Summary of Decommissioning and Contaminated Water Management

April 30, 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 FHM* → Fuel removal → Storage and handling

Unit 1: Fuel removal to start FY2017 (under consideration)
Unit 2: Fuel removal to start After FY2017 (under consideration)
Unit 3: Fuel removal to start FY2015 (scheduled)
Unit 4: Fuel removal completed 2014

FHM*: Fuel-Handling Machine

Fuel Debris (Corium) Removal

Unit 1-3

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

After FY2017
Water stoppage of PCV lower part (under consideration)

Dismantling Facilities

Scenario development & technology consideration → Design & 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 the fall of rubble in August 2013, it has resumed since December 2014 after implementing additional fall-prevention measures.

(Mar 6, 2015: Removal of fuel-handling machine west-side frame)

Three principles behind contaminated water countermeasures

Water to cool fuel having melted in the accident is mixed with ground water and approx. 300 tons of contaminated water is generated every day.
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 2)

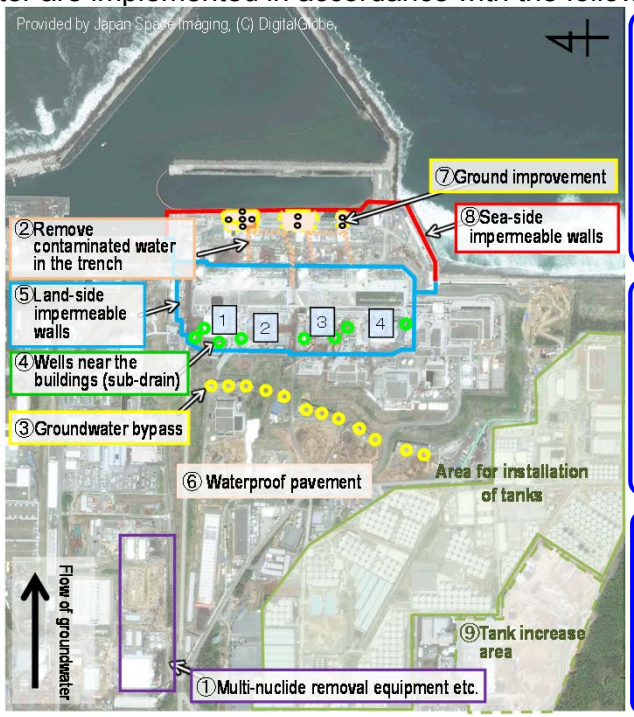
(Note 2) Underground tunnel containing pipes.

2. **Isolate** water from contamination

③ Pump up ground water for bypassing
④ Pump up ground water 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.
- In addition to multi-nuclide removal equipment, contaminated water is treated by installing additional multi-nuclide removal equipment by TEPCO (operation commenced in September 2014) and a subsidy project of the Japanese Government (operation commenced in October 2014).
- To reduce the risks of contaminated water, treatment is proceeding through multiple purification systems to remove strontium.

(Installation status of 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.
- Coolant functioning test started at the end of April 2015.

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

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. The closure time is being coordinated.

(Installation status)

Progress Status and Future Challenges of the Mid-and-Long-Term Roadmap toward the Decommissioning of TEPCO's Fukushima Daiichi Nuclear Power Station Units 1-4 (Outline)

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. 10-40°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.

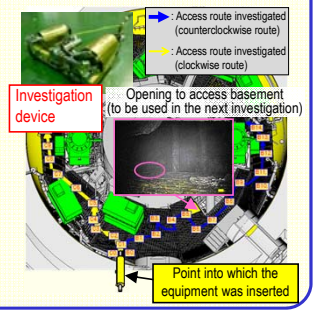
*1 The values vary somewhat depending on the unit and location of the thermometer.
*2 The radiation exposure dose due to the current release of radioactive materials from the Reactor Buildings peaked at 0.03 mSv/year at the site boundaries. This is approx. 1/70 of the annual radiation dose by natural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

Investigation inside Unit 1 PCV

An investigation inside the Unit 1 PCV was conducted using the robot from April 10 to 20.

This revealed information including images inside the PCV and airborne radiation.

Based on the investigative results of, another robot will be inserted to investigate the PCV basement.



Start of coolant functioning test of land-side impermeable walls

Regarding land-side impermeable walls, coolant functioning test started at 18 points (approx. 6% of the land-side) on April 30.

On the land-side, 99% of construction has already been completed. The remaining construction will proceed after taking the necessary procedures.

Commencement of dismantling of Unit 1 building cover

On May 15, work to dismantle the Unit 1 building cover will commence.

Before starting the dismantling work, measures to prevent spreading will be steadily implemented. First of all, anti-scattering agents will be sprayed through the penetration of the roof panels.

Completion of construction to cover seabed soil within the port

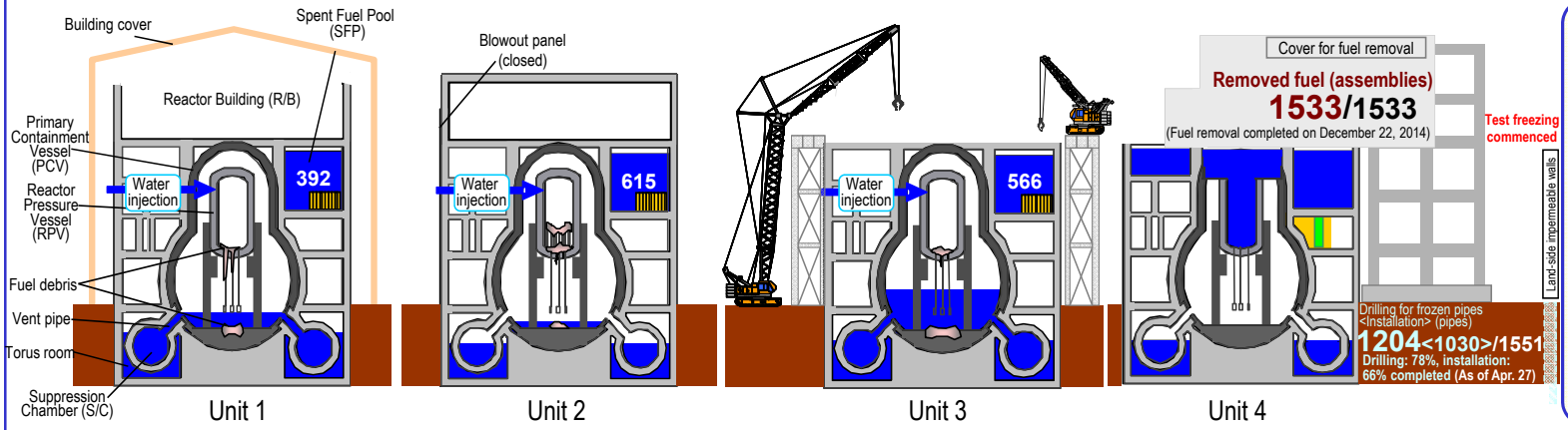
Covering of the seabed soil within the port, aiming to prevent radioactive materials spreading due to stirred-up seabed soil, was completed on April 23 for the entire area within the port.

Additional reinforcing layers will be constructed as necessary.

Efforts to improve the work environment

Based on the results of the survey conducted from August to September in 2014, measures have been implemented, including additional follow-up to individual comments, enhanced motivation and wage increase for workers.

Based on the increase in incidents and continued occurrence of accidents in FY2014, actions to improve management have been implemented according to a plan, most of which to commence in May.



Progress toward revising the Mid-long term road map

Toward the revision of the Mid-long term road map, the proposed outline was explained at the 7th meeting of the Fukushima Advisory Board on Decommissioning and Contaminated Water Management (Koriyama City) held on April 9. On April 30, the Nuclear Damage Compensation and Decommissioning Facilitation Corporation formulated the "Strategy Plan(Note:", which constitutes the technical basis of the Mid-long term road map.

