Summary of Decommissioning and Contaminated Water Management

June 27, 2014

Secretariat of the Team for Countermeasures for Decommissioning and Contaminated Water Treatment

Main works and steps for the decommissioning

Fuel removal from Unit 4 SFP is underway. Preparatory works for fuel removal from Unit 1-3 SFP and fuel debris (Note 1) removal are ongoing.

Fuel Removal from SFP

Unit 1&2 / Unit 3 / Unit 4

Rubble removal & dose reduction → Installing FHM* → Fuel removal → Storage and handling

Fuel Debris (Corium) Removal

Unit 1-3

Dose reduction & leakage identification → Stop leakage → Fuel debris removal → Storage and handling

Dismantling Facilities

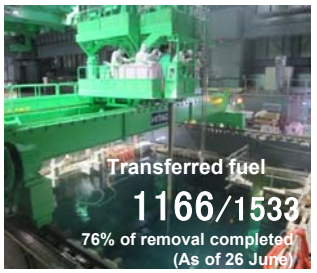
Scenario development & technology consideration → Design & Manufacturing of devices/ equipment → Dismantling

FHM*: Fuel Handling Machine

(Note 1) Fuel assemblies melted through in the accident.

Fuel removal from SFP

Fuel removal from Unit 4 SFP has been underway since Nov. 18, 2013.
The work at Unit 4 will be accomplished around the end of 2014.



(Fuel-removal operation)

Three principles for contaminated water countermeasures

Contaminated water countermeasures are implemented with the following three principles:

1. **Eliminate** contamination sources

① Multi-nuclide removal equipment

② Remove contaminated water in the trench (Note 2)

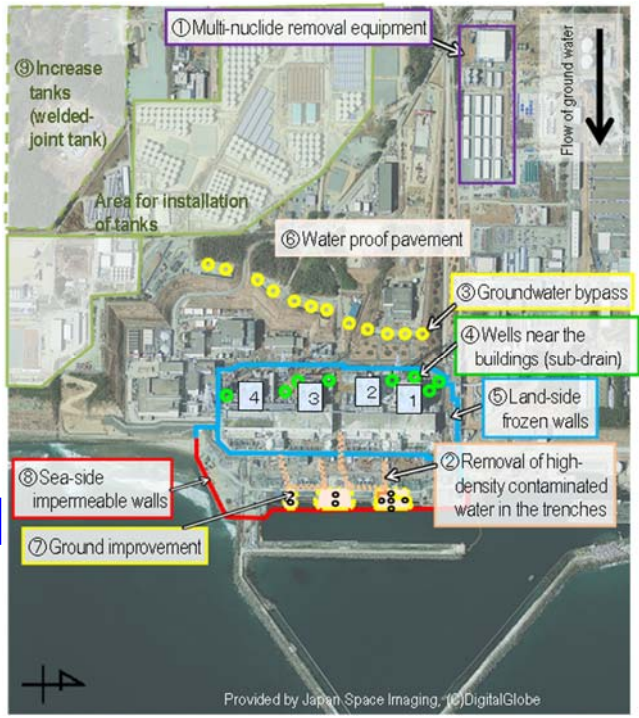
2. **Isolate** water from contamination

③ Pump up ground water for bypassing
④ Pump up ground water near buildings
⑤ Land-side frozen walls
⑥ Waterproof pavement

3. **Prevent leakage** of contaminated water

⑦ Soil improvement by sodium silicate
⑧ Sea-side impermeable walls
⑨ Increase tanks (welded-joint tanks)

(Note 2) Underground tunnels containing pipes.



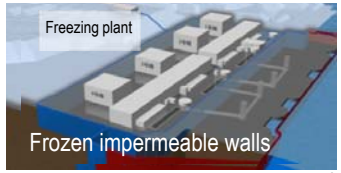
Multi-nuclide removal equipment (ALPS)

- This equipment removes radionuclides from the contaminated water in tanks, and reduces risks.
- It aims to reduce the levels of 62 nuclides in contaminated water to the legal release limit or lower (tritium cannot be removed).
- Furthermore, additional multi-nuclide removal equipment is installed by TEPCO as well as a subsidy project of the Japanese Government.

(Installation status of the facility that absorbs radioactive materials)

Land-side impermeable walls with frozen soil

- The walls surround the buildings with frozen soil and reduce groundwater inflow into the same.
- On-site tests have been conducted since last August. Construction work started in June and the freezing operation will start within FY 2014.



(Length: approx. 1,500m, frozen soil: approx. 70,000m^3)

Sea-side impermeable walls

- The walls aim to prevent the flow of contaminated groundwater into the sea.
- Installation of steel sheet piles is almost (98%) complete. Operation is scheduled to commence from this September.

(Installation status)

Progress status

◆ The temperatures of the Reactor Pressure Vessel (RPV) and the Primary Containment Vessel (PCV) of Units 1-3 have been maintained within the range of approx. 20-40℃*1 for the past month. There was no significant change in the density of radioactive materials newly released from Reactor Buildings in the air*2. It was evaluated that the comprehensive cold shutdown condition had been maintained.

*1 The values vary somewhat depending on the unit and location of the thermometer.
*2 The radiation exposure dose due to the current release of radioactive materials from the Reactor Buildings peaked at 0.03 mSv/year at the site boundaries. This is approx. 1/70 of the annual radiation dose by natural radiation (annual average in Japan: approx. 2.1 mSv/year).

Dismantling of Unit 1 R/B cover will start from early July

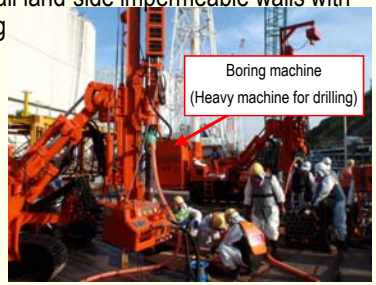
To facilitate fuel removal from Unit 1, there is a need to remove rubble in the upper part of the Reactor Building (R/B).

To facilitate rubble removal, dismantling of R/B cover will start from early July.

When dismantling the cover and removing rubble, sufficient measures will be taken to control scattering of radioactive materials, along with monitoring of these materials, to ensure the work progresses steadily.

Construction commenced for installing land-side impermeable walls with frozen soil

To prevent the inflow of groundwater into the buildings, there are plans to install land-side impermeable walls with frozen soil surrounding the buildings.
Aiming to commence freezing operation within FY2014, drilling for installing frozen pipes started in the Unit 1 northwest area from June 2.



<Installation of frozen pipes of land-side impermeable walls with frozen soil>

Resumption of 3-system operation of multi-nuclide removal equipment (ALPS)

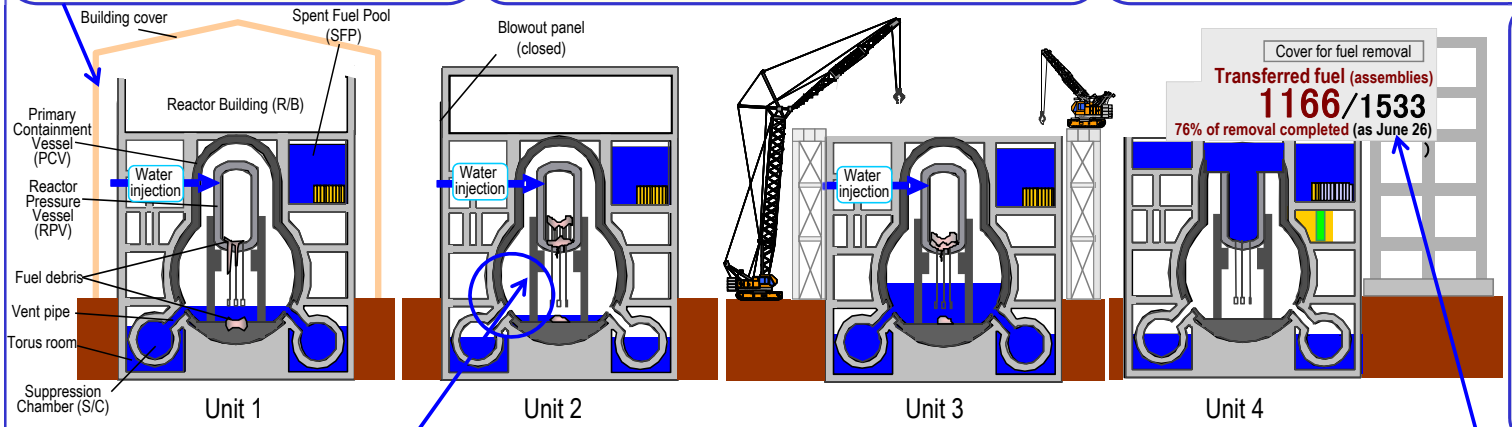
Regarding Systems A and C, operation was suspended without expanding contamination within the systems by detecting filter degradation at an early stage. After replacing the filters as with System B, treatment resumed on June 9 in System A and June 22 in System C (treatment resumed in all Systems).

Efforts will continue to complete treatment of contaminated water accumulated in tanks within FY2014.

Covering started for the whole area within the port

To prevent the spread of contamination due to contaminated soil being stirred up, covering over the sea bottom soil commences from June 30. The whole area will be covered within FY2014.

<Scope of additional covering over sea bottom soil within port>



Transfer to Temporary Administration Office Building near the field

To share information with the field and expedite any response, a Temporary Administration Office Building is under construction on the site of the Fukushima Daiichi Nuclear Power Station.

To the completed part of the building, approx. 400 staff members, including those of TEPCO's water treatment related sections, working at Fukushima Daini Nuclear Power Station, will transfer within July.


<External appearance of the Temporary Administration Office Building>

Installation of additional instrumentation in Unit 2 PCV

Aiming at improved reliability of monitoring instrumentation, additional thermometers and water level gauges were installed in Unit 2 PCV on June 5 and 6.
Measurement during the installation confirmed that the water level inside the PCV was approx. 300mm from the bottom.
The trend of added instrumentation will be monitored for approx. one month to evaluate the validity.

Status of groundwater bypass

To reduce the inflow of groundwater into the buildings and prevent increase in contaminated water, the steady release of pumped-up groundwater on the mountain side of the buildings has continued from May 21 to gradually reduce the groundwater level.
Based on the strict operation target (for tritium, 1,500 Bq/L (legal announcement density: 60,000 Bq/L)), pumped-up groundwater is released after ensuring the density is lower than this operation target each time. As increased tritium density was detected at one of 12 wells, monitoring has been enhanced by increasing the frequency of analysis on this well based on a predefined method, and it was confirmed that water quality at the time of release was sufficiently below the operation target.
Through continued monitoring of the radioactive material density in seawater, it is confirmed that the density was monitored within the same range as previously.

Inspection of overhead crane of Unit 4 SFP

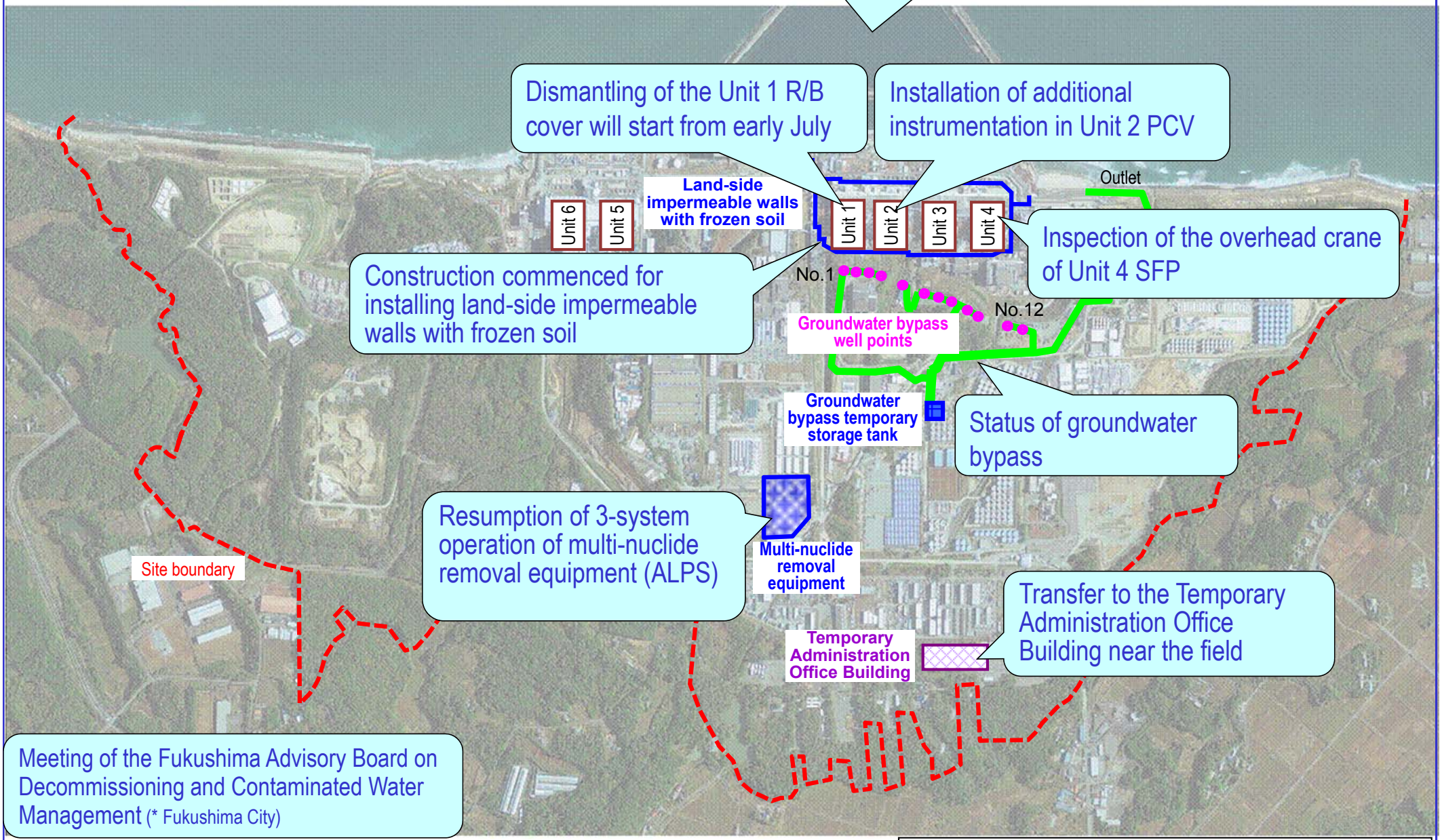
Due to annual inspection of the overhead cranes for Unit 4 and the common pool, fuel removal will be suspended from July 1 to early September.

This is the planned inspection and there is no change to the scheduled removal completion within 2014 (to date, approx. 70% of removal has been completed).

Meeting of the Fukushima Advisory Board on Decommissioning and Contaminated Water Management

On June 9, the 3rd meeting (in Fukushima City) was held, where based on feedback to date, efforts to provide information on Fukushima Daiichi Nuclear Power Station were introduced. Valuable opinions were also delivered to improve the provision of information.

