Summary of Decommissioning and Contaminated Water Management

June 25, 2015

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

Main works and steps for decommissioning

Fuel removal from Unit 4 SFP had been completed. Preparatory works to remove fuel from Unit 1-3 SFP and fuel debris (Note 1) removal are ongoing.

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

Fuel Removal from SFP

Unit 1&2 / Unit 3 / Unit 4

Rubble removal & dose reduction → Installing Fuel-Handling Machine → Fuel removal → Storage and handling

Unit 1: Fuel removal to start in FY2020
Unit 2: Fuel removal to start in FY2020
Unit 3: Fuel removal to start in FY2017
Unit 4: Fuel removal completed in 2014

Fuel Debris Removal

Unit 1-3

Capturing status inside PCV/ examination of fuel debris removal method, etc. (Note 2) → Fuel debris removal → Storage and handling

(Note 2) Fuel debris removal method for each unit will be decided two years later from the revision of medium- to long-term term road map (June 2015). The method for the first unit will be confirmed in the first half of FY2018.

Dismantling Facilities

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

Fuel removal from SFP

Toward fuel removal from Unit 3 SFP, large rubble within the pool is being removed.
Though removal of large rubble within Unit 3 SFP had been suspended since rubble fell in August 2014, it has resumed since December 2014 after implementing additional fall-prevention measures.

(FHM to be removed in late July)

Three principles behind contaminated water countermeasures

Water to cool fuel having melted in the accident is mixed with groundwater and approx. 300 tons of contaminated water is generated daily.
Countermeasures for contaminated water are implemented in accordance with the following three principles:

1. **Eliminate** contamination sources

① Multi-nuclide removal equipment, etc.

② Remove contaminated water in the trench (Note 3)

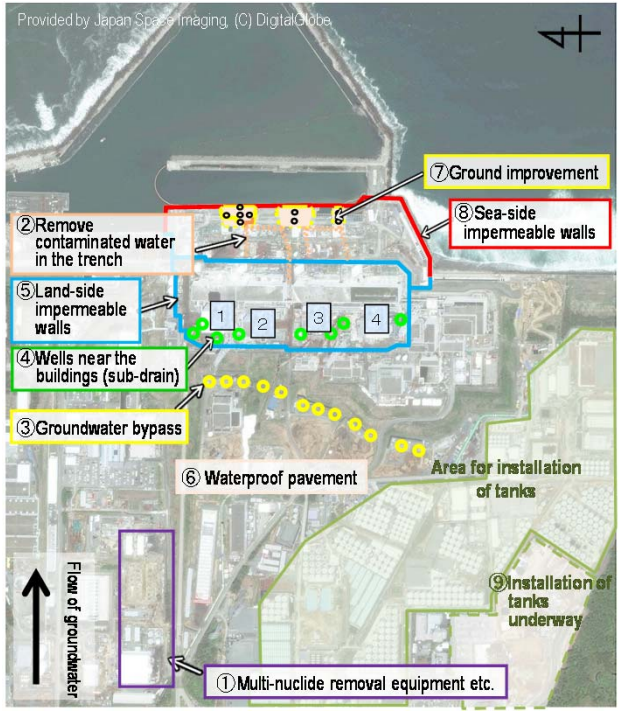
(Note 3) Underground tunnel containing pipes.

2. **Isolate** water from contamination

③ Pump up groundwater for bypassing
④ Pump up groundwater near buildings
⑤ Land-side impermeable 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)



Multi-nuclide removal equipment (ALPS), etc.

- This equipment removes radionuclides from the contaminated water in tanks and reduces risks.
- Treatment of contaminated water (RO concentrated salt water) was completed in May 2015 via multi-nuclide removal equipment, additional multi-nuclide removal equipment installed by TEPCO (operation commenced in September 2014) and a subsidy project of the Japanese Government (operation commenced in October 2014).
- Strontium-treated water from equipment other than ALPS is being re-treated in ALPS.

(High-performance multi-nuclide removal equipment)

Land-side impermeable walls

- Land-side impermeable walls surround the buildings and reduce groundwater inflow into the same.
- Onsite tests have been conducted since August 2013. Construction work commenced in June 2014.
- Regarding work on the mountain side, which will commence preceding freezing, the installation of frozen pipes is approx. 99% completed.
- A freezing functioning test started at the end of April 2015.

(Land-side impermeable walls; example of freezing functioning test point)

Sea-side impermeable walls

- The walls aim to prevent the flow of contaminated groundwater into the sea.
- The installation of steel sheet piles is almost (98%) complete. The closure time is being coordinated.

(Installation status)

Summary of Decommissioning and Contaminated Water Management

June 25, 2015
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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. 20-45°C*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 In May 2015, the radiation exposure dose due to the release of radioactive materials from the Reactor Buildings was evaluated as less than 0.0016 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).

Status of dismantling of Unit 1 building cover

On May 21, a disconnect was found with the balloon installed on the Reactor Building 3rd floor equipment hatch. The investigation confirmed rubble and anti-scattering agents had accumulated on the rain cover over the balloon.

As the release amount was sufficiently low, regardless of a balloon, it will not be recovered. However, countermeasures will be taken to reduce wind inflow with the aim of controlling the release.

The building cover is being removed with anti-scattering measures steadily implemented and safety prioritized above all.

Resumption of rubble removal from the Unit 3 spent fuel pool

For large rubble removal from the Unit 3 spent fuel pool (SFP), which has been suspended due to the failure of the camera mounted on the crane, the camera was replaced during the annual crane inspection.

From June 22, the removal of large rubble from Unit 3 SFP resumed.

The fuel handling machine, which is the largest rubble within the pool, will be removed carefully using a dedicated lifting tool.

Status of the freezing functioning test of land-side impermeable walls

From April 30, the freezing functioning test started at 18 points (58 frozen pipes, approx. 6% on the mountain side). This test is to confirm that there is no problem with the facility-wide operation status and that the earth temperature has decreased.

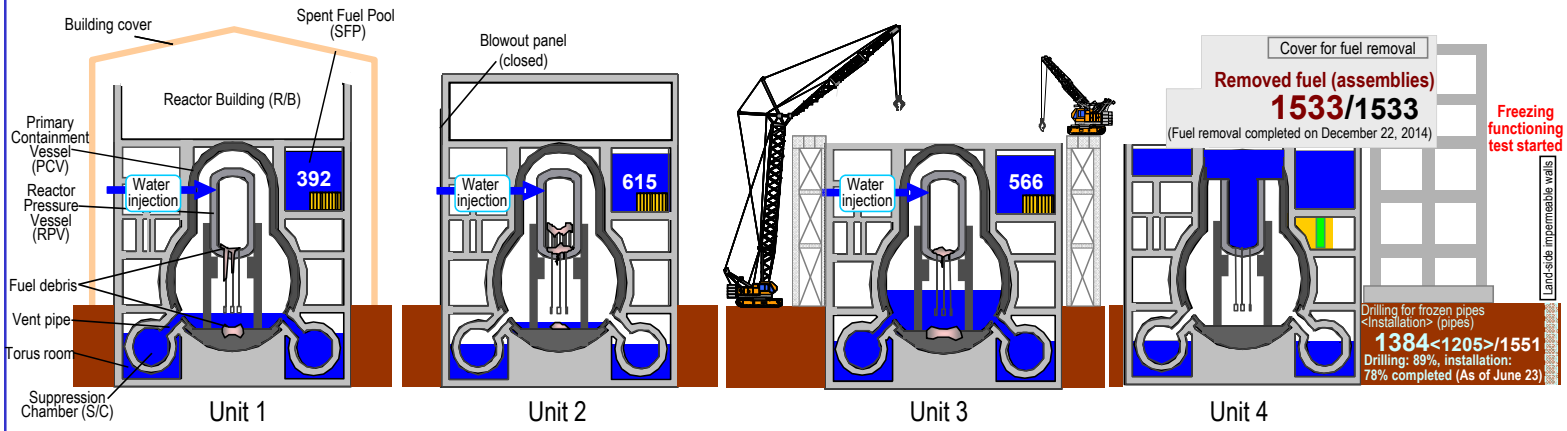
As a continuous change in the groundwater level was identified at a freezing functioning test point, coolant supply to this point has been suspended since June 3.

Revision of the Mid-and-Long-Term Roadmap

On June 12, at the Inter-Ministerial Council for Contaminated Water and Decommissioning Issues, the Mid-and-Long-Term Roadmap was resolved.

On June 15, at the Fukushima Advisory Board on Decommissioning and Contaminated Water Management, the revised Mid-and-Long Term Roadmap was explained.

The decommissioning and contaminated water countermeasures will steadily proceed based on continued close communication with local citizens and their requests.

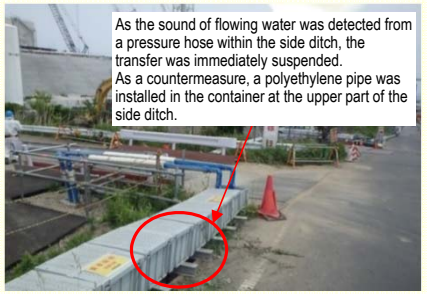


Leakage from the transfer hose to the Turbine Building

On May 29, leakage from a pressure hose was detected during the transfer from a 1,000t notch tank to the Turbine Building.

The leaking water flowed into the port via drainage channel K. However, the water was collected from drainage channel K, etc. and judging from no significant variation in radiation density at the port entrance and in the outer sea, it was considered that there was no impact outside the port.

As a countermeasure, the relevant pressure hose was replaced with a polyethylene pipe.



<Leakage point>

Operation start of large rest house

At the large rest house with a capacity of approx. 1,200 workers, operation started on May 31 and meal services at the dining room commenced on June 1. This rest house is used for workers to rest, conduct office work and receive safety checks before starting work.

Based on the judgement that renovation would be required to further improve it from a hygiene perspective, the dining room has been temporarily closed since June 9. Following the renovation, operations will resume from late July. During the suspension period, service hours of the dining room at the new Administration Office Building have been extended to improve usability for workers.

Start of drilling for solid waste storage

To store rubble safely, additional solid waste storage (9th) with a capacity of approx. 110,000 of 200 litter drums will be installed.

Following the pre-construction work, including site preparation, drilling commenced on June 8.

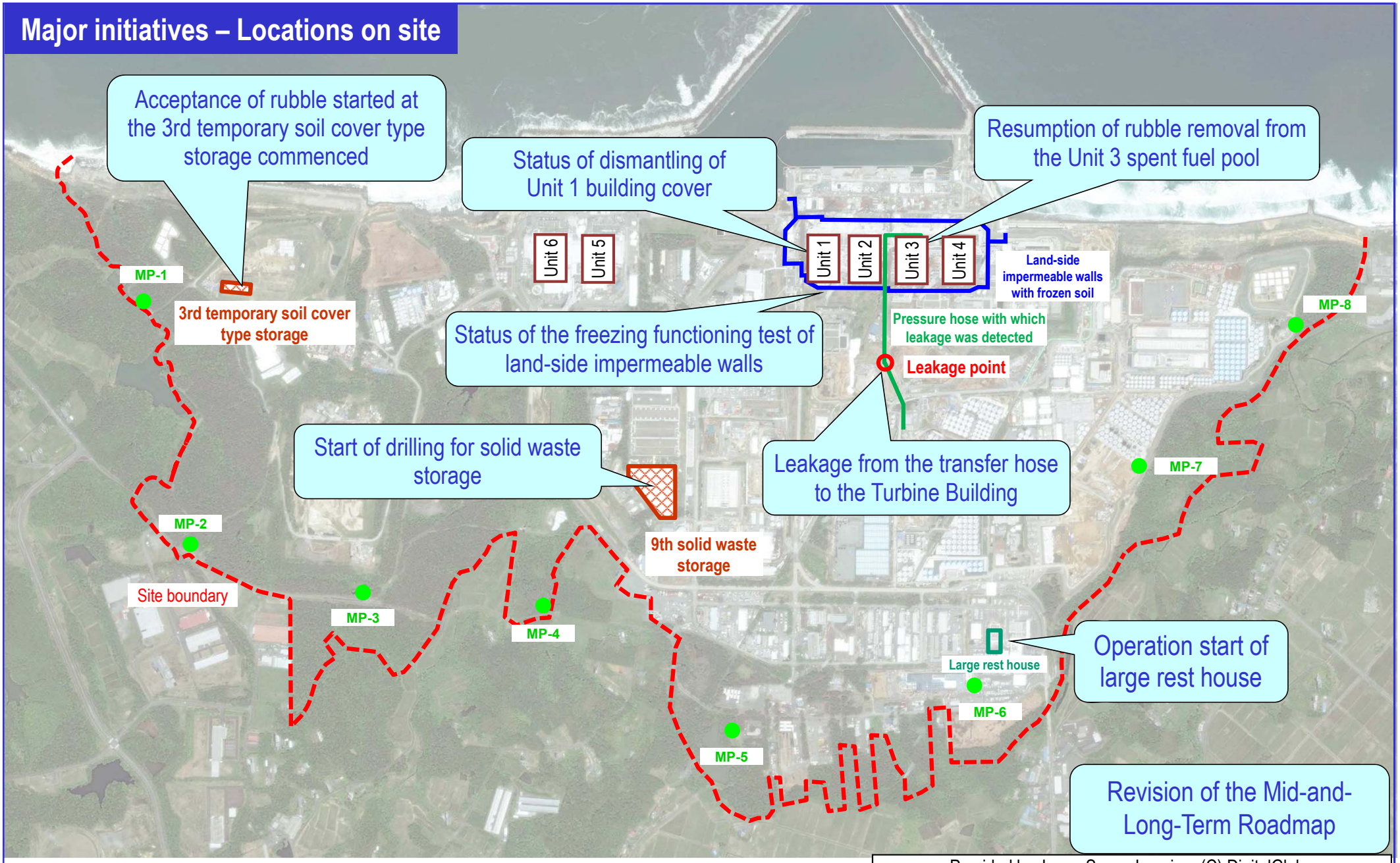
Acceptance of rubble started at the 3rd temporary soil cover type storage commenced

From June 23, acceptance of rubble started at the 3rd temporary soil cover type storage, which was installed to store waste appropriately.