The revision process will continue based on the views and comments of related parties for TEPCO.

Note: Strategy Plan: "Technical Strategy Plan 2015 for Decommissioning of TEPCO Fukushima Daiichi Nuclear Power Station"

Accumulated water detected around the outer periphery of the HIC hatch

Accumulated water was detected around the outer periphery of an HIC(note: hatch, which stores waste generated from the multi-nuclide removal equipment, and another nearby place (no leakage outside the storage was detected).

As well as investigating other HICs, cause analysis will be conducted and recurrence prevention measures will be considered.

Note: 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.

Investigation on the status of Unit 3 SFP

An investigation was conducted to check the possible connection of large rubble (part of the fuel handling machine (FHM)) in the Unit 3 spent fuel pool (SFP) to the pool gate. The investigative results showed that there was no distortion that could affect the seal performance of the gate and the FHM did not touch the gate.

Based on these results, removal of the FHM will be carefully implemented.

Achievement of on-site boundaries effective dose limit of less than 2mSv/year

Through the progress of contaminated water treatment by the multi-nuclide removal equipment, etc., the effective dose at the site boundaries(Note) at the end of FY2014 achieved a limit value of less than 2mSv/year.

The contaminated water treatment will continue to achieve the target of less than 1mSv/year by the end of FY2015.

Note: Effective dose at the site boundaries: Additional dose (evaluation values) at the site boundaries due to rubble and contaminated water, etc., generated after the accident

Information disclosure and comprehensive risk reviewing

Based on reflection of the information disclosed regarding the data of the drainage channel K, TEPCO decided to expand the disclosure scope of radiation data measured at the Fukushima Daiichi Nuclear Power Station sequentially from April 30 to all data around summer.

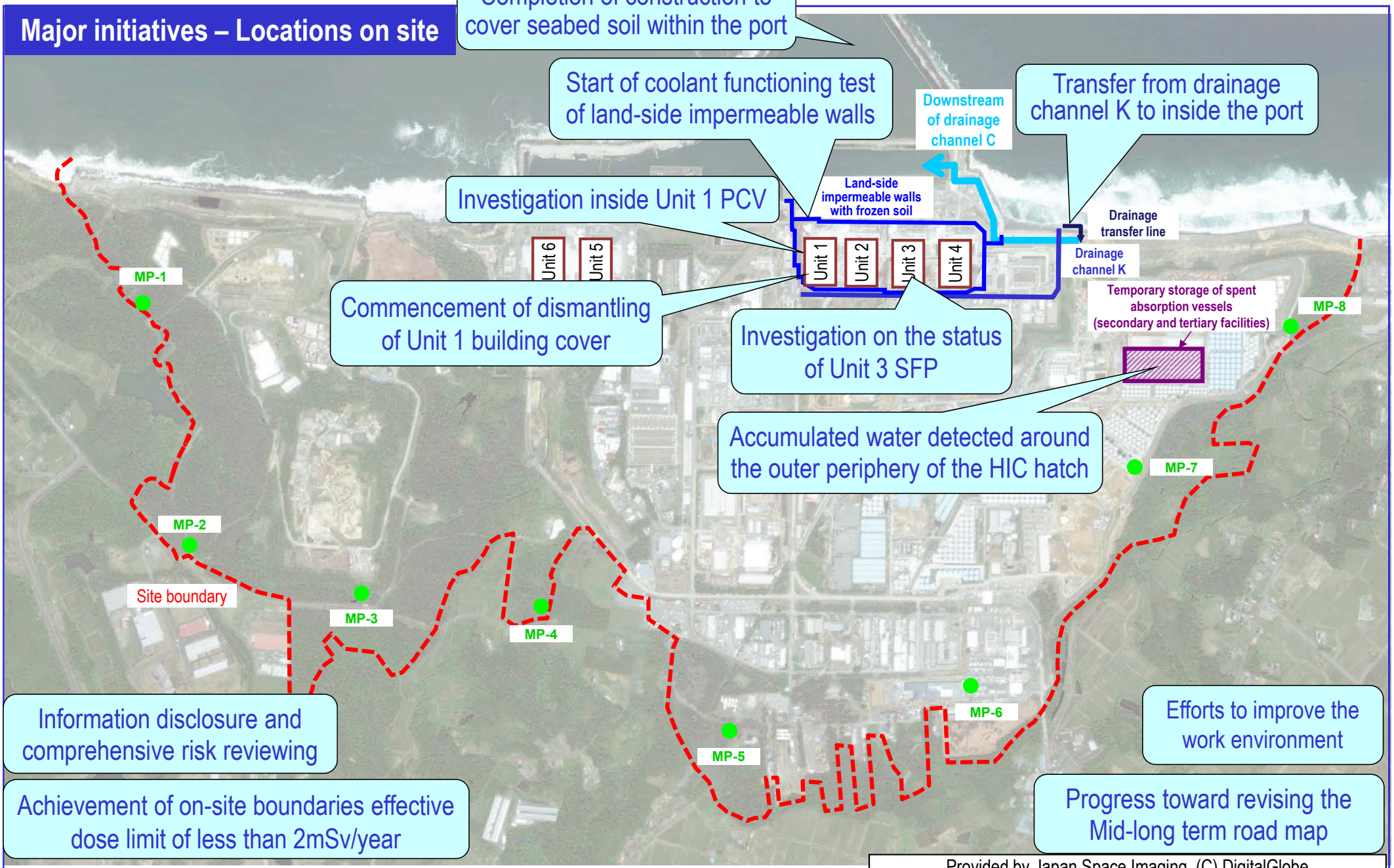
TEPCO also comprehensively reviewed risks which may impact on the area outside the site and continues striving to reduce such risks.

Transfer from drainage channel K to inside the port

Regarding the drainage channel K, which runs from around Unit 1-4 buildings to the outside of the port, drainage pumping commenced on April 17 using temporary pumps. The pumped drainage is channeled inside the port via drainage channel C.

The destination of the drainage channel K will be changed to inside the port within FY2015.

Major initiatives – Locations on site

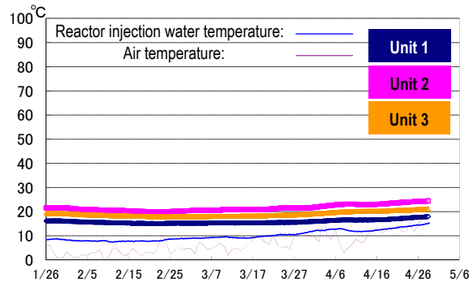


* Data of Monitoring Posts (MP1-MP8.)
Data of Monitoring Posts (MPs) measuring airborne radiation rate around site boundaries show 0.977 - 3.925μSv/h (March 25 – April 27, 2015).
We improved the measurement conditions of monitoring posts 2 to 8 for precise measurement of air dose rate. Construction works 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.
We are improving the measurement conditions of monitoring post 8 and construction works such as pavement of roads is being implemented from February 18 until around late May, 2015 and the airborne radiation rate around the monitoring post is decreasing.

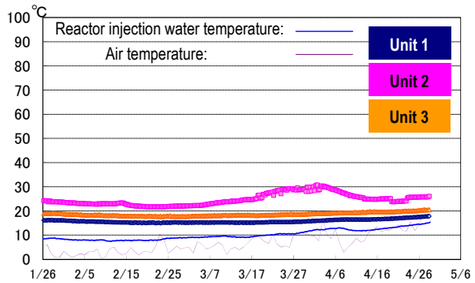
I. Confirmation of the reactor conditions

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. 10 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.

