioactivity monitoring site for fishery products (Marine Ecology Research Institute) in order to facilitate better understanding for monitoring on fishery products.

(3) Providing information to foreign nations through diplomatic channels

Whenever there is a significant update, the Ministry of Foreign Affairs sends out a notification with relevant information to all foreign missions stationed in Tokyo. The same information is conveyed to all Japanese embassies, consulate generals, and missions. As necessary, the information would be shared with foreign nations and relevant organizations through these diplomatic channels.

In addition, the Ministry of Foreign Affairs holds briefing sessions on Fukushima Daiichi Nuclear Power Station issues for the foreign missions stationed in Tokyo, when there is a significant update. The information on the last briefing session is shown in the link below.

http://www.mofa.go.jp/dns/inec/page18e_000058.html

(4) Disseminating information to Japanese populations

In general, the information is shared with Japanese populations through the channels shown above in (1)-(2). In addition to these efforts, the Government of Japan has improved public communication by enriching the content of relevant ministries' webpage and by hosting a local briefing session on a case by case basis. METI regularly informs the progress of the decommissioning activities and

contaminated water countermeasures to Fukushima prefecture and 13 local municipalities surrounding the site through video conference and direct visits.

3. Risk Communication

(1) Policy package regarding radioactive risk communication aiming for evacuees returning their home

In February 2014, the Government of Japan adopted a policy package regarding radioactive risk communication aiming for evacuees returning to their homes. The importance of addressing in detail each person's concern and apprehension is expected to increase, and the Government of Japan decided to adopt a comprehensive package regarding risk communication based on such recognition.

This package includes following measures:

(i) Reinforce the ongoing risk communication approaches to further address the individual's concern and apprehension

Up until now, the Government of Japan provided relevant information to the public regarding the impact of radiation on one's health through various measures such as hosting a lecture session or seminar by inviting radiation experts to the evacuation site or supplying a range of publication magazines to affected people.

In addition to these measures, it is necessary to provide open communication for people to freely ask any questions. The Government will address this issue by recognizing that the people's perception on the impaction of radiation on one's health varies from person to person.

The Government of Japan will reinforce its risk communication approaches by taking finely textured measures to alleviate individual's concern in evacuation order municipalities.

(a) Providing information in an accurate and straightforward manner

(b) Reinforcing risk communication approaches to small groups of people (man to man or in an intimate setting)

(c) Capacity building of experts in local areas

(d) Enriching risk communication services being delivered by therapists who closely support the local regions

(ii) Continuous delivery of risk communication service to other areas in Fukushima and expanding to the national audience

Regarding the following measures for risk communication which intend to cover Fukushima prefecture as well as rest of other prefectures in Japan, the Government will feedback the on-site challenges, improve the content and delivery of the measures to more effective ones and would make continuous effort.

(a) Meetings to explain radioactive substances in food will be held, and experts who can communicate precise information corresponding to specific regions will be trained so that workshops, etc. will be held all over Japan. In addition, information dissemination about radioactive substances in food will be promoted through utilization of the Internet, provision of public information to consumers and so on.

(b) A telephone counseling service will be furnished to respond to inquiries

from people with health anxiety due to radiation.

(c) Lectures, trainings, etc. about health effects of radiation will be provided.

(d) Teaching materials for schools about radiation will be prepared and distributed, and workshops, etc. for teachers will be held.

(e) Individual doses will be monitored with personal dosimeters, etc., and risk communication based on such monitoring results will be conducted to disseminate correct knowledge about radiation.

(2) Practical measures for evacuees to return their homes by NRA

NRA formulated practical measures of radiation protection for the evacuees, who will return their homes, from scientific and technological points of view in cooperation with other governmental organizations. The practical measures stay on addressing the difficulties which the evacuees have been facing. It is expected that the practical measures will be helpful for the evacuees to make decisions whether they return their homes or not.

The detail of these measures taken by NRA is available in the following link:
http://www.nsr.go.jp/english/library/data/special-report_20140204.pdf

4. Related websites

Information is frequently shared in English on the following websites:

- The Ministry of Foreign Affairs:
  http://www.mofa.go.jp/policy/page3e_000072.html
- The Nuclear Regulation Authority:
  http://www.nsr.go.jp/english/
- The Ministry of Economy, Trade and Industry:
  http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/index.html
- The Food Safety Commission of Japan:
  http://www.fsc.go.jp/english/emerg/radiological_index_e1.html
- The Ministry of Health Labour and Welfare:
  http://www.mhlw.go.jp/english/topics/2011eq/index_food_policies.html
- The Ministry of Agriculture, Forestry and Fisheries:
  http://www.maff.go.jp/e/quake/press_110312-1.html
- TEPCO (Information on water leakage):
  http://www.tepco.co.jp/en/nu/fukushima-np/water/index-e.html
- TEPCO (General information on activities onsite):
  http://www.tepco.co.jp/en/nu/fukushima-np/index-e.html

