

The investigation inside Unit 1 PCV (Primary Containment Vessel) at Fukushima Daiichi NPS (Nuclear Power Station)

Fukushima Reconstruction Promotion Group, METI  
Nuclear Accident Response Office, Agency for Natural Resources and Energy

1. The purpose of investigation from 18th through 22nd March 2017 was to identify the status inside the Unit 1 PCV and to make progress toward fuel debris removal. In this investigation, cameras and a robot were inserted into the PCV by remote control. A dosimeter and an underwater camera were suspended from the 1<sup>st</sup> floor, where grid-like scaffold is installed, to collect information to infer the distribution of fuel debris\*.

\* Distribution of fuel debris; for example, whether fuel debris have reached the internal wall of PCV or not.

2. In the investigation, information of radiation dose as well as images inside the PCV were obtained. The measured values are 12 Sv/h at maximum at the 1<sup>st</sup> floor and 11 Sv/h at maximum in water (about 0.3m high from the bottom).

The radiation dose of the 1<sup>st</sup> floor was almost the same level as the time of last investigation (April 2015), when the measured value was between 4.1 Sv/h and 9.7 Sv/h. Because the radiation dose in water was measured near the radiation source, these measuring results are within the scope of the anticipation. The results are going to be evaluated.

There have been no changes in the temperature and pressure inside PCV and the reactor maintains a stabilized condition. The result of this investigation does not mean that some new phenomenon inside the PCV has occurred. (See figure.1-1) Moreover, the inside of the PCV is shielded by thick steel vessel, concrete and zinc-plate inside the building. In addition, there are no significant changes in radiation levels of monitoring posts and dust monitoring at the site boundaries of Fukushima Daiichi NPS. Through this investigation, there was and will be no effect by the radioactive material to the outside the PCV. (See figure.1-2)

3. Policy for fuel debris removal which will be considered and decided by the end of the year based on the assessment of the series of investigations.

4. The efforts for decommissioning of Fukushima Daiichi NPS will be continued with safety before everything. In addition, to revitalize Fukushima, the government continues working as a unit and will progress efforts with responsibility in cooperation with the local. Japanese government will inform in a timely and appropriate manner to inside and outside the country.

5. Please note that a Q&A has just been issued by Consulate - General of Japan in Shanghai as some country showed their concerns about the results of the investigation inside Unit 2 PCV implemented from January to February this year. A part of the document issued by Consulate - General of Japan in Shanghai is attached at the end as a reference.

The investigation process for Unit 1 PCV;

March 18, Saturday

The investigation robot was inserted into the PCV

The data of radiation dose around the water drain of the PCV floor, etc. were obtained.

March 19, Sunday

The data of radiation dose around the floor where the fuel debris has not been melted were obtained. (Presence of fuel debris will be estimated by comparison with the measuring results at this point.)

March 20, Monday

The radiation data around the opening of the pedestal sustaining RPV (a walkway for workers) were obtained.

March 21, Tuesday

Following the investigation on 20<sup>th</sup> March, the radiation data around the opening of the pedestal sustaining RPV (a walkway for workers) were obtained.

The radiation dose around the inside wall of PCV were obtained.

March 22, Tuesday

Following the investigation on 20<sup>th</sup> and 21<sup>st</sup> March, the radiation data around the opening of the pedestal sustaining RPV (a walkway for workers) were obtained.

Following the investigation on 18<sup>th</sup> March, the data of radiation dose around the water drain of the PCV floor, etc. were obtained.

Reference 1: Various monitoring data before/after the investigation

(1)The temperature inside the PCV

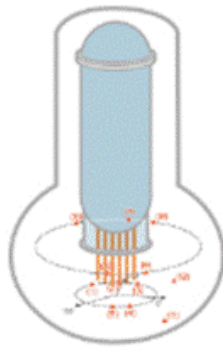
[http://www.tepco.co.jp/nu/fukushima-np/f1/plantdata/unit1/pcv\\_index-j.html](http://www.tepco.co.jp/nu/fukushima-np/f1/plantdata/unit1/pcv_index-j.html) (Japanese)