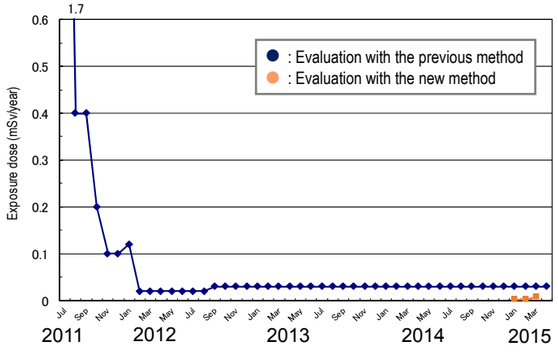
2. Release of radioactive materials from the Reactor Buildings

Evaluation on the additional release of gaseous waste has been changed to a method considering the values of continuous dust monitors since FY2015, with data to be evaluated monthly and announced in the following month.

For this month (April), provisional values evaluated using the previous method are described. 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. 1.4 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.

* The provisional value in April.

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 0.977 - 3.925μSv/h (March 25 – April 27).
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.

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

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

- Regarding the thermometer installed at the bottom of the RPV, which had broken in February 2014, replacement was completed by removing the thermometer on January 19 with a method considering the impact of rust and installing a new unit on March 13. As the new thermometer was deemed capable of monitoring the cooling status based on the one-month trend since its installation, its operation as a monitoring thermometer commenced (April 23).

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

➢ 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 April 28, 97,143m³ 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. 90 m³/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. 10-15 cm compared to the level before pumping at the groundwater bypass started.
- Due to a decrease in the flow rate of pumping well No. 9, water pumping was suspended for cleaning (from March 31 to April 27).

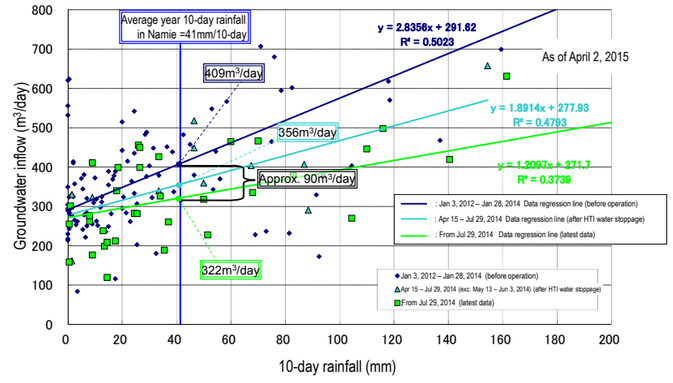


Figure 1: Analytical results of inflow into buildings

➢ 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 April 27, 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 2). Regarding brine pipes, as of April 9, installation of the slope 35m aquifer (approx. 100%) and the 10m aquifer mountain side (approx. 93%) had been completed. The BLK 1–8 pipes were filled with brine and preparation for brine circulation and coolant functioning test was completed. On April 30, coolant functioning test started at 18 points (approx. 6% of the mountain side). The remaining construction will proceed after the necessary procedures have been performed.

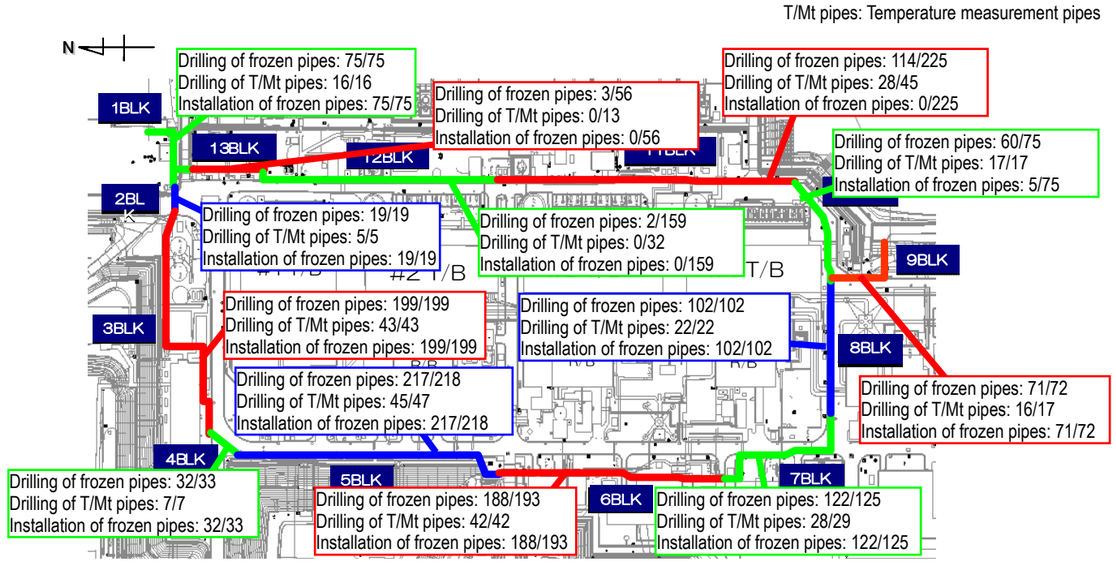


Figure 2: Drilling status for frozen-soil impermeable walls and installation of frozen pipes

➢ 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 April 23, the volumes treated by the existing, additional and high-performance multi-nuclide removal equipment were approx. 240,000, 117,000 and 47,000 m³ respectively (including approx. 9,500 m³ stored in J1(D) tank, which contained water with a high density of radioactive materials at the System B outlet).
- To reduce the risks of strontium-treated water, treatment by the high-performance multi-nuclide removal equipment commenced (from April 15). As of April 23, approx. 2,600 m³ had been treated.

➢ Toward reducing the risk of contaminated water stored in tanks

- Purification of RO concentrated salt water via RO concentrated water treatment equipment commenced (January 10, 2015). As of April 23, approx. 57,000 m³ had been treated.
- To purify the RO concentrated salt water, mobile strontium-removal equipment is being operated (G4 south area: from October 2, 2014 to February 28; H5 north area: from February to March 31; G6 south area: from February 28 to March 31). To further reduce risks, the purification of strontium treated water will continue beyond April.

