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

February, 2017

Section 1: Summary of updates from October 2016 through January 2017

1. Decommissioning and Contaminated Water management

Since the last report, there were progresses on the decommissioning and contaminated water management as below. For details please refer to section 2.

(1) Land-side impermeable wall (Frozen soil wall)

On the sea side, freezing started in March 2016 and was completed in October 2016. The volume of the pumped up groundwater has declined which shows that the impermeable wall is in effect. The system of the impermeable wall will establish a frozen barrier under the ground to block groundwater inflow into the Unit 1-4 buildings, and thus will decrease the generation of contaminated water.

(2) Efforts toward an investigation inside the Unit 2 Primary Containment Vessel (PCV)

An investigation inside the Unit 2 PCV has been conducted to identify the status of debris inside the Reactor Pressure Vessel (RPV) pedestal (The base supporting the RPV).

In January, cameras were inserted from the PCV penetration to check the status of the rail for Control Rod Drive (CRD) replacement on which the self-travelling equipment will run and the floor on the first floor inside the RPV pedestal. Based on the result of the investigation, the damage of grating and deposits were found.

2. Monitoring results

There were no significant changes in the monitoring results of air dose rate, dust, soil, seawater, sediment and marine biota during the period from October 2016 to January 2017. For details please refer to section 3.

3. Off-site decontamination

The Ministry of the Environment (MOE) is carrying out decontamination works. For details please refer to section 4.

4. Food products

Monitorings and inspections of radioactive materials in food are continuously conducted, and restrictions of food distribution and removal of these restrictions are taken based on monitoring results. Restrictions of several agricultural products were lifted during the period from October 2016 to January 2017.

According to the monitoring results of fishery products in Fukushima, from October 2016 to January 2017, the excess ratio* was 0.1 % (total: 2981 samples). In the other prefectures, the excess ratio was 0 % (total: 2641 samples). For details please refer to section 5.

*excess ratio: (Number of samples containing more than 100 Bq/kg) / (Total number of samples)

5. Radiation protection of worker

The Ministry of Health, Labour and Welfare (MHLW) has provided guidance on the prevention of radiation hazards to workers engaged in the decommissioning works at Fukushima Daiichi Nuclear Power Station (NPS) or decontamination and related works; as well, the Ministry has taken relevant and necessary measures such as provision of long-term healthcare for emergency workers. For details please refer to section 6.

Section 2: Decommissioning and contaminated water management at Fukushima Daiichi NPS

2.1: Basic strategies

(1) Basic Policy for the Contaminated Water Issue at the Tokyo Electric Power Company (TEPCO)'s Fukushima Daiichi NPS (September 3, 2013)

(Summary)
http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20130903_01a.pdf

(2) Preventive and Multi-layered Measures for Decommissioning and Contaminated Water Management (December 20, 2013)

http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20131226_001.pdf

(3) Mid-and-Long-Term Roadmap towards the Decommissioning of TEPCO's Fukushima Daiichi Nuclear Power Station (revised on June 12, 2015)

(Summary)
http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20150725_01a.pdf

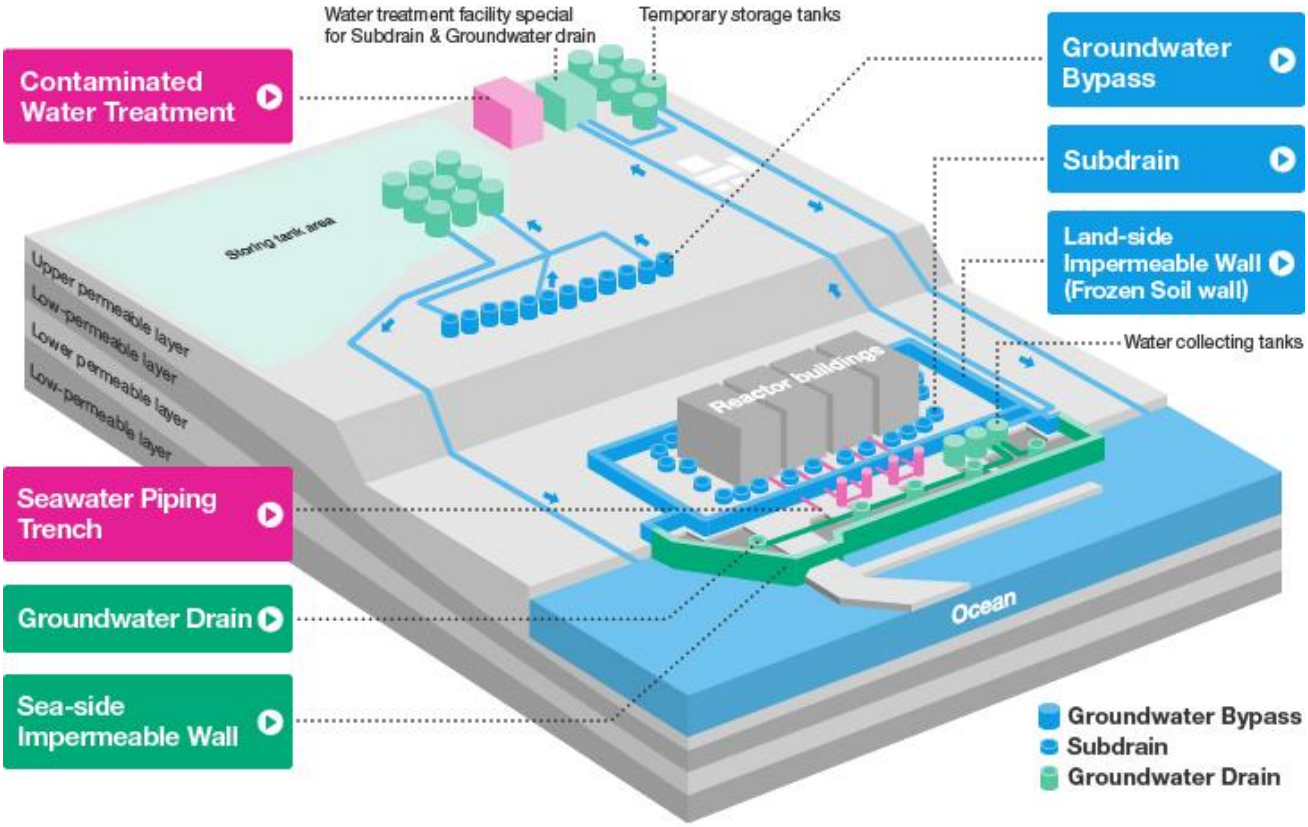
(Full text)

http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20150725_01b.pdf

2.2: Measures for decommissioning and contaminated water management

(1) Major initiatives for water management

The preventive and multi-layered measures against contaminated water issue are implemented based on the three principles; "Remove sources of contamination", "Isolate water from contamination" and "Prevent leakage of contaminated water".



(ⅰ) Groundwater bypass

Source: TEPCO

(a) Objective

The groundwater bypass function is to isolate water from contamination by pumping it and reducing its inflow into the reactor buildings.

(b) Mechanism

Clean groundwater is pumped from the wells installed on the mountain-side area of the reactor buildings and then discharged into the port area after passing water quality inspections.

(c) Recent situations

Up until January 24, 2017, 251,909 m³ of groundwater had been released to the ocean. The pumped-up groundwater was temporarily stored in tanks, purified and released after TEPCO and a third-party organization had confirmed that the quality met the operational targets. The pumps are inspected and cleaned as necessary to operate appropriately.