Major initiatives – Locations on site

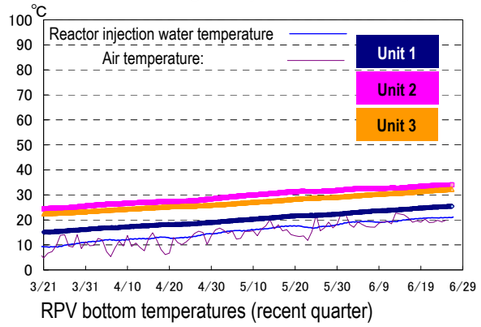


Provided by Japan Space Imaging, (C) DigitalGlobe

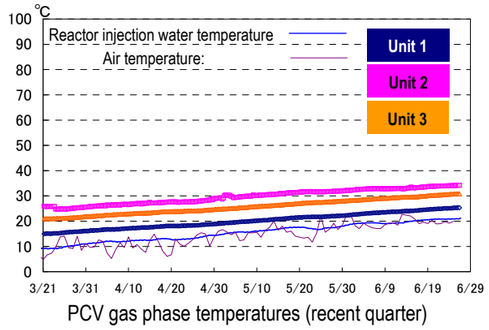
I. Confirmation of the reactor conditions

1. Temperatures inside the reactors

Through continuous reactor cooling by water injection, the temperatures of the Reactor Pressure Vessel (RPV) bottom and the Primary Containment Vessel (PCV) gas phase have been maintained within the range of approx. 20 to 40°C for the past month, though they vary depending on the unit and location of the thermometer.



RPV bottom temperatures (recent quarter)



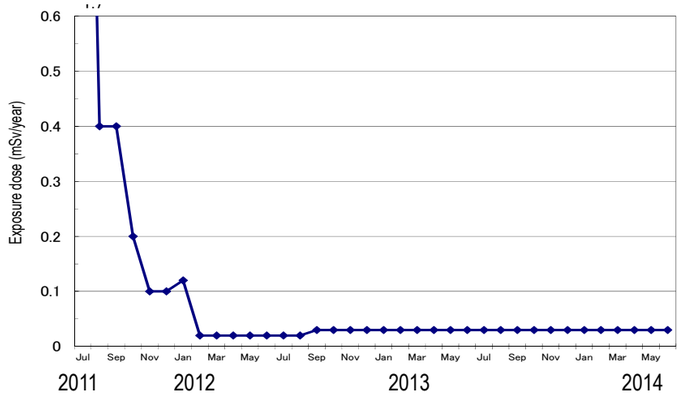
PCV gas phase temperatures (recent quarter)

* The trend graphs show part of the temperature data measured at multiple points.

2. Release of radioactive materials from the Reactor Buildings

The density of radioactive materials newly released from Reactor Building Units 1-4 in the air measured at site boundaries was evaluated at approx. 1.2 x 10^{-9} Bq/cm^3 for both Cs-134 and -137. The radiation exposure dose due to the release of radioactive materials was 0.03 mSv/year (equivalent to approx. 1/70 of the annual radiation dose by natural radiation (annual average in Japan: approx. 2.1 mSv/year)) at the site boundaries.

Annual radiation dose at site boundaries by radioactive materials (cesium) released from Reactor Building Units 1-4



(Reference)

* The density limit of radioactive materials in the air outside the surrounding monitoring area:
[Cs-134]: 2 x 10^{-5} Bq/cm^3
[Cs-137]: 3 x 10^{-5} Bq/cm^3

* Dust density around the site boundaries of Fukushima Daiichi Nuclear Power Station (actual measured values):
[Cs-134]: ND (Detection limit: approx. 1 x 10^{-7} Bq/cm^3)
[Cs-137]: ND (Detection limit: approx. 2 x 10^{-7} Bq/cm^3)

* Data of Monitoring Posts (MP1-MP8).
Data of Monitoring Posts (MPs) measuring airborne radiation rate around side boundaries show 1.6 - 4.6μSv/h (as of 2014/06/26 21:10)
To measure the variation of airborne radiation rate of MP2-MP8 more accurately, environmental improvement (tree trimming, removal of surface soil and shielding around the MPs) has been completed.

(Note) Different formulas and coefficients were used to evaluate the radiation dose in the facility operation plan and monthly report. The evaluation methods were integrated in September 2012. As the fuel removal from the spent fuel pool (SFP) commenced for Unit 4, the radiation exposure dose from Unit 4 was added to the items subject to evaluation since November 2013.

3. Other indices

There was no significant change in indices, including the pressure in the PCV and the PCV radioactivity density (Xe-135) for monitoring criticality, nor was any abnormality of cold shutdown condition or sign of criticality detected. Based on the above, it was confirmed that the comprehensive cold shutdown condition had been maintained and the reactors remained in a stabilized condition.

II. Progress status by each plan

1. Reactor cooling plan

The cold shutdown condition will be maintained by cooling the reactor by water injection and measures to complement status monitoring will continue to be implemented

➢ Reinstallation of supervisory instrumentation for Unit 2 PCV

- Some of the supervisory instrumentation (thermometer and water-level gauge) for PCV could not be installed in the planned locations during the work in August 2013 due to interference with existing grating. The instrumentation was removed on May 27, 2014 and new instruments were reinstalled on June 5 and 6. The measurement during the installation confirmed that the water level inside the PCV was approx. 300mm, which is almost the same as the overflow height of the vent pipe (see Figure 1). Regarding the instrument reading, variation will be monitored for about one month to verify the validity.

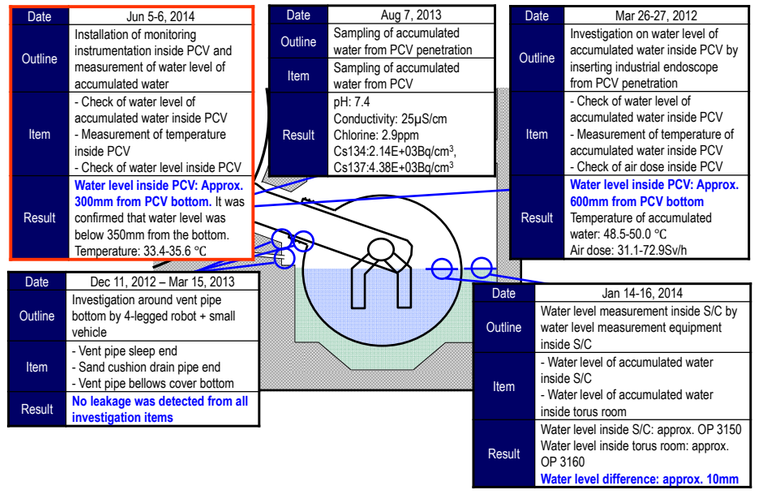


Figure 1: Unit 2 water level measurement results and previous PCV investigation results

➢ Replacement of the thermometer at the bottom of Unit 2 RPV

- Removal and replacement of the thermometer installed at the bottom of RPV, which was broken in February 2014, failed in April and the operation was suspended. The estimated cause was fixing or added friction due to rust having formed. To help remove the thermometer, tests to check rust formation and fixing are underway (from May 12).

2. Accumulated water-treatment plan

To tackle the increase in accumulated water due to groundwater inflow, fundamental measures to prevent such inflow into the Reactor Buildings will be implemented, while improving the decontamination capability of water-treatment and preparing facilities to control the contaminated water

➢ Preventing groundwater inflow to the Reactor Buildings

- From April 9, the operation of 12 groundwater bypass pumping wells commenced sequentially and pumping of groundwater commenced. Release commenced from May 21 in the presence of officials from the Intergovernmental Liaison Office for the Decommissioning and Contaminated Water Issue of the Cabinet Office. As of June 26, 8,635 m^3 of groundwater had been released. The pumped up groundwater has been temporarily stored in tanks and released after TEPCO and the third-party organization (Japan Chemical Analysis Center) confirms that its quality meets operational targets.
- The volume of pumped groundwater has been steadily increased to deliberately decrease the groundwater level.
- As tritium exceeding the operation target was detected from the sampled water from the groundwater bypass pumping well No. 12 on May 26, water pumping from that well was suspended on May 27. From the assessment results on the temporary storage tank side based on monitoring results (including third-party analysis), it was confirmed that the tritium density would not exceed the operation target. Water pumping resumed on June 12.
- To facilitate the installation of frozen impermeable walls surrounding Units 1-4 (a subsidy project of the Ministry of Economy, Trade and Industry), drilling for placement of frozen pipes commenced (from June 2). As of June 26, drilling at 42 points had been completed.
- To facilitate the installation of the sub-drain facility (by the end of September), drilling in 12 of 15 new pits was completed as of June 26. Regarding the sub-drain treatment facility, construction of the building from March 12 and installation of equipment inside the building from March 19 are underway.

➢ Operation of multi-nuclide removal equipment

- Hot tests using radioactive water are underway (System A: from March 30, 2013, System B: from June 13, 2013, System C: from September 27, 2013). To date, approx. 96,000 m^3 has been treated (as of June 24, including approx. 9,500m^3 stored in J1(D) tank, which contained water with a high density of radioactive materials at the System B outlet).

- Regarding Systems A, as the calcium density at the absorption vessel outlet increased (to 11ppm) on May 17, the early detection of carbonate slurry outflow from the filter meant operation was suspended. After replacing with improved filters, operation resumed from June 9.
- Regarding System B, after replacing with improved filters, the operation continued from May 23.
- Regarding Systems C, as the calcium density at the absorption vessel outlet increased (to 6.2ppm) on May 20, the early detection of carbonate slurry outflow from the filter meant operation was suspended. After replacing with improved filters and inspecting to verify the effectiveness of anti-corrosion measures, corrosion was detected in previously unaffected areas. After implementing additional measures, the operation resumed from June 22.
- To facilitate the installation of additional multi-nuclide removal equipment, foundation construction and steel frame building are underway. The attached electric equipment room building was completed (May 27). Installation of equipment commenced from June 21.
- To facilitate the installation of high-performance multi-nuclide removal equipment, a subsidy project of the Ministry of Economy, Trade and Industry, ground improvement was completed on June 4. Drilling, foundation construction and preparation for equipment installation are underway. The attached electric equipment room building was completed (June 12).

➢ Leakage from 4,000-ton notch tanks

- Leakage (gross β: 72,000Bq/L) was identified from near bolts on the upper side of some 4,000-ton notch tanks storing rainwater under the temporary release standard, which is accumulated inside the fences in the contaminated water tank area (June 2). The water level of the tanks was decreased to terminate the leakage (June 2). The estimated leakage volume from the tanks was 4.0m^3. Approx. 4.0m^3 of accumulated water inside the surrounding fences (gross β: 9,800Bq/L) was collected (June 3). Based on the radiation density inside the surrounding fences, it was estimated that 0.6m^3 of water having leaked from the tanks was collected. For the range of water leakage outside the fences (approx. 5 × 40m), soil recovery was conducted (approx. 31m^3).
- It is estimated that rainwater ingress from the opening on the tank top steadily increased the water level of the tank, which consequently leaked from the bolt hole located 11cm below the tank top. Daily patrol commenced (from June 4). Countermeasures for rainwater ingress from the tank top opening were implemented (June 5).

➢ Plan to install additional tanks

- In addition to the plan to increase the tank storage capacity to approx. 800,000 m^3 by the end of FY2014, there are plans to install additional tanks of approx. 30,000 m^3 by creating a new tank area.

➢ Measures in Tank Areas

- In case accumulated water leaks from a tank, duplication of tank fences and painting inside the fences are underway (see Figure 2). There are plans to reroute the release channel from outside to inside the port (installation of one of two channels was completed on June 14) (see Figure 3).

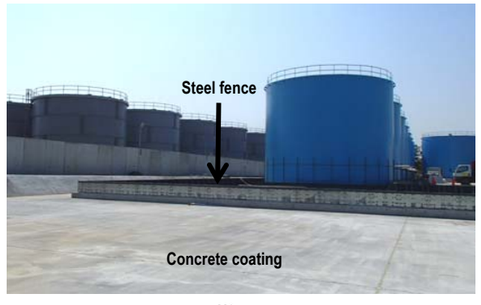


Figure 2: Status of duplication of tank fences and painting inside the fences

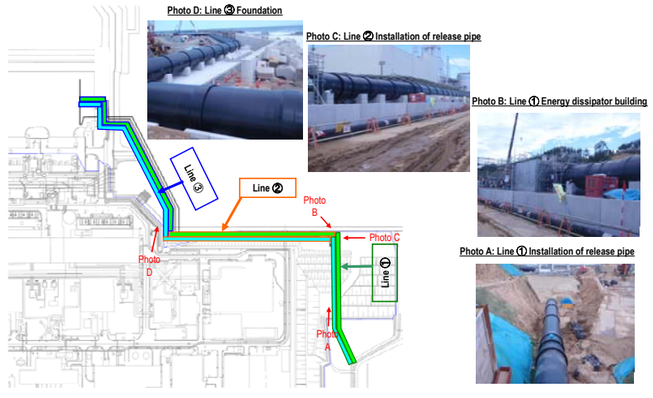


Figure 3: Status of rerouting of release channel

- The layout (approx. 80m) for implementing the ground improvement using improvement materials (apatite + zeolite + crushed stone) was decided (see Figure 4) as an additional and redundant measure to prevent outflow of radioactive strontium included in contaminated water of the tank at H4 Area, from which a leak was identified in August 2013, to the ocean. The ground improvement will be completed by the end of September.

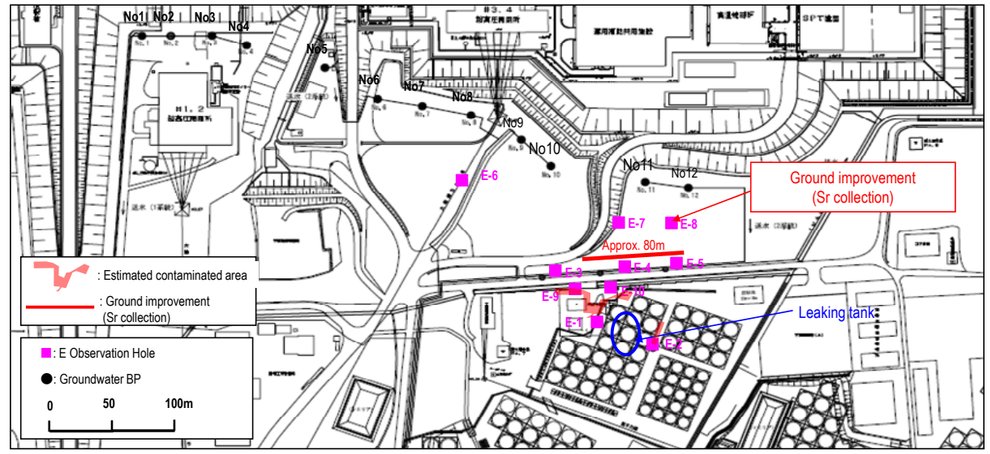


Figure 4: Collection of strontium collection from the soil – Scope of ground improvement

- Rainwater under the temporary release standard, which is accumulated inside the fences in the contaminated water tank area, was sprinkled on site after removing radioactive materials using rainwater treatment equipment since May 21 (as of June 23, a total of 1,707m^3).

