March 28, 2012
Nuclear Emergency Response Headquarters
Government-TEPCO Mid-and-long Term Response Council
Working Council
(Provisional translation)

Progress Status of Mid-and-long-Term Roadmap towards the Decommissioning of Fukushima Daiichi Nuclear Power Units 1-4, TEPCO

1. Past One Month Summary and Future Plans

1) Plans to Maintain Plants' Cold Shutdown Conditions

- Internal PCV Inspection at Unit 2 (The last investigation was conducted on Jan. 19)

  The secondary internal PCV investigation on Mar. 26 revealed that the accumulated water level inside the PCV was approx. 60 cm from the bottom and the water temperature was approx. 50 degrees Celsius (refer to Fig.1). On Mar. 27, the ambient radiation dosage at its peak was approx. 73 Sv/hour.

- Installation of Alternative Thermometers at the Unit 2 RPV

  We are considering an alternative way in light of the broken Unit 2's RPV bottom thermometers. From Mar. 15 to 22, we selected the most feasible piping locations where the thermometers can be installed, and conducted field surveys such as measuring the ambient radiation dosage. In light of the installation work, we will conduct measurements of the dimensions and the piping surface temperature of the Jet Pump Instrument System B, SLC differential pressure detection system, and the Traversing In-core Probe System, which were the candidate systems selected via the aforementioned surveys (scheduled from Mar. 28) (refer to Fig. 2).

- Designing the Advanced Liquid Processing System (ALPS)

  We are planning to install the ALPS in order to bring the radioactivity concentration in the processed water at an even lower level. In preparation for the installation, tree-clearing and site preparation are ongoing (scheduled from Mar. 1 to the month's end).
  The basic test shows that, in the target nuclides, the α-nuclide and the γ-nuclide particles can be brought to a level below the detection limit. As for the β-nuclide particles, although we verified that they can be brought to a level below the legal limit, as ^{89}Sr, ^{90}Sr and ^{90}Y can still be detected, we will improve the system design to enhance its purification capabilities.

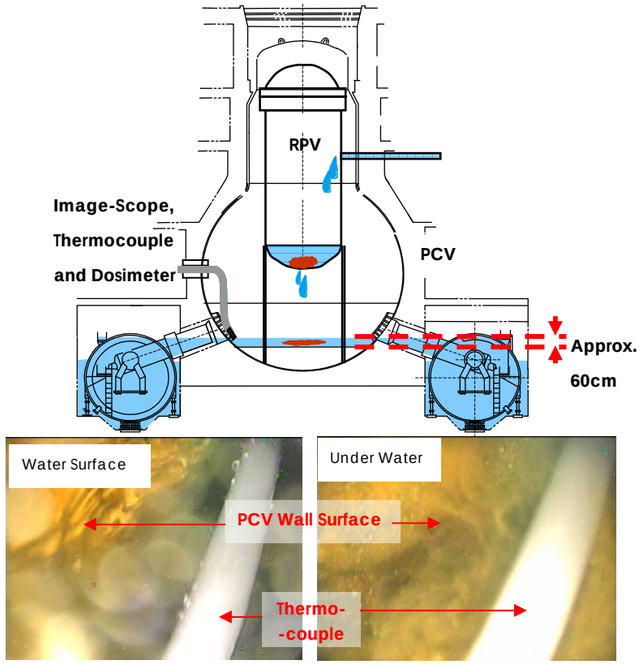
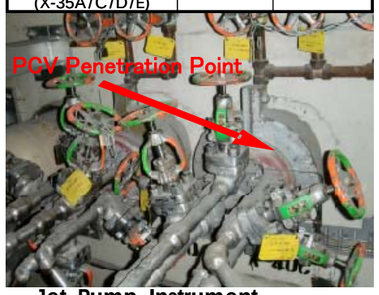


Fig.1: Internal PCV Inspection Results at Unit 2

Investigation System (PCV Penetration Point Number)	Measurement Results (mSv/h)	
	Upper Area of Work Floor (Maximum)	Penetration Point Area (Maximum)
Jet Pump Instrument System B (X-40C/D)	60.0	40.0
SLC DP Detection System (X-51)	18.0	35.0
Traversing In-core Probe System (X-35A/C/D/E)	3.0* *Floor	2.2