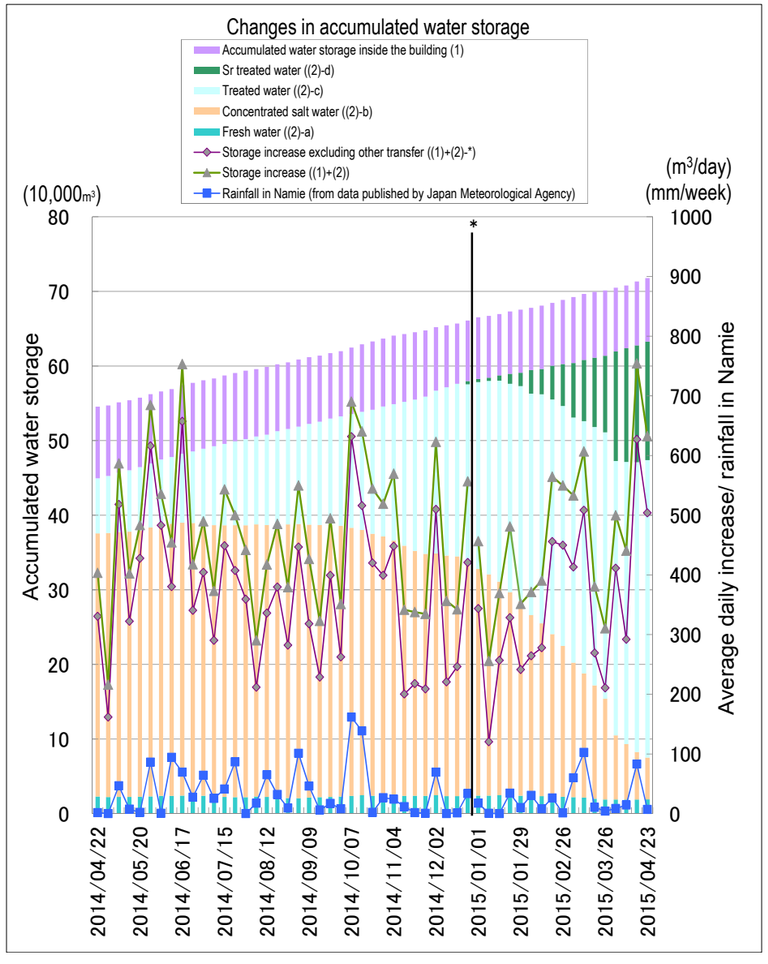
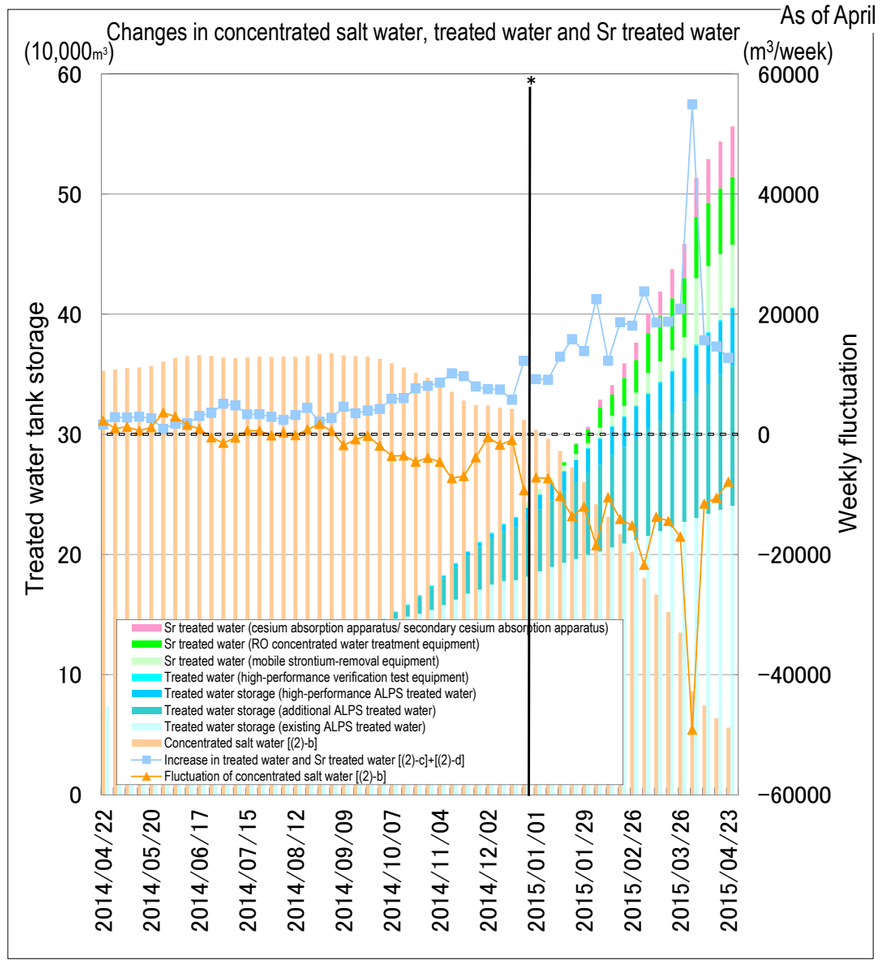


Figure 3: Status of accumulated water storage



* Since January 1, 2015, data collection days have been changed (from Tuesdays to Thursdays)

- The secondary mobile strontium-removal equipment (a total of 4 units) was operated for treatment (C area: from February 20 to March 31, G6 area: from February 20 to March 31). To further reduce risks, the purification of strontium treated water will continue beyond April.
- 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 April 23, approx. 42,000 m³ had been treated.

➢ Accumulated water detected around the outer periphery of the HIC hatch

- Accumulated water was detected around the outer periphery of a High Integrity Container (HIC)(note) hatch and on the floor inside the box culvert containing the HIC during regular inspection for any leakage from HIC. Sampling results showed that the accumulated water was contaminated.

Note: 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.

- As of April 29, 105 HICs were investigated, among which accumulated water was detected around the outer periphery of 15 HICs. The investigation is ongoing.
- Regarding the box culverts, in which accumulated water was detected, visual inspections of the external appearance and dose measurement were conducted, which confirmed that the contamination had not expanded to the outside.
- Based on the relatively higher contamination identified in the accumulated water around the outer periphery of the HIC hatch, water was assumed to have leaked from the HIC. It was also assumed that gas bloated inside the HIC raised the water level in the same, causing water to leak through the upper section. The investigation, including opening of the HIC hatch, is ongoing to identify the cause and consider recurrence prevention measures.

➢ 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 April 28, a total of 22,740 m³).

➢ 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 is underway (from February 24). On April 7, the first filling cycle was completed. A water-pumping test was conducted on April 9 to verify the filling of these vertical shafts, which confirmed that communication was reduced. The second filling cycle commenced on April 24.
- 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 A and B. Communication in Tunnel C is currently being evaluated and the vertical shafts will be filled from early May.
- Regarding the Unit 4 seawater-pipe trench, filling of the tunnel sections had been completed (from February 14 to March 21). A water-pumping test was conducted on March 27, which confirmed the lack of communication with the building. Filling of opening apertures II and III is underway (from April 15 and scheduled for completion on April 30).
- Regarding the contaminated water removal of seawater-pipe trenches, approx. 57% had been completed (as of April 27).

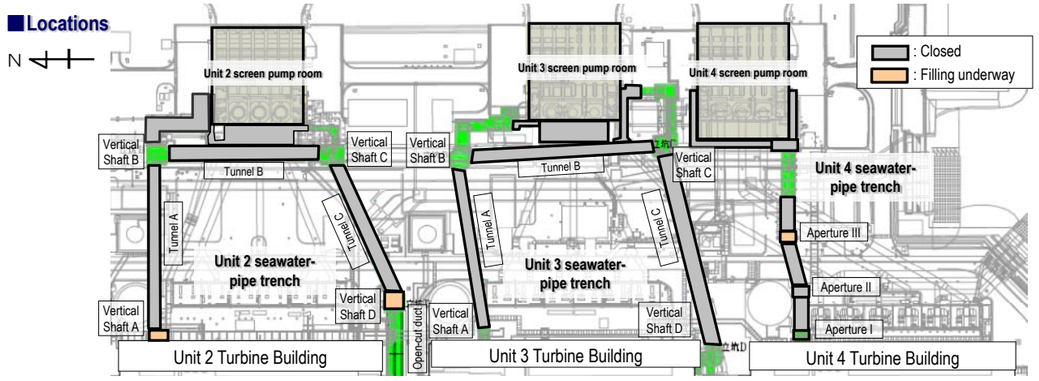


Figure 4: Progress status of contaminated water removal of seawater-pipe trenches

➢ Investigation inside the Reactor Buildings to control levels of accumulated water

- During the installation of water level gauges, water levels and communication status were investigated at 14 points where no water level gauge had been installed. These investigations confirmed communication at six points and no communication at eight points. Regarding Unit 1 D/G (B) and H/B rooms in the area where these investigations confirmed no communication, the accumulated water was drained by temporary pumps (from April 9) because the water levels of nearby sub-drains had decreased. On April 21, the water levels in these rooms was deemed to have sufficiently declined.