The result of sea area monitoring shows that the radiation level of seawater outside the port area remains low enough compared to the density limit specified by the Reactor Regulation and significant change in the radioactivity has not been observed.

TEPCO's website related to groundwater bypass:

http://www.tepco.co.jp/en/decommision/planaction/groundwater/index-e.html

Detailed analysis results regarding the water quality of the groundwater pumped up by sub-drain and purified at Fukushima Daiichi NPS (published by Ministry of Economy, Trade and Industry (METI))

http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20161019_01b.pdf

(October 19, 2016)

http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20161020_01b.pdf

(October 20, 2016)

http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20161121_01b.pdf

(November 21, 2016)

http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20161201_01b.pdf

(December 1, 2016)

http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20161226_01b.pdf

(December 26, 2016)

http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20170201_01b.pdf

(February 1, 2017)

(ⅱ) Subdrain and groundwater drain systems

(a) Objective

The subdrain system function is to isolate clean groundwater from contamination by pumping it and preventing its inflow into the reactor buildings, and thus reducing generation of contaminated water.

The groundwater drain system function is to prevent leakage of contaminated groundwater by pumping it before flowing into the port.

(b) Mechanism

Groundwater that contains slight radioactivity is pumped from the wells installed in the vicinity of the reactor buildings (called subdrain) and the wells installed in the bank protection area (called groundwater drain) and then treated through special purification equipment to meet the stringent operational targets set by TEPCO. The purified groundwater is discharged into the port area after passing water quality inspections.

(c) Recent situations

The operation of the subdrain and groundwater drain systems started in September 2015. The effects of the subdrain system are measured by two markers: the water level of the subdrain, and the difference between the water level of the subdrain and that of the reactor buildings. At the point when the former was lowered to T.P. 3.5 meters or when the latter decreased to less than 2 meters, the amount of the water flowing into the reactor buildings was decreased to the level of approx. 150 - 200 m3 per day.

*T.P.: Tokyo Peil (Mean Sea Level of Tokyo Bay)

Up until January 24, 2017, a total of 265,031 m³ had been drained after TEPCO and a third-party organization had confirmed that the quality met the operational targets. The result of sea area monitoring confirms that the radiation level of seawater outside the port area remains low enough compared to the density limit specified by the Reactor Regulation, and no significant change in the radioactivity level has been observed.

TEPCO's website related to the subdrain and the groundwater drain systems:

http://www.tepco.co.jp/en/decommision/planaction/sub-drain/index-e.html

Detailed analysis results regarding the water quality of the groundwater pumped up by sub-drain and purified at Fukushima Daiichi NPS (published by METI)

http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20161019_01b.pdf
(October 19, 2016)
http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20161020_01b.pdf
(October 20, 2016)
http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20161121_01b.pdf
(November 21, 2016)
http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20161201_01b.pdf
(December 1, 2016)
http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20161226_01b.pdf
(December 26, 2016)
http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20170201_01b.pdf
(February 1, 2017)

(iii) Land-side impermeable wall (Frozen soil wall)

(a) Objective

The installation of the land-side impermeable wall aims to isolate clean groundwater from contamination. This will be achieved by surrounding the reactor buildings with an in-ground frozen barrier and blocking groundwater from flowing into the buildings.

(b) Mechanism

An approximately 1,500 meters long wall, composed of frozen pipes driven into the ground, surrounds the Unit 1-4 reactor buildings. The barrier will be formed around the buildings to block groundwater inflow by supplying chilled brine (a freezing material) through the pipes and freezing the soil.

(c) Recent situations

On the sea side, freezing started in March 2016 and completed in October 2016.

Groundwater levels on the sea-side of the building and its volumes pumped at the area 4 m above sea level have been monitored to evaluate the effect of the impermeable walls. The pumped up groundwater has declined from approx. 400 m^3 at the time before freezing to approx. 140 m^3 in January 2017. That is to say the effect of the impermeable walls has been seen.

On the mountain side, following the Nuclear Regulation Authority (NRA)'s instruction, unfrozen sections were maintained from the point of view of safety so that the water level inside the building is lower than the water level around the building. There were seven unfrozen sections so far. Then, on 3rd December 2016, closure of two of seven unfrozen sections started keeping the difference of the water levels.

Since Frozen soil wall is still on the way of developing, freezing process on the mountain side will continue with a phased approach, keeping safety, toward completion of freezing with the prompt approval for freezing from NRA.

TEPCO's website related to the land-side impermeable wall:

http://www.tepco.co.jp/en/decommision/planaction/landwardwall/index-e.html

(ⅳ) Sea-side impermeable wall

(a) Objective

The installation of the sea-side impermeable wall aims to prevent leakage of contaminated water into the ocean. This was achieved by installing a wall to block groundwater from flowing into the port area, and thus protecting the marine environment against pollution.

(b) Mechanism

A wall, approximately 780 meters long and composed of 594 steel pipes with a diameter of 1.1 meters and a length of 30 meters, was installed around the bank protection area near the reactor buildings. The groundwater flowing from the site is blocked by the wall and pumped by the subdrain and the groundwater drain systems. Consequently, the wall prevents groundwater from flowing into the port area and also reduces the risk of contaminated water flowing into the ocean in case of any leakage.

(c) Situations

In October 2015, the sea-side impermeable wall construction was completed. It has been confirmed that the radiation level of seawater inside the port area substantially decreased. In addition to the operation of the subdrain and the groundwater drain systems, the completion of the wall marks major progress in water management at Fukushima Daiichi NPS.

TEPCO's website related to the sea-side impermeable wall:

http://www.tepco.co.jp/en/decommision/planaction/seasidewall/index-e.html

(ⅴ) Purification treatment of contaminated water

(a) Objective

The purification treatment of contaminated water aims to remove sources of contamination.

(b) Mechanism

Contaminated water that accumulated at the site of Fukushima Daiichi NPS is treated at multiple facilities including Multi-nuclide Removal Facility (Advanced Liquid Processing System = ALPS). In this process, after the concentration of caesium and strontium in the contaminated water is reduced, ALPS removes most of the radioactive materials except tritium.

(c) Recent situations

In May 2015, TEPCO announced that it has completed the purification treatment of highly contaminated water in the storage tanks. As of January 2017, nearly 1,800tons of contaminated water remains at the bottom of the tanks, which will be removed as the tanks are being dismantled. As a result, the radiological contamination risk due to leakage of contaminated water has been significantly reduced.

Regarding the contaminated water with low radioactive concentration, which includes tritium, experts are still investigating the most appropriate and safe approaches to dispose of it.

TEPCO's website related to purification treatment of contaminated water:

http://www.tepco.co.jp/en/decommision/planaction/alps/index-e.html

The subcommittee dealing with water treated with multi-nuclide removal equipment was established and held in November and December 2016. The subcommittee will perform comprehensive study on how to deal with water treated with multi-nuclide removal equipment, including the societal point of view based on the knowledge from Tritiated Water Task Force Report published in June 2016 by the Tritiated Water Task Force.

(2) Fuel removal from the reactor buildings

(ⅰ)Basic information

At the time of the accident in March 2011, the nuclear power plant operator of Unit 1, 2 and 3 were unable to maintain cooling of the reactor cores due to power loss. This resulted generation of a huge amount of hydrogen gas from the melted fuel. The pressure in the containment buildings continued to increase from accumulation of hydrogen that eventually caused hydrogen explosions in Unit 1, 3 and 4, causing structural damage. However, since November 2011, the nuclear power plant operator has been maintaining these units in a stable condition with no significant release of radioactive material to the environment.