➢ Treatment and removal of contaminated water from the Main Trenches

- As for the Main Trench Unit 2, treatment of contaminated water using mobile treatment equipment is underway (cesium: from November 14, 2013 to April 10, 2014, strontium: from April 10 to 25).
- As for the Main Trench Unit 3, removal of cesium in contaminated water using mobile treatment equipment is underway (from November 15, 2013). It was confirmed that the density of radioactive cesium had declined.
- To facilitate the removal of contaminated water in the Main Trench Unit 2, water stoppage by freezing two connections between the trench and Reactor Building is scheduled. Regarding Vertical Shaft A, the freezing of all frozen pipes commenced from April 28. As the temperature did not decline sufficiently, additional frozen pipes were installed (two ducts were completed on June 4) and the water level in the building was adjusted to decrease the water flow late around the frozen pipes. Injection of grout between the building and packer and freezing of the ground outside the trench are being examined. Regarding the other open-cut duct, installation of frozen pipes and temperature measurement ducts were completed (June 11) and the freezing operation by all frozen pipes commenced from June 13. Positional adjustment of the pump for pumping up contaminated water is underway.
- To facilitate the removal of contaminated water from the Main Trench Unit 3, water stoppage by freezing two connections between the trench and building is scheduled. Drilling of holes to install frozen pipes and temperature measurement ducts is underway (from May 5 and scheduled for completion in July).

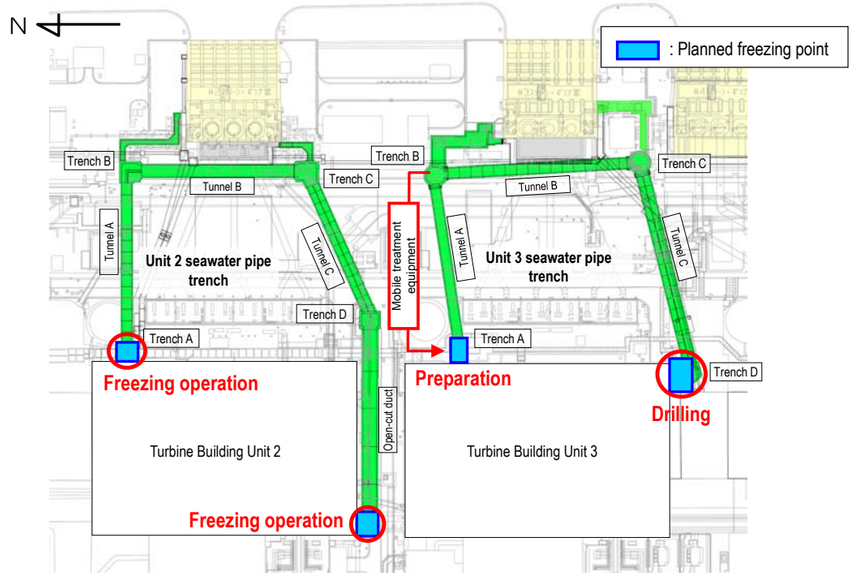


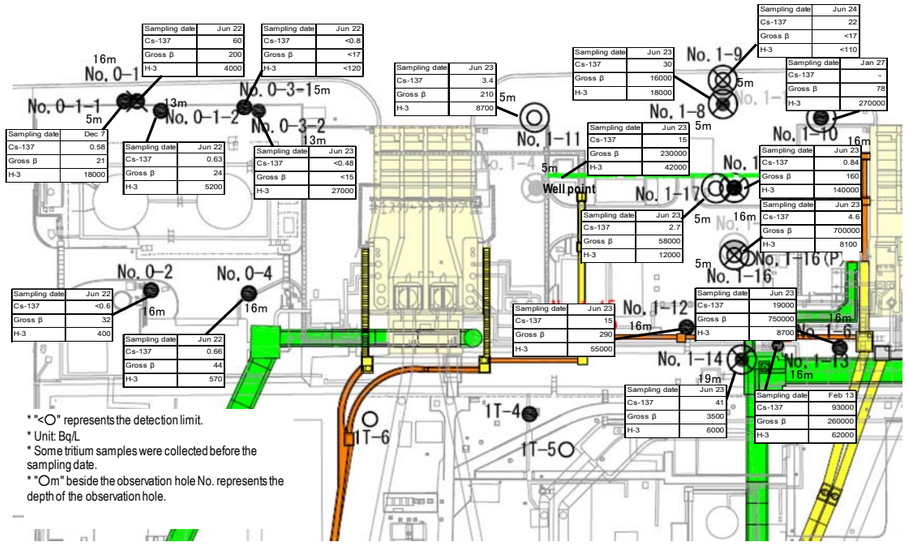
Figure 5: Image of contaminated water treatment in main trench and frozen water stoppage

3. Plan to reduce radiation dose and mitigate contamination

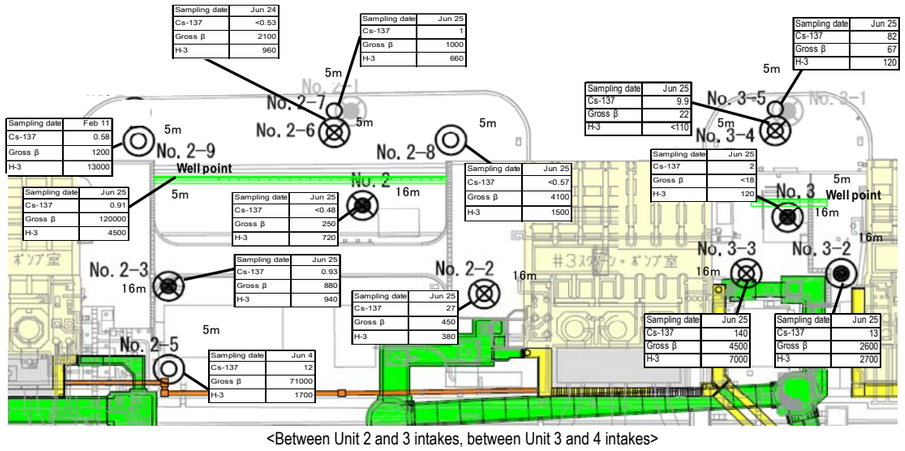
Effective dose-reduction at site boundaries and purification of the port water to mitigate the impact of radiation on the external environment

➢ Status of groundwater and seawater on the east side of Turbine Building Units 1 to 4

- Regarding the groundwater near the bank of the Unit 1-4 intakes, the density of radioactive materials is maintained at the same level as in May (see Figure 6).



<Unit 1 intake north side, between Unit 1 and 2 intakes>



<Between Unit 2 and 3 intakes, between Unit 3 and 4 intakes>

Figure 6: Groundwater density on the Turbine Building east side

- Regarding the groundwater near the bank on the north side of the Unit 1 intake, pumping of 1 m³/day of water from the Observation Hole No. 0-3-2 continues.
- Regarding the groundwater near the bank between the Unit 1 and 2 intakes, water pumping from the well point (approx. 50 m³/day) and the pumping well No. 1-16 (P) (1m³/day) installed near the Observation Hole No. 1-16 continues.
- Near the bank between the Unit 2 and 3 intakes, water pumping from the north side of the well point continues (4m³/day).
- Tritium was detected in groundwater of the lower permeable layer (second permeable layer: alternative layer). Measurement of water quality and water level continues.
- Regarding the seawater inside the sea-side impermeable walls, both densities of gross β radioactive materials and tritium have been increasing since March. The estimated causes were the reduction in seawater volume inside the impermeable walls.
- <u>The density of radioactive materials in seawater inside the open channels of Units 1-4 have been declining slightly since last autumn. The density of radioactive materials in seawater at the additional sampling point outside the sea-side impermeable walls was the same level as at the point on the north side of the east breakwater.</u>
- <u>The density of radioactive materials in seawater within the port has been declining slightly.</u>
- The radioactive material density in seawater at the port entrance and outside it has been maintained within the same range as previously.
- In response to the progress in constructing impermeable walls on the sea side, placement of concrete in water and landfill are underway inside the impermeable walls. Alongside these works, sampling points inside the impermeable walls ("Between Unit 1 and 2 intakes" and "Between Unit 2 and 3 intakes") were abolished and a new sampling point ("Unit 2 intake (in front of impermeable walls)") was added (see Figure 8).

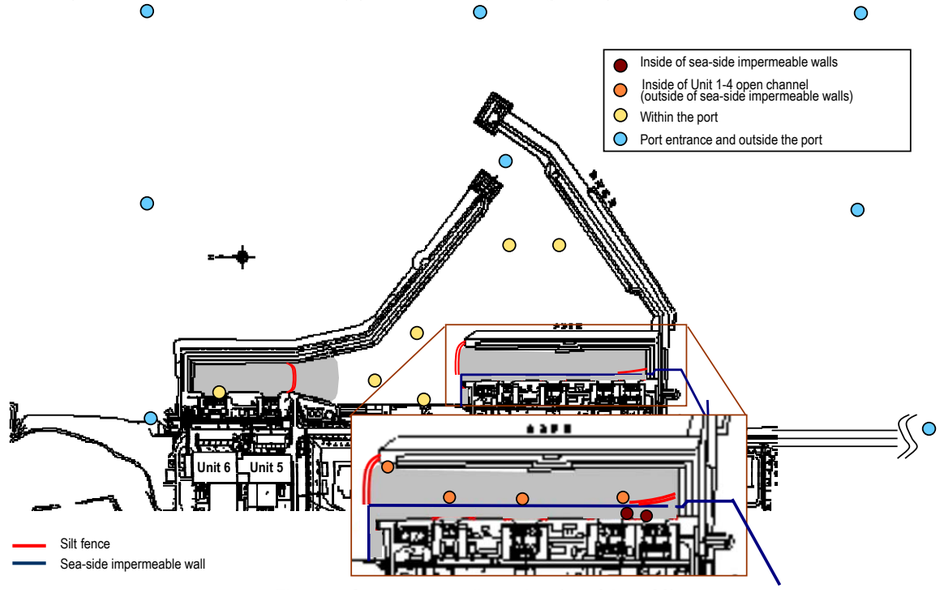
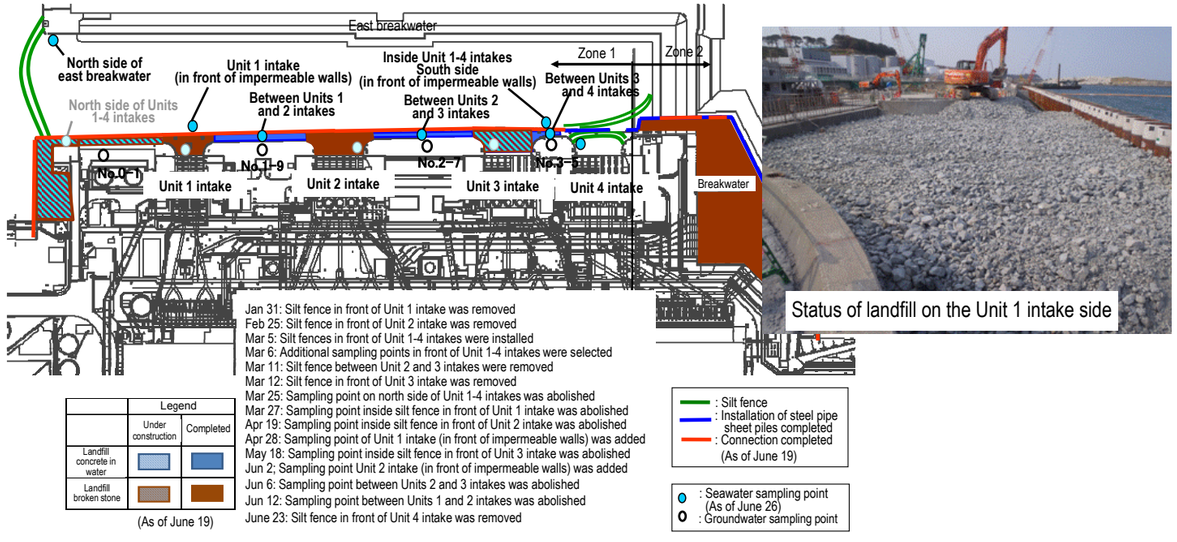


Figure 7: Seawater sampling points (as of June 26)



Status of landfill on the Unit 1 intake side

Figure 8: Progress status of impermeable walls on the sea side

- To prevent contamination spreading due to soil being stirred up from under the sea, covering over the sea bottom soil inside the port will commence from June 30. Composition tests for covering materials, hull outfitting and bathymetry are currently underway as preparation.
- The Unit 1-3 release channels* were additionally investigated after contamination had been detected. As the strontium density in accumulated water of the channels was approx. up to 10% of the density of gross β radioactive materials, <u>it was estimated that most of the gross β radioactive materials comprised cesium. After the water quality of the Unit 1 release channel downstream had been investigated,</u> the densities of gross β radioactive materials and cesium were approx. 1/2 - 1/3 of those upstream. As the densities of tritium and salt exceeded those on the upper stream, <u>the release channels may be affected by seawater or groundwater.</u>

* Release channel: A channel for releasing seawater used for cooling during normal operation, where rainwater is currently mixed with existing seawater.

4. Plan to remove fuel from the spent fuel pools

Work to help remove spent fuel from the pool is progressing steadily while ensuring seismic capacity and safety. The removal of spent fuel from the Unit 4 pool commenced on November 18, 2013 and efforts are being made to complete the process by around the end of 2014

➢ Fuel removal from the Unit 4 spent fuel pool

- Fuel removal from the spent fuel pool (SFP) commenced on November 18, 2013.
- As of June 26, 1144 of 1331 spent fuel assemblies and 22 of 202 non-irradiated fuel assemblies had been transferred to the common pool. More than 76% of the fuel removal was completed.
- For the annual inspection of overhead cranes of Unit 4 and the SFP, fuel removal will be suspended from July 1 to early September. During this period, racks for distorted/ damaged fuel assemblies will be installed in the common pool.
- As some of the procurement of storage casks was prolonged, the common pool run out of space. The plan was therefore revised to include transferring new fuel assemblies (all remaining 180 fuel assemblies) in the Unit 4 spent fuel pool to Unit 6.

➢ Main work to help remove spent fuel at Unit 3

- The removal of rubble inside the SFP was suspended due to failure of the brake for the crawler crane rotary (May 19). The brake for the rotary will be replaced during the annual inspection of the crawler crane (from June 16 to the end of July).
- Measures to reduce the radiation dose (decontamination and shielding) on the Reactor Building 5th floor (operating floor) have been underway since October 15, 2013. In some areas where planned decontamination was completed, the radiation dose was reduced to approx. 1/3. Given the large gap between the planned value (reduction to 1/100) and this actual value, additional decontamination and shielding measures are being examined.
- To facilitate fuel removal efforts inside the SFP, a new cover for fuel removal, fuel handling machine and transportation container will all be installed. The implementation plan to "prevent fuel drop and the occurrence of criticality," "monitor radioactivity," "transportation container" and "structure strength and quake resistance of fuel handling machine" was submitted (June 25).

➢ Main works to help remove spent fuel at Unit 1

- To help remove rubble from the Reactor Building 5th floor (operating floor) prior to fuel removal, dismantling of the building cover will commence. When dismantling the building cover and removing rubble, sufficient measures to reduce radioactive materials will be implemented along with monitoring of radioactive materials.