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 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 No. 1-17, which had been around 10,000 Bq/L, increased to 160,000 Bq/L since October 2014 and currently stands at around 140,000 Bq/L. The density of gross β radioactive materials, which has been increasing since March 2014, had reached 1.2 million Bq/L by October 2014. Though the density was later reduced to around 30,000 Bq/L, it temporarily increased to 400,000 Bq/L in February 2015 and currently stands at around 10,000 Bq/L. Water pumping from the well point (10m³/day) and the pumping well No. 1-16 (P) (1m³/day) installed near Observation Hole No. 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. The volume of water to treat the surface in the ground improvement area and pumped from the well point increased to 50 m³/day (from October 31, 2014). The treatment commenced on January 8 and concluded on February 18.
- 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 as up to March. Following the surface treatment in the ground improvement area (from March 19 to 31), pumping of rising groundwater commenced (20m³/day from April 1).
- Regarding the radioactive materials in seawater outside the seaside 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 March.
- The density of radioactive materials in seawater within the port has been slowly declining as up to March.

- The radioactive material density in seawater at and outside the port entrance has remained within the same range as previously recorded.
- Regarding the seaside impermeable walls, joining of installed steel pipe sheet piles (at 22 points) resumed from March 13. As of April 30, 13 points had been joined.
- Construction to cover the seabed soil within the port commenced on July 2014, targeting efforts to prevent contamination spreading due to stirred-up seabed soil. On April 23, covering of the entire area within the port was completed (see Figure 8). Additional reinforcing layers will be constructed as required. The seabed of the intake open channels had been covered by FY2012.

➢ Installation of dose rate monitors

- Following the implementation of radiation dose reduction measures, aiming to visualize the on-site dose rate and capture the real-time dose status prior to going out into the field, 20 dose rate monitors had been installed on site and operation commenced on April 17 (with 50 more units to be installed by September 2015).

➢ Operation of seawater radiation monitors commenced

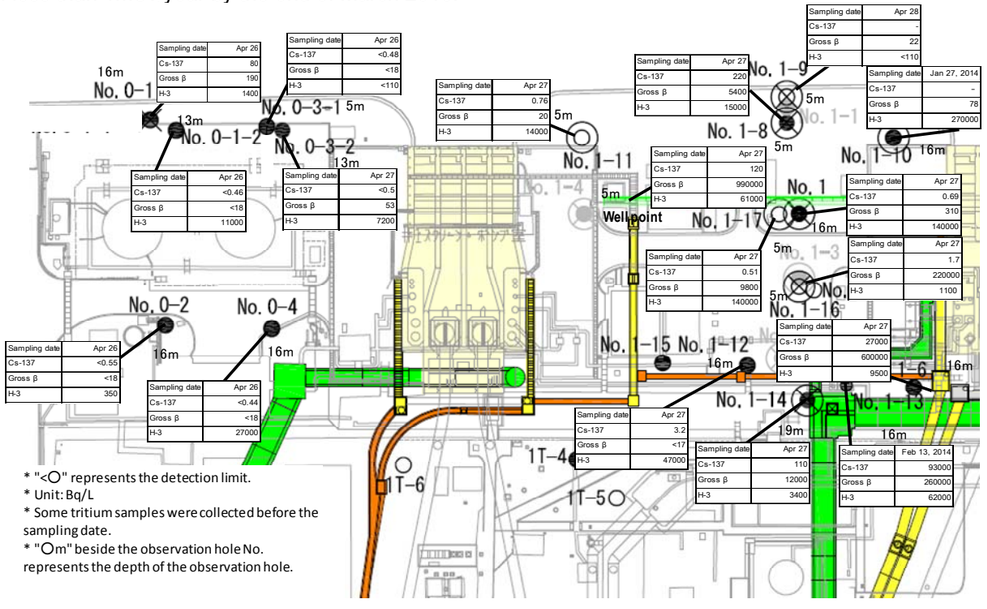
- Seawater radiation monitors have been installed at the port entrance and operation was trialed (from September 2014 to March 2015). Full-scale operation commenced on April 1. The data acquired from these monitors started to be posted on the TEPCO website.

➢ Commencement of transfer from drainage channel K to inside the port

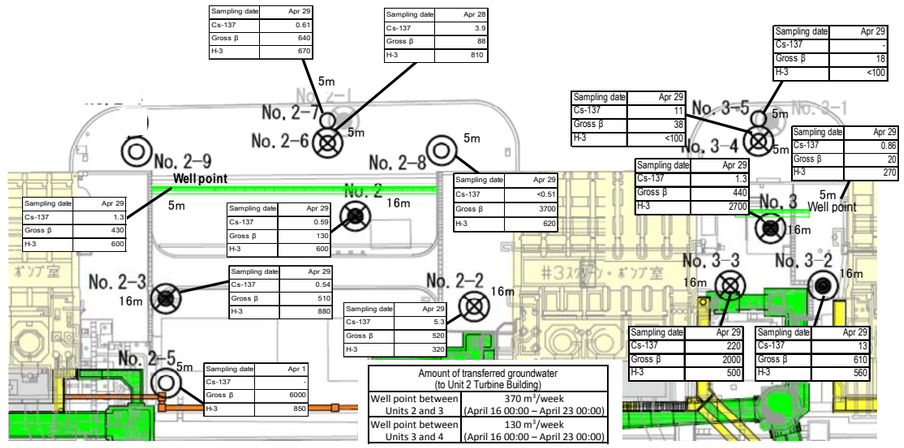
- Regarding the drainage channel K, which runs from around Unit 1-4 buildings to the outside of the port, drainage pumping commenced on April 17 using temporary pumps. The pumped drainage is channeled inside the port via drainage channel C. The destination of the drainage channel K will be changed to inside the port within FY2015. On April 21, the transfer pumps were suspended due to the failure of the generator, with operation resumed by switching to a spare generator (April 21).

➢ Achievement of on-site boundaries effective dose limit of less than 2mSv/year

- Through progress in treating contaminated water by multi-nuclide removal equipment, etc., the additional effective dose at the site boundaries was approx. 1.79mSv/year as of the end of March 2015, which can be evaluated as achieving a limit value of less than 2mSv/year. The contaminated water treatment will continue to achieve the target of less than 1mSv/year by the end of March 2016.