The most important tasks in the decommissioning process are the fuel removal from the spent fuel pools and removal of fuel debris (melted and solidified fuel) from the Primary Containment Vessels (PCV). Currently, various measures are being implemented in order to make progress toward these goals, including removal of rubble accumulated in the buildings and investigation of the condition inside the PCV by using state-of-the-art technologies.

(ⅱ) Unit 1

In July 2015, TEPCO started dismantlement of the building cover of the reactor building as a step to start fuel removal from the spent fuel pool. In October of the same year, the removal of roof panels was completed without any significant change in radiation dose rate around the reactor building. The removal work of the roof panels proceeded carefully and anti-scattering measures were implemented to reduce spread of contamination. In September 2016, dismantling of wall panels (18 in total) started and completed in November of the same year. No significant variation attributable to this work has been identified at the dust monitors installed on the workplace and near the boundary of the site.

Before removing fuel debris, investigation of the condition inside the PCV has commenced. From February to September 2015, TEPCO investigated inside of the PCV by using "muon", a kind of cosmic rays, and studied the condition of fuel debris inside. In addition, in April 2015, TEPCO sent robots into the PCV to investigate and collect important information such as radiation level and temperature and also took images from inside. Based on the results of these investigations, studies are now in progress to consider the best approach to remove the fuel debris.

Removal of wall panels

Robot for investigation

Image inside PCV

(iii) Unit 2

As for Unit 2, hydrogen explosion did not occur and therefore the building escaped from being damaged. However, TEPCO concluded that it would be better to dismantle the upper part of the reactor building to facilitate the fuel removal from the spent fuel pool.. Currently, TEPCO is proceeding with preparation work, such as removal of rubble around the reactor building and building scaffolding.

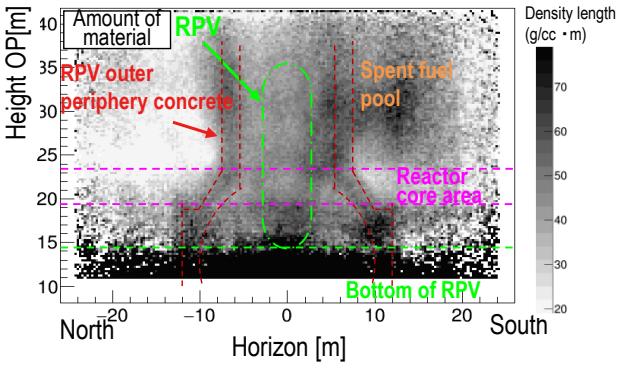
Another important preparation work is to find out the situation inside the building, around the PCV. Investigation of the inside of the building is being carried out by using robots to confirm conditions. The next step is to study the inside of the PCV. However, the robots with required technology for the investigation are still under development.

An investigation to capture the location of fuel debris inside the Unit 2 was conducted from March 22 to July 22 2016. This operation applied muon transmission method of which effectiveness was demonstrated in its appliance for locating the debris inside Unit 1. These operations used a small device developed through the "Development of Technology to Detect Fuel Debris inside the Reactor" project funded by a government subsidy.

The result of the investigation indicates that high-density material which are considered as fuel debris are at the bottom of the RPV as well as the lower part and outer periphery of the reactor core. It is assumed that most of the fuel debris existed at the bottom of the RPV.

An investigation inside the Unit 2 PCV has been conducted to identify the status of debris inside the RPV pedestal (The base supporting the RPV).

In January, cameras were inserted from the PCV penetration to check the status of the rail for CRD replacement on which the self-travelling equipment will run and the floor in the first floor inside the RPV pedestal. Based on the result of the investigation, the damage of grating and deposits were found.



Muon measurement results

(ⅳ) Unit 3

In August 2015, TEPCO completed removal of the Fuel Handling Machine (FHM) rubble from the spent fuel pool. By the end of November, all rubble remaining in the pool was removed. In the next step, an equipment to cover the upper part of the building as well as a crane will be installed to start removing spent fuel from the pool.

Concurrent with the above activities, investigation of the current condition inside the PCV is underway. In October 2015, robots were sent into the PCV and successfully collected useful information. The images taken by the robots confirmed that the main structure and walls inside the PCV had not been damaged. The next step is to analyse the collected data to study how to remove fuel debris from the PCV.

Installing shields on the operating floor

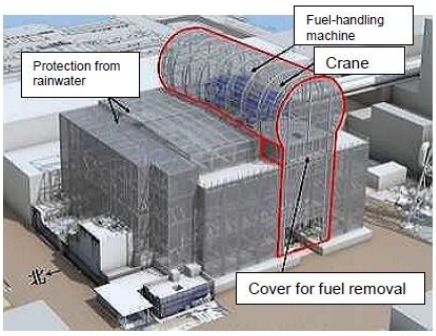


Image of the cover for fuel removal at Unit 3

Image inside PCV

(ⅴ) Unit 4

In spite of a hydrogen explosion, the fuel assemblies of Unit 4 were not damaged, as the plant was in cold shutdown status and all the fuel had been stored in the spent fuel pool before the accident. The fuel assemblies in the pool were taken out and transferred to the common pool located within the station site. This fuel removal operation started on November 2013 and was safely completed in December 2014. Fully utilizing this successful experience, the fuel assemblies remaining in the spent fuel pools of Units 1, 2 and 3 will be removed.

Equipment for fuel removal

Storage of removed fuel

(ⅵ) Unit 5 and 6

These reactors were not operating at the time of the accident, but the fuel remained in the reactor. In addition, unlike the case of Units 1, 2 and 3, the reactors of Unit 5 and 6 did not encounter power loss and the reactor cores were successfully cooled off.

Given that the conditions of the buildings and the equipment for storing the fuel are stable and risks of causing any problem in the decommissioning process are estimated to be low compared to the other Units, the fuel assemblies of Units 5 and 6 are safely stored in the spent fuel pool in each building for the time being. The following step will be to carefully remove fuel from the spent fuel pools without impact on fuel removal from Units 1, 2 and 3.

Besides these efforts, various measures are ongoing at Fukushima Daiichi NPS. For more detailed information, please refer to the monthly "Progress Status Report" of METI below.

The Progress Status Report as of September 29th, 2016:
http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20160929_e.pdf
The Progress Status Report as of August 25th, 2016:

http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20160825_e.pdf

The Progress Status Report as of October 27th, 2016

http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20161027_e.pdf

The Progress Status Report as of November 24th , 2016

http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20161124_e.pdf

The Progress Status Report as of December 22nd , 2016

http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20161222_e.pdf

2.3: Organizations related to decommissioning and contaminated water management

(1) Fukushima Daiichi Decontamination & Decommissioning (D&D) Engineering Company

In April 2014, TEPCO established a company for the purpose of clarifying the responsibilities and authorities inside the company, and streamlining the process of decision making regarding decommissioning and contaminated water management at Fukushima Daiichi NPS.

In addition, the company invited nuclear specialists from outside TEPCO, such as high rank nuclear executives of manufacturers, in order to collect and share expertise and technology of manufacturers.

This company is playing an important role on the frontline of decommissioning and contaminated water management.