Jet Pump Instrument

Fig.2: Field Survey Results of Unit 2's RPV Alternative Thermometers

2) Plans to Reduce Overall Onsite Radiation Dosage and Mitigate Contamination

- Additional Countermeasures for Mitigating Contamination

  We will cover and harden the seabed soil in front of the intake channel. We conducted a field test from Feb. 28 to Mar. 13 and the full-fledged implementation scheduled from Mar. 14 to Jun. after changed the composition of the fixation agent on the base of the results (refer to Fig. 3). Although we had planned to install silt-fences in front of Units 5 and 6 in Mar, a decision has been made to do the work from late Apr. to May in step with the progress of the covering work.

- Installation and Operation of the PCV Gas Controlling System

  From Mar. 14, at Unit 3, full-fledged operations of the facility that extracts and controls the gas inside the PCV began. The facilities at Units 1 and 2 are currently in operation.

- Reducing Effective Radiation Dosage at Site Boundaries
  - In order to reduce the radiation dosage at the site boundaries, we are conducting covering the floor with a water shielding sheet as one of the preparation works to build temporary rubble storage facilities (Feb. 13 ~ mid Apr.).
  - In order to improve the accuracy of detecting abnormal radioactive emissions at the Monitoring Post(MP), we are improving the environment by clearing trees away, removing the surface soil, and building a shielding wall (ongoing from Feb. 10 to the end of Apr.) (refer to Fig. 4). As of Mar. 22, radiation dosage reduction targets at MP-2, 5 and 6 were achieved.

- Scattered Rubble Investigation

  In order to investigate the scattered rubble situation, from Mar. 26 to 30, we took a walk around the site grounds from the center of Units 1~4 to the Monitoring Posts 1~8.

- Test Operation of Onsite Decontamination

  Scheduled from early Apr. to early May, we will verify the effects of several decontamination methods (such as the Collection System, Dry Ice Blasting, and High Pressure Washing) on the asphalt pavement, grass lawns and slopes in order to obtain knowledge toward future onsite decontamination.

Fig. 3: Implementing Seabed Covering Work in front of the Units 1~4's Intake

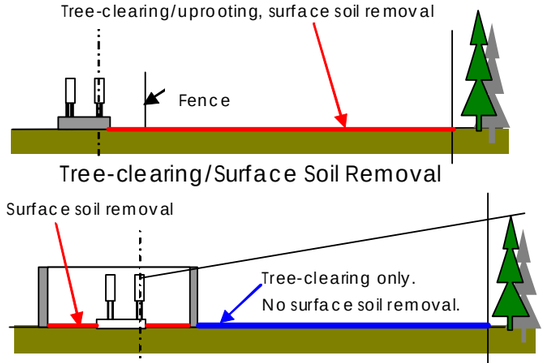


Fig. 4: Overview of the Environmental Improvement Work surrounding the Monitoring Posts

3) Fuel Removal from Spent Fuel Pools

- Rubble Clearing from the Upper Part of the Reactor Buildings of Units 3 and 4 (ongoing) (refer to Fig. 5).

Unit 3 Reactor Building
Installed a gantry for upper rubble clearing (eastside)

Unit 4 Reactor Building
Removing Overhead Crane Garter

Fig. 5 Rubble Clearing from the Upper Part of the Reactor Buildings of Units 3 and 4

➢ Investigation of the Dispersed Rubble Conditions Inside the Spent Fuel Pool at Unit 4

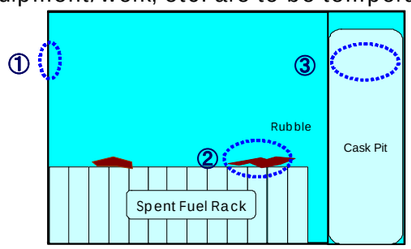
From Mar. 15 to 16, we conducted the following preparatory work;

- Considering transferring the control rods etcetera in the Cask Pit to the RPV bottom during fuel removal, we confirmed the conditions of the accumulated rubble at the RPV bottom.
- Confirmed conditions inside the spent fuel pool via an underwater camera.