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



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

Figure 5: Groundwater density on the Turbine Building east side

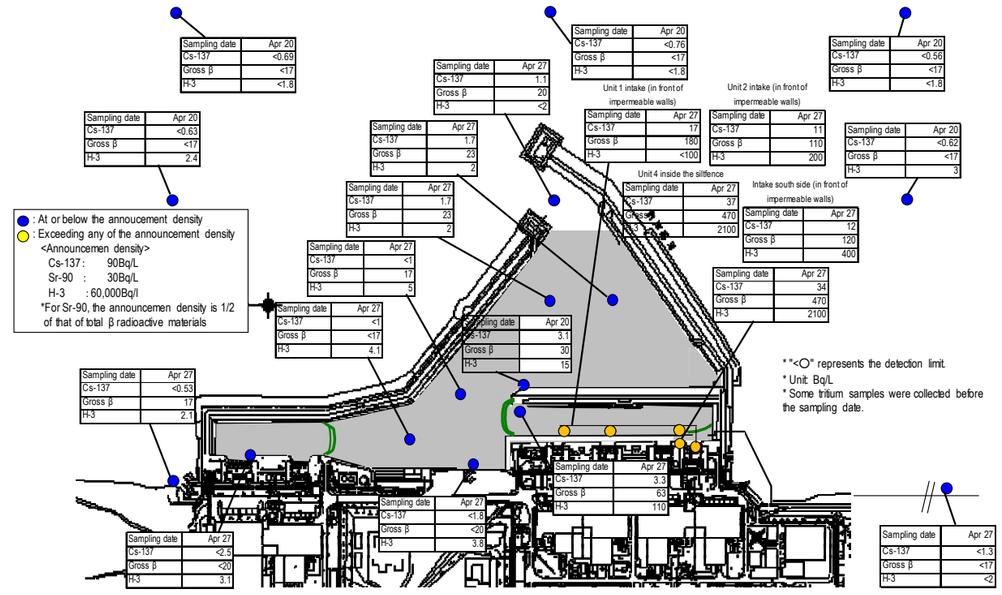


Figure 6: Seawater density around the port

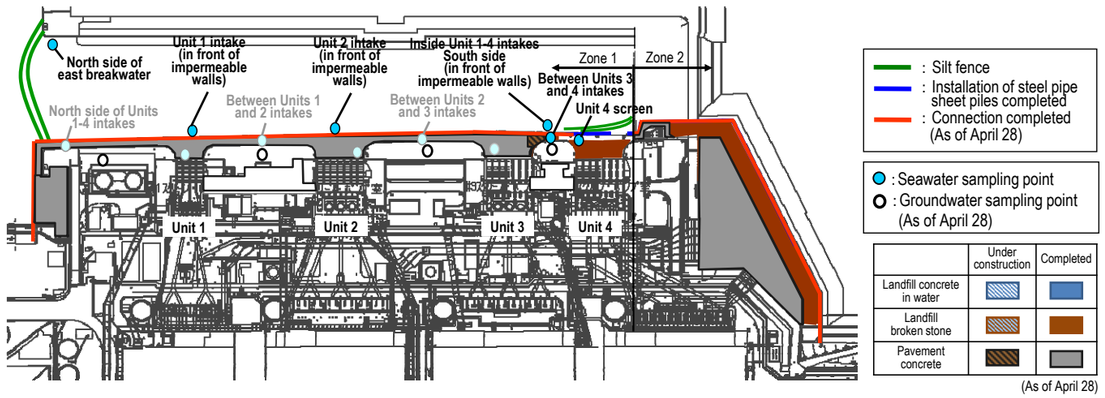


Figure 7: Progress status of impermeable walls on the sea side

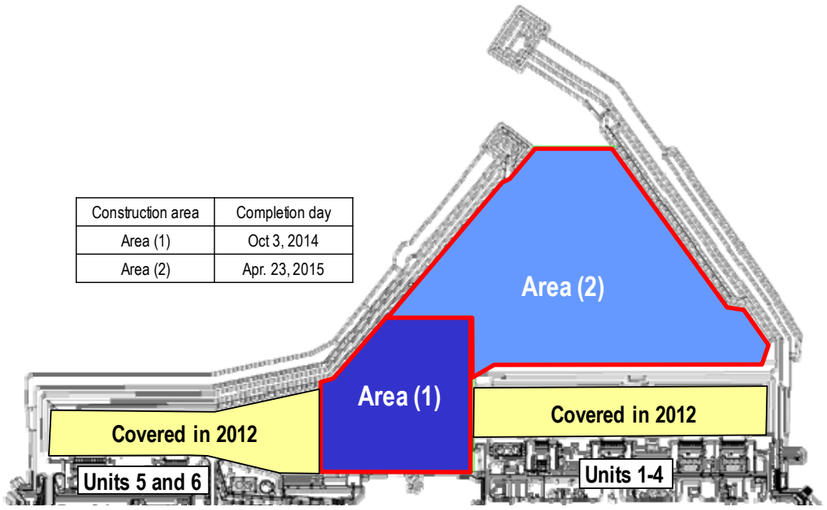


Figure 8: Progress status of the seabed soil covering within the port

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 was completed on December 22, 2014

➢ Main work to help remove spent fuel at Unit 3

- During the preparatory work to remove the fuel-handling machine (FHM), a possible connection was confirmed between part of the FHM and the pool gate of the spent fuel pool (SFP). The preparatory work was suspended and detailed investigations were conducted for the pool gate (from March 27 to April 2). The investigative results showed a lack of significant distortion with the pool gate, no misalignment that could affect the seal performance of the gate and that the FHM did not connect with the gate. A plan to remove the FHM will be examined with these results in mind and removal will commence after late May. The water levels of the SFP will continue.

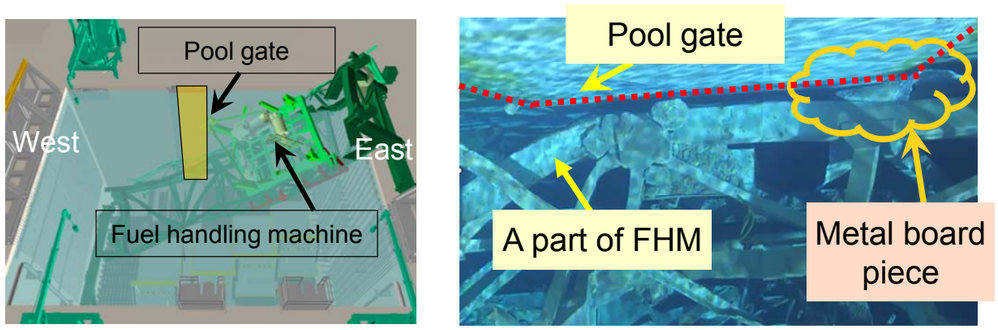


Figure 9: Status of the Unit 3 SFP and pool gate

➢ Main work to help remove spent fuel at Unit 1

- On March 16, the preparatory work for dismantling the Reactor Building cover commenced. After procuring the necessary equipment and cranes, the dismantling will commence on May 15. Before starting the dismantling work, to ensure steady implementation of the anti-spreading measures, anti-scattering agents will be sprayed through the penetration of the roof panels.
- Additional tests were conducted to verify the effect of the anti-scattering agents to contain dust against wind. The results showed that the dust containment effect could be maintained up to a momentary wind speed of 50.0m/s.

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)

➢ Development of technology to detect fuel debris inside the reactor

- To gain an insight into the positions and amounts of fuel debris, as required to examine fuel debris removal methods, there are plans to measure the position of debris via imaging technology using muons (a type of elementary particle), which are derived from cosmic radiation. Measurement equipment was installed in the area northwest outside the Unit 1 Reactor Building (February 9-10) and measurement has been underway since February 12. The data collected during the 26 days up to March 10 showed no large fuel block at the core location. The measurement will continue until mid-May.

➢ Investigation inside the Unit 1 PCV

- To help formulate a fuel debris removal plan, the environment around the outer part of the first floor grating outside the pedestal and the status of existing structures within the PCV was investigated via robot (from April 10-20). These investigations revealed information including the damage status inside the PCV, temperature and airborne radiation at each survey point. In the next step, another robot will be inserted from the access aperture leading to the basement floor, where the absence of obstacles was confirmed through this investigation, to survey the PCV basement.
- To investigate inside the PCV, the permanent monitors (thermometers and water level gauges) were removed (April 7). On completion of this investigation (April 20), the permanent monitors were re-installed (from April 2 to 23). The validity of post-installation PCV water level measurement is currently being verified. Regarding the thermometers, their use to monitor the cooling status will be evaluated within the following month.
-

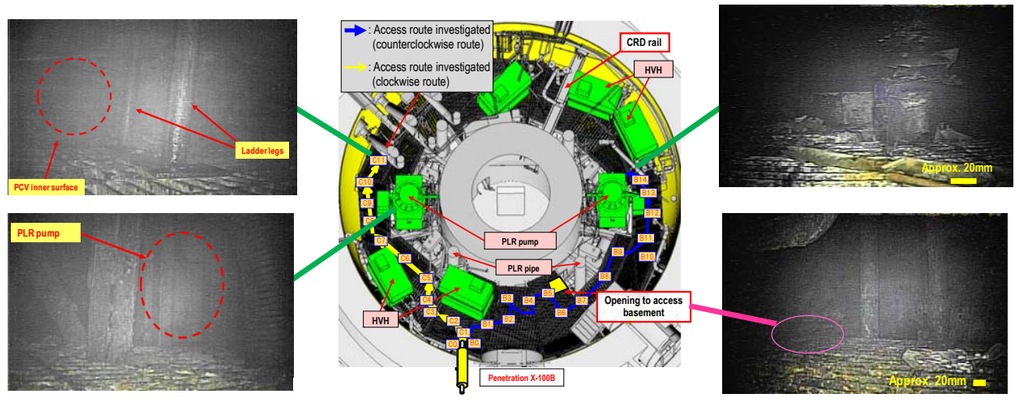


Figure 10: Investigation inside PCV

6. Plan to store, process and dispose of solid waste and decommission 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 March, the total storage volume of concrete and metal rubble was approx. 149,100 m³ (+8,900 m³ compared to at the end of February 2015, with an area-occupation rate of 62%). The total storage volume of trimmed trees was approx. 80,500 m³ (-200 m³ compared to at the end of February 2015, with an area-occupation rate of 58%). The variation in rubble and trimmed trees was mainly attributable to construction related to facing, the installation of tanks, construction related to land-side impermeable walls and the installation of nine solid waste storages.