**Temperatures measured inside the Unit 1 Primary Containment Vessel at Fukushima Daiichi Nuclear Power Station**

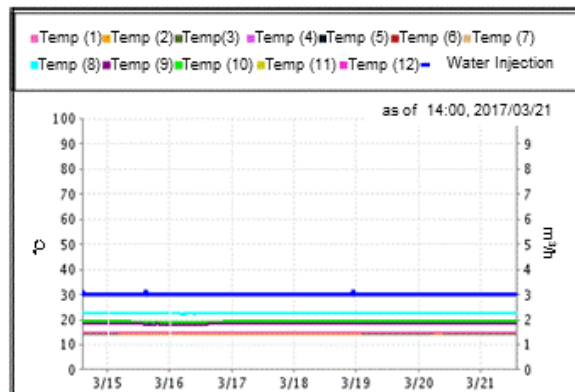
- Here are the measurement results of temperatures inside the Unit 1 Primary Containment Vessel at Fukushima Daiichi Nuclear Power Station.
- The measured temperatures are within the past fluctuation range, indicating the stable condition of the vessel.

**Monitoring points**

Unit 1 Primary Containment Vessel



**Temperature & Water Injection**



Temperature Unit: °C , Water Injection Unit: m³/h

Temperature (1)	Temperature (2)	Temperature (3)	Temperature (4)	Temperature (5)	Temperature (6)	Temperature (7)
15.0	14.8	14.6	14.8	14.7	14.6	14.6
Temperature (8)	Temperature (9)	Temperature (10)	Temperature (11)	Temperature (12)	Water injection	
22.8	18.6	19.5	-	-	3.0	

(as of 14:00, 2017/3/21 about 14~ 23°C)

(2) Measurement Results from Monitoring post and Dust monitor around the site boundaries

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

### Radiation Dose measured at Monitoring Post of Fukushima Daiichi Nuclear Power Station

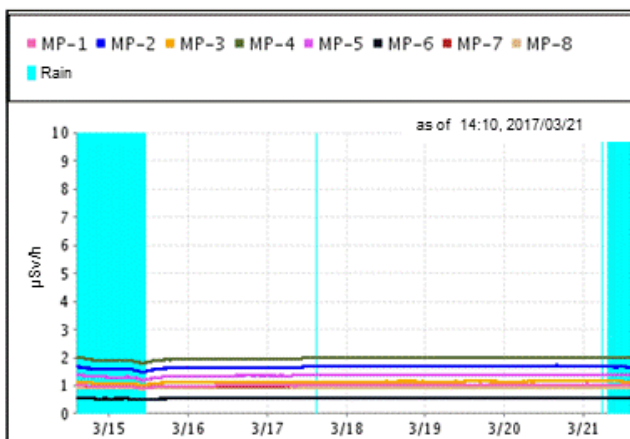
- Here are the measurement results of airborne radiation doses at the monitoring posts (MP1-8) on the premises of Fukushima Daiichi Nuclear Power Station.
- The measured radiation doses are within the past fluctuation range and no significant changes have been detected.

#### Monitoring post (MP1 - MP8)

##### Monitoring points



##### Radiation dose



MP Unit:  $\mu\text{Sv/h}$  Wind Velocity Unit: m/s

MP-1	MP-2	MP-3	MP-4	MP-5	MP-6	MP-7	MP-8	Wind Direction	Wind Velocity	Rain
1.017	1.652	1.131	1.976	1.361	0.549	1.001	0.929	Southeast	2.6	Yes

(as of 14:10, 2017/3/21 about 0.5~2.0 Bq/cm<sup>3</sup>)

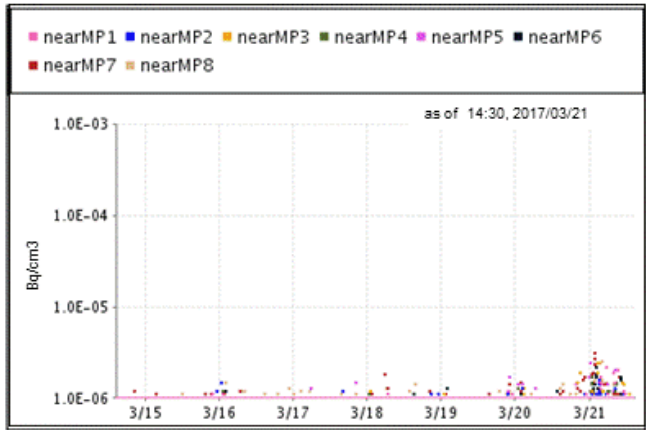
## Radioactive Concentration measured at Dust Monitors near the Site Boundary of Fukushima Daiichi Nuclear Power Station