This facility stores metal and concrete rubble at a surface dose rate of 30 mSv/h or less.


<First rubble acceptance>

Major initiatives – Locations on site



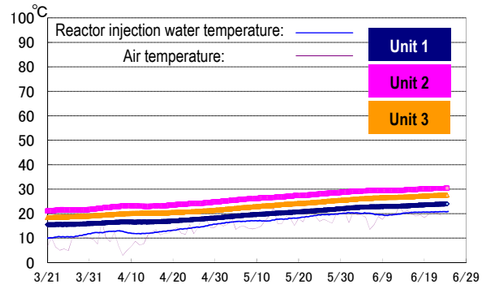
Provided by Japan Space Imaging, (C) DigitalGlobe

* Data of Monitoring Posts (MP1-MP8.)
Data of Monitoring Posts (MPs) measuring airborne radiation rate around site boundaries show 0.967 - 3.948 μSv/h (May 27 – June 23, 2015).
We improved the measurement conditions of monitoring posts 2 to 8 for precise measurement of air dose rate. Construction works such as tree-clearing, surface soil removal and shield wall setting were implemented from Feb .10 to Apr. 18, 2012.
Therefore monitoring results at these points are lower than elsewhere in the power plant site.
The radiation shielding panel around monitoring post No. 6, which is one of the instruments used to measure the radiation dose of the power station site boundary, were taken off from July 10-11, 2013, since the surrounding radiation dose has largely fallen down due to further cutting down of the forests etc.

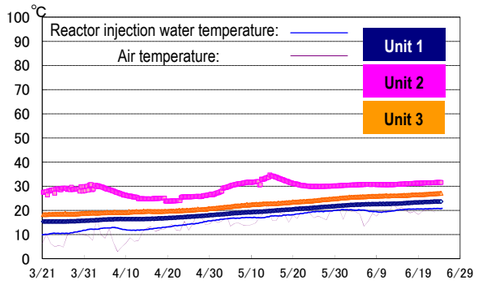
I. Confirmation of the reactor conditions

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 45°C for the past month, though they vary depending on the unit and location of the thermometer.



RPV bottom temperatures (recent quarter)



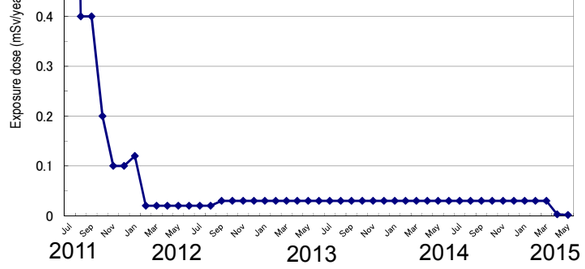
PCV gas phase temperatures (recent quarter)

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

2. Release of radioactive materials from the Reactor Buildings

As of May 2015, the density of radioactive materials newly released from Reactor Building Units 1-4 in the air and measured at the site boundaries was evaluated at approx. 4.5×10^{-11} Bq/cm^3 for Cs-134 and 1.2×10^{-10} Bq/cm^3 for Cs-137 respectively. The radiation exposure dose due to the release of radioactive materials was less than 0.0016 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 the airborne radiation rate around site boundaries showed 0.967 - 3.948 μSv/h (May27-June 23).
  To measure the variation in the airborne radiation rate of MP2-MP8 more accurately, environmental improvement (tree trimming, removal of surface soil and shielding around the MPs) was 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.
The evaluation has been changed to a method considering the values of continuous dust monitors since FY2015, with data to be evaluated monthly and announced the following month.

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.

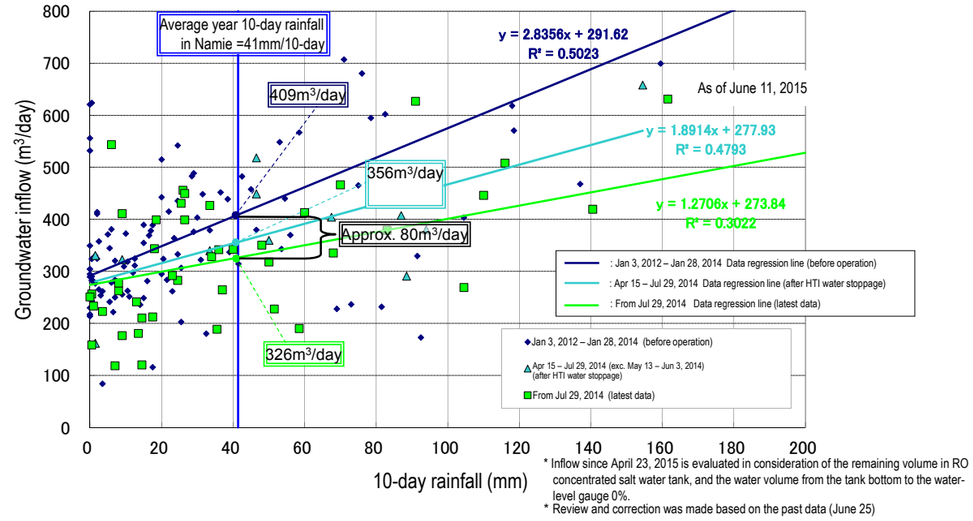
II. Progress status by each plan

1. Contaminated water countermeasures

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

➢ Operation of groundwater bypass

- From April 9, 2014, the operation of 12 groundwater bypass pumping wells commenced sequentially to pump up groundwater. The release commenced from May 21, 2014 in the presence of officials from the Intergovernmental Liaison Office for the Decommissioning and Contaminated Water Issue of the Cabinet Office. As of June 24, 2015, 111,583m^3 of groundwater had been released. The pumped up groundwater has been temporarily stored in tanks and released after TEPCO and a third-party organization (Japan Chemical Analysis Center) confirmed that its quality met operational targets.
- It was confirmed that the groundwater inflow into the buildings had decreased by approx. 80 m^3/day, based on the evaluation data to date, through measures such as groundwater bypass and water stoppage of the High Temperature Incinerator Building (HTI) (see Figure 1).
- It was confirmed that the groundwater level at the observation holes had decreased by approx. 5-20 cm compared to the level before pumping at the groundwater bypass started.
- Due to a decrease in the flow rate of pumping well Nos. 5, 7, 8, 10 and 12, water pumping was suspended for cleaning (No. 5: from May 22, No. 7: from June 10, No. 8: from May 22 to June 17, No. 10: from April 27 to June 9, No. 12: from May 25).



* Inflow since April 23, 2015 is evaluated in consideration of the remaining volume in RO concentrated salt water tank, and the water volume from the tank bottom to the water-level gauge 0%.
* Review and correction was made based on the past data (June 25)

Figure 1: Analytical results of inflow into buildings

➢ Construction status of land-side impermeable walls

- To facilitate the installation of land-side impermeable walls surrounding Units 1-4 (a subsidy project of the Ministry of Economy, Trade and Industry), drilling to place frozen pipes commenced (from June 2, 2014). Regarding the mountain side which will be frozen first, as of June 23, 2015 drilling at 1,249 points (approx. 99%, for frozen pipes: 1,025 of 1,036 points, for temperature-measurement pipes: 224 of 228 points) and installation of frozen pipes at 1,025 of 1,036 points (approx. 99%) had been completed (see Figure 3). The remaining construction will proceed after the necessary procedures have been performed.
- From April 30, the freezing functioning test is underway at 18 points (58 frozen pipes, approx. 6% on the mountain side). The test confirmed that the facilities were operating correctly and the earth temperature has decreased. As the change in groundwater level at the observation well near the freezing functioning test point No. 7 from the level of multiple observation wells, which had not been affected by freezing, exceeded the standard value for four consecutive days, supply of brine to this point was suspended since June 3.

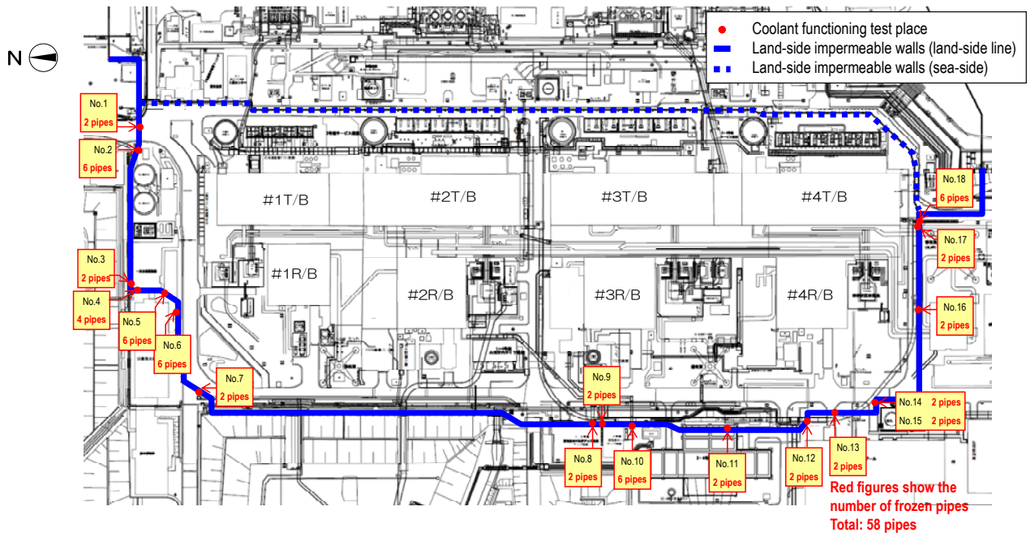


Figure 2: Freezing functioning test place on land-side impermeable walls

T/Mt pipes: Temperature-measurement pipes

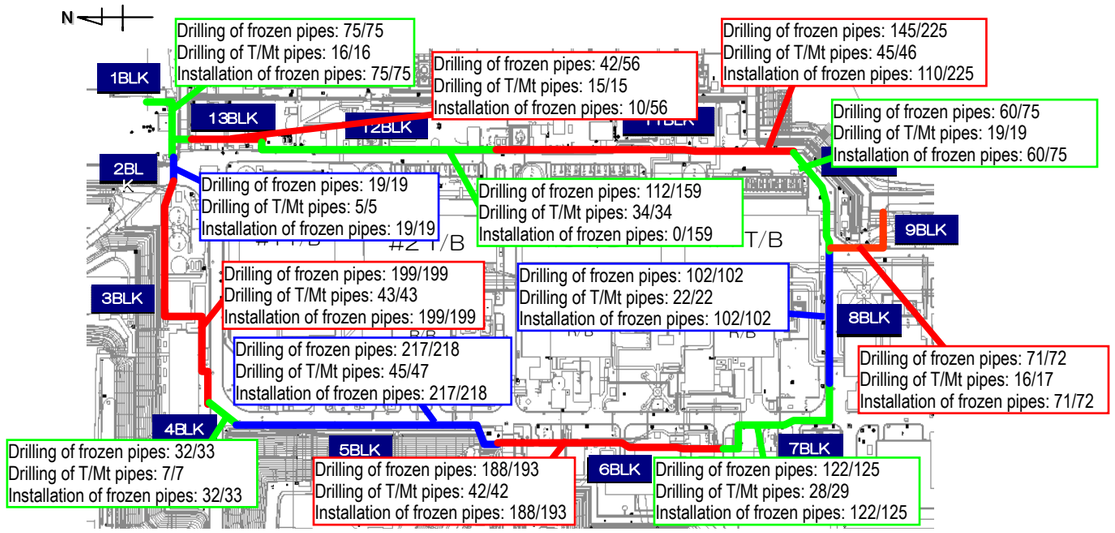
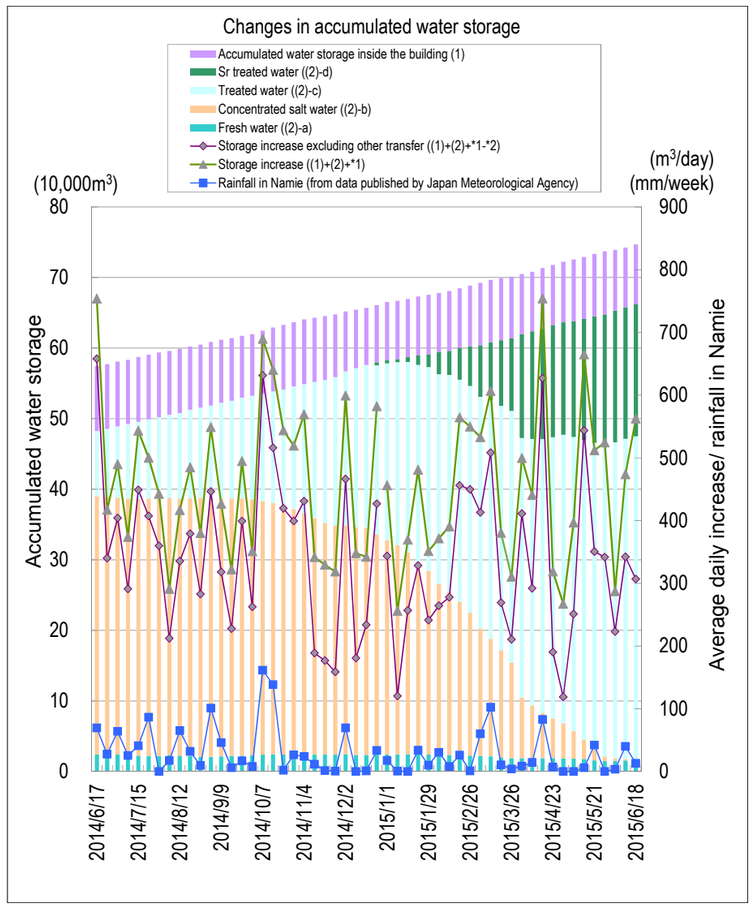
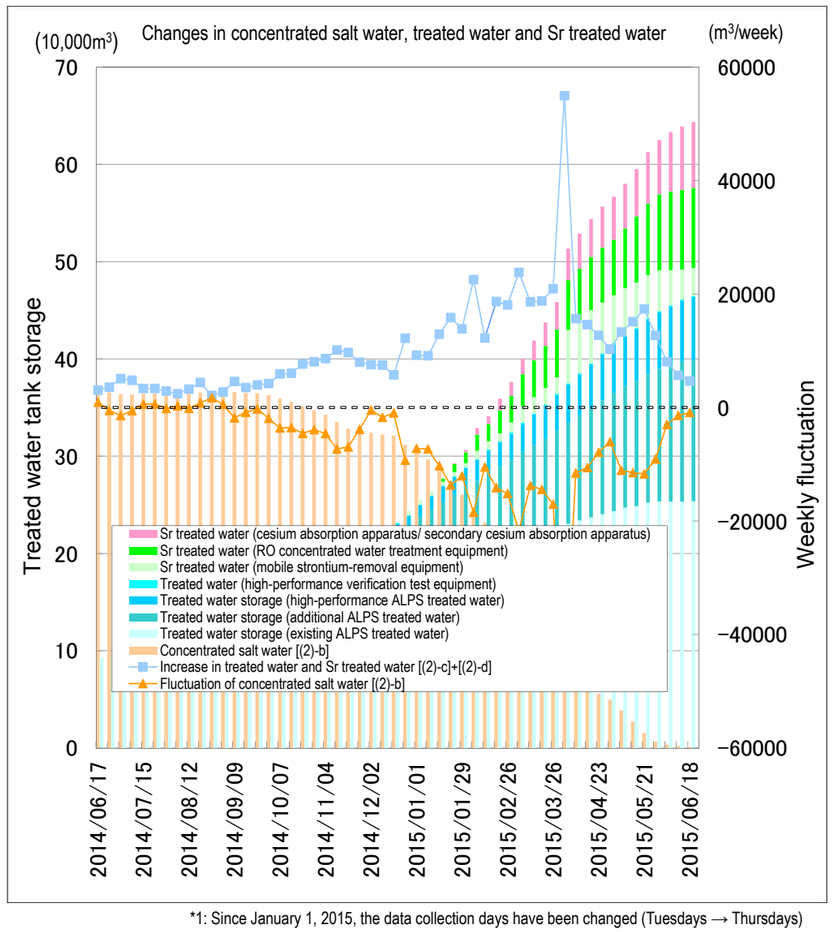