➢ Management status of secondary waste from water treatment

- As of April 23, the total storage volume of waste sludge was 597 m³ (area-occupation rate: 85%) and concentrated waste fluid was 9,203 m³ (area-occupation rate: 46%). The total number of stored spent vessels and High-Integrity Containers (HICs) for multi-nuclide removal equipment was 2,299 (area-occupation rate: 38%).

➢ Damage to part of the temporary rubble storage area A1 tent

- Damage was detected in the upper sheet of the temporary rubble storage area A1 (A tent), which temporarily stored a high density of rubble under shields (below 30 mSv/h) (February 16). The sheets were probably turned off following the disconnection of sheet guides having fixed the sheets to the tent frames, which, in turn, was due to the impact of winds over a long period since installing the tent. Sheets were installed on the floor as measures to shield the damaged parts of the upper sheet against rainwater. Repair of the damaged portion of the upper sheet was completed (April 24).

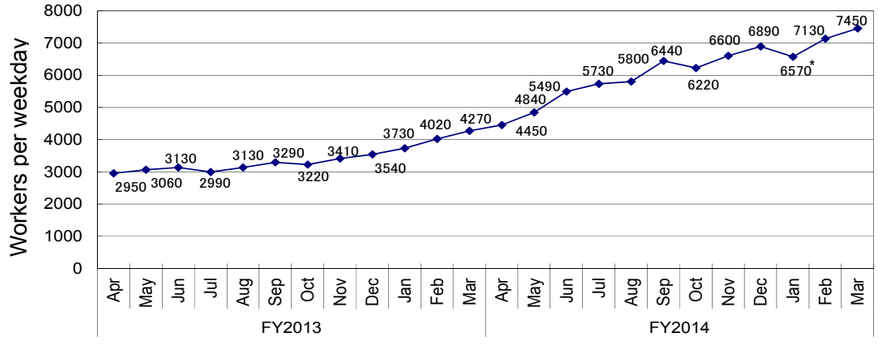
7. Plan for staffing and ensuring work safety

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 total of people registered for at least one day per month to work on site during the past quarter from December 2014 to February 2015 was approx. 14,900 (TEPCO and partner company workers), which exceeded the monthly average number of actual workers (approx. 11,500). Accordingly, sufficient people are registered to work on site.
- It was confirmed with prime contractors that the estimated manpower necessary for the work in May (approx. 6,930 per day: TEPCO and partner company workers)* would be secured at present. The average numbers of workers per day for each month of the last fiscal year (actual values) were maintained, with approx. 3,000 to 7,500 per month since the last fiscal year (See Figure 11).
- The number of workers has been increasing, both from within and outside Fukushima prefecture. However, as the growth rate of workers from outside exceeds that of those from within the prefecture, the local employment ratio (TEPCO and partner company workers) as of March was approx. 45%.

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



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

Figure 11: Changes in the average number of workers per weekday for each month since FY2013

- 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.

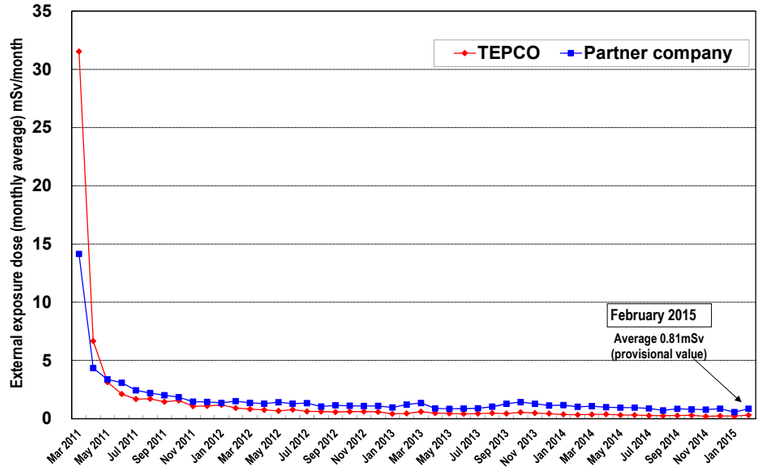


Figure 12: Changes in monthly individual worker exposure dose
(monthly average exposure dose since March 2011)

➢ Status of influenza and norovirus cases (conclusion of infection and expansion preventive measures)

- In response to the decline in influenza cases, measures to prevent infection and expansion were concluded at the end of FY2014. During this season (2014-2015), there were 353 cases of influenza infections and 10 cases of norovirus infections in total. The totals for the entire previous season (2013-2014) showed 254 cases of influenza infections and 35 cases of norovirus infections.

Note: The above data is based on reports from TEPCO and partner companies, which include diagnoses at medical clinics outside the site. The subjects of this report were workers of partner companies and TEPCO in Fukushima Daiichi and Daini Nuclear Power Stations (including workers at J-Village in the previous season).

- Compared to the previous season, the number of influenza cases increased by 99, while norovirus infections decreased by 25. Possible factors for the influenza increase include the earlier pandemic this season and double the average number of workers in Fukushima Daiichi Nuclear Power Station. Regarding norovirus, infection cases remain at an even lower level than the previous season.
- Though station-wide measures were concluded, measures to prevent infection and expansion will be taken when infection cases are identified in the workplaces.

➢ Service from Fukushima revitalization meal service center commenced

- To improve and enhance the work environment, a Fukushima revitalization meal service center was established in Ogawara district in Okuma Town on March 31. On April 20, the meal service commenced in the dining space of the new Administration Office Building (target: 1000 meals per day). From early June, when the large rest house starts operation, the meal service will also commence at this rest house.

Figure 13: Dining scene and example menu

➢ Efforts to improve work environment based on the results of the workers' survey

- The results of the survey conducted from August to September 2014 showed the need for measures to (1) ensure appropriate labor conditions and (2) improve motivation and alleviate concerns about working in the Fukushima

Daiichi Nuclear Power Station. In response, measures were implemented, including holding seminars related to labor laws and regulations for partner companies; posting encouragement messages sent from not only Japan but also around the world on site; proactive attendance of TEPCO executives at morning assemblies of partner companies and visualizing dose rates by sequentially installing dose rate monitors on site. Regarding the increase in worker wages, which is one of the emergency safety measures, actions are being taken. These efforts to improve the work environment will continue based on workers' views and comments.

➢ Implementation of safety improvement measures following serious incidents

- Based on the increase in serious incidents in FY2014, an action plan is being implemented as safety improvement measures (improvement in management) related to "utilization and horizontal spreading of operational experience information (trouble information)", "enhancement of mechanism, organization and system of safety management" and "TEPCO's involvement and capability improvement".
- Given the fact that half the workers injured or killed in fatal accidents in FY2014 were newcomers who had worked in the Fukushima Daiichi Nuclear Power Station for less than half a year, improving the risk prediction capability of newcomers is an emergent issue. On March 31, a course to experience risks in work at elevation started at a temporary training facility. Operation will expand sequentially from experience items which become ready.