IAEA assessment on aspects presented in the June 2014 report *'Events and highlights on the progress related to recovery operations at Fukushima Daiichi NPS'*

'Groundwater Bypassing' Activities

As reported by Japan, on 21 May 2014, the operation of a groundwater bypass system was begun at the Fukushima Daiichi Nuclear Power Station (NPS). This work aims to reduce the amount of water flowing into the reactor buildings by first pumping the groundwater from the upstream side of the buildings and transferring it into temporary storage tanks, then analysing the quality of the water in the tanks to determine if it falls below the discharge criteria, and finally discharging to the sea the water that fulfils the discharging criteria. TEPCO reported in a press release (http://www.tepco.co.jp/en/press/corp-com/release/2014/1236559_5892.html), that bypass operations had begun and expressed appreciation for the understanding of many stakeholders, including Fukushima Prefecture and members of the fishing industry.

As also reported by Japan, groundwater which was determined to be below the discharge criteria at the Fukushima Daiichi NPS has been discharged three times to date into the coastal area of the Fukushima Daiichi NPS; on 21 and 27 May and 2 June 2014. This groundwater was pumped hydrostatically upstream of the plant, and was not directly in contact with any contaminated groundwater under the nuclear power units. The levels of tritium and radiocaesium were monitored in this groundwater and were determined to be significantly below the legal discharge limits. The water was analysed by two analytical centres and the values were in good agreement. The levels of ^{134}Cs and ^{137}Cs were determined to be below the limit of detection of 0.64 to 0.71 Bq/L, and tritium levels were measured at roughly 200 Bq/L. As reference, note that legal discharge limits established by Japanese authorities are 60 Bq/L for ^{134}Cs and 90 Bq/L for ^{137}Cs, and 60,000 Bq/L for tritium).

The extremely low levels of the two radiocaesium isotopes are as expected, because caesium fixes mainly to clay minerals in the soil and does not migrate over long distances in groundwater. This is not the case for tritium, which exists as tritiated water and follows the behaviour of water. However, due to the fact that this groundwater was not in contact with contamination from the effluent waters of the reactors, the discharge into the ocean is equivalent to the regular submarine groundwater inflow. The detected level of tritium is very low in relation to the discharge level of 60 000 Bq/L, or the operational target limit of 1500 Bq/L, and does not significantly increase the radiation exposure of the marine environment or organisms.

The levels of ^{90}Sr are monitored by gross-beta measurements and also showed levels below the detection limit of 0.53 or 0.87 Bq/L, as determined by the two analysing laboratories. Any risk arising from ^{90}Sr can also be excluded in the marine environment due to the low concentrations detected. Rapid dilution by tidal and other ocean currents will also further reduce the ^{90}Sr concentration.

The IAEA considers that a successful operation of the groundwater bypass could contribute not only to reducing the volume of contaminated water to be stored at Fukushima Daiichi NPS, but also may rebuild confidence in TEPCO and its on-site activities. The IAEA encourages TEPCO to continue to verify the water quality before discharge, and to monitor the radioactive concentrations in the Fukushima Daiichi NPS and the surrounding areas, including the area off coast the Fukushima Daiichi NPS.

It is noted that the quantity of groundwater pumped out to date is relatively small compared to the volume of contaminated water accumulated and stored at the site. Further, the groundwater bypass system is expected to reduce the amount flowing into the building basements by up to 100 tons per day, a reduction of 25 percent (http://www.tepco.co.jp/en/press/corp-com/release/2014/1236566_5892.html It will take time before a significant reduction in contaminated water requiring treatment and storage is reflected in day to day operational activities. In this regard, the

IAEA encourages TEPCO to continue to monitor the water balance as a measure of the effectiveness of the groundwater bypass.

Overall, the IAEA considers that the discharge of this groundwater will lead to a more manageable situation at the Fukushima Daiichi NPS regarding contaminated water management.

Location of water leakage from Unit 3 reactor container

As reported by TEPCO (http://www.tepco.co.jp/en/press/corp-com/release/2014/1236458_5892.html), on 15 May 2014, a location of water leakage in the main steam isolation valve room in Unit 3 was identified by using a remotely operated video camera. According to information published by TEPCO (http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140515_05-j.pdf), this leak was found at an expansion joint connected before the main steam isolation valve to a steam pipe coming from the primary containment vessel (PCV). This leak was approximately four metres away from the surface of the PCV. It was reported that this was the first time a leakage location was pinpointed at Unit 3.