Figure 3: Drilling status for frozen-soil impermeable walls and installation of frozen pipes





As of June 18, 2015

Figure 4: Status of accumulated water storage

*1: Since January 1, 2015, the data collection days have been changed (Tuesdays → Thursdays)
*2: Since April 23, 2015, the data collection method has been changed (Increase in storage: (1)+(2) → (1)+(2)+*1); increase in storage excluding other amounts transferred: (1)+(2)-*2 → (1)+(2)+*1-*2),
*3: Water amount with which water-level gauge indicates 0% or more
*4: Review and correction was made based on past data

➢ Operation of multi-nuclide removal equipment

- Regarding multi-nuclide removal equipment (existing, additional and high-performance), hot tests using radioactive water are underway (for existing equipment, System A: from March 30, 2013, System B: from June 13, 2013, System C: from September 27, 2013; for additional equipment, System A: from September 17, 2014, System B: from September 27, 2014, System C: from October 9, 2014; for high-performance equipment, from October 18, 2014).
- As of June 18, the volumes treated by existing, additional and high-performance multi-nuclide removal equipment were approx. 254,000, 146,000 and 64,000 m³ respectively (including approx. 9,500 m³ stored in the J1(D) tank, which contained water with a high density of radioactive materials at the System B outlet).
- For Systems A and C of existing multi-nuclide removal equipment, facility inspections are underway and additional absorption vessels are being installed to improve their performance (from May 24). System B will be operated as necessary to treat wastewater generated in association with inspections, remaining water of RO concentrated salt water, etc. An inspection for System B will be conducted after Systems A and C have been inspected.
- To reduce the risks of strontium-treated water, treatment by additional and high-performance multi-nuclide removal equipment is underway (additional from May 27, high-performance from April 15). As of June 18, approx. 26,000 m³ had been treated.
- On June 11, an incident occurred at the additional multi-nuclide removal equipment, in which successive standby operation was automatically suspended following the change in control software. There was no leakage of contaminated water or device failure due to the impact of the automatic suspension. The identified cause was grounding of the source circuit for the control equipment. After confirming the soundness of the source circuit and recovering the power source, treatment resumed on June 13. Investigations continue to determine the causes of the grounding and the impact of the software modification.

➢ Status of investigation on accumulated water detected around the outer periphery of the HIC hatch

- In response to the detection of accumulated water around the outer periphery of the HIC* hatch on April 2, investigations to confirm any other accumulated water is being conducted. On June 15, an inspection of the temporary absorption vessel storage (secondary facility) has been completed, which confirmed accumulated water at 30 HICs out of 684 HICs stored.

* High Integrity Container (HIC): A container storing sediment products (slurry) and spent adsorbent generated from the pre-treatment facilities and absorption vessels of the multi-nuclide removal equipment, etc.

- From May 29, water removal from HICs commenced at the secondary facility. As of June 24, water removal of 32 HICs has been completed.
- As the inspection revealed HICs which included hatches with no vent hole, an additional check was conducted on hatches lacking data on the number of vent holes. This check identified eight hatches with an excessive or insufficient number of holes, of 478 HICs at the secondary facility. Hatches with no holes were replaced. Holes will be added to the prescribed number for hatches lacking holes.
- Regarding HICs with rubber mats, which were added to prevent expanded contamination in response to the leak from HICs in April 2014, it was shown that vent holes did not function due to the rubber mats. These mats were collected to ensure the vent function (June 18).
- Inspection will continue at the temporary absorption vessel storage (third facility).

➢ Toward reducing the risk of contaminated water stored in tanks

- Treatment measures comprising the removal of strontium by cesium absorption apparatus (KURION) (from January 6) and secondary cesium absorption apparatus (SARRY) (from December 26, 2014) are underway. As of June 18, approx. 68,000 m³ had been treated.

➢ Measures in Tank Areas

- Rainwater, under the release standard and having accumulated inside the fences in the contaminated water tank area, was sprinkled on site after eliminating radioactive materials using rainwater-treatment equipment since May 21, 2014 (as of June 23, 2015 a total of 26,250 m³).

➢ Collection of contaminated soil around the underground reservoir No. 1 completed

- Collection of soil and sand around the underground reservoir No. 1, which was contaminated due to the leakage of RO concentrated salt water in April 2013, was completed (June 2). Contaminated soil around the underground reservoir No. 2 had been collected by August 2013.

➢ Leakage from transfer hose from 1,000t notch tank to Unit 3 Turbine Building

- On May 29, leakage from the pressure hose was detected during the transfer from a 1,000t notch tank to the Unit 3 Turbine Building. The leaking water was assumed to flow inside the port via the drainage side ditch and drainage channel K. However, judging from the lack of significant variation identified in radiation density at the port entrance and in the outer sea, there was not considered to be any impact outside the port. The assumed leakage amount was approx. 7-15 m³.
- Immediately, water inside the drainage channel and drainage side ditch was collected (from May 29), likewise soil and sand inside the drainage side ditch (May 29) and sandbags were installed (May 29). As the density at the K drainage channel outlet remained within the normal range (below 200Bq/L), water collection was finished and the sandbags were removed (June 3).
- The pressure hoses, with which leakage was detected, were replaced with polyethylene pipes (completed on June 20).
- Inspections were conducted for all pressure hoses used on site (May 30 – June 10).
- It was confirmed that hoses handling highly-concentrated water were currently used under adequate management.
- Among hoses not handling highly-concentrated water, two disabled lines, which will not be used in future, will be removed. 139 usable lines requiring improvement will be upgraded according to the plan.
- Even usable hoses which will no longer be used in future will also be removed according to the plan.

➢ Inflow of groundwater into Unit 2 additional FSTR, etc.

- At Unit 2 additional FSTR* and Unit 3 FSTR, which were evaluated as having no connection with the Reactor Buildings, accumulated water within the buildings was released using temporary pumps.

* FSTR (filter sludge tank room): Building for underground waste storage

- In association with the decrease in the water level of Unit 2 additional FSTR building, the location of the groundwater inflow was identified. In association with the decrease in the water level of Unit 3 FSTR building, an increase in the water level inside the building was identified after the release, though no new spot of groundwater inflow was detected.
- Following the release of accumulated water from the building, a visual inspection will be conducted.
- During the transfer of accumulated groundwater in Unit 3 FSTR, distortion was identified at the side plate of the temporary waste sludge storage tank (A) within the building (June 18). The results of inspection inside the tank confirmed hexagonal distortion inside the tank (June 22). No damage was identified with other tanks inside Unit 3 FSTR.

➢ Installation of the central waste treatment building bypass line

- At present, accumulated water in the Turbine Building basement is temporarily stored in the basement of the central waste treatment buildings (main process building and High Temperature Incinerator Building) and nuclides of this water are removed using various types of treatment equipment. To reduce the risks of storing highly-concentrated contaminated water in the basement of the central waste treatment buildings, there is a plan to install systems to

transfer accumulated water inside the Turbine Building basement directly to each treatment equipment. An application for this change in the implementation plan was submitted on June 9.

➢ Removal of contaminated water from seawater-pipe trenches

- Regarding the Unit 2 seawater-pipe trench, filling of the tunnel sections was completed on December 18, 2014. Filling of Vertical Shafts A and D commenced on February 24, 2015 and the first and second filling cycles were completed on April 7 and May 27 respectively. Filling of open-cut ducts commenced on June 3. Filling of Vertical Shaft C commenced on June 1 and was completed on June 22. Removal of accumulated water is scheduled for completion within June.
- Regarding the Unit 3 seawater-pipe trench, filling of the tunnel sections had been completed (from February 5 to April 8). Water-pumping tests were conducted to verify the filling of these tunnel sections (April 16, 21 and 27), which confirmed the lack of communication in Tunnels. Filling of Vertical Shafts D and A commenced on May 2 and 15 respectively. Filling of Vertical Shaft A was completed on June 6. Filling of Vertical Shafts B and C commenced on June 13 and 17 respectively. Removal of accumulated water will commence as soon as the preparation for transfer to Unit 1 condensate storage tank is completed.
- Regarding the Unit 4 seawater-pipe trench, filling of the tunnel sections (February 14 - March 21) and opening apertures II and III (April 15 - 28) had been completed. Filling of the upper stream of drainage channels will be conducted after coordinating with other construction nearby. Opening apertures I will be filled when the contaminated water level of the building is reduced.
- Regarding the overall contaminated water removal from seawater-pipe trenches, approx. 83% had been completed (as of June 23).

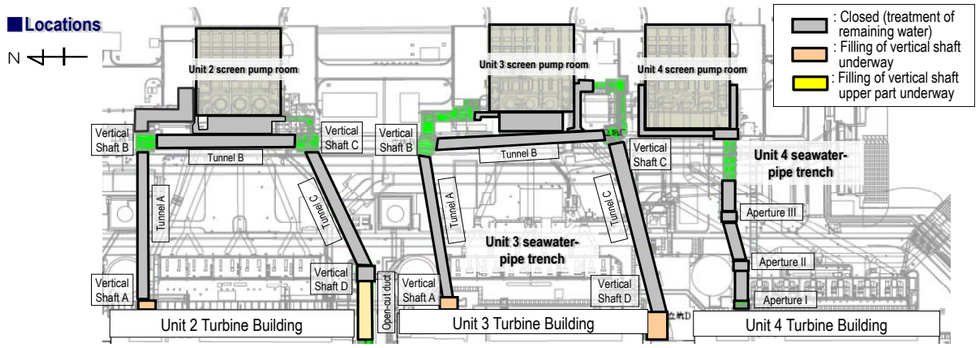


Figure 5: Progress status of contaminated water removal of seawater-pipe trenches

2. Fuel removal 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 was completed on December 22, 2014.

➢ Main work to help remove spent fuel at Unit 1

- On May 21, a disconnect was found with the balloon installed on the Reactor Building 3rd floor equipment hatch to reduce the release of radioactive materials. The investigative results on the status showed that rubble and anti-scattering agents had accumulated on the rain cover over the balloon and that there was no damage with the balloon. As the latest data also showed that the release amount was sufficiently low without a balloon, it will not be recovered. However, countermeasures will be taken to reduce wind inflow with the aim of controlling the release.
- The removal of the building cover is being conducted with anti-scattering measures steadily implemented and safety prioritized above all.

➢ Main work to help remove spent fuel at Unit 2

- To help remove spent fuel from the pool of Unit 2 Reactor Building, a yard is being constructed around the Reactor Building to ensure a work area for installing large heavy-duty machines.
- Currently, preparatory works including closure of ducts, etc. and transfer of existing facilities are underway. Following completion of these works, full-scale removal of interfering buildings will commence from around August, 2015.