- Here are the measurement results of airborne radioactive concentrations near the monitoring posts (MP1-8) at the site boundary of Fukushima Daiichi Nuclear Power Station.
- The measured radioactive concentrations are within the past fluctuation range and no significant changes have been detected.

### Monitoring points



### Radioactive concentration



Dust Monitor Unit: Bq/cm<sup>3</sup> Wind Velocity Unit: m/s

nearMP1	nearMP2	nearMP3	nearMP4	nearMP5	nearMP6	nearMP7	nearMP8	Wind Direction	Wind Velocity
1.0E-06	1.0E-06	1.0E-06	1.0E-06	1.0E-06	1.0E-06	1.0E-06	1.0E-06	east - southeast	0.9

(as of 14:30, 2017/3/21 about 1.0E-06 Bq/cm<sup>3</sup>)

※ 1.0E-06=0.000001

## Reference 2: Q&A

Q1 I am worrying if visiting to Japan would be safe or not when I heard the result of the investigation like a few hundred Sievert per hour was measured. Should I postpone my travel to Japan?

The radiation dose data published in this time indicates the status consistently inside PCV. Therefore, the result of this investigation does not mean that some new phenomenon inside the PCV has occurred and there was and will be no effect by the radioactive material to the outside the PCV or the area around Fukushima Daiichi Nuclear Power Station. The reactors have remained in a stabilized condition.

The monitoring of radiation dose which has been implemented since the preinitiation of this investigation shows that there is no problem of the radiation dose in the Japanese atmosphere as same as the other main cities in abroad.

### 【Example】

- Sapporo-city (Hokkaido) : 0.023 $\mu$ Sv/h (March 8, 2017)
- Tokyo : 0.040 $\mu$ Sv/h (March 8, 2017)
- Osaka-city : 0.075 $\mu$ Sv/h (March 8, 2017)
- Fukuoka-city(Kyusyu area) : 0.040 $\mu$ Sv/h (March 8, 2017)
- Fukushima-city (Fukushima prefecture) : 0.10 $\mu$ Sv/h (March 8, 2017)
- Aizuwakamatsu-city (Fukushima prefecture) : 0.06 $\mu$ Sv/h (March 8, 2017)
- New York (USA) : 0.058 $\mu$ Sv/h (March 16, 2017)
- London (UK) : 0.11 $\mu$ Sv/h (March 16, 2017)
- Beijing (China) : 0.089 $\mu$ Sv/h (March 13, 2017)

Note that the radiation dose increasing in Tokyo after the accident in March 2011 corresponds to 0.05mSv/year. This amount is much less than one (0.2mSv/year) that people takes in one roundtrip by aircraft between Tokyo and New York.

There is no effect by the radioactive material in most area of Japan except the evacuation order area very close to the Fukushima Daiichi Nuclear Power Station. Please feel safe to visit to Japan.

Q2 I have heard that the investigation inside the Unit 2 PCV using a camera on 30th January in this year. What was the result?