TEPCO's website related to Fukushima Daiichi D&D Engineering Company:

http://www.tepco.co.jp/en/decommision/team/index-e.html

(2) Nuclear Damage Compensation and Decommissioning Facilitation Corporation (NDF)

In August 2014, Nuclear Damage Compensation Facilitation Fund, originally established in 2011 to support the compensation for nuclear damage resulted from the Fukushima Daiichi NPS accident, was reorganized into Nuclear Damage Compensation and Decommissioning Facilitation Corporation (NDF).

The NDF's mission is to support decommissioning activities at Fukushima Daiichi NPS. For example, it formulates decommissioning strategies and develops plans for the research and development (R&D) program on technology necessary for decommissioning.

The NDF and METI co-organized an international forum, in April 2016, on the decommissioning of Fukushima Daiichi NPS. The forum was attended by as many as 641 people from 15 countries including Japan. Main subjects were "Communications with Local Communities" and "World-leading Technical Session regarding Decommissioning." "Decommissioning Technology Exhibition" was also held with participation of 37 institutions (16 from overseas).

NDF's booklet:

http://www.ndf.go.jp/soshiki/pamph_e.pdf

The 1st International Forum on the Decommissioning of Fukushima Daiichi NPS:

http://ndf-forum.com/index_en.html

(3) International Research Institute for Nuclear Decommissioning (IRID)

In August 2013, IRID was established by 18 corporations and organizations related to R&D of technology for the decommissioning of Fukushima Daiichi NPS. In accordance with the Mid-and-long-term Roadmap written by the Japanese government, IRID is conducting R&D on removal of fuel from the spent fuel pools, removal of fuel debris from the PCVs and disposal of radioactive wastes, and gathering domestic and international expertise. Currently, methods developed by IRID are being applied to investigations into Unit 1-3 reactor buildings, such as various kinds of robots and the muon cosmic ray.

IRID's website:

http://irid.or.jp/en/

(4) Collaborative Laboratories for Advanced Decommissioning Science (CLADS)

In April 2015, Japan Atomic Energy Agency (JAEA) established the CLADS, based on the Acceleration Plan of Reactor Decommissioning R&D for Fukushima Daiichi NPS, written by Ministry of Education, Culture, Sports, Science and Technology (MEXT). This institution is aimed at being an international hub for R&D on decommissioning, and promoting cooperation in R&D and human resource development (HRD) among government, industry and academia.

JAEA will construct the International Collaborative Research Facility in Fukushima in March 2017, as a central facility of CLADS where educational and research institutions at home and abroad work together to conduct R&D on decommissioning. Furthermore, as its R&D bases in Fukushima, JAEA built the Naraha Remote Technology Development Center in October 2015. A ceremony to commemorate the completion of the test building was held in March 2016, and full-scale operation started from this April. In addition, the Okuma Analysis and Research Center will be launched from spring 2017. CLADS is expected to collaborate on research activities with these centers.

JAEA's website related to the CLADS:

http://fukushima.jaea.go.jp/english/index.html

2.4: Related information

- Measures for Mid-term Risk Reduction at TEPCO's Fukushima Daiichi NPS (Nuclear Regulation Authority (NRA)) (December 14, 2016)

  http://ww.nsr.go.jp/0000177091.pdf

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 Fukushima Daiichi NPS has detected no significant increase in radiation levels.

(2) Noteworthy change in data during the period from October 2016 to January 2017

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.

(3) Monitoring result data

The monitoring results in the air at the site of the NPS are available in the following webpage (Please see the calendar titled "Air on the premises 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.

Increase of the radioactivity level 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/2015/images/handouts_150109_02-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 daily).

- Analysis Results of Seawater (Outside of the Port)
  http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2017/images/seawater_map-e.pdf
  Analysis Results of Seawater (Inside of the Port)
  http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2017/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/2017/images/2tb-east_map-e.pdf
- Analysis Results of Groundwater (Unit 1-4 Bank Protection)
  http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2017/images/tb-east_map-e.pdf

3.2: Offsite monitoring results

1. Monitoring results of air dose rates obtained within the 20 km zone around Fukushima Daiichi NPS

(1) Outline of the item

The monitoring of air dose rates within the 20 km zone around Fukushima Daiichi NPS has been conducted. The air dose rates within the 20 km zone are gradually declined with the lapse of time since May 2011 (soon after the accident at Fukushima Daiichi NPS on March 11, 2011).

(2) Noteworthy updates in the past months

As described in (1) above, the air dose rates within the 20 km zone around the NPS have been on a decreasing trend, and the monitored air dose rates were stable from August 2016 to September 2016. Based on these results, any further

announcement was not made on this item (e.g., a significant rise of air dose rates within the 20 km zone) during this period; therefore the frequency of the implementation of monitoring by survey meter was changed to annual.

(3) Monitoring results

The following URL leads to the monitoring results of air dose rates in Fukushima prefecture including the 20 km zone around Fukushima Daiichi NPS:

http://radioactivity.nsr.go.jp/map/ja/ (in Japanese)

http://radioactivity.nsr.go.jp/en/contents/12000/11435/24/206_20160916.pdf

2. Monitoring results of dust in air and soil within the 20 km zone around Fukushima Daiichi NPS

(1) Dust

The monitoring results of dust obtained from October 2016 to January 2017 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., a significant rise of the activity concentrations obtained from dust samples) during this period.

The following URL leads to the monitoring results (dated January 17, 2017) of dust:

(2) http://radioactivity.nsr.go.jp/en/contents/12000/11760/24/223_20170117.pdfSoil

Radiation monitoring of soil is conducted as appropriate. The most recent monitoring of soil was conducted in October 2016. The following URL leads to the monitoring results (dated October 11, 2016) of soil:

http://radioactivity.nsr.go.jp/en/contents/12000/11500/24/495_20161011.pdf

(3) Previous monitoring results

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

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

3. Converted values and measured values of environmental radiation dose rate at 1m height from the ground surface in 46 prefectures in total other than Fukushima Prefecture

(1) Outline

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

(2) Updates from October 2016 to January 2017

The converted and measured values were relatively stable from October 2016 to January 2017. Based on the results, any further announcement was not made on this item (e.g., a significant rise of the converted and measured values) during this period.

(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: Sea area monitoring results of seawater, sediment and biota

(1) Outline

Sea area monitoring results in the area around Fukushima Daiichi NPS have indicates that the radioactivity levels obtained from the outside of the port or in the open sea have been relatively stable.

(2) Updates during the period from August 2016 to September 2016

The sea area monitoring results from October 2016 to Japnuary 2017 were relatively stable as described in (1) above. Based on the results, any further announcement was not made on this item (e.g., a significant rise of sea area monitoring results) during this period.

(3) Related information

Sea area monitoring is classified to be conducted in 5 areas (Area 1: Sea area close to TEPCO's Fukushima Daiichi NPS, 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 NPS, Area 2: Coastal area, Area 3: Off-shore area, Area 4: Tokyo bay area). The NRA has been providing 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 URL lead to the webpage and report on sea area monitoring:

- Readings of Sea Area Monitoring
  http://radioactivity.nsr.go.jp/en/list/205/list-1.html
- Sea Area Monitoring (Monthly Report)
  http://radioactivity.nsr.go.jp/en/list/295/list-1.html
- F1 issues (NRA is providing monitoring results weekly to the IAEA which are openly shared with the public)
  http://www.nsr.go.jp/english/f1issues/index.html
  https://www.iaea.org/newscenter/focus/fukushima/status-update

Section 4: Off-site Decontamination

4.1: Outline

Off-site decontamination is in operation since the accident of the TEPCO Fukushima Daiichi NPS. Currently, target areas of decontamination are categorized as below.