The IAEA considers this to be an important step towards stopping water leakage and pursuing the eventual work of removing fuel debris from the Unit 3 reactor. The IAEA also considers that this discovery is important toward gaining an understanding on how and when the leak started, and suggests that TEPCO carry out further investigations to identify the failure mechanisms for this and any other damage to the PCV.

Request for Proposal for the project of tritium separation technology

Although the multi-nuclide removal equipment (Advanced Liquid Processing System) was installed to reduce the contamination levels of contaminated water to the legal discharge limit or lower, tritium cannot be removed. To address the tritiated water issue, the Government of Japan opened a Request for Proposal that called for entities to implement a demonstration project for verification tests of tritium separation technologies. This project is financially subsidized by Japan's fiscal year 2013 supplementary budget. According to the announcement made by the Government of Japan, this project aims to verify the performance of tritium separation technologies, to assess construction and operation costs required for installing such equipment in the Fukushima Daiichi NPS and to treat the remaining water through the Advanced Liquid Processing System.

The IAEA notes that this is part of the multi-pronged efforts being made by the Government of Japan to address the contaminated water issue. The IAEA also notes that at this time, no decision has been taken on whether or not to conduct tritium separation.

Fukushima Daiichi D&D Engineering Company

As reported by TEPCO (http://www.tepco.co.jp/en/press/corp-com/release/2014/1235009_5892.html), on 1 April 2014, the Fukushima Daiichi D&D Engineering Company was established by TEPCO to clearly distinguish the responsibilities within TEPCO and to exclusively address decommissioning and contaminated water at the Fukushima Daiichi Nuclear Power Station.

The IAEA considers that this dedicated D&D unit is a positive development that should enhance Japan's capacity for meeting current and future decommissioning and decontamination demands.

Removal of fuel assemblies from Unit 4 spent fuel pool

As reported by Japan, as of 2 June 2014, in total 968 (946 spent fuel assemblies and 22 non-irradiated fuel assemblies) out of 1533 fuel assemblies (1331 spent fuel assemblies and 202 non-irradiated fuel assemblies) have been transferred to the common pool through 44 cask transfers since the first fuel assemblies were removed from the Unit 4 spent fuel pool beginning 18 November 2013 (http://www.tepco.co.jp/en/decommision/index-e.html).

The IAEA acknowledges the work of TEPCO toward achieving milestones in the fuel removal activities and in the decommissioning of the plant.

Fukushima Advisory Board on Decommissioning and Contaminated Water Management

As reported by the Ministry of Economy, Trade and Industry (METI) (http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20140227-e.pdf), on 17 February 2014, the first meeting of the Fukushima Advisory Board on Decommissioning and Contaminated Water Management was held by METI, and included the participation of the Fukushima prefectural government, municipal governments, the commerce and industry association, agricultural cooperatives, fishermen's cooperatives, the university, non-profit organizations, relevant ministries and agencies and TEPCO. A second meeting was held on 14 April 2014. The Board was established to promote dissemination of information to relevant stakeholders, to enhance public relations, and to hear opinions about the approaches and measures taken, or to be taken, for the decommissioning of Fukushima Daiichi NPS as well as for the management of contaminated water.

The IAEA considers that the establishment of the Board is a commendable step toward strengthening public communications and engagement of stakeholders in decommissioning and contaminated water management in a structured manner. This is in line with the advice given during the second IAEA International Review Mission on Mid-and-Long-Term Roadmap towards the Decommissioning of TEPCO's Fukushima Daiichi Nuclear Power Station Units 1-4 conducted from 25 November to 4 December 2013 (http://www.iaea.org/newscenter/focus/fukushima/final_report120214.pdf).

Monitoring of food products

According to information provided by Japan in the past months, the situation with regards to food, fishery and agricultural production remains stable. The authorities are continuing to monitor food, both on the market and at production areas. Monitoring results are made openly available and are published on the internet. And based on this information the results of food monitoring to date, do not raise any new or immediate issues regarding safety of the food supply chain.

There are regulatory limits that apply to levels of radionuclides in food products, and a comprehensive surveillance and control regime remains in place to monitor radionuclide levels in food against these legal limits. The mechanism for placing and lifting restrictions on food products is based on the results of the surveillance monitoring.

Based on information provided by Japan, monitoring measurements indicate that the concentration of radiocaesium in over 99% of the food items sampled are either not detectable or are below regulatory limits. Also, the revisions and updates to the food restrictions indicate the continued vigilance of the authorities in Japan and their commitment to protecting consumers and trade.

The IAEA considers that in summary, systems are in place and are being implemented that prevent food and agricultural products with levels of caesium radionuclides in excess of the legal limits from entering the food supply chain. Based on the information that has been made available, the Joint FAO / IAEA Division understands that the measures taken to monitor and respond to issues regarding radionuclide contamination of food are appropriate and that the food supply chain is under control.