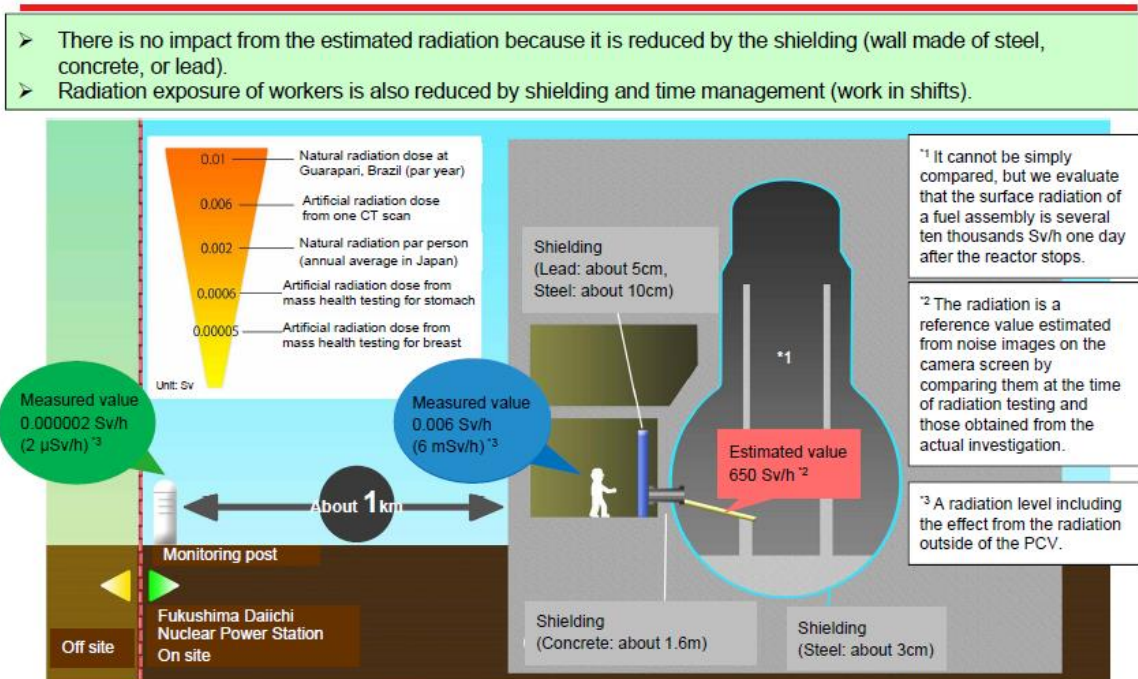
On 30<sup>th</sup> January in this year, the investigation inside Unit 2 PCV using a camera was implemented by Tokyo Electric Power Company (TEPCO) as a consistent work toward decommissioning of Fukushima Daiichi. TEPCO announced that the deposits on the control rod

drive (CRD) exchange rail and the grating platform (the wire mesh-like scaffold at the directory bottom of the reactor) were found.

As a result of the analysis of image by the camera, the fallen grating was confirmed and the radiation dose such as a few dozen to hundreds Sievert per hour was estimated inside the PCV. This result, however, needs to be understood that there might be a large measurement error because it was not an actual measurement. Note that it was obtained that the actual measurement of dose rate as 210 Sievert per hour from the result of the actual measurement of radiation dose on 16<sup>th</sup> February.

The inside of the PCV is shielded by thick steel vessel, concrete and zinc-plate inside the building and gases inside of the PCV are controlled. In addition, there are no significant changes in radiation levels at the site boundaries of Fukushima Daiichi NPS. Thus, through this investigation, there was and will be no effect by the radioactive material to the outside the PCV. The result of this investigation does not mean that some new phenomenon inside the PCV has occurred.

### 1. Unit 2 Primary Containment Vessel investigation (estimated radiation)



Source : TEPCO (February 15, 2017)

[Reference: the publication by TEPCO]

Fukushima Daiichi NPS Prompt Report (Feb 10, 2017)

Recent Topics: TEPCO HOLDINGS SENT ROBOT INTO FUKUSHIMA DAIICHI UNIT 2 REACTOR TO CLEAR PATH FOR LATER INVESTIGATION WITH "SCORPION" ROBOT

[http://www.tepcoco.jp/en/press/corp-com/release/2017/1375551\\_10469.html](http://www.tepcoco.jp/en/press/corp-com/release/2017/1375551_10469.html)



Q3 A nuclear accident has occurred at Fukushima Daiichi NPS due to the Great East Japan Earthquake on March 11<sup>th</sup> in 2011. What is the current status of the NPS.

The Great East Japan Earthquake made it impossible to cool the reactors in Unit 1, 2 and 3 at Fukushima Daiichi NPS that had six units. Then, the fuel melted, causing a large amount of hydrogen, and the building of Unit 1, 3 and 4 (Unit 4 is connected to Unit 3) was exploded and damaged. However, the systems for cooling the reactors by water were established and the reactors have remained in a stabilized condition since then.