➢ Main work to help remove spent fuel at Unit 3

- On May 9, failure in a zoom function was found in two monitoring cameras of the crawler crane used to remove rubble. One of the two cameras was replaced (May 13) and the other was repaired during the annual inspection of the crawler crane (June 1-19).
- Removal of large rubble within the spent fuel pool has resumed since June 22. The fuel-handling machine will be removed in late July.

3. Fuel debris removal

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)

➢ Preparation for investigation inside the Unit 2 PCV

- As preparation to investigate the status of the platform inside the Unit 2 PCV pedestal was scheduled for August, removal of shielding blocks installed in front of the PCV penetration (X-6 penetration), from which the investigation device will be inserted, commenced on June 11 through remote operation.
- Following the removal of these blocks, construction for X-6 penetration will be conducted in July.

4. Plans to store, process and dispose of solid waste and decommission of reactor facilities

Promoting efforts to reduce and store waste generated appropriately 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. 155,100 m³ (+3,600 m³ compared to at the end of April, with an area-occupation rate of 62%). The total storage volume of trimmed trees was approx. 82,500 m³ (+3,900 m³ compared to at the end of April, with an area-occupation rate of 60%). The increase in rubble was mainly attributable to construction related to facing, the removal of rubble around Unit 1-4 buildings, the installation of tanks and the 9th solid waste storage. The increase in trimmed trees was mainly attributable to construction related to facing.

➢ Management status of secondary waste from water treatment

- As of June 18, 2015, the total storage volume of waste sludge was 597 m³ (area-occupation rate: 85%) and that of concentrated waste fluid was 9,237 m³ (area-occupation rate: 46%). The total number of stored spent vessels, High-Integrity Containers (HICs) for multi-nuclide removal equipment, etc. was 2, 571 (area-occupation rate: 42%).

➢ Start of excavation for 9th solid waste storage

- For solid waste storage with a capacity of approx. 110,000 200L-drums, earth-retaining work in association with the excavation commenced on June 8.

➢ Acceptance of rubble started at the 3rd temporary soil cover type storage commenced

- From June 23, acceptance of rubble started at the 3rd temporary soil cover type storage, which was installed to store concrete and metal rubble with a surface dose rate of 30 mSv/h or less.

5. Reactor cooling

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

➢ Reinstallation of the water level gauge and thermometer inside Unit 1 PCV

- To investigate inside the PCV, the permanent supervisory instrumentation (thermometer and water level gauge) installed there was removed (April 7). Upon completion of the investigation (April 20), the permanent supervisory instrumentation was reinstalled (April 22-23). Based on the temperature trends for one month since the installation, the instrumentation was deemed capable of being used to monitor the cooling status and surveillance of this instrumentation started on June 4.

➢ Reading failure in the radiation detector of Unit 1 PCV gas control equipment

- On June 12 and 13, a reading failure was identified in the radiation detector of PCV gas control equipment system B after this system issued an alert. After this detector and cooling facility was replaced and inspected, the system was recovered on June 17. There was no impact on plant data monitoring because System A operated correctly while measurement of System B was suspended.

➢ Water purification of the Unit 1 spent fuel pool

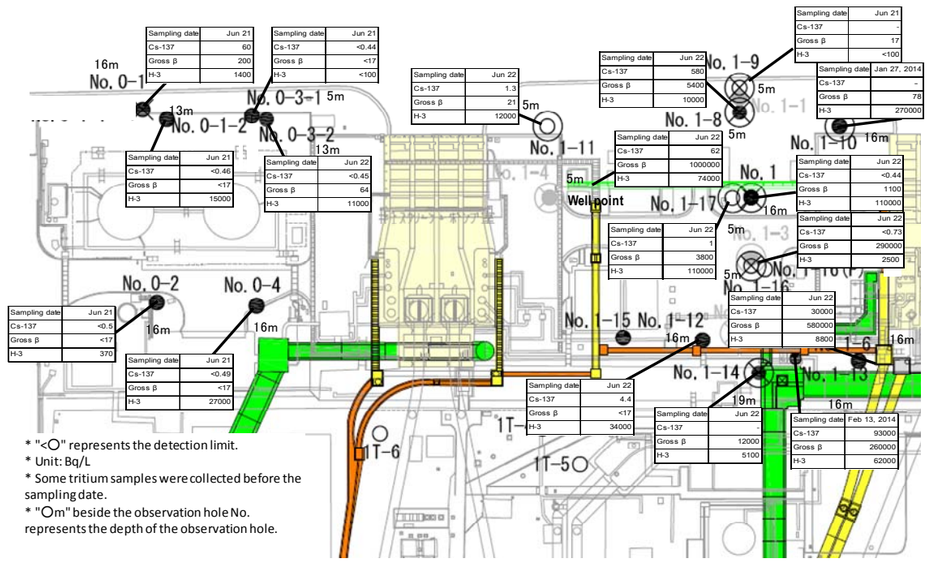
- Radioactivity removal will be conducted from the water of the Unit 1 spent fuel pool in preparation for a case requiring desalination due to the impact of wind, rain, etc. after removing the building cover (scheduled for commencement in late July).

6. Reduction of radiation dose and mitigation of contamination

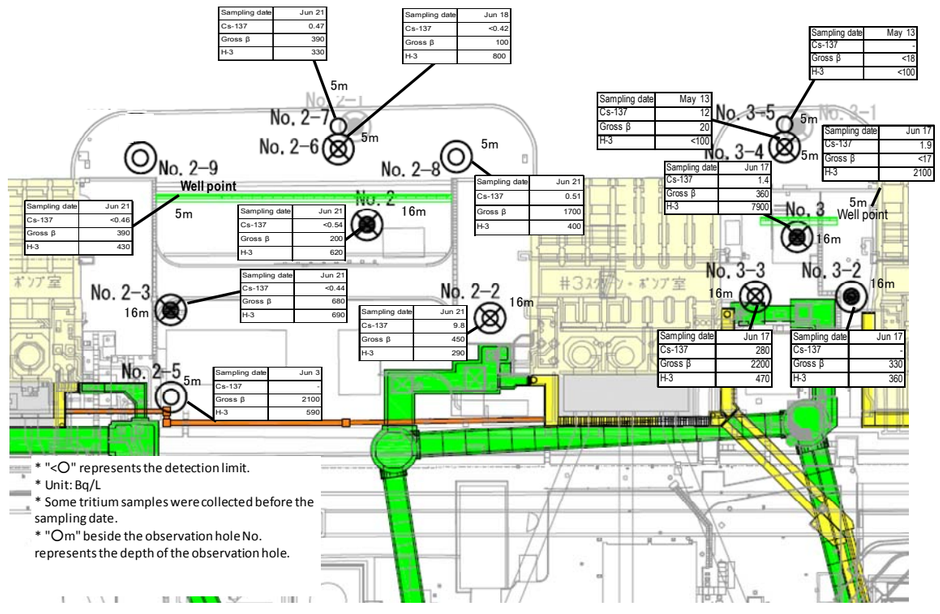
Effective dose-reduction at site boundaries and purification of the port water to mitigate the impact of radiation on the external environment

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

- Regarding the radioactive materials in groundwater near the bank on the north side of the Unit 1 intake, tritium densities have been increasing in groundwater Observation Hole Nos. 0-4 since July 2014 and currently stand at around 25,000 Bq/L. Pumping of 1 m³/day of water from Observation Hole No. 0-3-2 continues.
- Regarding the groundwater near the bank between the Unit 1 and 2 intakes, the tritium density at groundwater Observation Hole Nos. 1 and 1-17 has remained constant at around 120,000 Bq/L since March 2015. The density of gross β radioactive materials at groundwater Observation Hole No. 1 has been increasing since February 2015 and currently stands at around 1,000 Bq/L, while the density at groundwater Observation Hole No. 1-17 has been decreasing and currently stands at around 4,000 Bq/L. Water pumping from the well point (10m³/day) and the pumping well No. 1-16 (P) (1m³/day) installed near Observation Hole Nos. 1-16 continues.
- Regarding radioactive materials in the groundwater near the bank between the Unit 2 and 3 intakes, the densities of tritium and gross β radioactive materials have been further decreasing from March and currently stand at around 500 Bq/L for both tritium and gross β radioactive materials. To treat the surface of the ground improvement area and repair the well point, the volume of water pumped from the well point increased to 50 m³/day (from October 31, 2014). The surface treatment commenced on January 8 and was concluded on February 18. The repair of the well point is underway (scheduled for completion in mid-July).
- Regarding the radioactive materials in groundwater near the bank between the Unit 3 and 4 intakes, a low density was maintained at all observation holes. Following the surface treatment in the ground improvement area (March 19-31), pumping of rising groundwater commenced (20m³/day from April 1, 10m³/day from April 24). Both densities of tritium and gross β radioactive materials have been increasing at groundwater Observation Hole No. 3 since April. The repair of the well point is underway (scheduled for completion in mid-July).
- Regarding the radioactive materials in seawater outside the sea side impermeable walls and within the open channels of Units 1-4, a low density equivalent to that at the point north of the east breakwater was maintained as up to May.
- The density of radioactive materials in seawater within the port has remained low at the same level as up to May.
- The radioactive material density in seawater at and outside the port entrance has remained within the same range as previously recorded.



<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

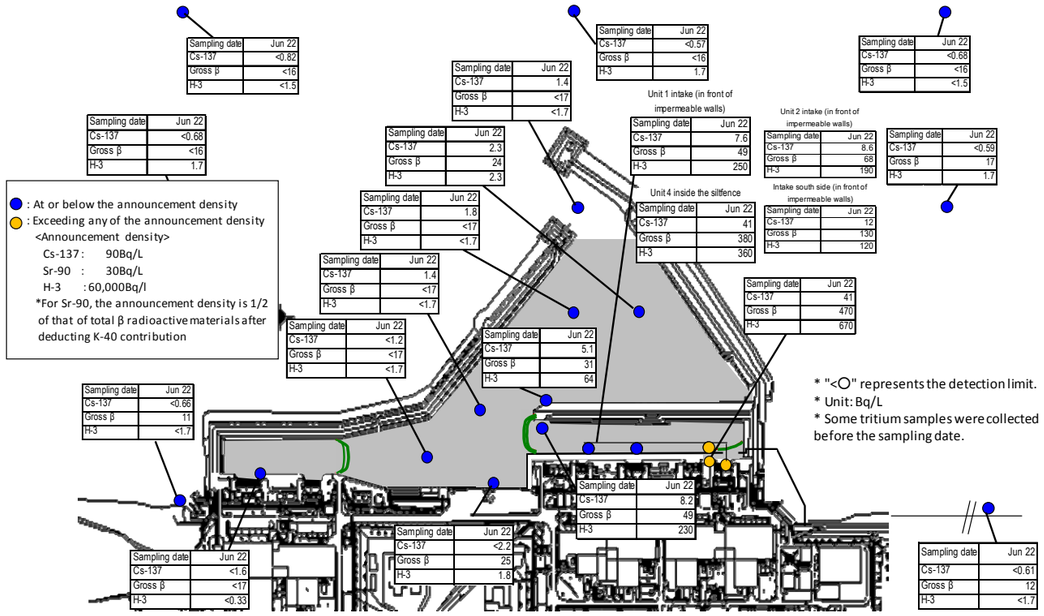


Figure 7: Seawater density around the port

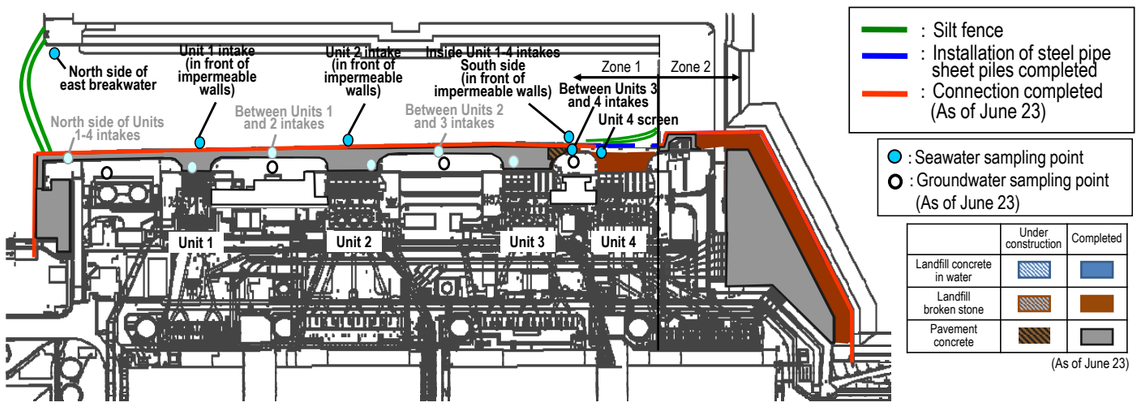


Figure 8: Progress status of impermeable walls on the sea side

7. Review of the number of staff required and efforts to improve the labor environment and conditions

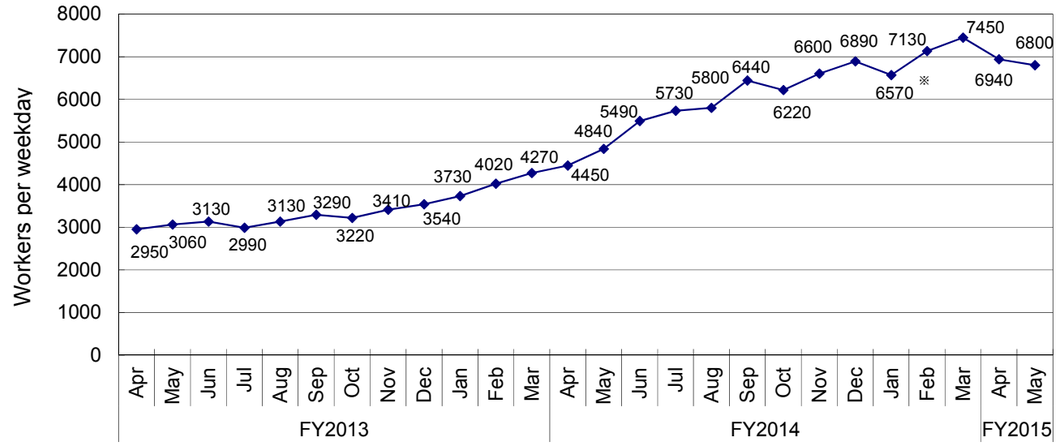
Securing appropriate staff long-term while thoroughly implementing workers' exposure dose control. Improving the work environment and labor conditions continuously based on an understanding of workers' on-site needs

➢ Staff management

- The monthly average total of people registered for at least one day per month to work on site during the past quarter from February to April 2015 was approx. 15,000 (TEPCO and partner company workers), which exceeded the monthly average number of actual workers (approx. 11,900). Accordingly, sufficient people are registered to work on site.
- It was confirmed with prime contractors that the estimated manpower necessary for the work in July (approx. 6,800 per day: TEPCO and partner company workers)* would be secured at present. The average numbers of workers per day for each month (actual values) were maintained, with approx. 3,000 to 7,500 since FY2013 (See Figure 9).