4.1.1 Special Decontamination Area (SDA)

National Government is responsible for development of plans and implementation of measures for decontamination of SDA. SDA consists of the previous “restricted areas” located within a 20 km radius from the NPS and the previous “deliberate evacuation areas” which are beyond 20km radius from the NPS and where the additional annual effective dose for individuals was anticipated to exceed 20 mSv in the first year after the accident.

4.1.2 Intensive Contamination Survey Area (ICSA)

ICSA is the area where the air dose rate is over 0.23 uSv/h (equivalent to over 1 mSv/y of additional dose under a certain condition). At first, 104 municipalities in 8 prefectures were designated as ICSA. Decontamination for the area is implemented by each municipality with financial and technical supports by the national government.

4.2: Current status

4.2.1 SDA

- Development of decontamination plans for all 11 municipalities were completed.

- Decontamination work for 7 municipalities (Tamura-city, Kawauchi-village, Naraha-town, Okuma-town, Katsurao-village, Kawamata-town and Futaba-town at the end of March 2016) has been completed in accordance with the decontamination plans.

-Decontamination works are planned to be completed by the end of March, 2017.

-Evacuation orders were lifted in Katsurao village, a part of Kawauchi village (former “Areas in which residents are not permitted to live”) and in Minamisoma city in summer in 2016, in addition to Tamura city and Naraha town

4.2.2 ICSA within Fukushima Pref. as of the end of July 2016 (Outside of Fukushima Pref. as of the end of June 2016)

- Approximately 90% (almost all in other prefectures) of planned decontamination projects for public facilities have been completed.

- Approximately 90% (almost all in other prefectures) of planned decontamination projects for residential houses have been completed.

4.3: Related information

Since July 2015, a consultant meeting summarized “the strategy for volume reduction and recycling technology development” and “roadmap” in this April.

Main contents are as follows:

- For recycling of soil, MOE should promote the classification of decontamination soil. And purified materials should be also increased as much as possible.

- MOE should share information with the public to build national consensus for recycling.

The following URL leads to the web page of MOE's, which posts updated information related to Environmental Remediation

http://josen.env.go.jp/en/

Section 5: Food products

5.1: Summary of testing

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

During the month of October 2016, 32,382 samples were taken and analysed. Among these samples, 53 samples were found to be above the limits (caesium-134+caesium-137: 100 Becquerel/kg). This represents 0.16 percent of all samples.

During the month of November 2016, 25,980 samples were taken and analysed. Among these samples, 3 samples were found to be above the limits (caesium-134+caesium-137: 100 Becquerel/kg). This represents 0.01 percent of all samples.

During the month of December 2016, 31,380 samples were taken and analysed. Among these samples, 22 samples were found to be above the limits (caesium-134+caesium-137: 100 Becquerel/kg). This represents 0.07 percent of all samples.

During the month of January 2017, 24,153 samples were taken and analysed. Among these samples, 48 samples were found to be above the limits (caesium-134+caesium-137: 100 Becquerel/kg). This represents 0.20 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 (caesium-134+caesium-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.

5.2: 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 (during the period from October 2016 to January 2017)

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

(i) Products whose distribution was newly restricted in October 2016
- none

(ii) Products whose restrictions were removed in October 2016
- none

(iii) Products whose distribution was newly restricted in November 2016
- none

(iv) Products whose restrictions were removed in November 2016

(v) - Slime flounder captured in part of Fukushima offshore Products whose distribution was newly restricted in December 2016
- none

(vi) Products whose restrictions were removed in December 2016
- Log-grown shiitakes (outdoor cultivation) produced in Kawasaki-machi, Miyagi prefecture that are managed based on shipment and inspection policy set by Miyagi prefecture
- Log-grown shiitakes (outdoor cultivation) produced in Mooka-shi, Tochigi prefecture that are managed based on shipment and inspection policy set by Tochigi prefecture
- Raw milk produced in Tamura-shi (Limiting areas within 20 km radius from the TEPCO's Fukushima Daiichi Nuclear Power Plant), Minamisoma-shi (Limiting areas except "areas where it is expected that the residents have difficulties in returning for a long time" designated by the Instruction on March 30, 2012), Naraha-machi (Limiting areas within 20 km radius from the TEPCO's Fukushima Daiichi Nuclear Power Plant), Kawauchi-mura (Limiting areas within 20 km radius from the TEPCO's Fukushima Daiichi Nuclear Power Plant) and Katsurao-mura (Limiting areas except "areas where it is expected that the residents have difficulties in returning for a long time" designated by the Instruction on March 7, 2013) , Fukushima prefecture

(vii) Products whose distribution was newly restricted in January 2017
- none

(viii) Products whose restrictions were removed in January 2017
- Stone flounder, Black cow-tongue and Black rockfish captured in part of Fukushima offshore

(3) Monitoring results data

See the link below (new monitoring results are added once a week):
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 refer to the fact sheet uploaded in the site. This fact sheet is available in English, French, Spanish, Russian, Chinese and Korean.

(ii) "Report on the Monitoring of Radionuclides in Fishery Products" was updated by the Fisheries Agency of Japan

Since the accident at the TEPCO's Fukushima Daiichi NPS, the Government of Japan and local authorities have cooperated closely with relevant bodies to secure the safety of fishery products. With an aim to promote accurate understanding on the safety of Japanese fisheries products at home and abroad, the data and information accumulated in the inspection of the last three years was evaluated comprehensively in the previous Report, which was published in May 2014.

In April 2015, the Fisheries Agency of Japan released updated Report, which reflects latest data and recent research results. It shows that, after four years from the accident, the level of radioactive Cs in fishery products has declined substantially.

The Report is available at the following URLs:

- Japanese version, full Report
  http://www.jfa.maff.go.jp/j/housyanou/pdf/report_zenbun.pdf
- Japanese version, summary
  http://www.jfa.maff.go.jp/j/housyanou/pdf/report_gaiyou_a.pdf
- English translation, full report
  http://www.jfa.maff.go.jp/e/inspection/pdf/report_on_the_monitoring_of_radionuclides_in_fishery_products.pdf
- English translation, summary
  http://www.jfa.maff.go.jp/e/inspection/pdf/summary_report_1_1.pdf

(iii) Monitoring results data

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

Section 6: 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

6.1: TEPCO's 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's Fukushima Daiichi NPP are reported to the MHLW once a month. The latest monthly report is available on the following webpage:

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

(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:

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

Results of supervision and instruction activities for employers of decommissioning and decontamination workers at the TEPCO Fukushima Daiichi Nuclear Power Plant (in 2015) (Updated on April 13, 2016)

http://www.mhlw.go.jp/english/topics/2011eq/workers/tepco/rp/rp_160413.pdf

Results of supervision and instruction activities for employers of workers engaged in decommissioning of the TEPCO Fukushima Daiichi Nuclear Power Plant (from 11 March 2011 to 30 September 2015) (Updated on November 20, 2015)

http://www.mhlw.go.jp/english/topics/2011eq/workers/tepco/rp/rp_151120.pdf

(3) Long-term Health Care

Updated Information on long-term health care of emergency workers including health examination and guidelines;