5. Fuel debris removal plan

In addition to decontamination and shield installation to improve PCV accessibility, technology was developed and data gathered as required to prepare to remove fuel debris (such as investigating and repairing PCV leak locations)

➢ Contamination status survey and decontamination of Reactor Building Units 1 to 3

- To examine methods to reduce the radiation dose on the 2nd and 3rd floors of the Reactor Building Units 1 to 3, measurement of the radiation dose rates and investigation using gamma cameras with remote-control robots are underway on the 2nd and 3rd floors of Units 1 and 2, and the 2nd floor of Unit 3. (Unit 1: from April 28 to May 22, Unit 2: from May 28 to June 11, Unit 3: measurement unavailable due to rubble on the steps).
- To investigate areas significantly contributing to radiation dose rates (hot spots) on the 1st floor of the Reactor Building Units 1 to 3, an investigation using gamma cameras mounted on the remote-control robot is underway in the upper areas of the relevant floors. (Unit 1: May 9-29, June 13 and 14, Unit 2: June 19 and 20, Unit 3: June 4-10, from June 24 and scheduled for completion on July 2)

➢ Investigation of Unit 1 Suppression Chamber (S/C) upper part

- To check for any leakage from the structure around the upper part of the point where water flow outside S/C was detected when investigating using a surface boat in November 2013, the leak points of the upper part of S/C were investigated from the outer catwalk (passage for investigation) of the upper part of the S/C in the demonstration of the S/C upper part investigative equipment and the torus room wall investigative equipment being developed in the subsidy project of the Ministry of Economy, Trade and Industry "Investigation and development of repair (water-stoppage) technology to facilitate water filling of primary containment vessels" is underway (May 27, 29 and June 10). However, the investigative scope revealed no leakage except from the expansion joint cover of the vacuum break line identified on May 27. An insulation plate dropped on the catwalk was detected. The radiation dose on the catwalk is approx. 200 – 2400 mSv/h.

➢

➢ Investigation of the east-side wall of the Unit 1 torus room

- To investigate the status of accumulated water flow from the Reactor Building to the Turbine Building, investigation pipe penetrations on the east-side wall of the Reactor Building (the Turbine Building side) were investigated (June 10, see Figure 9). No flow was detected on the water surface above the five penetrations, nor any flow around the penetrations when additionally investigating two of these five penetrations to check for any flow underwater using tracer (clay particles). Regarding the remaining three penetrations, as obstacles hindered any effort to insert a camera, the underwater check failed. Checks for any leakage will be conducted before commencing water-stoppage work between the buildings using the underwater wall investigative equipment, which is under demonstration in Unit 2.

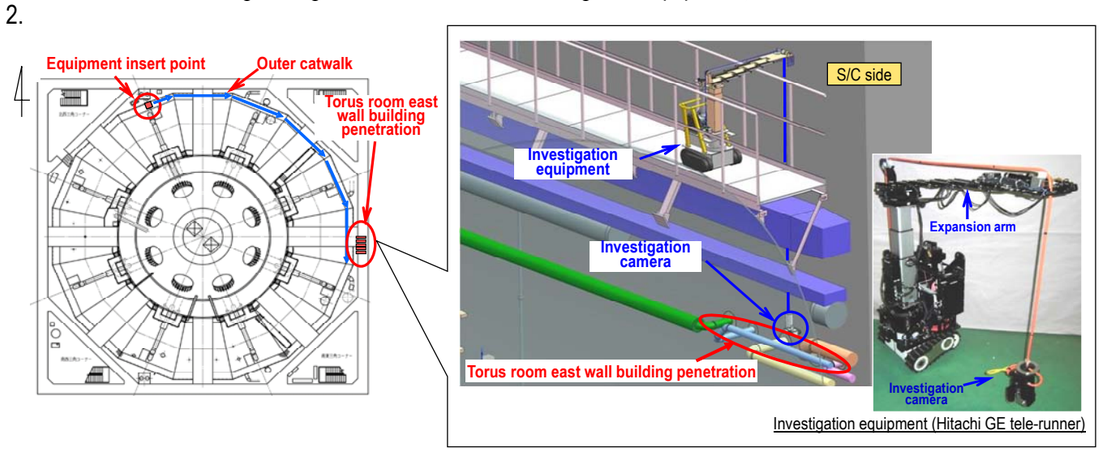


Figure 9: Image of investigation of the torus room east-side wall

➢ Demonstration on east-side wall of Unit 2 torus room

- Regarding the torus room wall investigative equipment being developed in the subsidy project of the Ministry of Economy, Trade and Industry "Investigation and development of repair (water-stoppage) technology to facilitate water filling of primary containment vessels," the demonstration on the walls (east-side walls on the north side) of the Unit 2 torus room will be conducted (from mid- to late July). Two types of equipment (a swimming robot and a floor traveling robot). The ability of these robots to check for flows of accumulated water will be verified using actual machines (see Figure 10).

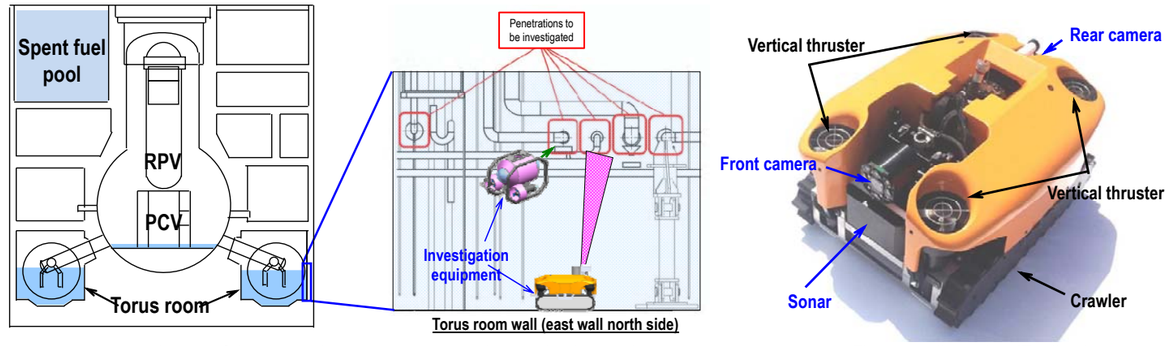


Image of demonstration on torus room wall investigative equipment

Floor traveling robot (Trydiver)

Figure 10: Investigation of Unit 2 torus room east wall

6. Plan to store, process and dispose of solid waste and decommission reactor facilities

Promoting efforts to reduce and appropriately store waste generated and R&D to facilitate adequate and safe storage, processing and disposal of radioactive waste

➢ Management status of rubble and trimmed trees

- As of the end of May, the total storage volume of concrete and metal rubble was approx. 103,500m^3 (-1,800m^3 compared to at the end of April, area occupation rate: 78%). The total storage volume of trimmed trees was approx. 76,500m^3 (+3,400m^3 compared to at the end of April, area occupation rate: 55%). The decrease in rubble was mainly attributable to removing things stored in the area and construction when installing frozen impermeable walls.

The increase in trimmed trees was mainly attributable to construction related to installing additional multi-nuclide removal equipment and tanks.

➢ Management status of secondary waste from water treatment

- As of June 24, the total storage volume of waste sludge was 597 m^3 (area occupation rate: 85%). The total number of stored spent vessels and high-integrity containers (HIC) of multi-nuclide removable equipment was 973 (area occupation rate: 38%).

7. Plan for staffing and ensuring work safety

Securing appropriate staff long-term while thoroughly implementing workers' exposure dose control. Improving the work environment and labor conditions continuously based on an understanding of workers' on-site needs

➢ Staff management

- The monthly average number of people registered for at least one day per month to work on site during the past quarter from February to April was approx. 10,400 (TEPCO and partner company workers), which exceeds the monthly average number of workers (approx. 8,000). Accordingly, sufficient people are registered to work on site.
- It was confirmed with the prime contractors that the estimated manpower necessary for the work in July (approx. 5,080 per day: TEPCO and partner company workers)* would be secured at present. The average numbers of workers per day for each month of last fiscal year (actual value) were maintained with approx. 3,000 to 5,000 per month since August (See Figure 11). * Workers with whom contract procedures had not yet been completed were excluded from the total for each month.
- As of May, the local employment ratio (TEPCO and partner company workers) was approx. 50%.

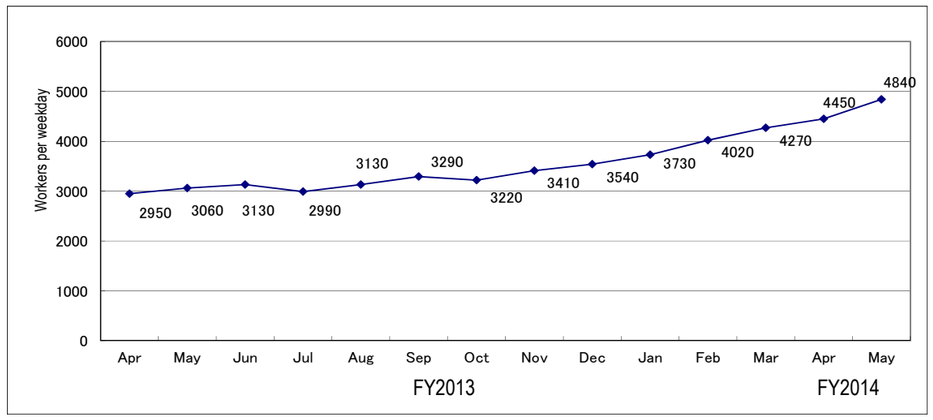


Figure 11: Changes in the average number of workers per day for each month since fiscal 2013 (actual values)

- The average exposure dose of workers was maintained at approx. 1mSv/month by implementing measures to reduce exposure dose for each work and relocation of workers based on the dose forecast. (Reference: annual average exposure dose 20mSv/year≒1.7mSv/month)
- Regarding most workers, the exposure dose is sufficiently within the dose limit and at a level which allows them to continue engaging in radiation work.

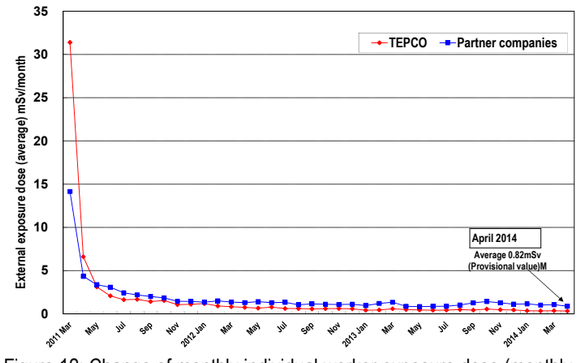


Figure 12: Change of monthly individual worker exposure dose (monthly average dose) (monthly average exposure dose since March 2011)

Category (mSv)	Mar 2011-Apr 2014		
	TEPCO	Partner companies	Total
More than 250	6	0	6
More than 200 up to 250	1	2	3
More than 150 up to 200	25	2	27
More than 100 up to 150	118	20	138
More than 75 up to 100	272	133	405
More than 50 up to 75	319	980	1299
More than 20 up to 50	611	4556	5167
More than 10 up to 20	556	4207	4763
More than 5 up to 10	454	3975	4429
More than 1 up to 5	731	7453	8184
Up to 1	1077	8647	9724
Total	4170	299.75	34145
Max. (mSv)	678.80	238.42	678.80
Average (mSv)	23.56	10.94	12.49

○ Among 34,145 persons working between March 11, 2011 to April 30, 2014
- 33,971 (99.5%): accumulated dose since the accident is 100mSv or lower
- 32,267 (94.5%): accumulated dose since the accident is 50mSv or lower

Figure 13: Distribution of worker's accumulated exposure dose (Distribution of accumulated exposure dose since March 11, 2011)

➢ Efforts to improve the labor environment

- The 1st phase construction of the Temporary Administration Office Building will be completed on June 30. Approx. 400 staff members, including those of TEPCO's water treatment related sections, working at Fukushima Daini Nuclear Power Station, will transfer within July.

➢ Outbreak status of heat stroke

- This fiscal year, a total of five workers got heat stroke as of June 26, including one attributable to work and potential patients. Continued measures will be taken to prevent heat stroke. (Last year, no worker got heat stroke as of June end with no patient or potential patient attributable to work)

8. Others

➢ Results of assessment of candidate sites to locate Radioactive Material Analysis and Research Facility (report)

- Based on the "basic concept of the Radioactive Material Analysis and Research Facility and technical requirements for location" approved at the Council for the Decommissioning of TEPCO's Fukushima Daiichi Nuclear Power Station (the 6th meeting) held in November 14, 2013, the Japan Atomic Energy Agency, which is the organization constructing and operating the facilities, assessed the candidate sites, and submitted a report to the Minister of Economy, Trade and Industry, which chairs the Team for Countermeasures for Decommissioning and Contaminated Water Treatment (June 27).

➢ The 3rd meeting of the Fukushima Advisory Board on Decommissioning and Contaminated Water Management

- On June 9, the 3rd meeting (in Fukushima City) was held, where the newsletter from the on-site office created based on the feedback to date to show the efforts to provide information on Fukushima Daiichi Nuclear Power Station and views from the fields was introduced. Valuable opinions were also delivered to improve the provision of information.

➢ Implementers of projects for contaminated water treatment (METI FY2013 supplementary budget) were decided

- Public offerings was made for (1) seawater purification technology verification project, (2) soil radioactive materials collection technology verification project, (3) contaminated water storage tank decontamination technology verification project and (4) unmanned boring technology verification project (offering period: March 24 - May 19, 2014).
- Through screening by the review board comprising exerts within and outside Japan, a total of 11 proposals were adopted on June 19 (three of which were related to overseas companies).

➢ Public offering for the decommissioning project (METI FY2013 supplementary budget) started

- Based on 194 items of technological information provided in January 2014, public offering started for the project to examine the concept for the method (alternative) to remove fuel debris in the air without filling the Reactor Buildings with water and the feasibility of element technology necessary for the alternative method (June 27).