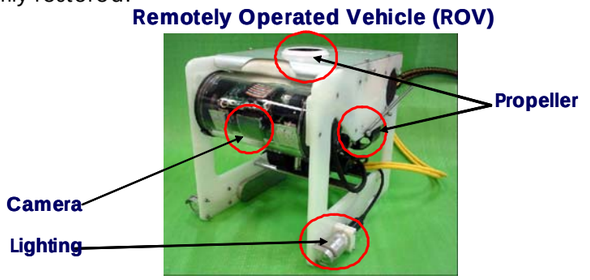
From Mar. 19 to 21, in order to develop a plan to remove the fuels from the spent fuel pool, we investigated the dispersed rubble conditions inside the pool using a remote operated vehicle (refer to Fig. 6).

➢ Common Pool Restoration

In order to store the fuels removed from the spent fuel pools, the common pool is being restored (ongoing); by Mar. 15, the Make-Up Water System and Compressed Air System have been restored, and scheduled at the end of Apr., the lighting and power panels for the equipment/work, etc. are to be temporarily restored.



Spent Fuel Pool



① Southern Wall Surface **② Rubble and Upper Part of Spent Fuels** **③ Cask Pit Inside**

Fig. 6: Investigation Results of Dispersed Rubble Conditions inside Unit 4's Spent Fuel Pool

4) Fuel Debris Removal Plan

➢ Decontaminating the insides of the Buildings

- We are preparing to remodel the current robots in order to investigate the contamination situation. The factory test will begin from April.
- Preparations are underway to conduct decontamination experiments using mock contaminated objects in order to come up with an optimal decontamination method in light of the contamination situation.

➢ Inspection and Repair of PCV Leakage Points

- Inspection and repair methods are under consideration. We conducted a water tank experiment of the materials to stop water leakage between the buildings, and verified the effectiveness of the flexible grout comprised of an optimal composition. (Water-stop test: Feb. 28 ~ Mar. 1, placing joint test: Mar. 13 ~ 14).
- On Mar. 14, we investigated the access route to the torus room at Units 2 and 3 (refer to Fig. 7).

➢ Fuel Debris Removal

We are considering investigating the details of the inspection points and methods of the PCV internal in each Unit.

Unit 2 Inspection | Unit 3 Inspection


Accumulated Water Surface | Inside the torus room | Accumulated Water Surface | Unable to access the torus room due to the door being deformed

Fig. 7: Pre - investigation Results of Torus Room

5) Reactor Facilities Demolition and Radioactive Waste Processing & Disposal

➢ Treatment & Disposal of Secondary Waste Generated via Contaminated Water Processing

- Various sorts of characteristic tests for the long-term storage of Water Processing Secondary Waste are ongoing.
- The accumulated water and outlet water samples of the water processing facilities have been delivered to JAEA, who are analyzing the radioactivity concentration of each type of nuclide in the water (Co- 60, Cs-137: by Mar. As for the other nuclides, the analysis plan is under revision as it is taking time for the pretreatment work etc.).

➢ Processing & Disposal of Radioactive Waste

- We installed analysis equipment at JAEA such as "Sample Pretreatment Equipment" that decomposes solid samples such as rubble using microwaves (Feb. ~ Mar. 21).

6) Organization and Staffing Plan

➢ Staff Management

- There are plans to procure the necessary manpower for the April work.
- Personnel rotation has been balanced out in consideration of the exposure dosage amounts and quality of onsite work (143 TEPCO employees have been transferred out since last Oct.).
- As of February, the present local employment rate is 65 % (partner companies' staff).

➢ Improvements to the Work & Living Environment

On Mar. 1, we held a periodic meeting with our partner companies to improve the work environment. (The next monthly meeting is scheduled on Mar. 30.)

7) Plan to Secure Worker Safety

➢ Continual Employment of Medical Staff

On Mar. 18, at the network conference, discussions were held among emergency medical personnel concerning an ongoing medical operation organization at the emergency medical room and the clinic at J-village.

➢ Lift Radiation Controls at the Main Anti-earthquake Building

The implementation of dosage reduction measures such as the laying of lead plates on the floors and walls (by Apr. 30) have been ongoing at the Main Anti-earthquake Building.