"Policies for Epidemiological Studies Targeting Emergency Workers at the TEPCO's Fukushima Daiichi Nuclear Power Plant Have Been Compiled." is available on the following webpage. (Updated on June 4, 2014)

http://www.mhlw.go.jp/english/topics/2011eq/workers/tepco/lhc/pr_140604.html

(4) Good Practices in Radiation Exposure Controls

Nov. 14, '16Good Practices in Radiation Exposure Control at the Fukushima Daiichi NPP (Fiscal Year of 2016) (Updated on November 14, 2016)http://www.mhlw.go.jp/english/topics/2011eq/workers/tepco/gre/gre_161114.html

Good Practices in Radiation Exposure Control at the Fukushima Daiichi NPP (Fiscal Year of 2015)(Updated on November 10, 2015)

http://www.mhlw.go.jp/english/topics/2011eq/workers/tepco/gre/gre_151111.html

(5) Other Related Topics

Updated other related information on the workers at TEPCO's Fukushima Daiichi NPP:

Start of a weekly on-site consultation desk to address health matters of decommissioning workers, etc. (Updated on June 24, 2016)

http://www.mhlw.go.jp/english/topics/2011eq/workers/tepco/ort/ort_160624.html

Senior Vice-Minister of Health, Labour and Welfare Demands Thorough Implementation of Occupational Accident Prevention Measures (Updated on January 23, 2015)

http://www.mhlw.go.jp/english/topics/2011eq/workers/ri/pr/pr_150123.html

6.2: Decontamination/Remediation

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

(1) Decontamination/Remediation

Updated Information on decontamination and remediation including guidelines and results of labour inspection:

Results of supervision and instruction activities for employers of decommissioning workers at the TEPCO Fukushima Daiichi Nuclear Power Plant and decontamination workers in Fukushima Prefecture (from Jan. to June 2016) (Updated on September 20, 2016)

http://www.mhlw.go.jp/english/topics/2011eq/workers/tepco/rp/rp_160920.pdf

Results of supervision and instruction activities for employers of decommissioning and decontamination workers at the TEPCO Fukushima Daiichi Nuclear Power Plant (in 2015) (Updated on April 13, 2016)

http://www.mhlw.go.jp/english/topics/2011eq/workers/tepco/rp/rp_160413.pdf

Promotion of General Measures toward Improvement of Level of Compliance with Laws and Ordinances for Decontamination Works, etc (Fukushima Prefectural Labour Bureau Notification No. 1030-2) (Updated on October 30, 2015)

http://www.mhlw.go.jp/english/topics/2011eq/workers/dr/dr/dr_151030.pdf

Results of supervision and instruction activities for employers of decontamination workers (from Jan. to June 2015) (Updated on October 9, 2015)

http://www.mhlw.go.jp/english/topics/2011eq/workers/dr/dr/dr_151009.pdf

Results of supervision/instructions to employers of decontamination workers (July - December 2014) (Updated on March 5, 2015)

http://www.mhlw.go.jp/english/topics/2011eq/workers/dr/dr/dr_150305.html

(2) Waste Disposal

Information on waste disposal work including guidelines:

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

(3) Other Related Topics

Other related information on waste disposal work:

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

6.3: Related Information

(1) Press Releases

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

Dose distribution of workers engaged in decontamination and related works, etc. per quarter [Flash report] [From July 2014 to June 2015] (by Radiation Effects Association) (Updated on October 15, 2015)

http://www.mhlw.go.jp/english/topics/2011eq/workers/dr/ort/ort_151015.pdf

Measures to prevent radiation hazards for emergency workers at nuclear facilities were formulated- Ordinance on Prevention of Ionizing Radiation Hazards and related regulations were partially revised to be applied from 1 April 2016 - (Updated on August 31, 2015)

http://www.mhlw.go.jp/english/topics/2011eq/workers/tepco/rp/pr_150831.html

Measures for occupational safety and health management will be enhanced at the TEPCO Fukushima Daiichi Nuclear Power Plant - A guideline was formulated - (Updated on August 26, 2015)

http://www.mhlw.go.jp/english/topics/2011eq/workers/tepco/rp/pr_150826.html

Producing and Offering Graphic Presentations of Dose Statistical Data Based on the Information Registered with the System of Registration and Management of Radiation Exposure Doses for Decontamination and Related Works (2014) (by Radiation Effects Association) (Updated on July 14, 2015)

http://www.mhlw.go.jp/english/topics/2011eq/workers/dr/ort/pr_150714.html

Quarterly Radiation Exposure Dose Distribution of Workers for Decontamination and Related Works, etc. (Preliminary Figures) [From April 2014 to March 2015] (by Radiation Effects Association) (Updated on July 14, 2015)

http://www.mhlw.go.jp/english/topics/2011eq/workers/ors/oi/pr_150714_a01.pdf

A recommendation received from the Labor Policy Council confirming the validity of the "Outline of the Draft Ministerial Ordinance for Partial Revision of the Ordinance on Prevention of Ionizing Radiation Hazards" (Updated on June 18, 2015)

http://www.mhlw.go.jp/english/topics/2011eq/workers/tepco/rp/pr_150618.html

Senior Vice-Minister of Health, Labour and Welfare Demands Thorough Implementation of Occupational Accident Prevention Measures (Updated on January 23, 2015)

http://www.mhlw.go.jp/english/topics/2011eq/workers/ri/pr/pr_150123.html

(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

Guideline on Revision of Part of the Guidelines on Safety and Health Education for Those Who Are Currently Engaged in Dangerous or Harmful Operations (Labour Standards Bureau Notification No. 0831-6) (Updated on August 31, 2015)

http://www.mhlw.go.jp/english/topics/2011eq/workers/tepco/rp/pr_150831_attachment09.pdf

Formulation of the Guideline: "Guidelines on Maintaining and Improving Health of Emergency Workers at Nuclear Facilities, etc." (Labour Standards Bureau Notification No. 0831-10) (Updated on August 31, 2015)

http://www.mhlw.go.jp/english/topics/2011eq/workers/tepco/rp/pr_150831_attachment10.pdf

Formulation of the "Guidelines on occupational safety and health management at the TEPCO Fukushima Daiichi Nuclear Power Plant" (Updated on August 26, 2015)

http://www.mhlw.go.jp/english/topics/2011eq/workers/tepco/rp/pr_150826_attachment03.pdf

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

Opinions on the Draft Ministerial Ordinance to Revise Part of the Ordinance on Prevention of Ionizing Radiation Hazards (Updated on August 31, 2015)

http://www.mhlw.go.jp/english/topics/2011eq/workers/ri/rl/pr_150831.pdf

Enforcement of the Ministerial Ordinance for Partial Revision of the Ordinance on Prevention of Ionizing Radiation Hazards and Other Related Regulations (Labour Standards Bureau Notification No. 0831-13) (Updated on August 31, 2015)

http://www.mhlw.go.jp/english/topics/2011eq/workers/tepco/rp/pr_150831_attachment11.pdf

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

Result of review at the "review meeting on occupational/non-occupational ionizing radiation disease" and approval as occupational disease/injury (Updated on August 19, 2016)

http://www.mhlw.go.jp/english/topics/2011eq/workers/ri/gr/gr_160819.pdf

Responses and Actions Taken by the Ministry of Health, Labour and Welfare of Japan on Radiation Protection at Works Relating to the Accident at TEPCO's Fukushima Daiichi Nuclear Power Plant 3rd Edition (Fiscal Year of 2015) (Updated on January 31, 2016)

http://www.mhlw.go.jp/english/topics/2011eq/workers/ri/gr/gr_160131.pdf

Result of review at the "review meeting on occupational /non-occupational ionizing radiation disease" and approval as occupational disease/injury (Updated on October 20, 2015)

http://www.mhlw.go.jp/english/policy/employ-labour/labour-standards/dl/151111-01.pdf