Status of seawater monitoring within the port
(comparison between the highest values in 2013 and the latest values)

Appendix 1

"The highest value" → "the latest value (sampled during June 16-23)"; unit (Bq/L); ND represents a value below the detection limit

【In front of Unit 6 intake】

Cesium-134: 3.3 (2013/10/17) → ND (1.1) Below 1/3
Cesium-137: 9.0 (2013/10/17) → ND (1.0) Below 1/7
Gross β: 74 (2013/ 8/19) → ND (16) Below 1/4
Tritium: 67 (2013/ 8/19) → 3.9 Below 1/10

【North side in the port】

Cesium-134: 4.4 (2013/12/24) → ND (1.2) Below 1/3
Cesium-137: 10 (2013/12/24) → ND (1.4) Below 1/7
Gross β: 60 (2013/ 7/ 4) → ND (16) Below 1/3
Tritium: 59 (2013/ 8/19) → 3.7 Below 1/10

【In front of shallow draft quay】

Cesium-134: 5.0 (2013/12/ 2) → ND (1.3) Below 1/3
Cesium-137: 8.4 (2013/12/ 2) → ND (0.92) Below 1/9
Gross β: 69 (2013/ 8/19) → ND (16) Below 1/4
Tritium: 52 (2013/ 8/19) → 12 Below 1/4

【West side in the port】

Cesium-134: 2.8 (2013/12/ 2) → ND (2.0) Below 8/10
Cesium-137: 5.8 (2013/12/ 2) → ND (1.8) Below 1/3
Gross β: 46 (2013/ 8/19) → ND (19) Below 1/2
Tritium: 24 (2013/ 8/19) → 4.8 Below 1/5

【Port entrance】

Cesium-134: 3.3 (2013/12/24) → ND (0.81) Below 1/4
Cesium-137: 7.3 (2013/10/11) → ND (1.4) Below 1/5
Gross β: 69 (2013/ 8/19) → ND (16) Below 1/4
Tritium: 68 (2013/ 8/19) → ND (1.7) Below 1/40

【East side in the port】

Cesium-134: 3.5 (2013/10/17) → ND (1.3) Below 1/2
Cesium-137: 7.8 (2013/10/17) → ND (1.0) Below 1/7
Gross β: 79 (2013/ 8/19) → ND (16) Below 1/4
Tritium: 60 (2013/ 8/19) → ND (1.7) Below 1/30

【South side in the port】

Cesium-134: 32 (2013/10/11) → 7.5 Below 1/4
Cesium-137: 73 (2013/10/11) → 18 Below 1/4
Gross β: 320 (2013/ 8/12) → ND (19) Below 1/10
Tritium: 510 (2013/ 9/ 2) → ND (110) Below 1/4

Sea side impermeable wall

Silt fence

Cesium-134: 89 (2013/10/10) → 14 Below 1/6
Cesium-137: 190 (2013/10/10) → 41 Below 1/4
Gross β: 1,400 (2013/11/ 7) → 200 1/7
Tritium: 4,800 (2013/11/ 7) → 630 Below 1/7
(As measurement was terminated due to landfill, values are as of March 2014)

Cesium-134: 5.3 (2013/ 8/ 5) → ND (1.9) Below 1/2
Cesium-137: 8.6 (2013/ 8/ 5) → 2.3 Below 1/3
Gross β: 40 (2013/ 7/ 3) → ND (19) Below 1/2
Tritium: 340 (2013/ 6/26) → ND (1.9) Below 1/100

Unit 5

	Legal discharge limit
Cesium-134	60
Cesium-137	90
Strontium-90 (strongly correlate with Gross β)	30
Tritium	60,000

Summary of TEPCO data as of June 26

Source: TEPCO website
Analysis results on nuclides of radioactive materials around Fukushima Daiichi Nuclear Power Station
http://www.tepco.co.jp/nu/fukushima-np/f1/smp/index-j.html

Status of seawater monitoring around outside of the port
(comparison between the highest values in 2013 and the latest values)

(The latest values sampled during June 17-24)

	Legal discharge limit
Cesium-134	60
Cesium-137	90
Strontium-90 (strongly correlate with Gross β)	30
Tritium	60,000

Unit (Bq/L); ND represents a value below the detection limit; values in ( ) represent the detection limit; ND (2013) represents ND throughout 2013

【Northeast side of port entrance(offshore 1km)】

Cesium-134: ND (2013) → ND (0.62)
Cesium-137: ND (2013) → ND (0.58)
Gross β: ND (2013) → ND (17)
Tritium: ND (2013) → ND (1.9)

【East side of port entrance (offshore 1km)】

Cesium-134: ND (2013) → ND (0.75)
Cesium-137: 1.6 (2013/10/18) → ND (0.70) Below 1/2
Gross β: ND (2013) → ND (17)
Tritium: 6.4 (2013/10/18) → ND (1.9) Below 1/3

【Southeast side of port entrance(offshore 1km)】

Cesium-134: ND (2013) → ND (0.58)
Cesium-137: ND (2013) → ND (0.66)
Gross β: ND (2013) → ND (17)
Tritium: ND (2013) → ND (1.9)

Cesium-134: ND (2013) → ND (0.71)
Cesium-137: ND (2013) → ND (0.68)
Gross β: ND (2013) → ND (17)
Tritium: 4.7 (2013/ 8/18) → ND(1.9) Below 1/2

【North side of north breakwater(offshore 0.5km)】

【Port entrance】

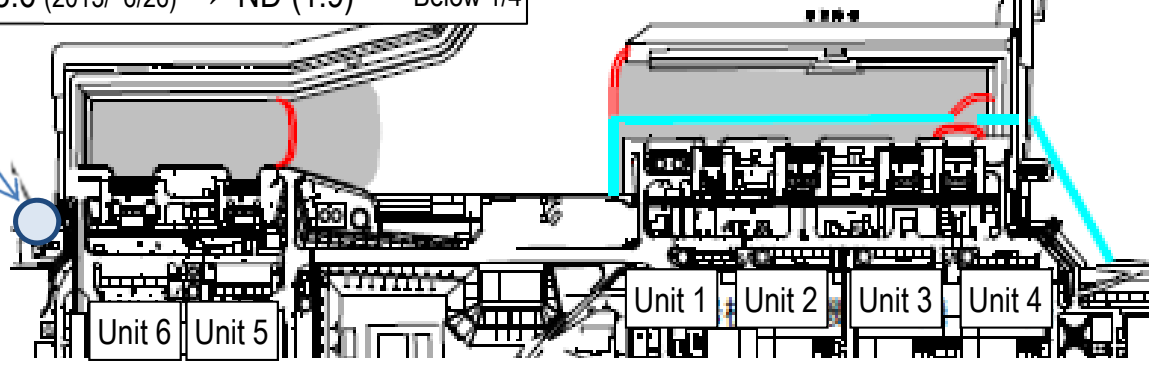
Cesium-134: 3.3 (2013/12/24) → ND (0.81) Below 1/4
Cesium-137: 7.3 (2013/10/11) → ND (1.4) Below 1/5
Gross β: 69 (2013/ 8/19) → ND (16) Below 1/4
Tritium: 68 (2013/ 8/19) → ND (1.7) Below 1/40

【South side of south breakwater(offshore 0.5km)】

Cesium-134: ND (2013) → ND (0.96)
Cesium-137: ND (2013) → ND (0.58)
Gross β: ND (2013) → ND (17)
Tritium: ND (2013) → ND (1.9)

【North side of Units 5 and 6 discharge channel】

Cesium-134: 1.8 (2013/ 6/21) → ND (0.69) Below 1/2
Cesium-137: 4.5 (2013/ 3/17) → ND (0.72) Below 1/3
Gross β: 12 (2013/12/23) → 14
Tritium: 8.6 (2013/ 6/26) → ND (1.9) Below 1/4



Cesium-134: ND (2013) → ND (0.56)
Cesium-137: 3.0 (2013/ 7/15) → ND (0.58) Below 1/3
Gross β: 15 (2013/12/23) → 9.7 Below 7/10
Tritium: 1.9 (2013/11/25) → ND (1.9)

Sea side impermeable wall

Silt fence

【Around south discharge channel】

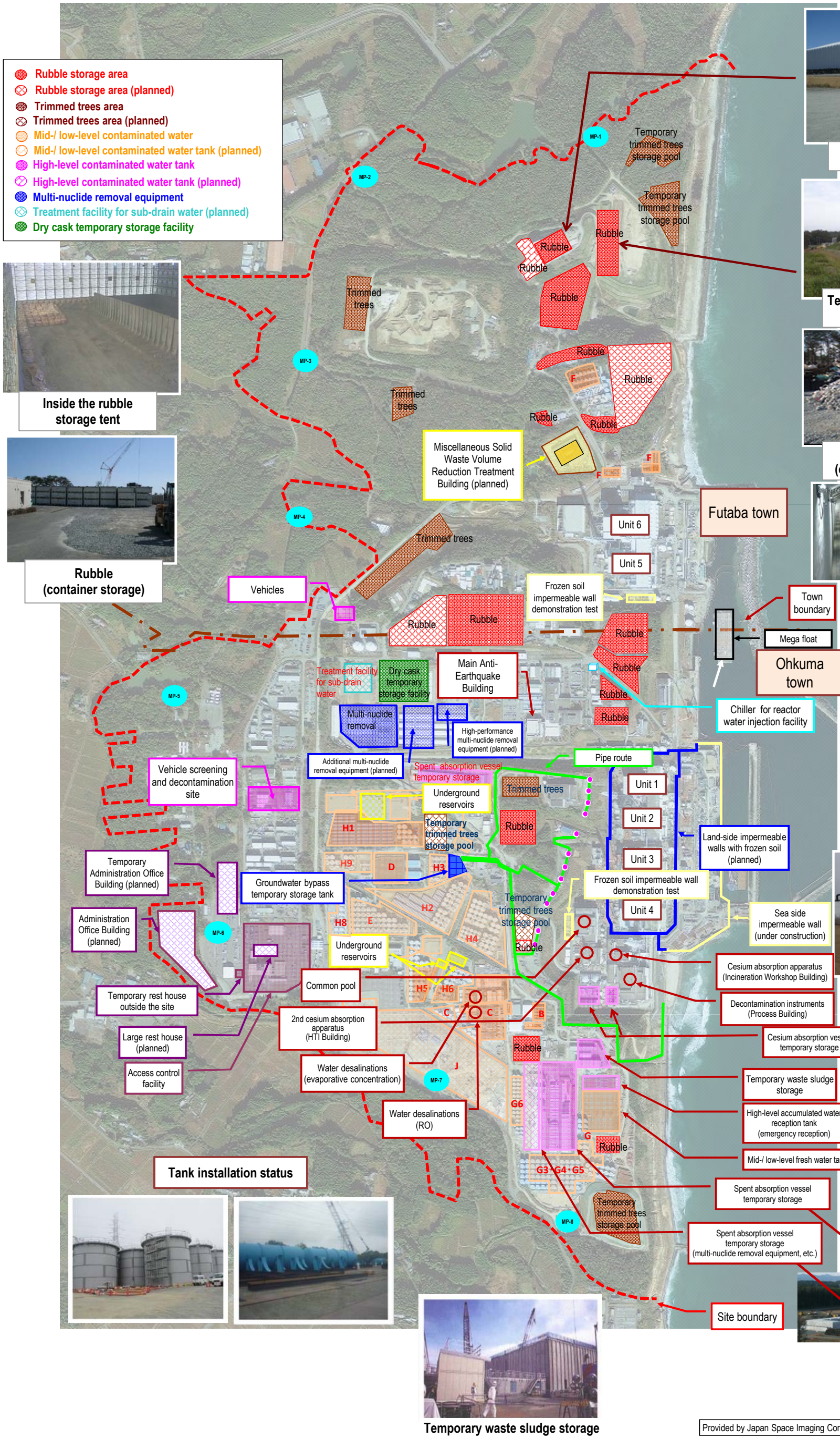
Summary of TEPCO data as of June 26

Source: TEPCO website, Analysis results on nuclides of radioactive materials around Fukushima Daiichi Nuclear Power Station, http://www.tepco.co.jp/nu/fukushima-np/f1/smp/index-j.html

Appendix 2

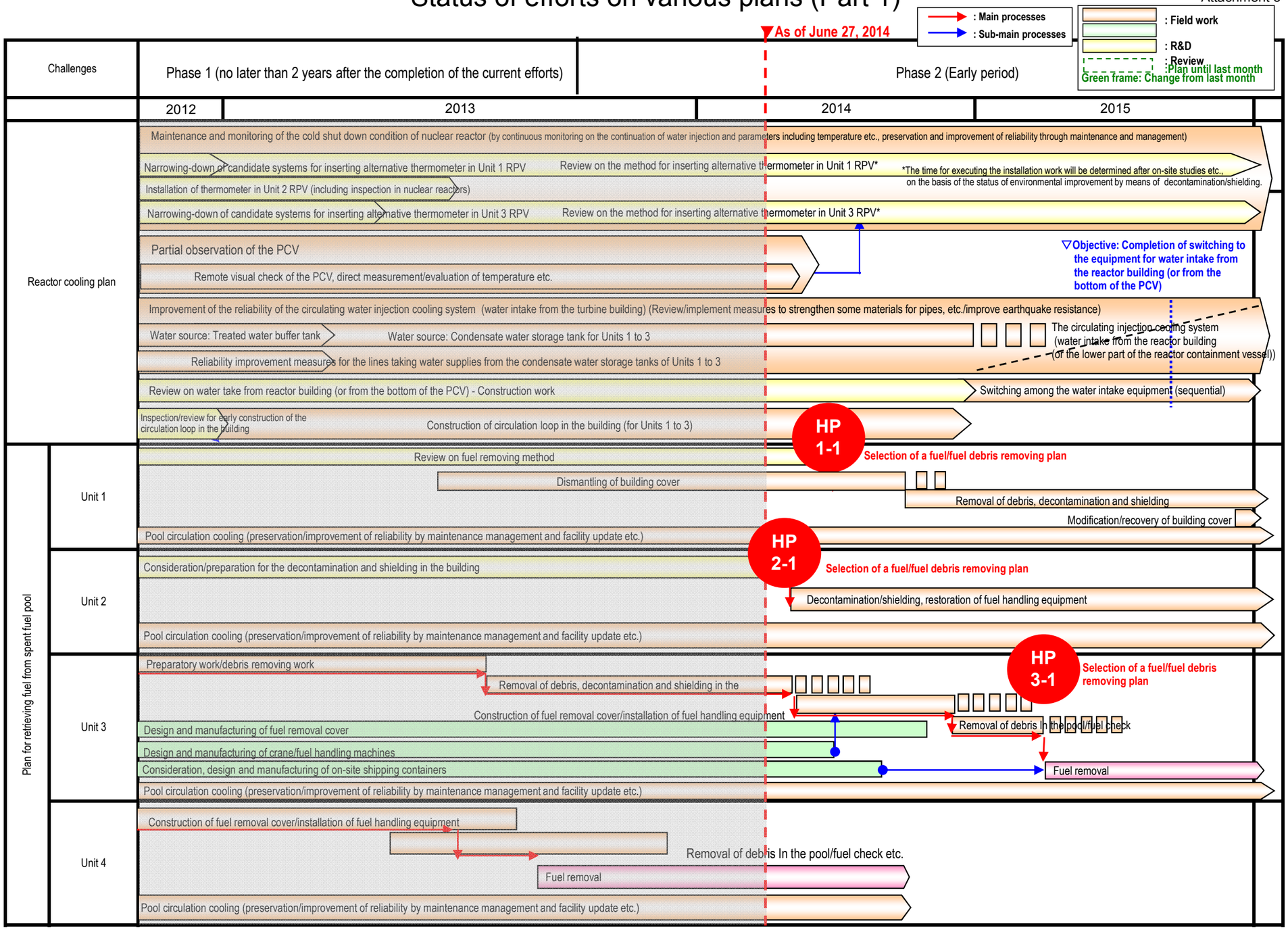
June 27, 2014

TEPCO Fukushima Daiichi Nuclear Power Station Site Layout



Status of efforts on various plans (Part 1)

Attachment 3



Status of efforts on various plans (Part 2)

: Main processes
: Sub-main processes
: Field work
: R&D
: Review
:Plan until last month
Green frame: Change from last month

As of June 27, 2014

Challenges	Phase 1 (no later than 2 years after the completion of the current efforts)		Phase 2 (Early period)	
	2012	2013	2014	2015