Now, toward the decommissioning, TEPCO and other entities are prudently working on the fuel debris retrieval from spent fuel pools, fuel debris retrieval (including preliminary works) and other tasks while placing the top priority on the safety.

Q4 Is Japanese food safe?

On 30<sup>th</sup> January in this year, 530 Sievert per hour was estimated as the radiation dose at one point inside the PCV. This investigation just unveiled one of the unknown facts, not meaning that some new phenomenon has occurred that affects growth environment for agricultural, forestry and fishery products.

Since the accident at the Fukushima Daiichi NPS, the safety of Japanese food has been ensured. In some regions where the influence by radioactive materials was confirmed, the production of agricultural, forestry and fishery products is strictly controlled by countermeasures against radioactive materials so as not to absorb them. Besides, pre-shipping inspections allow only products that meet the criteria based on scientific evidences\* to be shipped.

For example, all the bags that contain rice produced in Fukushima prefecture must be inspected before being shipped. Though more than ten million bags are inspected per year, there have been no bags that exceed the criteria since 2015. In addition, vegetables, fruits, teas, animal products (meat, eggs, milk) and seafood produced in Fukushima prefecture have not exceeded the criteria since 2015. Even if some products are confirmed to exceed the criteria by inspections, they would be discarded immediately and not be in the marketplace.

With no worry, you can eat the foods during your trip to Japan as well as Japanese foods imported to your country because they are safe.

(\*) The standard of radioactive material in food is 1mSv/year based on the standard of Codex Alimentarius Commission (the joint commission of FAO and WHO) which develops international standard of food. In addition, it undergoes the assessment of the Effects of Food on Health implemented by Food Safety Commission of Japan which is the organization of the risk assessment. And then, it is decided based on the discussion of Pharmaceutical Affairs and Food Sanitation Council in Ministry of Health, Labour and Welfare which is the organization of risk management. Note that the setting standards are carried out by careful attention to that anyone at any age can eat Japanese food in relief.

Q5 I would like to search correct information by myself. Please let me know some reference websites.

Please look at these websites below as your reference.

- Japan National Tourism Organization  
Japan Travel Updates after the 3.11 Earthquake  
[http://www.jnto.go.jp/eq/eng/04\\_recovery.htm](http://www.jnto.go.jp/eq/eng/04_recovery.htm)
- Japan Tourism Agency For Safe Travel in Japan  
[http://www.jnto.go.jp/eq/eng/kankocho\\_e\\_1021.pdf](http://www.jnto.go.jp/eq/eng/kankocho_e_1021.pdf)
- Fukushima Prefectural Government Steps for Revitalization in Fukushima  
<http://www.pref.fukushima.lg.jp/uploaded/attachment/195693.pdf>
- Reconstruction Agency Official Website  
<http://www.reconstruction.go.jp/english/topics/RR/index.html>
- Ministry of Foreign Affairs Brief overview of contaminated water leakage at the TEPCO's Fukushima Daiichi Nuclear Power Station and countermeasures  
[http://www.mofa.go.jp/policy/page3e\\_000071.html](http://www.mofa.go.jp/policy/page3e_000071.html)
- Nuclear Regulation Authority Dose Monitoring  
<http://radioactivity.nsr.go.jp/en/>
- Ministry of Land, Infrastructure, Transport and Tourism  
Monitoring of air and seawater radiation in the ports  
[http://www.mlit.go.jp/kowan/kowan\\_frl\\_000041.html](http://www.mlit.go.jp/kowan/kowan_frl_000041.html)
- Fukushima Prefectural Government Dose Monitoring  
<https://www.pref.fukushima.lg.jp/sec/16025d/kukan-monitoring.html>
- Ministry of Foreign Affairs  
Provision of comprehensive information regarding the events and highlights on the progress related to recovery operations at Fukushima Daiichi Nuclear Power Station on the IAEA's webpage  
[http://www.mofa.go.jp/dns/inec/page22e\\_000222.html](http://www.mofa.go.jp/dns/inec/page22e_000222.html)