8) Miscellaneous

➢ The "Technology Catalogue Work Shop pertaining to Machine and Equipment Development" held on Feb. 24, and the "International Workshop/ Symposium" held from Mar. 12 to 14.

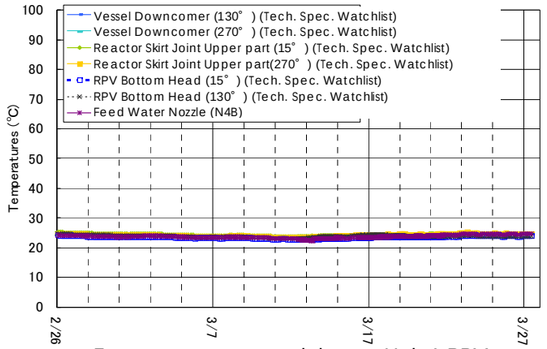
They were held in order to disseminate information domestically and internationally as well as to obtain cooperation from relevant organizations via such means as technical proposals or advice concerning R&D towards decommissioning, etc.

➢ Consideration of R&D Hub

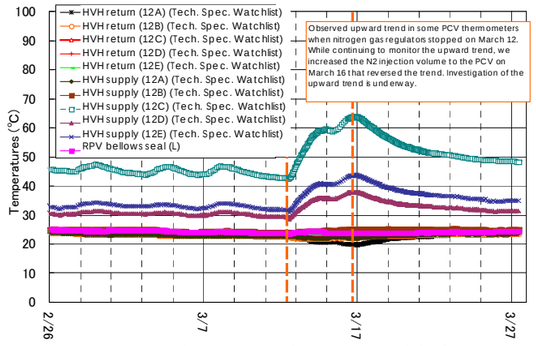
For fuel removal, we are considering establishing an R&D hub where we will analyze the radioactive material nuclides, verify the effectiveness of equipment to be developed and train operators etc.

2. Confirming Conditions Equivalent to a Cold Shutdown

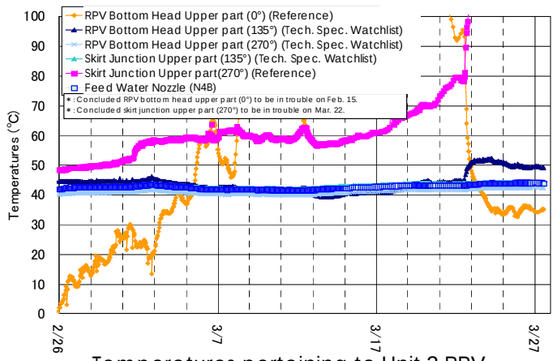
- Units 1~3's cold shutdown conditions are being maintained; the temperatures at the RPV bottom and in the PCV gaseous part have stabilized between approx. 25 and 55 degrees Celsius (as of Mar. 27), in addition, major parameters such as the PCV pressure and radioactive release rate from the PCV showed no significant changes.