Fuel debris removal plan

Decontamination of the inside of the building
- Review on decontamination technology/development of remote decontamination equipment
- Development of remote contamination investigation technologies (1)
- Development of remote decontamination technologies (1)
- Site survey and on-site demonstration
- Objective: Establish decontamination robot technology
- Decontamination, shielding, etc. in the building (Work environment improvement (1))
- First floor of the reactor building
- To be continued

Measures to reduce overall dose
- Formulation of a comprehensive plan for exposure reduction
- Grasping of the situation of work area
- Formulation of work plan in the reactor building
- Formulation of work plan on the floor with damage from explosion

Inspection/repair of leaking locations of the PCV
- R&D for inspection/repair of leaking locations of the PCV (including stop leakage between buildings).
- Design, manufacturing and testing etc. of the equipment for inspecting the PCV (2)
- Design, manufacturing and testing etc. of the equipment for inspecting the PCV (3), (6)
- [Units 1 and 3] Inspection of the basement of the nuclear reactor building, Inspection of leaking locations☆
- [Unit 2] Inspection of the basement of the nuclear reactor building, Inspection of leaking locations☆
- ☆: Including on-site demonstration

Fuel debris removal
- R&D toward the removal of fuel debris (to be continued to address long-term challenges including internal R&D of equipment etc.)
- Design, manufacturing and testing etc. of the equipment for inspecting the inside of the PCV (5)
- Inspection from outside the PCV (including on-site demonstration of development results)

Stable storage, processing/disposal of fuel debris after removal
- Development of storage cans (surveys on existing technologies, review on storage systems/development of safety evaluation technique etc.)
- Research on/development of mock-up processing/disposal technologies
- Establishment of nuclear material accountancy and control measures for the fuel debris

Others
- Development of criticality evaluation and detection technologies

Status of efforts on various plans (Part 3)

: Main processes
: Sub-main processes
: Field work
: R&D
: Review
:Plan until last month
Green frame: Change from last month

As of June 27, 2014

Challenges	The Phase 1 (no later than 2 years after the completion of the current efforts)		The Phase 2 (Early period)	
	2012	2013	2014	2015

Plan for maintaining and continuing the steady state of plant

Retained water treatment plan

- Objective: Implement the measures to improve the reliability of the current facilities
- Retained water treatment by means of existing treatment facilities
- Improving the reliability of the current facilities, etc. (improve the reliability of transfer, processing, and storage facilities).
- Treatment of retained water by water treatment facilities with improved reliability
- Replacement of branch pipe pressure hoses with PE pipes
- Measures to prevent the expansion of tank leakage (Reinforced concrete dam/embankment/replacement by closed conduits), to be taken sequentially along with the installation of
- Consideration of reducing the circular lines
- * Completed
- Review on sub-drain recovery methods
- Sub-drain restoration work
- Restore sub-drain facilities, reduce the amount of groundwater inflow (reduction in retained water)
- Review on sub-drain and other purification facility → Installation work
- Drawdown of groundwater in the building
- Groundwater bypass installation work
- Groundwater inflow is reduced (Retained water is decreased).
- Installation of multi-nuclide removal equipment
- Consider and implement measures to increase the amount processing
- Purification of on-site reservoir water
- Preparation work for frozen soil impermeable walls
- Installation work
- Reduce groundwater inflow rate (Reduce accumulated water)

Plans toward the reduction in the radiation dose and prevention of the spread of contamination in the entire power plant

Plan for preventing the spread of marine pollution

- Construction of sea side water barrier wall
- Landfilling etc. in the harbor area
- Objective: Reduction of the risk of spreading marine contamination during the leakage of contaminated water
- Installation of steel pipe sheet pile
- Objective: Reduction of the concentration of radioactive substances contained in the seawater of the harbor (to less than the notified concentration)
- Consideration of technologies for decontaminating radioactive strontium (Sr)
- Seawater circulation purification
- Sea water purification by fibrous adsorbent material (ongoing)
- Decontamination of Radioactive strontium (Sr)
- Covering etc. of dredge soil over sea routes and berths
- Monitoring of ground water and seawater (implemented on an ongoing basis)

Gas/liquid waste

- Operation of the gas management system of Units 1 to 3 PCVs
- Installation of ventilation equipment/closure of the opening of blow-out panel for Unit 2
- Measurement of dust concentration at the opening of buildings etc., on-site survey
- Improve the accuracy of gas monitoring
- Land and marine environmental monitoring (implemented in an ongoing basis)

Reduction in radiation dose at the site boundary

- Objective: Control the radiation dose at the site boundaries caused by radioactive substance etc. additionally released from the entire power plant at 1mSv/year or less
- Reduction of radiation dose by shielding, etc.
- Reduction of radiation dose by the purification of contaminated water etc.
- Land and marine environmental monitoring (implemented in an ongoing basis)

Site decontamination plan

- Objective: Reduction to average 5 μSv/hour in the South side area on site except for around Units 1-4.
- Systematic implementation of decontamination in the site of power generation plant

Status of efforts on various plans (Part 4)

: Main processes
: Sub-main processes
: Field work
: R&D
: Review
:Plan until last month
Green frame: Change from last month

As of June 27, 2014

Challenges		The Phase 1 (no later than 2 years after the completion of the current efforts)		The Phase 2 (Early period)	
		2012	2013	2014	2015
Plan for retrieving fuel from spent fuel pool	Cask for both transport and storage	Cask manufacturing			
	Dry storage cask	Cask manufacturing			
	Harbor	Wharf restoration work			
		Carrying-in of empty casks (sequential)			
	Common pool	Already carried-in	Sequential carrying-in		
		Inspection of existing dry storage casks (9 pieces)		Retrieval of fuel from the common pool	
		Design/manufacturing of damaged fuel racks		Fixation	
		Storage of fuel retrieved from spent fuel pool (storage and management).			
	Temporary cask storage facility	Design and production			
		Installation	Acceptance and interim storage of casks		
	R&D	Evaluation of long-term integrity of fuel retrieved from spent fuel pool			
		Examination of the processing method of damaged fuel etc. retrieved from spent fuel pool			
Fuel debris removal plan	Installation of reactor building				
	Preservation of the integrity of RPV/PCV	Development of evaluation technology for integrity against corrosion of RPV/PCV			
		Corrosion protection (Reduction in dissolved oxygen contained in reactor cooling water by means of nitrogen bubbling)			
Plan for management and processing/disposal of solid radioactive waste, and the decommissioning of reactor facilities	Storage and management plans for solid wastes	Continuation of secure storage equipped with adequate shielding and scattering prevention measures			
		Development of storage management plans (Reduction in generation amount/optimization of storage)	Evaluation of waste prevention measures		Improvement of waste reducing management policy
			Establishment of vehicle maintenance shops		
			Update the storage management plan		Improvement of waste storage management policy
			Establishment of drum storage facility		
		Design and manufacturing of incineration plants for miscellaneous solid wastes			
		Installation of incineration plants for miscellaneous solid wastes			
		Transfer of debris to the soil-coveried temporary storage facility			
		Soil covering work for felled trees			
		Reduction of radiation dose from stored secondary wastes from water treatment through shielding etc.			
		Evaluation of secondary wastes from water treatment and lifespan of storage containers		Facility renewal plan development	
	Processing/ disposal plans for solid wastes	Development of R&D plan for safety processing/disposal	Verification of applicability of processing/disposal technologies in Japan and foreign countries		
			Waste characterization (radiochemistry analysis, assessment of volume etc.)		
	Decommissioning plans for reactor facilities	Development of feasible and rational decommissioning scenarios			
				Establishment of decommissioning scenarios	
Implementation system and personnel procurement plan		Systematic cultivation/deployment of personnel, including the cooperative companies, and implementation of measures to stimulate motivation etc			
Plan to ensure the safety of work		Continuation of safety activities, maintenance and enhancement of radiation management, continuous ensurement of medical services, etc.			
		Reduction of radiation dose in the rest area of the main office building, rest area in front of the important quake-proof building, and the important quake-proof building			

HP ND-1

Progress toward decommissioning: Fuel removal from the spent fuel pool (SFP)

Immediate target Commence fuel removal from the Spent Fuel Pool (Unit 4, November 2013)

Unit 4

In the Mid- and Long-Term Roadmap, the target of Phase 1 involved commencing fuel removal from inside the spent fuel pool (SFP) of the 1st Unit within two years of completion of Step 2 (by December 2013). On November 18, 2013, fuel removal from Unit 4, or the 1st Unit, commenced and Phase 2 of the roadmap started.
As of June 26, 1,144/1,331 of spent fuel assemblies and 22/202 new fuel assemblies had been transferred to the common pool. To date, 76% of removal has been completed.
Due to annual inspection of the overhead cranes for Unit 4 and the common pool, fuel removal will be suspended from July 1 to early September. There is no change in the scheduled removal completion within 2014.
Since the procurement of storage casks was partially prolonged, the common pool run out of space. The plan was changed to transferring new fuel assemblies (all remaining 180 fuel assemblies) in the Unit 4 spent fuel pool to Unit 6.


Fuel removal status

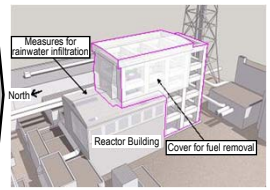

Loading the transportation container onto the trailer

* Some portions of these photos, in which classified information related to physical protection is included, were corrected.

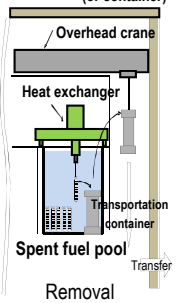
Work is proceeding with appropriate risk countermeasures, careful checks and safety first

Steps toward fuel removal


Removal of rubble from the roof of the Reactor Building
Completed in Dec. 2012



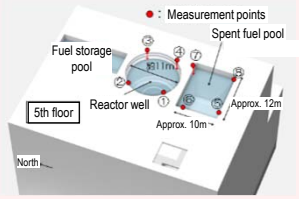
Installation of cover for fuel removal
From Apr. 2012, completed in Nov. 2013



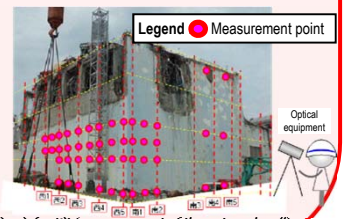
Removal
Commenced in Nov. 2013

Check of the soundness of the Reactor Building

Since May 2012, regular quarterly inspections have been conducted, which have confirmed that the soundness of the Reactor Building has been maintained.



Check for tilt (measurement of the water level)



Check for tilt (measurement of the external wall)

Unit 3

To facilitate the installation of a cover for fuel removal, installation of the gantry was completed (March 13, 2013). Removal of rubble from the roof of the Reactor Building was completed (October 11, 2013). Currently, toward the installation of a cover for fuel removal and the fuel-handling machine on the operating floor (*1), measures to reduce the radiation dose (decontamination and shielding) are underway (from October 15, 2013). Removal of large rubble from the SFP is also underway (from December 17, 2013).

Before removal of the large rubble

After removal of the large rubble

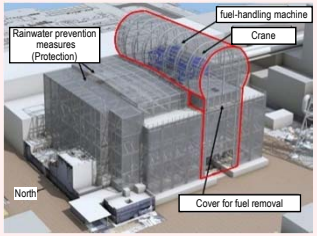


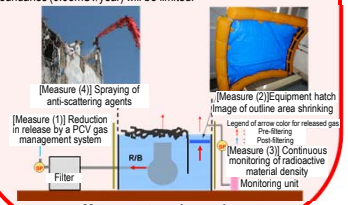
Image of the cover for fuel removal

Units 1 and 2

- Regarding Unit 1, to remove rubble from the top of the operating floor, there are plans to dismantle the cover over the Reactor Building is planned. Prior to dismantling, the ventilation system of the cover was suspended (September 17, 2013).
  Dismantling of the R/B cover will start from early July, 2014. When dismantling the cover and removing rubble, enough measures will be taken to control scattering of radioactive materials, along with monitoring of these materials.
- Regarding Unit 2, based on the progress of decontamination and shielding within the Reactor Building, the facilities will be inspected and a concrete plan examined and prepared.

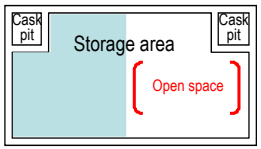
Dismantling of the cover over Reactor Building Unit 1

To facilitate the early removal of fuel and fuel debris from the SFP, the cover over the Reactor Building will be dismantled to accelerate the removal of rubble on the operation floor. The radiation dose on the site boundaries will also increase compared to before the dismantling. However, through measures to reduce the release, the estimated impact of the release from Units 1 to 3 on the site boundaries (0.03mSv/year) will be limited.



Measures to reduce release

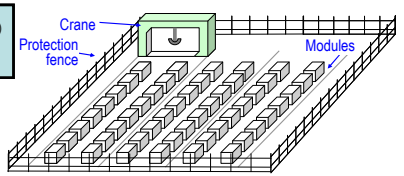
Common pool



An open space will be maintained in the common pool (Transfer to the temporary dry cask storage facility)

Progress to date
- The common pool has been restored to a condition allowing it to re-accommodate fuel to be handled (November 2012)
- Loading of spent fuel stored in the common pool to dry casks commenced (June 2013)
- Fuel removed from the Unit 4 spent fuel pool began to be received (November 2013)

Temporary dry cask (*3) storage facility



Spent fuel is accepted from the common pool

Operation commenced on April 12, 2013; from the cask-storage building, transfer of 9 existing dry casks completed (May 21); fuel stored in the common pool sequentially transferred.

<Glossary>
(*1) Operating floor: During regular inspection, the roof over the reactor is opened while on the operating floor, fuel inside the core is replaced and the core internals are inspected.
(*2) Equipment hatch: A through-hole used to carry equipment in and out of the PCV.
(*3) Cask: Transportation container for samples and equipment, including radioactive materials.

Progress toward decommissioning: Works to identify the plant status and toward fuel debris removal

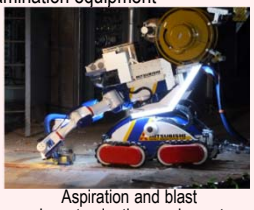
June 27, 2014
Secretariat of the Team for Countermeasures for Decommissioning and Contaminated Water Treatment

Immediate target	Identify the plant status and commence R&D and decontamination toward fuel debris removal

Demonstration of decontamination equipment

(1) Demonstration of suction and blast decontamination equipment

- Demonstration was conducted on the 1st floor of Unit 1 Reactor Building (from January 30 to February 4). The result showed that the β ray dose rate was reduced by removing dust through aspiration decontamination and the coated surface was shaved by the subsequent blast decontamination.



Aspiration and blast decontamination equipment

(2) Dry ice-blast decontamination equipment

- A demonstration was conducted on the 1st floor of the Unit 2 Reactor Building (from April 15-21).

Dry ice blast decontamination equipment

(3) High-pressure water decontamination equipment

- A demonstration was conducted on the 1st floor of Unit 1 Reactor Building (from April 23-29).

* Blast decontamination: A method to shave the surface by injecting polygonal steel grains into the object to be decontaminated (floor surface)

High-pressure water decontamination equipment

Investigation in the leak point detected in the upper part of Unit 1 Suppression Chamber (S/C)

Investigation in the leak point detected in the upper part of Unit 1 S/C from May 27 from one expansion joint cover among the lines installed there. As no leakage was identified from other parts, specific methods will be examined to halt the flow of water and repair the PCV.