A Report Has Been Compiled on Methods etc. for Providing Health care and Exposure Dose Control during Emergency Works in Nuclear Facilities. (Updated on May 1, 2015)

http://www.mhlw.go.jp/english/topics/2011eq/workers/ri/pr/pr_150520.html

Response and Action Taken by the Ministry of Health, Labour and Welfare of Japan on Radiation Protection at Works Relating to TEPCO's Fukushima Daiichi Nuclear Power Plant Accident. (Updated on March 31, 2015)

http://www.mhlw.go.jp/english/topics/2011eq/workers/ri/gr/pr_150331_a01.pdf

(4) 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

More thorough implementation of ensuring working conditions and controlling radiation exposure, etc. of workers engaged in decontamination and related works. (Updated on April, 2015)

http://www.mhlw.go.jp/english/topics/2011eq/workers/ri/lb/lb_1504.pdf

Engaging in decontamination and related works by young people below the age of 18 (minors) is prohibited. (Updated on February, 2015)

http://www.mhlw.go.jp/english/topics/2011eq/workers/ri/lb/lb_1502.pdf

(5) Other Institutions
Statistics on Radiation Exposure Doses of Decontamination Workers and Other Items Have Been Announced. (Updated on April 15, 2015)

http://www.mhlw.go.jp/english/topics/2011eq/workers/ors/oi/pr_150415.html

The launch of the organization for systematic control of radiation exposure doses, etc. for decontamination and related works (Updated on November 15, 2013)

http://www.mhlw.go.jp/english/topics/2011eq/workers/ors/oi/pr_131115.html

Section 7: Other issues on recovery operations

7.1: Public communication

1. Provision of updates to the IAEA

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. Japan provided updates in August on 2, September on 5 and 16, 2016. All of the updates provided to the IAEA are available on this webpage:

https://www.iaea.org/newscenter/focus/fukushima/status-update

2. Lifting of evacuation orders

Current condition of evacuation order areas of Fukushima Dai-ichi Nuclear Power Plant (as of July 2017)

In Tamura city, the order of *Preparation Areas for Lift of Evacuation Order* was removed on April 1st2014. In Naraha town, the order of *Preparation Areas for Lift of Evacuation Order* was removed on September 5th 2015. In Katsurao village, the order of *Habitation Restricted Areas* and *Preparation Areas for Lift of Evacuation Order* were removed on June 12th 2016. In Kawauchi village, the order of *Preparation Areas for Lift of Evacuation Order* was removed on June 14th2016. In Minamisoma city, the order of *Habitation Restricted Areas* and the order of *Preparation Areas for Lift of Evacuation Order* were removed on July 12th2016. In Iitate village and Kawamata town, the order of *Habitation Restricted Areas* and *Preparation Areas for Lift of Evacuation Order* were decided to be lifted on March 31st 2017.

Regarding *Habitation Restricted Areas* and *Preparation Areas for Lift of Evacuation Order*, as preparation for return of residents, Long-term stay and Preparatory stay has also started. In Iitate village, Long-term stay has started on July 1st 2016. In Kawamata town, Preparatory stay has started on August 31st 2016. Also, in Tomioka town,

Preparatory stay has started on September 17th 2016. And in Namie town, Preparatory stay has started on November 1st 2016.

As for cities, towns, and villages, where evacuation orders were removed, it was confirmed that annual cumulative dose, the total radiation dose which residents in the cities, towns, and villages would receive per year, was surely below 20mSv, and also the reconstruction of infrastructure necessary for people's daily life and decontamination were steadily advancing. In the wake of consultation with these cities, towns, and villages and adequate explanation to the residents through briefing sessions and by other means, the above-mentioned lift of the evacuation order were determined.

<Reference>Classification of evacuation orders:

(1) Preparation Areas for Lift of Evacuation Order

Entry into the area is permitted. Overnight stay in the area is generally prohibited. Business activities are permitted except those to be provided for residents living inside the area.

(2) Habitation Restricted Areas

Entry into the area is permitted.

Overnight stay in the area is prohibited in principle. Business activities are permitted but limited in some cases.

(3) Areas where Returning is Difficult

Entry into the area is prohibited in principle, and staying in this area is also prohibited.

3. Relevant activities in disseminating information to the public

(1) Press Conference

Recovery operations at the Fukushima Daiichi NPS 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 NPS 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/page22e_000751.html

Furthermore, the Ministry of Economy, Trade and Industry (METI) has produced a short video clip on the current situation in Fukushima, in collaboration with the Support Team for Residents Affected by Nuclear Incidents under the Nuclear Emergency Response Headquarters under the Cabinet Office. This video was shared through many Japanese embassies and ministerial-level bilateral conversations, etc.

The video is available in the following link:

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

(4) Measures taken by TEPCO

TEPCO has thus far been providing briefings on the status of Fukushima Daiichi NPS. In June and October 2014, in order to supplement such briefings, it has arranged for field observation tours of Fukushima Daiichi NPS for diplomatic officials and employees of embassies to Japan.

These briefings have been conducted with the aim of facilitating a correct understanding through the expeditious communication of accurate information outside of Japan, as well as maintaining TEPCO's accountability as the main party responsible for the accident.

The purpose of the field tours is to enable participants to observe the actual circumstances as they are at the power station by viewing and touring the actual site, in conjunction with the briefings at diplomatic missions. Moreover, TEPCO expects to utilize the network of diplomatic officials to build a new relationship, and provide a connection with TEPCO which had not been open before conducting these tours.

(5) 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.

4. Risk Communication

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

In order to address in detail each person's concern and apprehension, in February 2014, the Government of Japan adopted a policy package regarding radioactive risk communication aiming for evacuees returning to their homes

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 measures (such as holding meetings to explain radioactive substances in food, providing telephone counseling service to respond to inquiries from people with health anxiety due to radiation, etc.) 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.

(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:
https://www.nsr.go.jp/data/000067234.pdf

7.2: Websites for your reference

Further information on each section above is available at the following websites:

- The Prime Minister's Office

http://japan.kantei.go.jp/ongoingtopics/waterissues.html

- The Food Safety Commission (FSC)

http://www.fsc.go.jp/english/emerg/radiological_index_e1.html

- The Reconstruction Agency (RA)

http://www.reconstruction.go.jp/english/

- The Ministry of Foreign Affairs (MOFA)

http://www.mofa.go.jp/j_info/visit/incidents/index.html

- The Ministry of Health Labour and Welfare (MHLW)

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

- The Ministry of Agriculture, Forestry and Fisheries (MAFF)

http://www.maff.go.jp/e/quake/press_110312-1.html

- The Fisheries Agency (FA)

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

- The Ministry of Economy, Trade and Industry (METI)

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

- The Ministry of the Environment (MOE)

http://josen.env.go.jp/en/

- The Nuclear Regulation Authority (NRA)

http://www.nsr.go.jp/english/

- The Japan Atomic Energy Agency (JAEA)

http://www.jaea.go.jp/english/index.html

- Tokyo Electric Power Company (TEPCO)

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

- Fukushima Daiichi Decontamination & Decommissioning Engineering Company

http://www.tepco.co.jp/en/press/corp-com/release/2014/1235009_5892.html

- Nuclear Damage Compensation and Decommissioning Facilitation Corporation (NDF)

http://www.ndf.go.jp/soshiki/pamph_e.pdf

- International Research Institute for Nuclear Decommissioning (IRID)

http://irid.or.jp/en/

- The Collaborative Laboratories for Advanced Decommissioning Science (CLADS)

http://fukushima.jaea.go.jp/english/topics/pdf/topics-fukushima066e.pdf

IAEA assessment on aspects presented in the February 2017 report *'Events and highlights on the progress related to recovery operations at Fukushima Daiichi Nuclear Power Station'*

Contaminated water management

Japan has reported that continuous progress is being achieved with the freezing of the land-side impermeable wall on the sea side that started in March 2016 and completed in October 2016. It was also reported that the volume of ingress groundwater decreased from approximately 400 m^3/day (from before the initiation of freezing) to approximately 140 m^3/day in January 2017. The sub-drain and groundwater drain systems also contributed to the achievement of this reduction.