* Some works for which contractual procedures have yet to be completed are excluded from the July estimate.

- The number of workers from Fukushima Prefecture has remained the same but workers from outside the prefecture has been slightly decreasing. Therefore, the local employment ratio (TEPCO and partner company workers) as of May remained at around 45% with a slight increase.
- The average exposure dose of workers remained at approx. 1 mSv/month during both FY2013 and FY2014. (Reference: Annual average exposure dose 20mSv/year ≒ 1.7mSv/month)
- For most workers, the exposure dose was sufficiently within the limit and allowed them to continue engaging in radiation work.



* Calculated based on the number of workers as of January 20 (due to safety inspection from January 21)

Figure 9: Changes in the average number of workers per weekday for each month since FY2013

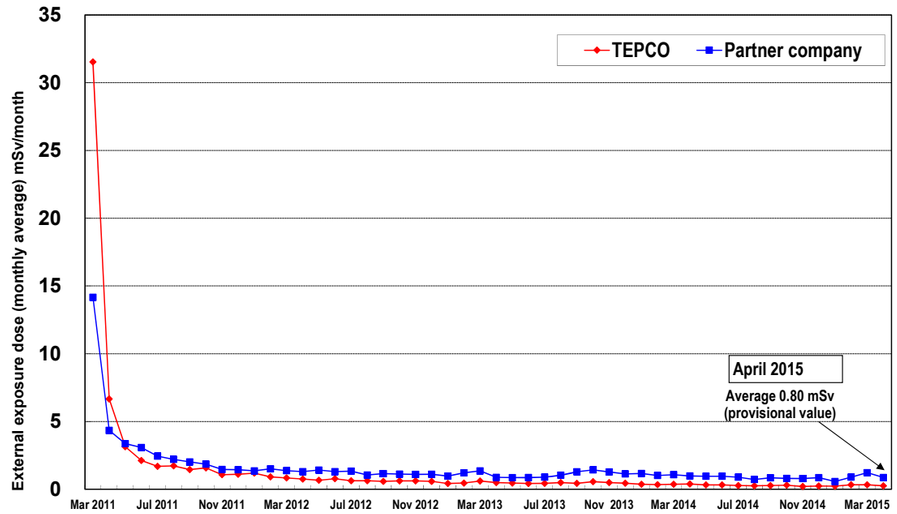


Figure 10: Changes in monthly individual worker exposure dose (monthly average exposure dose since March 2011)

➢ Status of heat stroke cases

- As of June 24 in FY2015, there were a total of five heat stroke cases, four of which attributable to work and one alleged case. Through preventive measures for heat stroke continue to be taken. (As of the end of June FY2014, there were a total of five heat stroke cases, one of which attributable to work and alleged cases.)

➢ Renovation of dining space at the large rest house

- At the large rest house with a capacity of approx. 1,200 workers, the operation started on May 31 and meal services at the dining room commenced on June 1.
- Regarding the meal service, having decided that renovation would be required for a portion of the building to continue long-term operation and further improve it from a hygiene perspective, the dining room has been

temporarily closed from June 9 to 23. The renovation included enhancing the ceiling, installing additional hand-wash stations and establishing a container carry-in entrance. As the construction schedule was decided, operations temporarily resumed on June 24. However, the operations will be suspended again for about three weeks from June 29 and resume from late July. During the suspension period, the service hours of the dining room at the new Administration Office Building will be extended to enhance usability for workers.

8. Status of Units 5 and 6

➢ Status of Units 5 and 6 spent fuel storage

- For Unit 5, fuel removal of the reactor commenced on April 22 and was completed on June 1. At the spent fuel pool (with a capacity of 1,590 fuel assemblies), 1,374 spent and 168 non-irradiated fuel assemblies are currently stored.
- For Unit 6, fuel removal of the reactor has been completed in FY2013. At the spent fuel pool (with a capacity of 1,654 fuel assemblies), 1,456 spent and 198 non-irradiated fuel assemblies (among which 180 fuel assemblies were transferred from Unit 4 spent fuel pool) and at the non-irradiated fuel storage (with a capacity of 230 fuel assemblies), 230 non-irradiated fuel assemblies are currently stored.

➢ Status of Unit 5 and 6 accumulated water treatment

- Accumulated water in Unit 5 and 6 buildings is transferred from Unit 6 Turbine Building to outdoor tanks. After separating oil, providing RO treatment and confirming the radiation density, the water is sprinkled.

9. Other

➢ Revision of the Mid-and-Long-Term Roadmap

- On June 12, at the Inter-Ministerial Council for Contaminated Water and Decommissioning Issues, revision of the Mid-and-Long-Term Roadmap was resolved.
- The overall goal, including “completion of decommissioning 30-40 years from now”, etc. was maintained. Based on this framework, the following five fields were revised:
  - i) Emphasizing risk reduction (as well as increasing speed, prioritizing risks to ensure steady long-term risk reduction)
  - ii) Specifying targets (milestones) (in response to the views of local stakeholders, setting specific targets over the next several years)
  - iii) Enhancing trusting relationships with local citizens through thorough information disclosure, etc. (enhancing communications)
  - iv) Further reducing the exposure dose of workers and strengthening the labor, safety and hygiene control
  - v) Reinforcing the Nuclear Damage Compensation and Decommissioning Facilitation Corporation (NDF) (centrally managing research and development and accumulating knowledge domestically and overseas)
- Based on this revised Mid-and-Long-Term Roadmap, decommissioning and contaminated water countermeasures will steadily proceed.

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

- On June 15, at the 8th meeting of the Fukushima Advisory Board on Decommissioning and Contaminated Water Management (Fukushima City), the revised Mid-and-Long-Term Roadmap, which was approved by the Inter-Ministerial Council for Contaminated Water and Decommissioning Issues on June 12, was explained.
- During the meeting, the revised Mid-and-Long-Term Roadmap was positively evaluated for shifting its priority on ensuring safety rather than speed. Requests were also received for appropriate information delivery concerning decommissioning and contaminated water countermeasures.
- The decommissioning and contaminated water countermeasures will steadily proceed based on continued close communication with local citizens and their requests.

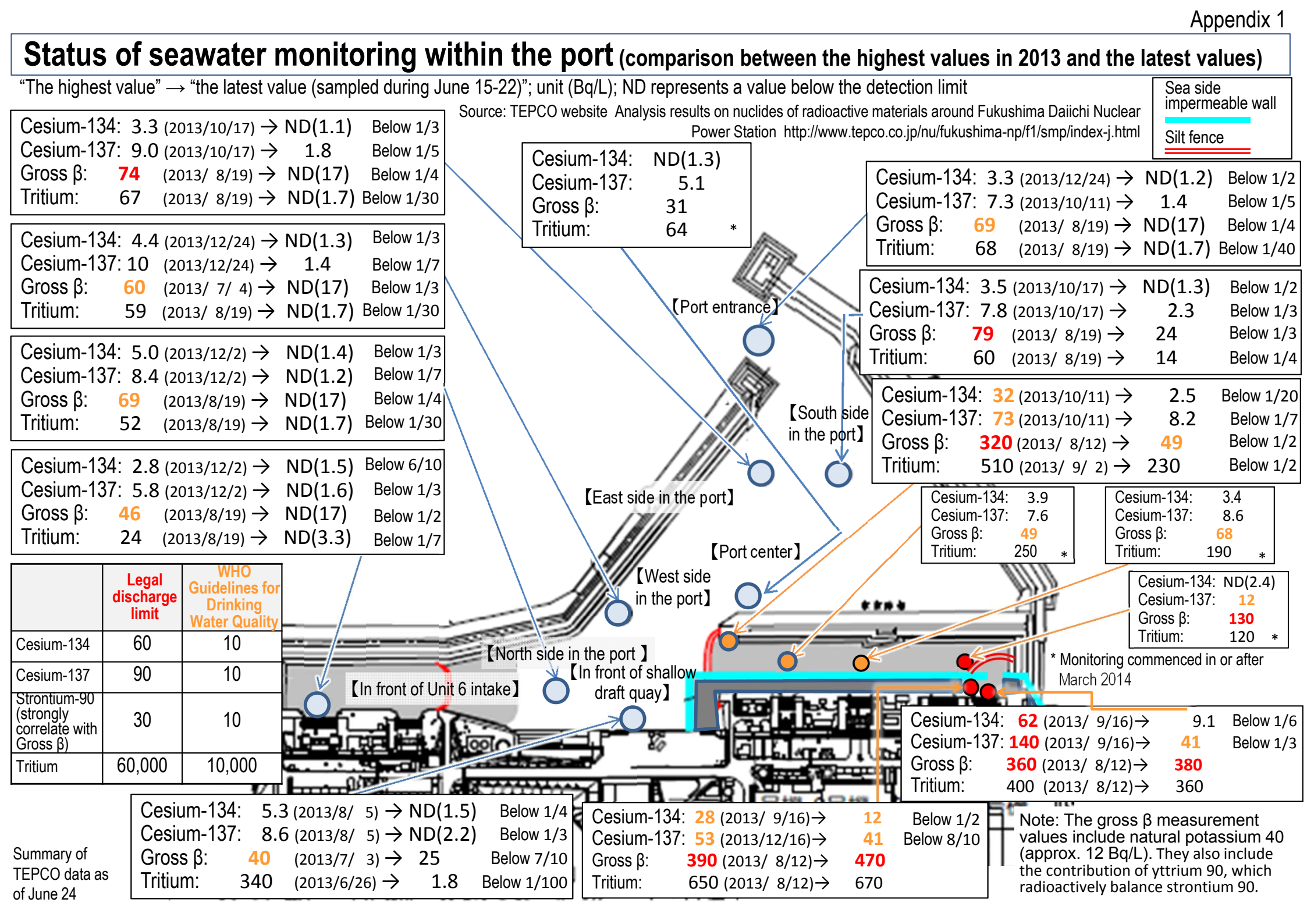
Status of seawater monitoring within the port (comparison between the highest values in 2013 and the latest values)

"The highest value" → "the latest value (sampled during June 15-22)"; unit (Bq/L); ND represents a value below the detection limit

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

Sea side impermeable wall

Silt fence



	Cesium-134: 3.3 (2013/10/17) → ND(1.1)	Below 1/3
	Cesium-137: 9.0 (2013/10/17) → 1.8	Below 1/5
	Gross β: 74 (2013/ 8/19) → ND(17)	Below 1/4
	Tritium: 67 (2013/ 8/19) → ND(1.7)	Below 1/30

	Cesium-134: 4.4 (2013/12/24) → ND(1.3)	Below 1/3
	Cesium-137: 10 (2013/12/24) → 1.4	Below 1/7
	Gross β: 60 (2013/ 7/ 4) → ND(17)	Below 1/3
	Tritium: 59 (2013/ 8/19) → ND(1.7)	Below 1/30

	Cesium-134: 5.0 (2013/12/2) → ND(1.4)	Below 1/3
	Cesium-137: 8.4 (2013/12/2) → ND(1.2)	Below 1/7
	Gross β: 69 (2013/8/19) → ND(17)	Below 1/4
	Tritium: 52 (2013/8/19) → ND(1.7)	Below 1/30

	Cesium-134: 2.8 (2013/12/2) → ND(1.5)	Below 6/10
	Cesium-137: 5.8 (2013/12/2) → ND(1.6)	Below 1/3
	Gross β: 46 (2013/8/19) → ND(17)	Below 1/2
	Tritium: 24 (2013/8/19) → ND(3.3)	Below 1/7

	Legal discharge limit	WHO Guidelines for Drinking Water Quality
Cesium-134	60	10
Cesium-137	90	10
Strontium-90 (strongly correlate with Gross β)	30	10
Tritium	60,000	10,000

	Cesium-134: ND(1.3)	
	Cesium-137: 5.1	
	Gross β: 31	
	Tritium: 64 *	

	Cesium-134: 3.3 (2013/12/24) → ND(1.2)	Below 1/2
	Cesium-137: 7.3 (2013/10/11) → 1.4	Below 1/5
	Gross β: 69 (2013/ 8/19) → ND(17)	Below 1/4
	Tritium: 68 (2013/ 8/19) → ND(1.7)	Below 1/40