Leak point

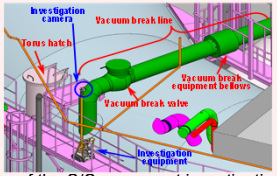
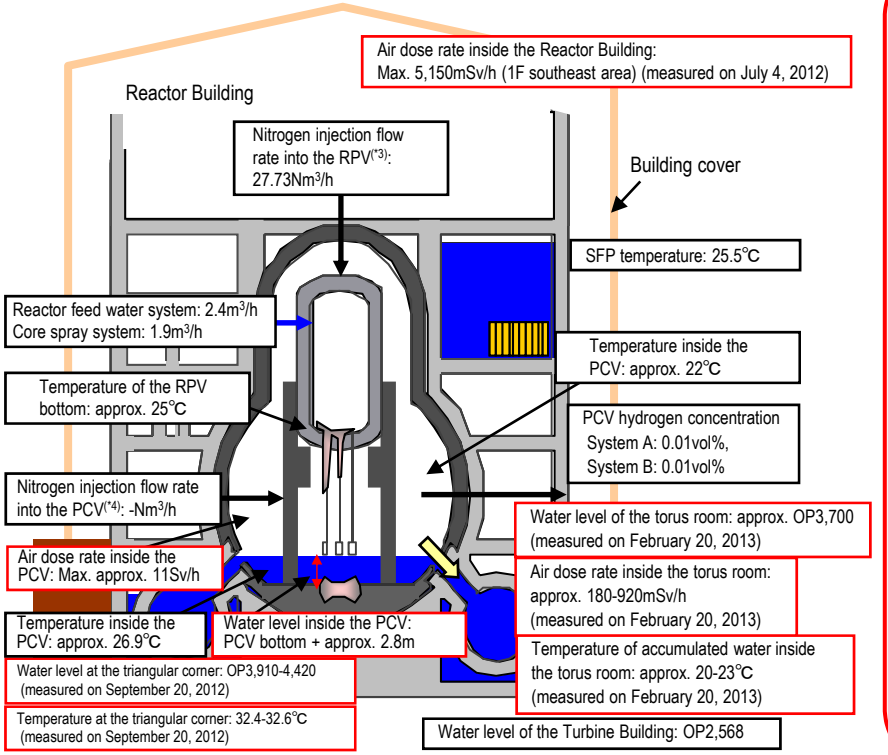


Image of the S/C upper part investigation

Unit 1



* Indices related to the plant are values as of 11:00, June 26, 2014

Status of equipment development toward investigating inside the PCV

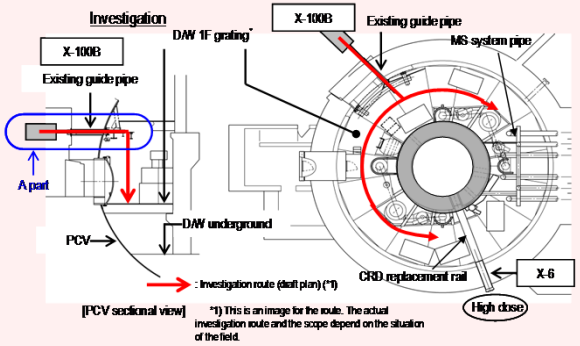
Prior to removing fuel debris, to check the conditions inside the Primary Containment Vessel (PCV), including the location of the fuel debris, investigation inside the PCV is scheduled. For Unit 1, where fuel debris may spread outside the pedestal, an investigation of the external side will commence.

[Investigative outline]

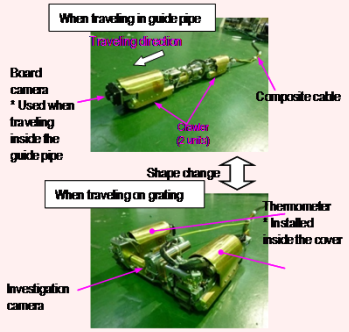
- Inserting equipment from Unit 1 X-100B penetration(*5) to investigate in clockwise and counter-clockwise directions.

[Status of investigation equipment development]

- Crawler-type equipment with a shape-changing structure which allows it to enter the PCV from the narrow access entrance (bore: φ100mm) and stably move on the grating is currently under development. A field demonstration is scheduled for the 2nd half of FY2014.



Investigative route inside the PCV (draft plan)



<Glossary>

(*1) S/C (Suppression Chamber): Suppression pool, used as the water source for the emergent core cooling system.
(*2) SFP (Spent Fuel Pool):
(*3) RPV (Reactor Pressure Vessel)
(*4) PCV (Primary Containment Vessel)
(*5) Penetration: Through-hole of the PCV

Progress toward decommissioning: Works to identify the plant status and toward fuel debris removal

June 27, 2014
Secretariat of the Team for Countermeasures for Decommissioning and Contaminated Water Treatment
3/6

Immediate target	Identify the plant status and commence R&D and decontamination toward fuel debris removal

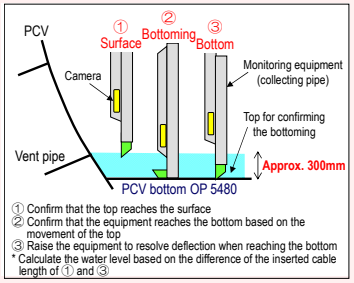
Installation of an RPV thermometer and permanent PCV supervisory instrumentation

(1) Replacement of the RPV thermometer

- As the thermometer installed at the Unit 2 RPV bottom after the earthquake had broken, it was excluded from the monitoring thermometers (February 19).
- On April 17, removal of the broken thermometer failed and was suspended. To facilitate removal, tests to check rust formation and fixing are underway (from May 12).

(2) Reinstallation of the PCV thermometer and water-level gauge

- Some of the permanent supervisory instrumentation for PCV could not be installed in the planned locations due to interference with existing grating (August 13, 2013).
- The instrumentation was removed on May 27, 2014 and new instruments were reinstalled on June 5 and 6. The trend of added instrumentation will be monitored for approx. one month to evaluate its validity.
- The measurement during the installation confirmed that the water level inside the PCV was approx. 300mm from the bottom.



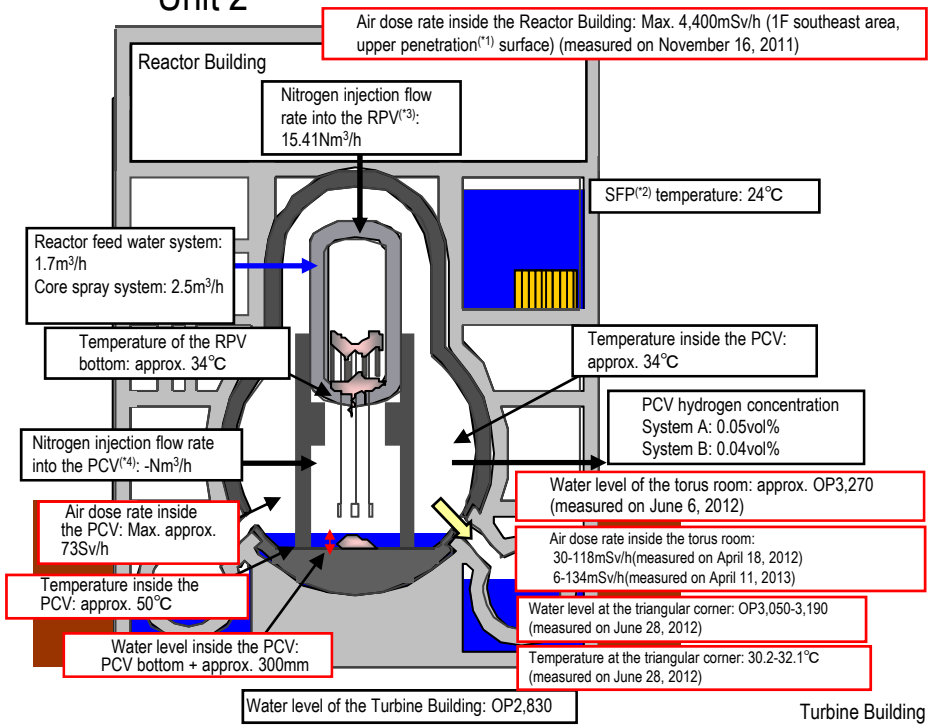
Method to measure water levels when re-installing monitoring instrumentation for Unit 2 PCV

Investigation of the contamination status of the Reactor Building 5th floor

- To investigate the contamination status of the Reactor Building 5th floor, investigative equipment (gamma camera, radiation dose gauge, optical camera) will be suspended through holes drilled in the building roof. In addition, core samples on the 5th floor are collected using a remote-control robot.
- To ensure the operation route of the robot used to collect floor core samples, fences on the operating floor (*6) were removed using the remote-control robot (March 13 and 14).
- As the robot fell while in operation and the battery became low, the robot could not be collected. Removal of fences was completed and the core was collected within the accessible range (from March 20-26).

Status of remote-control robot falling down

Unit 2



* Indices related to plant are values as of 11:00, June 26, 2014

Status of equipment development toward investigating inside the PCV

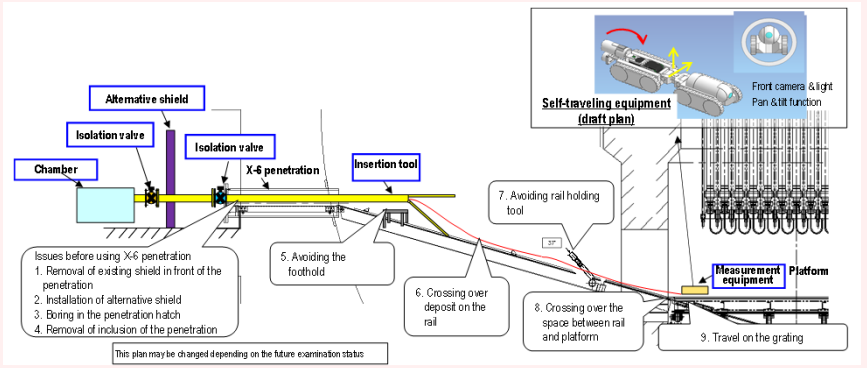
Prior to removing fuel debris, to check the conditions inside the Primary Containment Vessel (PCV), including the location of the fuel debris, investigations inside the PCV are scheduled. For Unit 2, where fuel debris is unlikely to have spread outside the pedestal, the focus will be placed on investigating the inside.

[Investigative outline]

- Inserting the equipment from Unit 2 X-6 penetration(*1) and accessing inside the pedestal using the CRD rail to conduct investigation.

[Status of investigative equipment development]

- Based on issues confirmed by the CRD rail status investigation conducted in August 2013, the investigation method and equipment design are currently being examined. A demonstration is scheduled in the field in the 2nd half of FY2014.



Investigative issues inside the PCV and equipment configuration (draft plan)

<Glossary>
(*1) Penetration: Through-hole of the PCV (*2) SFP (Spent Fuel Pool)
(*3) RPV (Reactor Pressure Vessel) (*4) PCV (Primary Containment Vessel)
(*5) S/C (Suppression Chamber): Suppression pool; used as the water source for the emergency core cooling system.
(*6) Operating floor: During regular inspection, the roof over the reactor is opened while on the operating floor, fuel inside the core is replaced and core internals are inspected.

Progress toward decommissioning: Works to identify the plant status and toward fuel debris removal

June 27, 2014
Secretariat of the Team for Countermeasures for Decommissioning and Contaminated Water Treatment
4/6

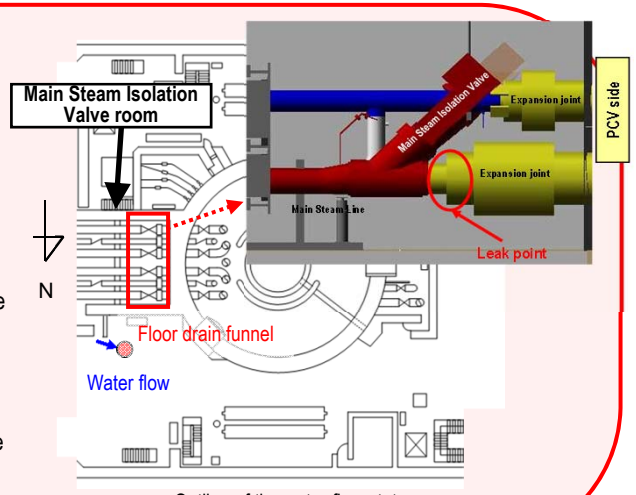
Immediate target	Identify the plant status and commence R&D and decontamination toward fuel debris removal

Water flow was detected from the Main Steam Isolation Valve* room

On January 18, a flow of water from around the door of the Steam Isolation Valve room in the Reactor Building Unit 3 1st floor northeast area to the nearby floor drain funnel (drain outlet) was detected. As the drain outlet connects with the underground part of the Reactor Building, there is no possibility of outflow from the building.

From April 23, image data has been acquired by camera and the radiation dose measured via pipes for measurement instrumentation, which connect the air-conditioning room on the Reactor Building 2nd floor with the Main Steam Isolation Valve Room on the 1st floor. On May 15, water flow from the expansion joint of one Main Steam Line was detected.

This is the first leak from PCV detected in Unit 3. Based on the images collected in this investigation, the leak volume will be estimated and the need for additional investigations will be examined. The investigative results will also be utilized to examine water stoppage and PCV repair methods.



Outline of the water-flow status

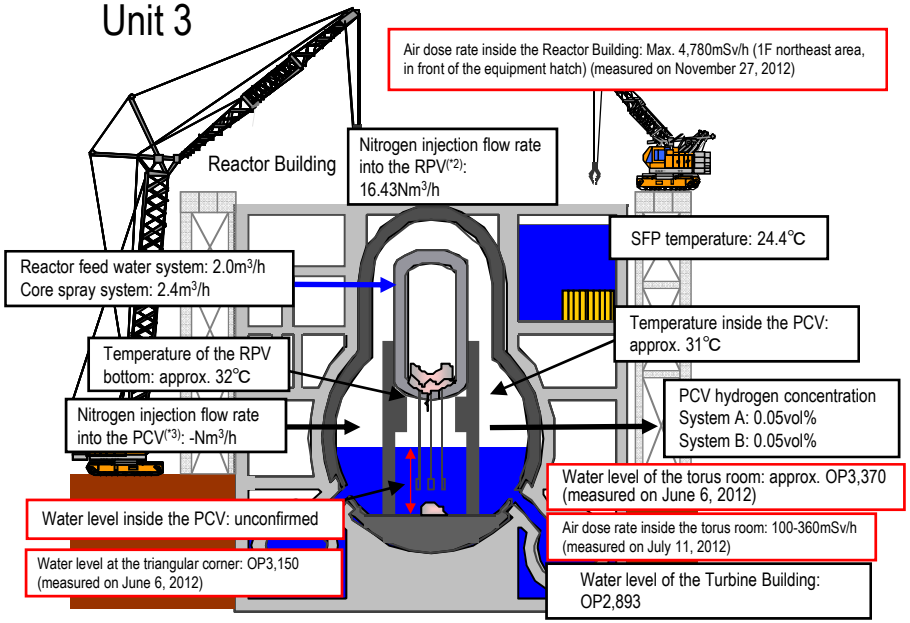
* Main Steam Isolation Valve: A valve to shut off the steam generated from the Reactor in an emergency

Decontamination inside R/B

- The contamination status inside the Reactor Building (R/B) was investigated by a robot (June 11-15, 2012).
- To select an optimal decontamination method, decontamination samples were collected (June 29 to July 3, 2012).
- To facilitate decontamination inside the Reactor Building, removal of obstacles on the 1st floor was conducted (from November 18, 2013 to March 20, 2014).