The IAEA acknowledges further progress with the freezing of the land-side impermeable wall and, in combination with the sub-drain and groundwater drain systems operation, its effect on decreasing the volume of ingress groundwater. The IAEA encourages continuation of these efforts for contaminated water management.

Fuel removal from the reactor buildings

Further efforts to investigate the inside of the Unit 2 Primary Containment Vessel (PCV) have been reported by Japan. These included an investigation to identify the status of the debris inside the RPV pedestal. In January 2017, cameras were inserted to examine the condition of the Control Rod Drive (CRD) replacement rails and the state of the floor on the first floor inside the RPV pedestal of Unit 2. The CRD replacement rail is intended to be used by self-travelling equipment. Based on the result of these investigations, it was concluded that there was damage to the grating as well as deposits of material on the floor. During the investigation the radiation dose rate was estimated using the image noise from the camera inserted into the PCV.

The IAEA notes the progress made in the investigation of damaged fuel and fuel debris inside the PCVs. The investigation will allow the operator to plan for future activities needed to remove fuel and fuel debris.

Japan has reported progress in the preparatory activities required prior to the removal of spent fuel from the reactor building storage pools. Significant accomplishments include the completion in November 2016 of the removal of 18 wall panels from the Unit 1 Reactor building. *The IAEA acknowledges further progress in the preparatory activities towards the removal of spent fuel from storage pools of the reactor buildings.*

Off-site environmental remediation

Japan has reported that decontamination plans for all 11 municipalities within the Special Decontamination Area (SDA) have been developed. Decontamination work for 7 municipalities (Tamura-city, Kawauchi-village, Naraha-town, Okuma-town, Katsurao-village, Kawamata-town and Futaba-town) has been completed in accordance with the decontamination plans at the end of March 2016. The remaining planned decontamination works in the SDA are expected to be finished by March 2017.

In the Intensive Contamination Survey Area (ICSA) it is reported that approximately 90% of the planned decontamination projects for public facilities have been completed. Activities to define a strategy for the reduction of volume of contaminated soil and the development of recycling technology are ongoing. This includes addressing the classification of decontaminated soil for recycling. It also includes sustaining public interaction in the pursuit of a consensus on such an approach.

The IAEA acknowledges the efforts and the progress in the decontamination works both in the SDA and ICSA. Efforts to reduce the amounts of contaminated soil to be disposed of are encouraged and discussions with stakeholders to find appropriate options for soil recycling are noted as a positive action.

On-site and off-site air monitoring results

Japan has reported that air monitoring at TEPCO's Fukushima Daiichi NPS continues to take place. TEPCO has reported that all monitoring results for the period covered by the report remain below the detection limit. Japan has also reported that the air dose rates within the 20 km zone have gradually declined since May 2011.

Based on the information that has been provided, the IAEA acknowledges that on-site monitoring results remain stable. Extensive decontamination efforts and the decay of the radionuclides contributed to the decrease of air dose rates within the 20 km zone.

Lifting of evacuation orders

Japan has reported the decision to lift evacuation orders in Iitate village and Kawamata town on March 31, 2017 (the order of 'Habitation Restricted Areas' and the order of 'Preparation Areas for Lift of Evacuation Order'). Preparations for the return of residents to the areas, which are currently under these orders, are ongoing.

The IAEA takes note of the decisions to lift the evacuation orders and the preparation for the return of residents, which indicate Japan's continued efforts towards the recovery of the areas affected by the accident. As mentioned in a previous report in August 2016, the IAEA encourages Japan to continue its monitoring of radiation exposure doses of the residents and the continued provision of practical measures of radiation protection (e.g. measurement of individual doses, health care and consultations) for people returning to previously evacuated areas.

Radiation protection of workers

Japan continues to report the status of the exposure doses, health care management and radiation protection of workers at TEPCO's Fukushima Daiichi NPS, as well as the workers involved in off-site decontamination and remediation activities. This information is useful to monitor the occupational radiation protection program for workers.

The IAEA acknowledges the availability of data related to the occupational radiation protection of workers involved with on-site and off-site decontamination and remediation activities.

Sea area monitoring results

Japan has reported monitoring results and that there have been no significant changes since the last report. The monitoring results continue to be published regularly by NRA. The data shows that radioactivity levels in the marine environment (seawater, sediment and biota) in the areas around TEPCO's Fukushima Daiichi NPS have not been adversely affected by decommissioning and contaminated water management activities on-site. In particular, the discharges of treated and monitored groundwater have had no detectable effect on the levels of radioactivity in the marine environment, which were measured in these areas during the period covered by this report. The results of hourly seawater radioactivity measurements at the port entrance of TEPCO's Fukushima Daiichi NPS, reported by TEPCO, confirm that the levels have been relatively stable over time.

Based on the information provided by Japan, no significant changes were observed in the monitoring results for seawater, sediment and marine biota during the period covered by this report. The levels measured by Japan in the marine environment are low and relatively stable. For the purpose of public reassurance, the IAEA encourages continuation of sea area monitoring, particularly considering the ongoing authorized discharges of treated and monitored groundwater into the ocean.

Sea area monitoring data quality assurance

The IAEA continues to assist the Government of Japan in ensuring that the regularly updated Sea Area Monitoring Plan is comprehensive, credible and transparent. A proficiency test and two interlaboratory comparison exercises have been organized annually since 2014 to test the sampling and analytical performance of the Japanese laboratories for the analysis of radionuclides in seawater, sediment and fisheries samples. A sixth interlaboratory comparison exercise addressing the sampling and analysis of seawater and fisheries samples is ongoing. A report of the results of a third proficiency test addressing the analysis of the levels of radionuclides in seawater is currently being finalised.

The IAEA considers that the extensive data quality assurance programme helps to build confidence of the stakeholders in the accuracy and quality of the sea area monitoring data.

Food products

As reported by the authorities in Japan, the situation remains stable and a comprehensive surveillance system is in place for the monitoring of food, including seafood. The national regulatory limits for radionuclides of caesium remain in place. Food production areas, where food is found to be above these limits, are subject to restrictions in order to prevent such food from entering into the food supply chain.

There have been no significant changes since the previous report. Based on the information provided by the Japanese authorities, the situation with regard to the safety of food, fishery and agricultural production continues to remain stable. Measurements of caesium radionuclide levels in foodstuffs, together with appropriate regulatory action and public communication, including the publication of monitoring results, are helping to maintain confidence in the safety of the food supply. Food restrictions continue to be revised and updated as necessary in line with the results of food sampling and monitoring. This indicates the continued vigilance of the authorities in Japan and their commitment to protecting consumers and trade.

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 controlled effectively by the relevant authorities.