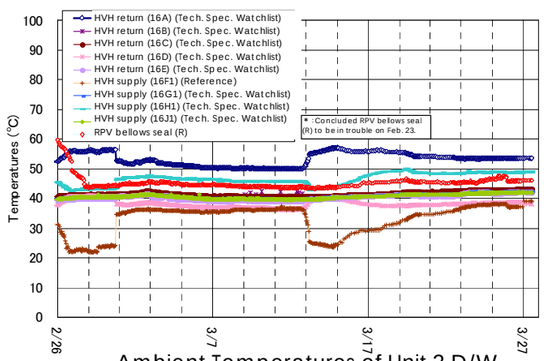
Temperatures pertaining to Unit 1 RPV



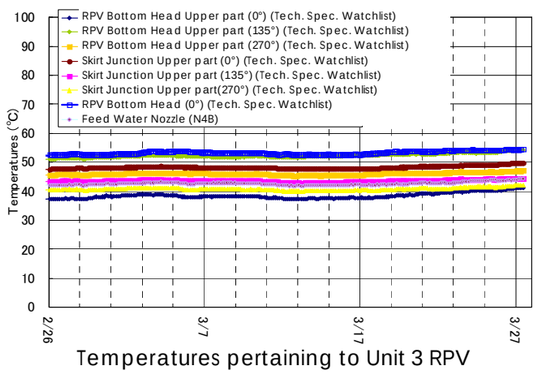
Ambient Temperatures of Unit 1 D/W



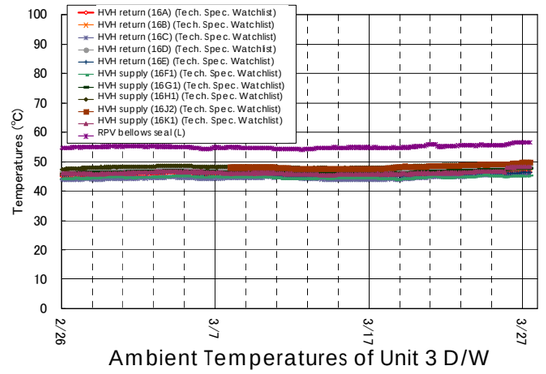
Temperatures pertaining to Unit 2 RPV



Ambient Temperatures of Unit 2 D/W



Temperatures pertaining to Unit 3 RPV



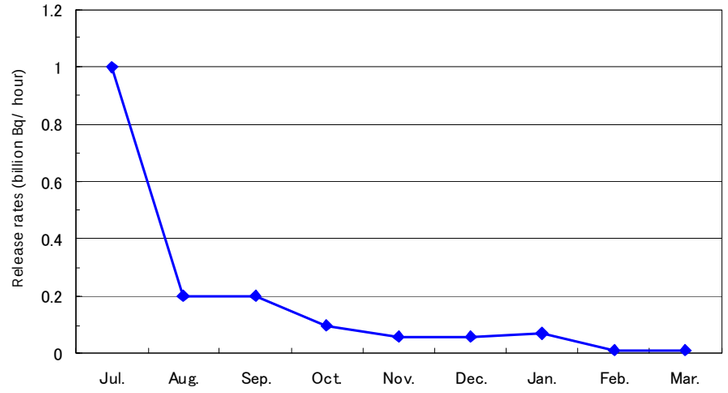
Ambient Temperatures of Unit 3 D/W

- We have periodically monitored the temperatures at the RPV bottom and PCV gaseous part and concluded that with the exception of some instruments*1, there has been no significant changes.
- We also have periodically monitored PCV pressure and ascertained that no significant changes*2.

- We monitored the gas inside the PCV gas controlling system monitoring and sampling noble gas, and confirmed that xenon 135 was below 0.1Bq/cm^3. This is far below the re-criticality criterion of 1Bq/cm^3.
- The total current release rate (cesium) from the PCVs of Units 1~3 based on the airborne radioactivity concentration (dust concentration) at the upper parts of the reactor buildings, etc. is estimated to be 0.01 Billion Bq/hour at maximum; approximately 0.0004 Billion Bq/hour at Unit 1, 0.001 Billion Bq/hour at Unit 2 and 0.002 Billion Bq/hour at Unit 3.

  The radiation exposure per year at the site boundaries is assessed at 0.02 mSv/year, excluding the effects of the radioactive materials so far released.

Release rates of radioactive materials (Cesium) from the PCVs of Units 1-3



Furthermore, we are continuously checking the monitoring posts (MP-1~8) and temporary monitoring posts (southern administration building, main gate and west gate), and have so far detected no changes in the radiation dosage at the site boundaries.

*1 On Mar. 12, an upward trend was observed in some of Unit 1's PCV thermometers when the nitrogen gas regulator stopped. On Mar. 16, while monitoring the trend, we increased the N^2 injection volume to the PCV which reversed the trend.

Although we are investigating the cause, there were at least several similar phenomena caused by the nitrogen flow rate reduction. Hence, we are supposing that the changed gas flow rate inside the PCV due to the amount of nitrogen injected might be playing a role. Although the gas fluid mechanics inside the PCV is considered quite complicated, we are continuously looking into the details.

*2 On Mar. 19, the descent of the PCV pressure at Unit 2 was observed due to the decrease of nitrogen injection volume that was conducted in order to reduce the PCV internal pressure at Unit 2 to secure a safe work environment for the inspection inside the PCV.

End