Robot for investigating the contamination status (gamma camera mounted)

Unit 3



* Indices related to plant are values as of 11:00, June 26, 2014

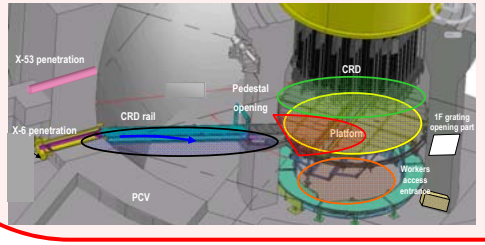
Status of equipment development toward investigating inside the PCV

Prior to removing fuel debris, to check the conditions inside the Primary Containment Vessel (PCV), including the location of the fuel debris, investigation inside the PCV is scheduled. For Unit 3, where there is little possibility of fuel debris spreading outside the pedestal, the focus will be placed on investigating the inside. As the water level inside the PCV is high and the penetration scheduled for use in Units 1 and 2 may decline in the water, another method needs to be examined.

[Steps for investigation and equipment development]

(1) Investigation from X-53 penetration
- Following decontamination, a field investigation is scheduled in the areas around X-53 penetration to determine the plan for conducting the inside investigation and equipment specifications.

(2) Investigation plan following the investigation of X-53 penetration
- Based on the measurement values of hydraulic head pressure inside the PCV, X-6 penetration may decline. It is estimated that access to X-6 penetration is difficult.
- For access from another penetration, approaches such as “further downsizing the equipment” or “moving in water to access the pedestal” are necessary and will be examined.



<Glossary>
(*1) SFP (Spent Fuel Pool)
(*2) RPV (Reactor Pressure Vessel)
(*3) PCV (Primary Containment Vessel)
(*4) TIP (Traversing Incore Probe System)
Measures neutrons by moving the detector up and down inside the core.

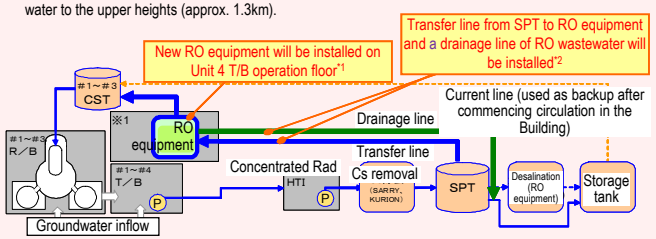
Progress toward decommissioning: Work related to circulation cooling and accumulated water treatment line

Immediate target | Stably continue reactor cooling and accumulated water treatment, and improve reliability

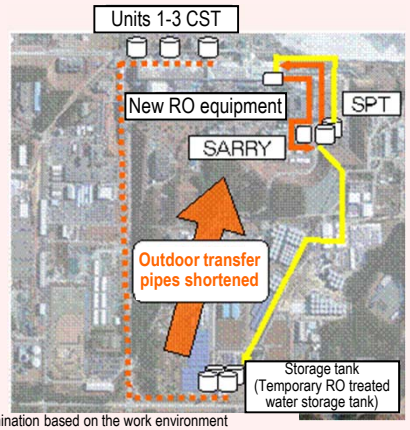
Work to improve the reliability of the circulation water injection cooling system and pipes to transfer accumulated water.

- Operation of the reactor water injection system using Unit 3 CST as a water source commenced (from July 5, 2013). Compared to the previous systems, in addition to the shortened outdoor line, the reliability of the reactor water injection system was enhanced, e.g. by increasing the amount of water-source storage and enhancing durability.
- By newly installing RO equipment inside the Reactor Building by the end of FY2014, the reactor water injection loop (circulation loop) will be shortened from approx. 3km to approx. 0.8km*.

* The entire length of contaminated water transfer pipes is approx. 2.1km, including the transfer line of surplus water to the upper heights (approx. 1.3km).

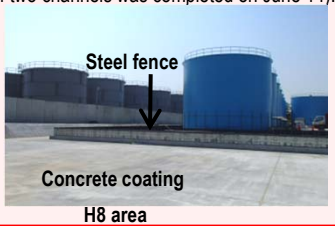


*1 Unit 4 T/B operation floor is one of the installation proposals, which will be determined after further examination based on the work environment
*2 A detailed line configuration will be determined after further examination



Measures in Tank Areas

- In case accumulated water leaks from Tank Areas, duplication of tank fences and painting inside the fences is underway.
- There are plans to reroute the release channel from outside to inside the port (installation of one of two channels was completed on June 14).

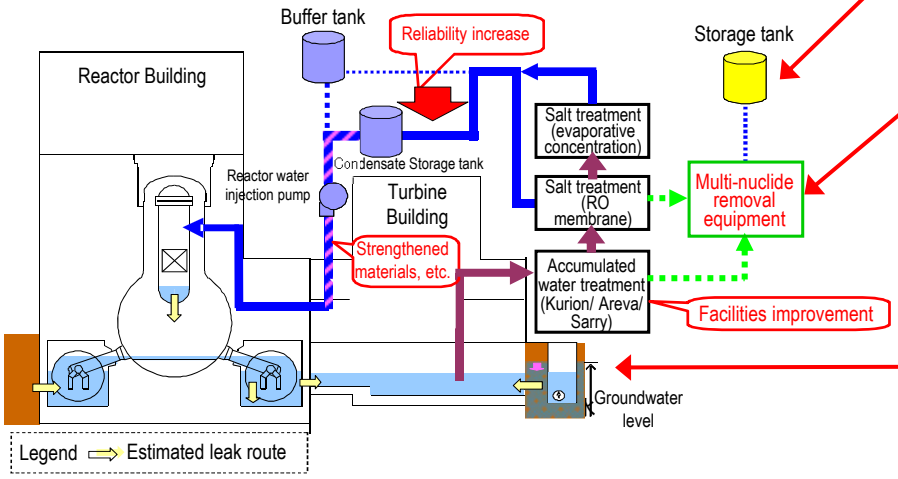


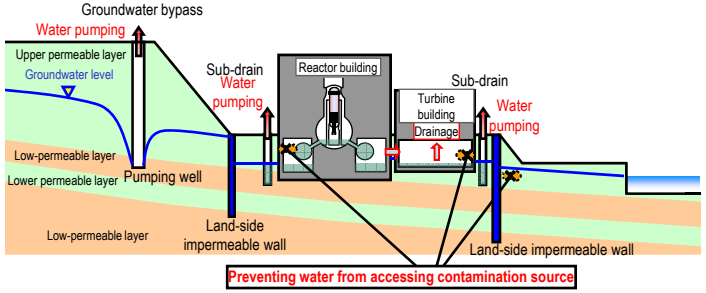
H8 area

H1 East area

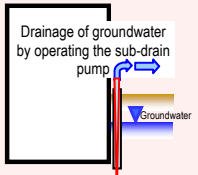
Status of multi-nuclide removal equipment

- Hot tests using radioactive water are underway (System A: from March 30, 2013, System B: from June 13, 2013, System C: from September 27, 2013).
- Regarding Systems A and C, operation was suspended without expanding contamination within the systems by detecting filter degradation at an early stage. After replacing the filters as with System B, treatment resumed (System A: June 9, System C: June 22).
- Regarding Systems C, a second inspection to verify the effectiveness of anti-corrosion measures was conducted. As corrosion was detected at places in previously unaffected areas, additional measures were implemented.



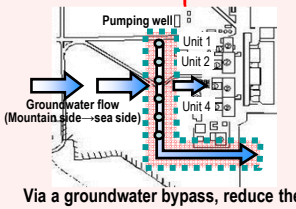


Preventing groundwater from flowing into the Reactor Buildings



To reduce groundwater level by sub-drain water pumping, treatment tests were conducted for some sub-drain pits of Units 1-4. The next stage will involve scheduled examination of the sub-drain recovery method.

Reducing groundwater inflow by pumping sub-drain water



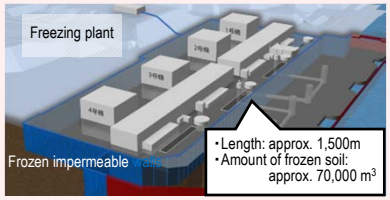
Measures to pump up groundwater flowing from the mountain side upstream of the Building to reduce the groundwater inflow (groundwater bypass) have been implemented.

Release of pumped groundwater began from May 21.

The pumped up groundwater is temporarily stored in tanks and released after TEPCO and the third-party organization confirm that its quality meets operational targets.

Through periodical monitoring, pumping of wells and tanks is operated appropriately.

Via a groundwater bypass, reduce the groundwater level around the Building and groundwater inflow into the Building



To prevent the inflow of groundwater into the Reactor Buildings, installation of impermeable walls surrounding the buildings on the land side is planned.

The freezing test of small-scale impermeable walls on site confirmed the feasibility of freezing.

Placement of frozen ducts will begin after preparation is complete.

Installing frozen impermeable walls around Units 1-4 to prevent the inflow of groundwater into R/B

<Glossary>
(*1) CST (Condensate Storage Tank)
Tank for temporarily storing water used in the plant.

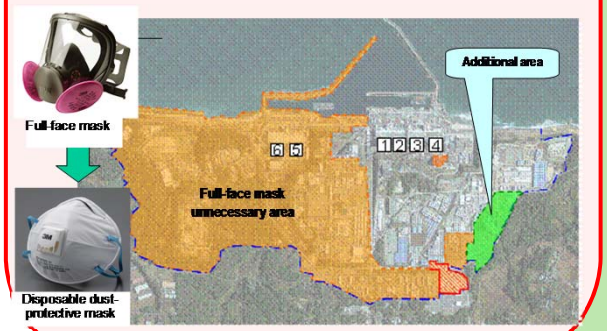
Progress toward decommissioning: Work to improve the environment within the site

Immediate targets	・Reduce the effect of additional release from the entire power station and radiation from radioactive waste (secondary water treatment waste, rubble, etc.) generated after the accident, to limit the effective radiation dose to below 1mSv/year at the site boundaries. ・Prevent contamination expansion in sea, decontamination within the site

Expansion of full-face mask unnecessary area

Operation based on the rules for mask wearing according to radioactive material density in air and decontamination/ ionization rules was defined, and the area is being expanded.

In the J tank installation area on the south side of the site, as decontamination was completed, the area will be set as full-face mask unnecessary area (from May 30), where for works not handling contaminated water, wearing disposable dust-protective masks will be deemed sufficient .

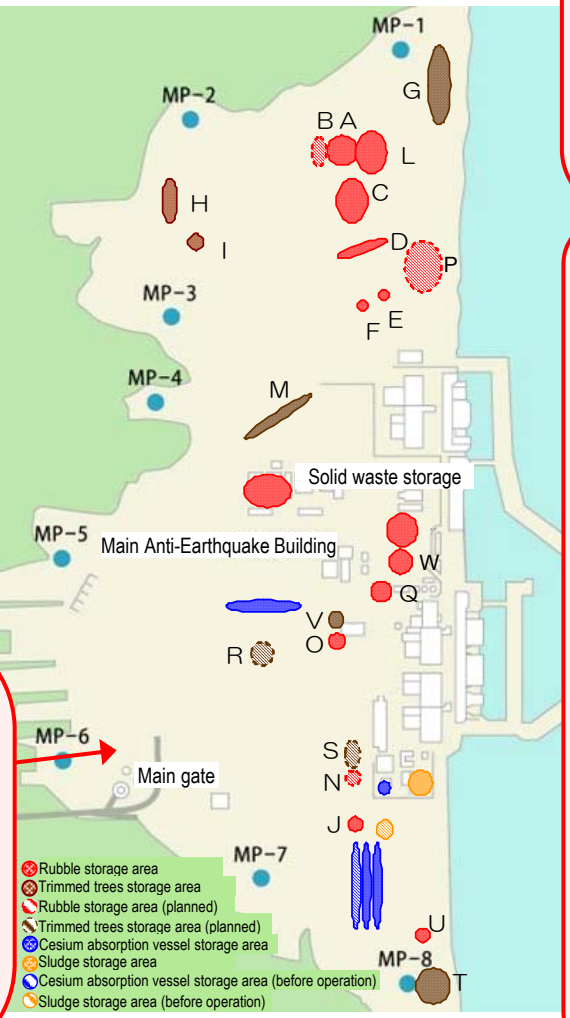


Full-face mask unnecessary area

Transfer to Temporary Administration Office Building near the field

To share information with the field and expedite the response to issues, a Temporary Administration Office Building is under construction on the site of Fukushima Daiichi Nuclear Power Station. For the part completed on June 30, approx. 400 staff members, including those of TEPCO's water treatment related sections, working at Fukushima Daini Nuclear Power Station, will transfer within July.


External and internal appearances of the Temporary Administration Office Building



Installation of impermeable walls on the sea side

To prevent contamination expansion into the sea when contaminated water leaks into groundwater, impermeable walls are being installed (scheduled for completion in September 2014).

Installation of steel pipe sheet piles temporarily completed by December 4, 2013 except for 9 pipes.

The next stage will involve installing steel pipe sheet piles outside the port, landfilling within the port, and installing a pumping facility to close before the construction completion.

Installation status of impermeable walls on the sea side
(Landfill status on the Unit 1 intake side)

Reducing radioactive materials in seawater within the harbor

- The analytical result for data such as the density and level of groundwater on the east (sea) side of the Building identified that contaminated groundwater was leaking into seawater.
- No significant change has been detected in seawater within the harbor for the past month, nor was any significant change detected in offshore measurement results as of last month.
- To prevent contamination expansion into the sea, the following measures are being implemented:

(1) Prevent leakage of contaminated water
- Ground improvement behind the bank to prevent the expansion of radioactive materials.
  (Between Units 1 and 2: completed on August 9, 2013;
  between Units 2 and 3: from August 29 and completed on December 12, 2013;
  between Units 3 and 4: from August 23, 2013 and completed on January 23, 2014)
- Pumping groundwater in contaminated areas (from August 9, 2013, scheduled to commence sequentially)

(2) Isolate water from contamination
- Enclosure by ground improvement on the mountain side
  (Between Units 1 and 2: from August 13, 2013 and completed on March 25, 2014;
  between Units 2 and 3: from October 1, 2013 and completed on February 6, 2014;
  between Units 3 and 4: from October 19, 2013 and completed on March 5, 2014)
- To prevent the ingress of rainwater, the ground surface was paved with concrete (commenced on November 25, 2013 and completed on May 2)

(3) Eliminate contamination sources
- Removing contaminated water in branch trenches and closing them (completed on September 19, 2013)
- Treatment and removal of contaminated water in the main trench
  Unit 2: Treatment commenced on November 14, 2013, freezing toward water stoppage commenced on April 2
  Unit 3: Treatment commenced on November 15, 2013