	Cesium-134: 3.5 (2013/10/17) → ND(1.3)	Below 1/2
	Cesium-137: 7.8 (2013/10/17) → 2.3	Below 1/3
	Gross β: 79 (2013/ 8/19) → 24	Below 1/3
	Tritium: 60 (2013/ 8/19) → 14	Below 1/4

	Cesium-134: 32 (2013/10/11) → 2.5	Below 1/20
	Cesium-137: 73 (2013/10/11) → 8.2	Below 1/7
	Gross β: 320 (2013/ 8/12) → 49	Below 1/2
	Tritium: 510 (2013/ 9/ 2) → 230	Below 1/2

	Cesium-134: 3.9
	Cesium-137: 7.6
	Gross β: 49
	Tritium: 250 *

	Cesium-134: 3.4
	Cesium-137: 8.6
	Gross β: 68
	Tritium: 190 *

	Cesium-134: ND(2.4)
	Cesium-137: 12
	Gross β: 130
	Tritium: 120 *

* Monitoring commenced in or after March 2014

	Cesium-134: 62 (2013/ 9/16)→ 9.1	Below 1/6
	Cesium-137: 140 (2013/ 9/16)→ 41	Below 1/3
	Gross β: 360 (2013/ 8/12)→ 380	
	Tritium: 400 (2013/ 8/12)→ 360	

	Cesium-134: 5.3 (2013/8/ 5) → ND(1.5)	Below 1/4
	Cesium-137: 8.6 (2013/8/ 5) → ND(2.2)	Below 1/3
	Gross β: 40 (2013/7/ 3) → 25	Below 7/10
	Tritium: 340 (2013/6/26) → 1.8	Below 1/100

	Cesium-134: 28 (2013/ 9/16)→ 12	Below 1/2
	Cesium-137: 53 (2013/12/16)→ 41	Below 8/10
	Gross β: 390 (2013/ 8/12)→ 470	
	Tritium: 650 (2013/ 8/12)→ 670	

Summary of TEPCO data as of June 24

Note: The gross β measurement values include natural potassium 40 (approx. 12 Bq/L). They also include the contribution of yttrium 90, which radioactively balance strontium 90.

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 15-22)

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

	Legal discharge limit	WHO Guidelines for Drinking Water Quality
Cesium-134	60	10
Cesium-137	90	10
Strontium-90 (strongly correlate with Gross β)	30	10
Tritium	60,000	10,000

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

Cesium-134: ND (2013) → ND (0.59)
Cesium-137: ND (2013) → ND (0.82)
Gross β: ND (2013) → ND (16)
Tritium: ND (2013) → ND (1.5)

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

Cesium-134: ND (2013) → ND (0.72)
Cesium-137: 1.6 (2013/10/18) → ND (0.57) Below 1/2
Gross β: ND (2013) → ND (16)
Tritium: 6.4 (2013/10/18) → 1.7 Below 1/3

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

Cesium-134: ND (2013) → ND (0.71)
Cesium-137: ND (2013) → ND (0.68)
Gross β: ND (2013) → ND (16)
Tritium: ND (2013) → ND (1.5)

Cesium-134: ND (2013) → ND (0.79)
Cesium-137: ND (2013) → ND (0.68)
Gross β: ND (2013) → ND (16)
Tritium: 4.7 (2013/ 8/18) → 1.7 Below 1/2

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

【Port entrance】

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

Cesium-134: ND (2013) → ND (0.76)
Cesium-137: ND (2013) → ND (0.59)
Gross β: ND (2013) → 17
Tritium: ND (2013) → 1.7

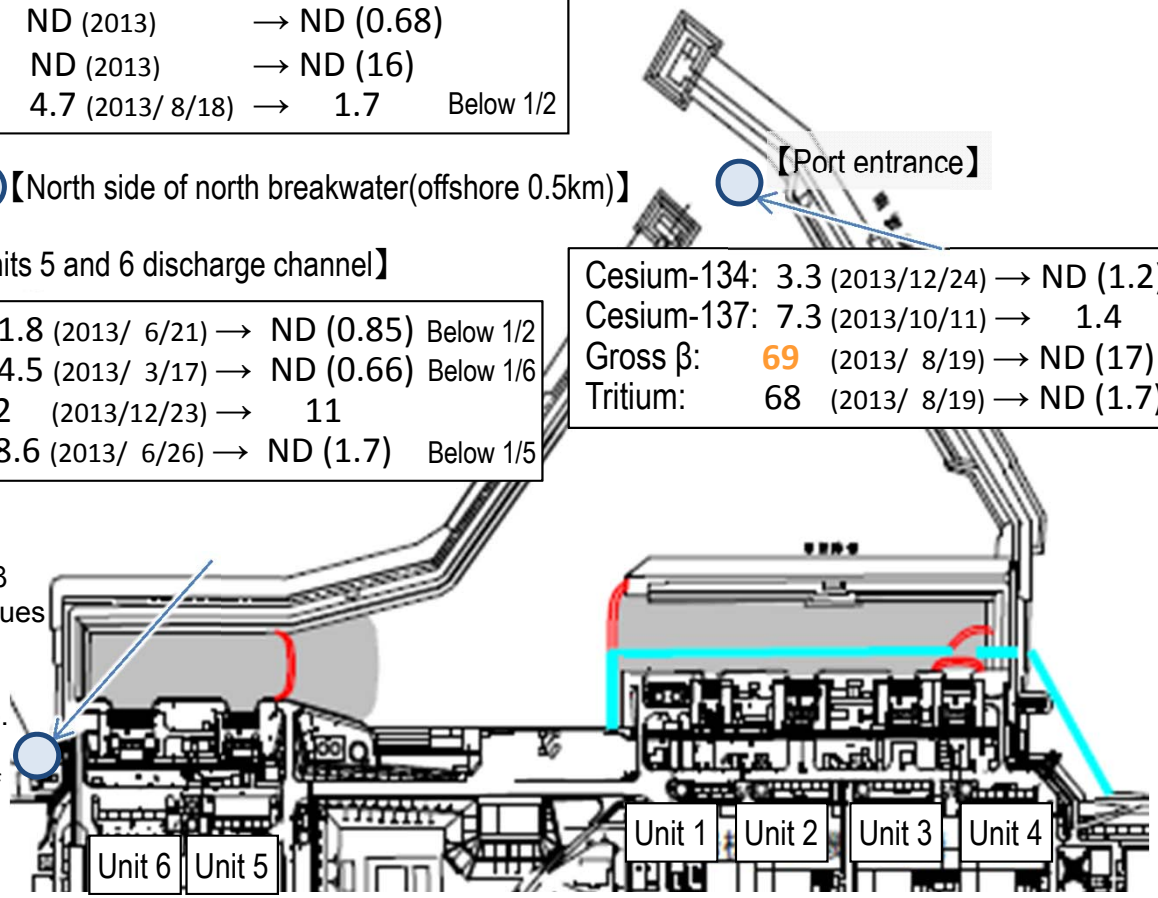
【North side of Units 5 and 6 discharge channel】

Cesium-134: 1.8 (2013/ 6/21) → ND (0.85) Below 1/2
Cesium-137: 4.5 (2013/ 3/17) → ND (0.66) Below 1/6
Gross β: 12 (2013/12/23) → 11
Tritium: 8.6 (2013/ 6/26) → ND (1.7) Below 1/5

Cesium-134: 3.3 (2013/12/24) → ND (1.2) Below 1/2
Cesium-137: 7.3 (2013/10/11) → 1.4 Below 1/5
Gross β: 69 (2013/ 8/19) → ND (17) Below 1/4
Tritium: 68 (2013/ 8/19) → ND (1.7) Below 1/40

Cesium-134: ND (2013) → ND (0.79)
Cesium-137: 3.0 (2013/ 7/15) → ND (0.61) Below 1/4
Gross β: 15 (2013/12/23) → 12
Tritium: 1.9 (2013/11/25) → ND (1.7)

【Around south discharge channel】



Sea side impermeable wall

Silt fence

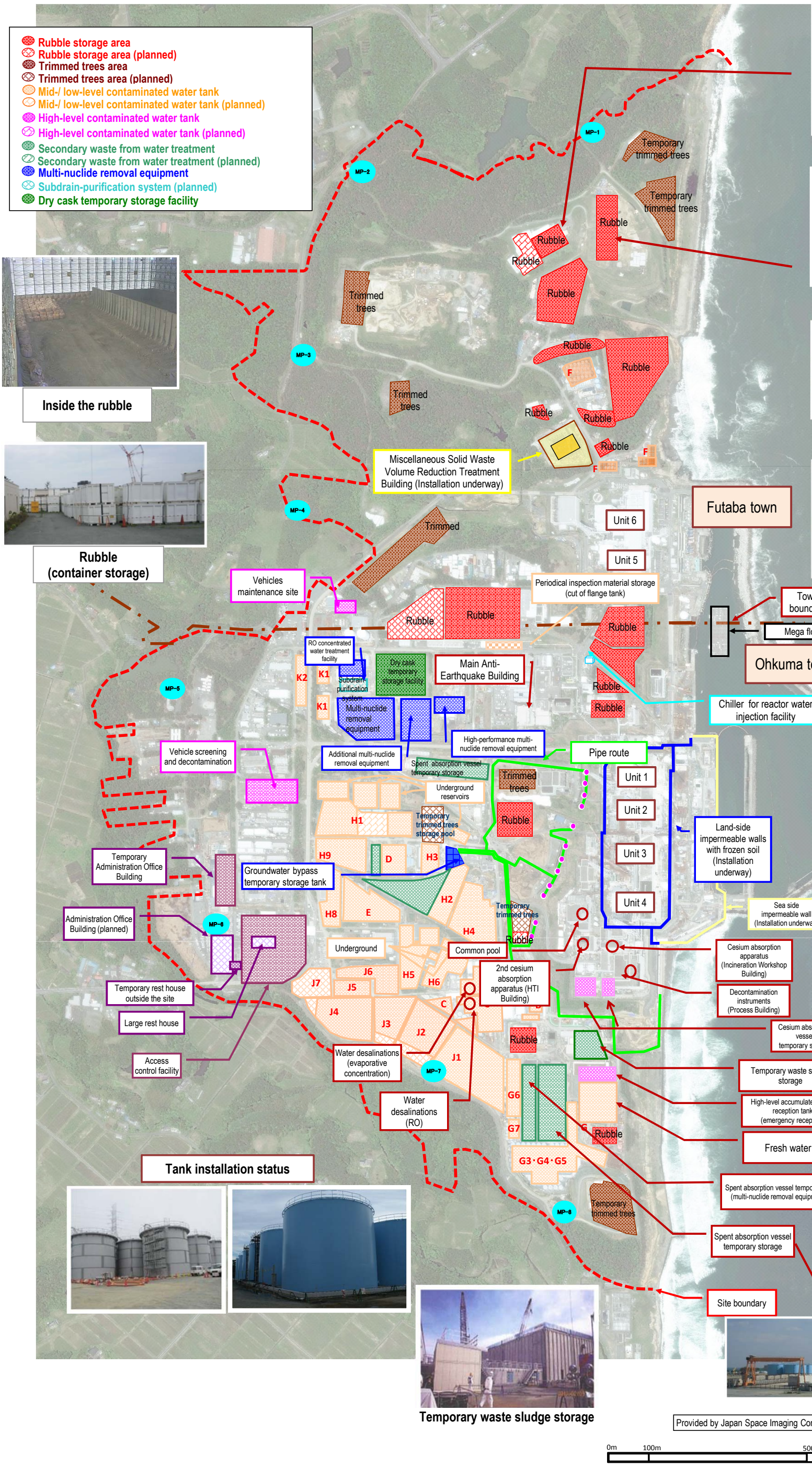
Note: The gross β measurement values include natural potassium 40 (approx. 12 Bq/L). They also include the contribution of yttrium 90, which radioactively balance strontium 90.

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

Summary of TEPCO data as of June 24

Appendix 2
June 25, 2015

TEPCO Fukushima Daiichi Nuclear Power Station Site Layout



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

Immediate target	Commence fuel removal from the Unit 1-3 Spent Fuel Pools

Unit 1

Regarding fuel removal from Unit 1 spent fuel pool, there is a plan to install a dedicated cover for fuel removal over the operating floor(*1).

Before starting this plan, the building cover will be dismantled to remove rubble from the top of the operating floor, with anti-scattering measures steadily implemented.

On May 21, a disconnect was found with the balloon installed on the Reactor Building 3rd floor equipment hatch. As the release amount was sufficiently low regardless of a balloon, it will not be recovered. However, countermeasures will be taken to reduce wind inflow.

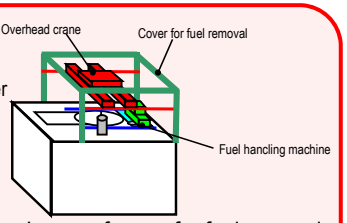
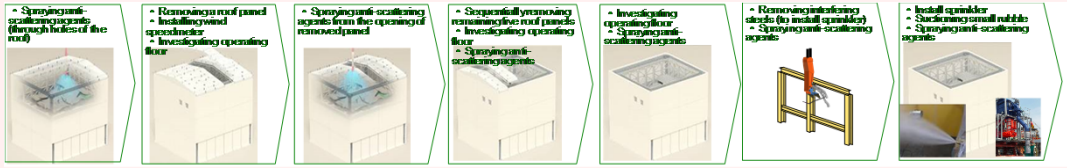


Image of cover for fuel removal


Flow of building cover dismantling

Unit 2

Regarding fuel removal for Unit 2 spent fuel pool, two plans are being considered: Plan 1 to share a container for removing fuel assemblies and debris from the pool; and Plan 2 to install a dedicated cover for fuel removal.

As both plans require work areas of large heavy machines, etc. to install a structure for fuel removal and a fuel handling machine, preparatory work is currently underway to construct a yard around the Reactor Building.

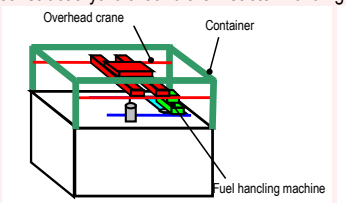


Image of Plan 1

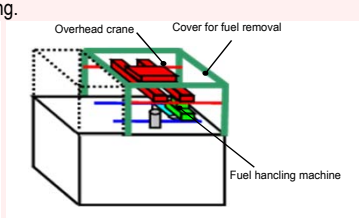


Image of Plan 2

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

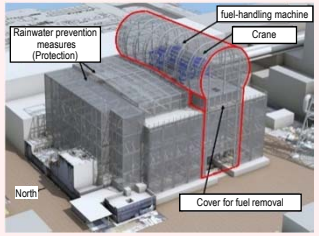


Image of the cover for fuel removal

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.


Fuel removal status

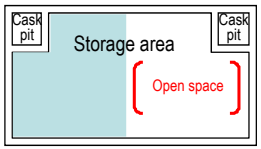
On November 5, 2014, within a year of commencing work to remove the fuel, all 1,331 spent fuel assemblies in the pool had been transferred. The transfer of the remaining non-irradiated fuel assemblies to the Unit 6 SFP was completed on December 22, 2014. (2 of the non-irradiated fuel assemblies were removed in advance in July 2012 for fuel checks)

This marks the completion of fuel removal from the Unit 4 Reactor Building.

Based on this experience, fuel assemblies will be removed from Unit 1-3 pools.

* A part of the photo is corrected because it includes sensitive information related to physical protection.

Common pool

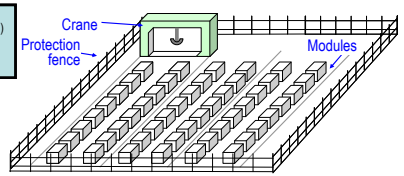


An open space will be maintained in the common pool (Transfer to the temporary dry cask storage facility)

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, 2013); 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) 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 25, 2015
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

3D laser scan inside the Unit 1 R/B underground floor

The upper part of the underground floor (torus room) of Unit 1 R/B was investigated with a laser scan using a remote-controlled robot, and collected 3D data.

3D data, which allows examination based on actual measurements, can be used to examine more detailed accessibility and allocation of equipment.

Combining it with 3D data on the R/B 1st floor allows obstacles on both 1st and underground floors to be checked simultaneously. This allows efficient examination of positions to install repair equipment for PCVs and vacuum break lines.

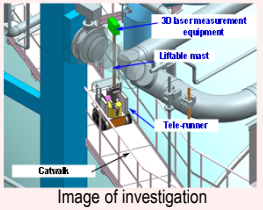
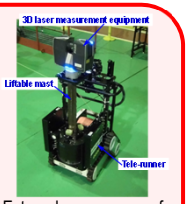


Image of investigation



External appearance of remote-controlled robot

Image of 3D data

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

Investigation in the leak point detected in the upper part of Unit 1 S/C from May 27, 2014 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

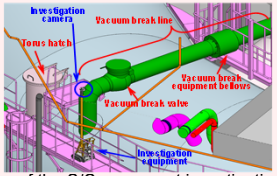
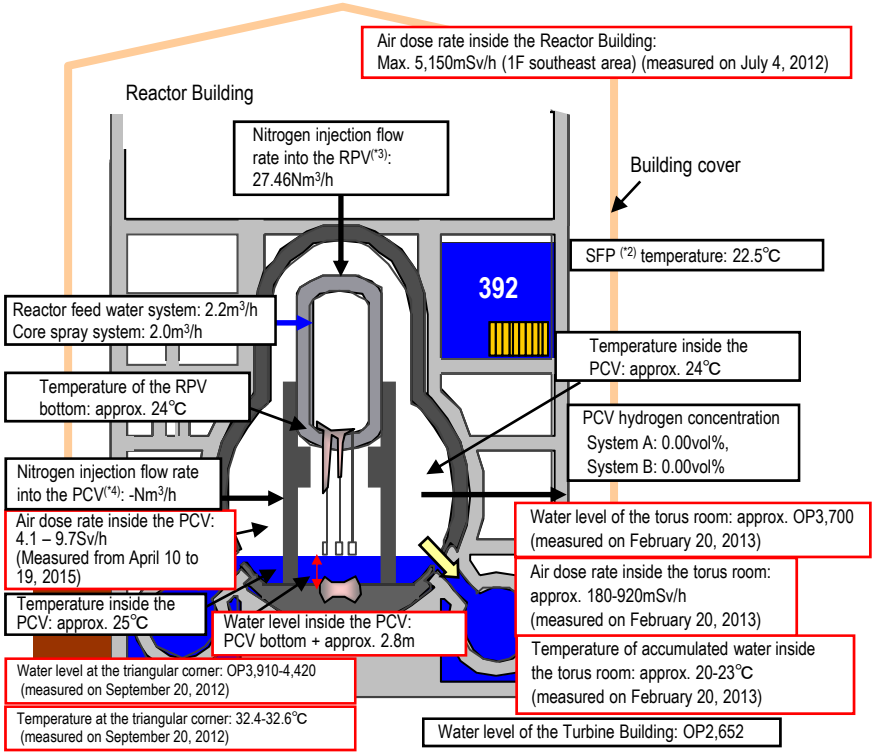


Image of the S/C upper part investigation

Unit 1



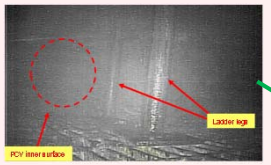
* Indices related to the plant are values as of 11:00, June 24, 2015

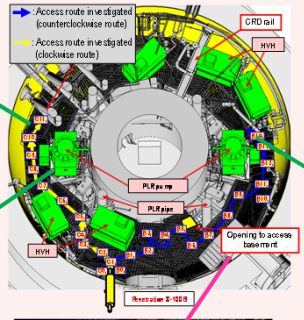
Status of equipment development toward investigating inside the PCV

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.

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

[Status of investigation equipment development]
- Using the crawler-type equipment with a shape-changing structure which allows it to enter the PCV from the narrow access entrance (bore: 100mm) and stably move on the grating, a field demonstration was implemented from April 10 to 20, 2015.
- Through this investigation, information including images inside the PCV 1st floor and airborne radiation was obtained. The investigation also confirmed the absence of obstacles around the access aperture leading to the basement floor, which will be used in the next investigation. These results will be considered in next investigation of the PCV basement floor.





Investigation inside PCV


Investigative equipment

<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 25, 2015
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

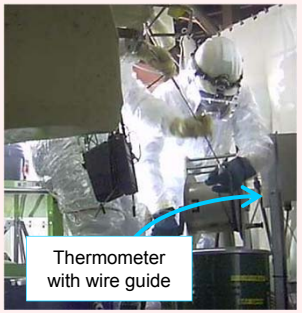
Installation of an RPV thermometer and permanent PCV supervisory instrumentation

(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, 2014).
- On April 17, 2014, removal of the broken thermometer failed and was suspended. Rust-stripping chemicals were injected and the broken thermometer was removed on January 19, 2015. A new thermometer was reinstalled on March 13, 2015. The thermometer has been used as a part of permanent supervisory instrumentation since April 23.

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

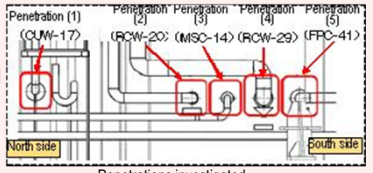
- Some of the permanent supervisory instrumentation for PCV could not be installed in the planned locations due to interference with existing grating (August 13, 2013).
- The instrumentation was removed on May 27, 2014 and new instruments were reinstalled on June 5 and 6, 2014. The trend of added instrumentation 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.



Removal situation of broken thermometer inside Unit 2 RPV

Investigative results on torus room walls

- The torus room walls were investigated (on the north side of the east-side walls) using equipment specially developed for that purpose (a swimming robot and a floor traveling robot).
- At the east-side wall pipe penetrations (five points), "the status" and "existence of flow" were checked.
- A demonstration using the above two types of underwater wall investigative equipment showed how the equipment could check the status of penetration.
- Regarding Penetrations 1 - 5, the results of checking the sprayed tracer (*5) by camera showed no flow around the penetrations. (investigation by the swimming robot)
- Regarding Penetration 3, a sonar check showed no flow around the penetrations. (investigation by the floor traveling robot)



Penetrations investigated

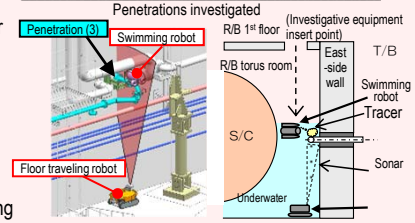
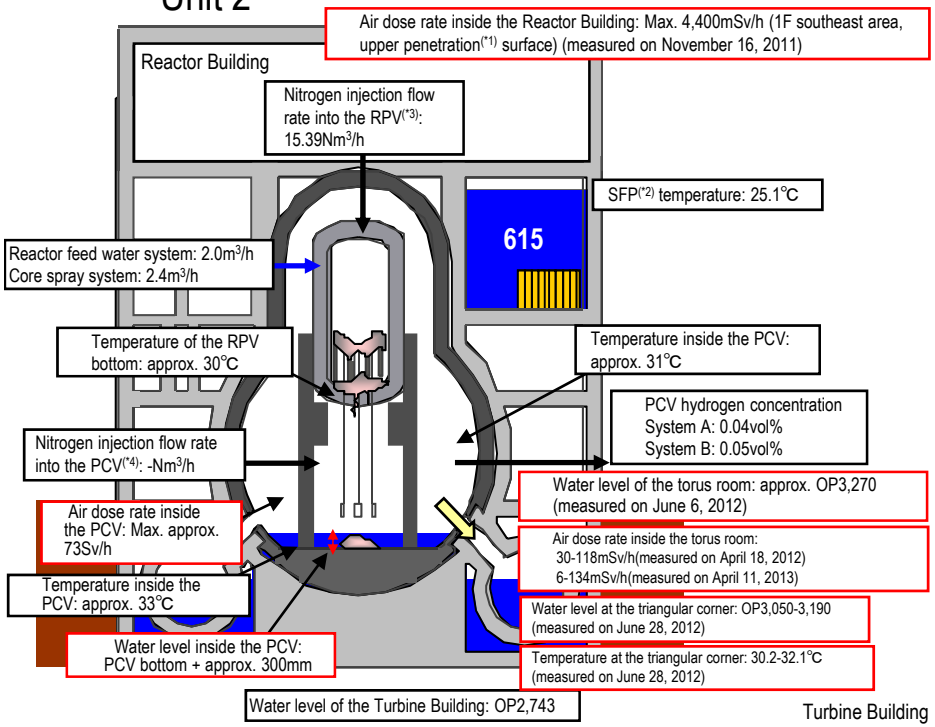


Image of the torus room east-side cross-sectional investigation

Unit 2



* Indices related to plant are values as of 11:00, June 24, 2015

Status of equipment development toward investigating inside the PCV

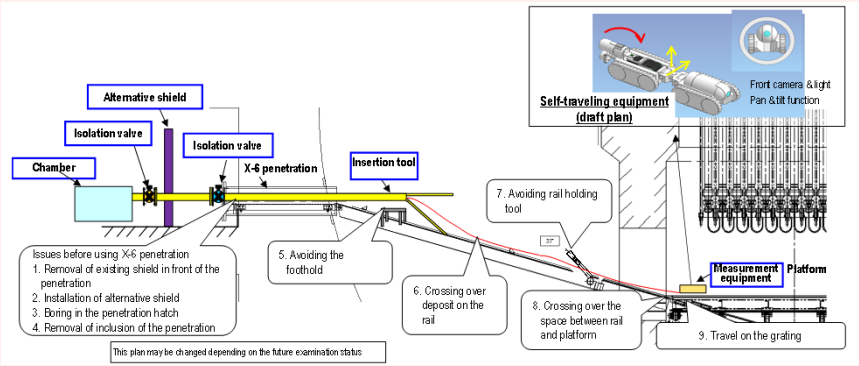
Prior to removing fuel debris, to check the conditions inside the Primary Containment Vessel (PCV), including the location of the fuel debris, investigations inside the PCV are scheduled.

[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 1st half of FY2015.



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) Tracer: Material used to trace the fluid flow. Clay particles

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

June 25, 2015
Secretariat of the Team for Countermeasures for Decommissioning and Contaminated Water Treatment
4/6

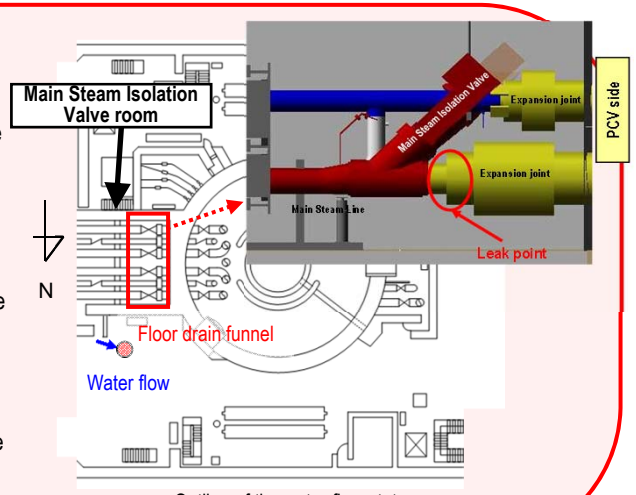
Immediate target	Identify the plant status and commence R&D and decontamination toward fuel debris removal

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

On January 18, 2014, 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, 2014, 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, 2014, 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

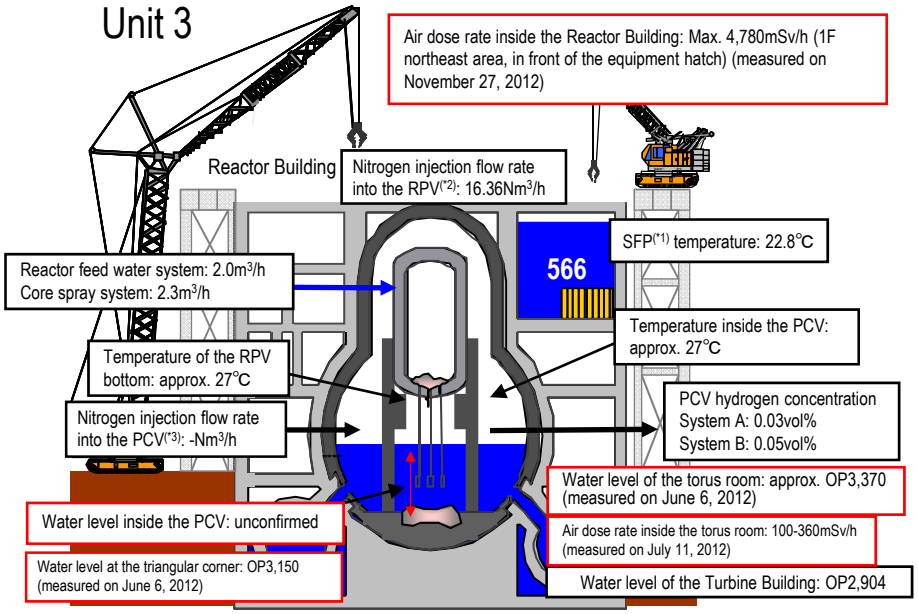
* Main Steam Isolation Valve: A valve to shut off the steam generated from the Reactor in an emergency

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 24, 2015

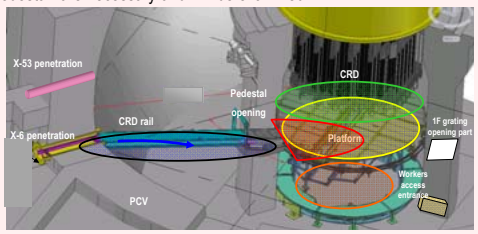
Status of equipment development toward investigating inside the PCV

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. As the water level inside the PCV is high and the penetration scheduled for use in Units 1 and 2 may be under the water, another method needs to be examined.

[Steps for investigation and equipment development]

(1) Investigation from X-53 penetration(*4)
- From October 22-24, the status of X-53 penetration, which may be under the water and which is scheduled for use to investigate the inside of the PCV, was investigated using remote-controlled ultrasonic test equipment. Results showed that the penetration is not under the water.
- An investigation of the inside of the PCV is scheduled for around the 1st half of FY2015. Given the high radioactivity around X-53 penetration, the introduction of remote-controlled equipment will be examined based on the decontamination status and shielding.

(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) Penetration: Through-hole of the PCV

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

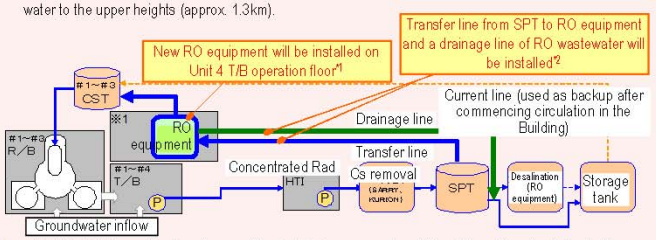
June 25, 2015
Secretariat of the Team for Countermeasures for Decommissioning and Contaminated Water Treatment
5/6

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

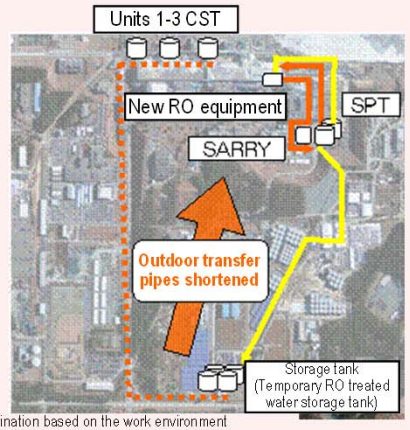
Work to improve the reliability of the circulation water injection cooling system and pipes to transfer accumulated water.

- 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 1st half of 2015, 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



Typhoon measures improved for Tank Area

- Enhanced rainwater measures were implemented, including increasing the height of fences to increase the capacity to receive rainwater and installing rain gutters and fence cover to prevent rainwater inflow. Though a total of 300mm of rainfall was recorded by typhoon Nos. 18 and 19, no outflow of contaminated rainwater from inside the fences was detected.

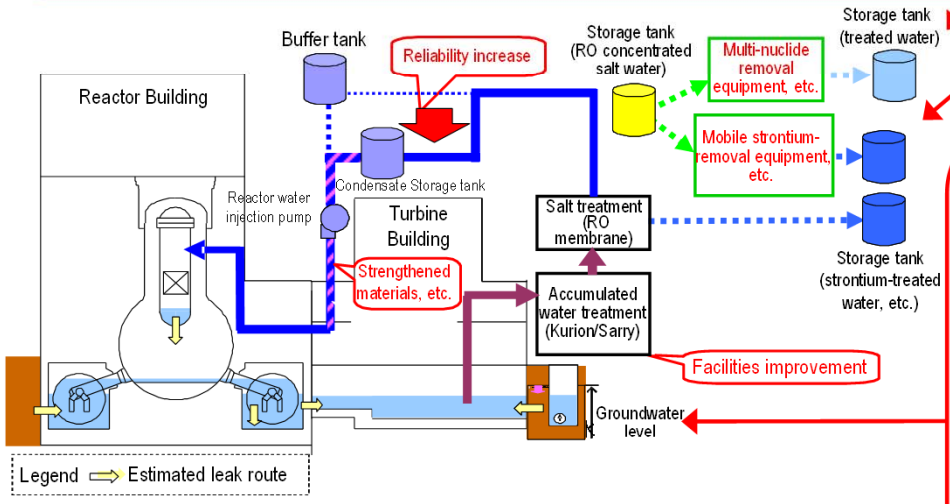
Before installing the fence cover

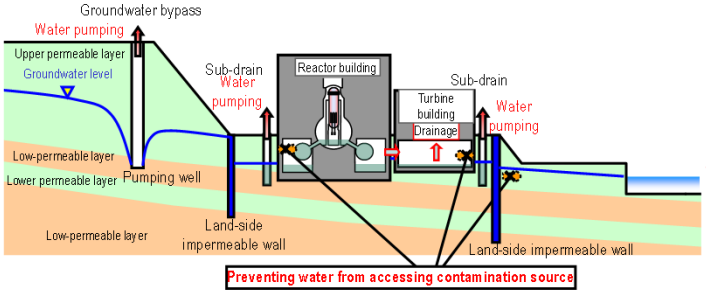
After installing the fence cover

Completion of purification of contaminated water (RO concentrated salt water)

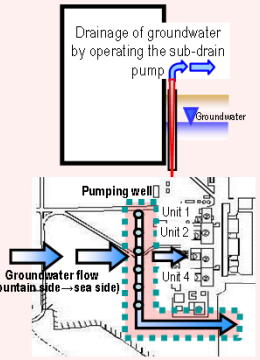
Contaminated water (RO concentrated salt water) is being treated using seven types of equipment including the multi-nuclide removal equipment (ALPS). Treatment of the RO concentrated salt water was completed on May 27, with the exception of the remaining water at the tank bottom. The remaining water will be treated sequentially toward dismantling the tanks.

The strontium-treated water from other facilities than the multi-nuclide removal equipment will be re-purified in the multi-nuclide removal equipment to further reduce risks.





Preventing groundwater from flowing into the Reactor Buildings



Aiming to reduce the level of groundwater by pumping subdrain water, tests were conducted to verify the stable operation of water treatment facilities, including subdrain.

The results showed that through purification by the system, the density of radioactive materials declined to below the operational target and no other γ nuclides were detected.

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.

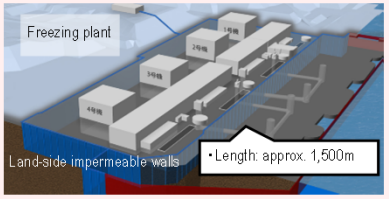
The pumped up groundwater is temporarily stored in tanks and released after TEPCO and a third-party organization have confirmed that its quality meets operational targets.

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

At the observation holes installed at a height equivalent to the buildings, the trend showing a decline in groundwater levels is checked.

The analytical results on groundwater inflow into the buildings based on existing data showed a declining trend.

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 on the land side is planned.

Drilling holes to install frozen pipes commenced from June 2, 2014.

Regarding the mountain side which will commence preceding freezing, approx. 99% installation of frozen pipes has been completed.

Freezing functioning test started on April 30, 2015.

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

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

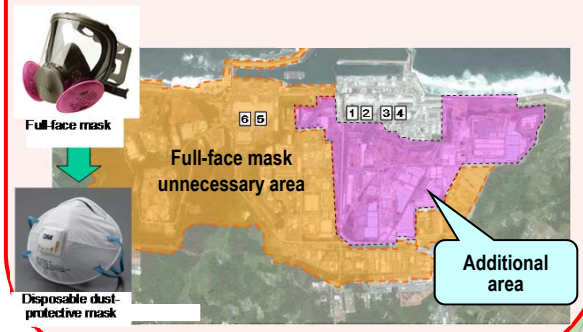
Progress toward decommissioning: Work to improve the environment within the site

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

The number of dust monitors has increased to ten with additional monitors installed in Units 3 and 4 slopes and tank areas, the full-face mask unnecessary area will be expanded to approx. 90% of the site from May 29.

However, wearing full- or half-face mask is required for works exposed to highly concentrated dust; and full-face masks, for works involving a risk of ingesting concentrated salt water, etc.



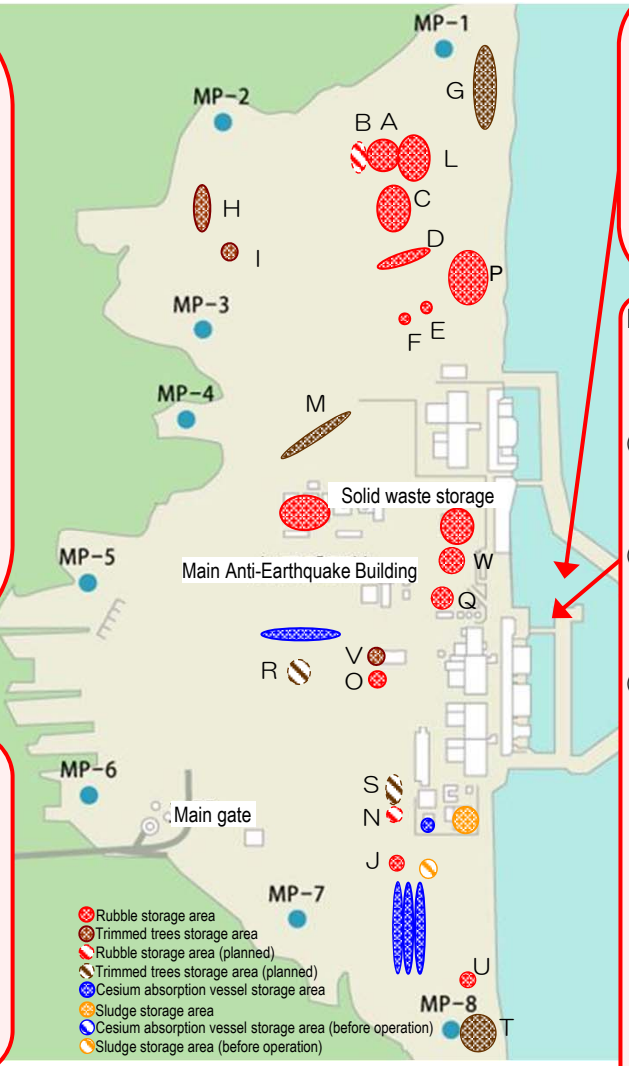
Full-face mask unnecessary area

Operation start of the large rest house

A large rest house for workers was established and its operation commenced on May 31.

Spaces in the large rest house are also installed for office work and collective worker safety checks as well as taking rest.

To further improve it from a hygiene perspective the dining room has been temporarily closed. Following the renovation, the operations will resume from late July.



Installation of impermeable walls on the sea side

To prevent contamination expansion into the sea where contaminated water had leaked 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, 2014)

(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 seawater pipe trench

Unit 2: November 25 to December 18, 2014 - tunnel sections were filled.
February 24, 2015 - filling of the Vertical Shafts commenced.
Unit 3: February 5 to April 8, 2015 - tunnel sections were filled.
May 2, 2015 – filling of Vertical Shafts commenced
Unit 4: February 14 – March 21, 2015 - tunnel sections were filled.
April 15 to 28, 2015 - opening apertures II and III were filled.