8. Others

➢ Information disclosure and comprehensive risk reviewing

- Following reflection on information disclosure regarding the data of the drainage channel K, TEPCO decided to expand the disclosure range of radiation data measured at the Fukushima Daiichi Nuclear Power Station sequentially from April 30 to include all data around summer.
- TEPCO also implemented a comprehensive review of risks which may impact on the outside of the site and continues striving to reduce such risks.

➢ Progress toward revising the Mid-long term road map

- A proposed outline toward revising the Mid- to Long-Term Roadmap was explained at the 7th meeting of the Fukushima Advisory Board on Decommissioning and Contaminated Water Management (Koriyama City) held on April 9. On April 30, the Nuclear Damage Compensation and Decommissioning Facilitation Corporation (NDF) formulated the "Technical Strategy Plan 2015 for Decommissioning the TEPCO Fukushima Daiichi Nuclear Power Station", which constitutes the technical basis for the Mid-long term road map. The revision process will continue based on the views and comments of related parties for TEPCO.

➢ Implementers of the decommissioning project (METI FY2014 supplementary budget) were decided

- Public offerings were made regarding the following research and development (offering period: March 10–25): (1) evaluation on the long-term soundness of fuel assemblies removed from spent fuel pools; (2) analysis of accident progress and advanced capturing of status inside reactors using actual equipment data; (3) development of technology to contain, store and transfer fuel debris; (4) development of fuel debris criticality management technology; (5) understanding the characteristics of fuel debris and (6) treatment and disposal of solid waste.
- Following screening by the review board, comprising external experts, implementers for above six fields were decided on March 31.

➢ Implementers reported the results of the FY2013 supplementary budget "contaminated water treatment technology verification project"

- From June 2014 to March 2015, the "contaminated water treatment technology verification project" were implemented in the following four fields: (1) seawater purification technology; (2) technology to repair radioactive materials in soil; (3) technology to decontaminate contaminated water storage tanks and (4) unmanned boring technology. These project results will be utilized at the sites with applicability to the relevant area in mind.

➢ Fire in the west of Units 5 and 6 switchyard

- On March 21, a fire was identified at the roadside in the west of Units 5 and 6 switchyard.
- A field investigation revealed a vehicle part (resembling a brake pad), which was assumed to be the cause of the fire. Investigation of vehicles having traversed the nearby road showed a vehicle with part of the parking brake (brake drum) broken.
- Following investigation of the vehicle, it was assumed that as the vehicle was running without releasing the brake, part of the parking brake broke. It was also confirmed that the lamp, which should have lit up when the parking brake was engaged, did not do so due to a defect.
- Inspections on vehicles operating on site will be enhanced. For those vehicles which can be brought outside the site, inspections will be conducted at external vehicle maintenance factories. For those vehicles which cannot be brought outside the site, inspections will be conducted at the on-site vehicle maintenance factory sequentially from August 2015.

➢ Fire around the roadside ditch on site

- On March 29, a fire was identified at the direct joint (connection) of the high-pressure cable installed in the roadside ditch in the west of the Main Anti-Earthquake Building.
- It was assumed that in addition to the "impact of cable insulator extension by heat due to temperature variation of external air", other factors such as "possible installation failure during the cable connection work" cut the cable shielding copper tape and caused the fire.
- Inspections on external appearance were conducted for other cable connections and completed for almost all connections. Recurrence prevention measures are being considered based on these inspection results.

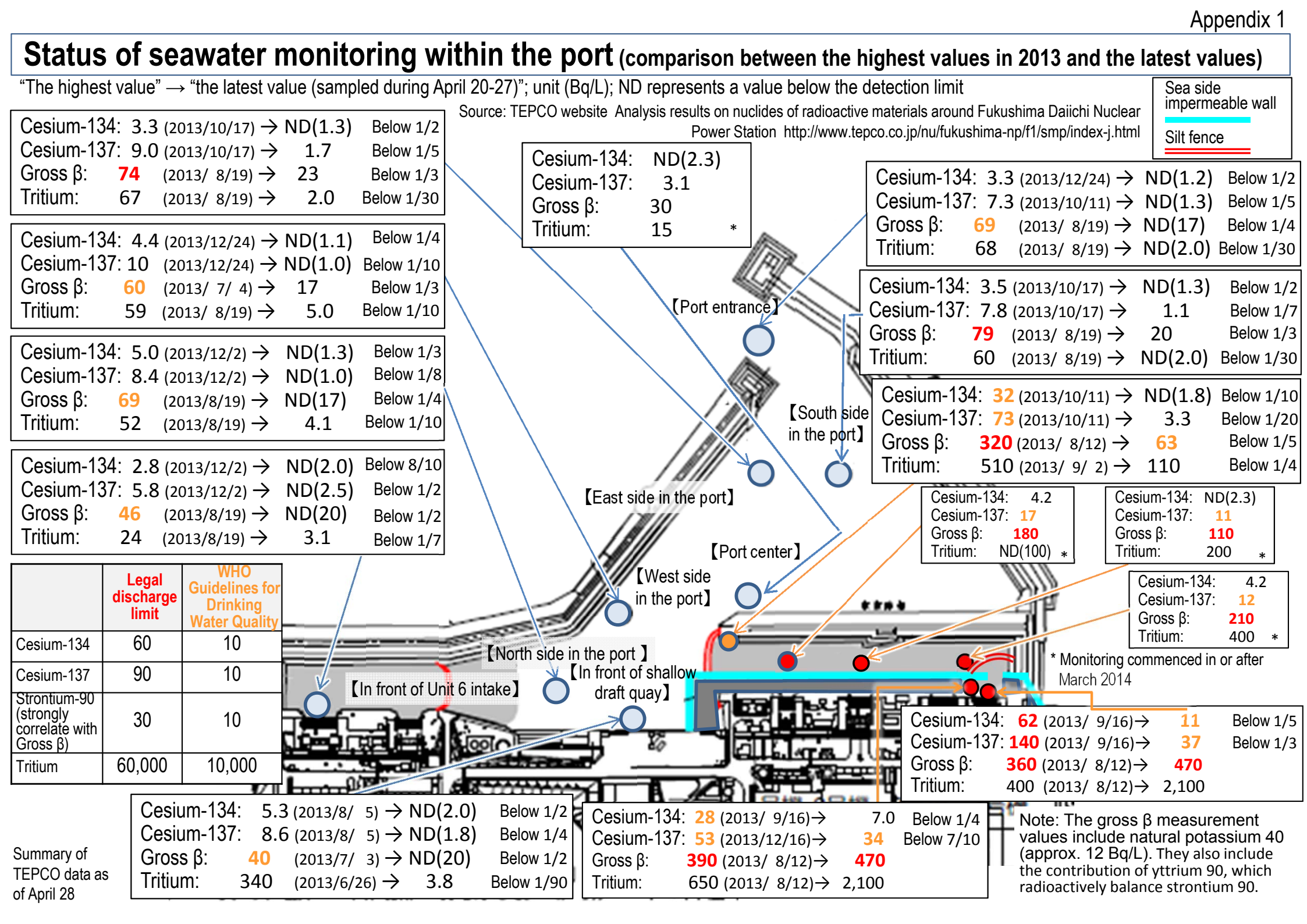
Status of seawater monitoring within the port (comparison between the highest values in 2013 and the latest values)

"The highest value" → "the latest value (sampled during April 20-27)"; 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(1.3) Below 1/2
Cesium-137: 9.0 (2013/10/17) → 1.7 Below 1/5
Gross β: 74 (2013/ 8/19) → 23 Below 1/3
Tritium: 67 (2013/ 8/19) → 2.0 Below 1/30

Cesium-134: 4.4 (2013/12/24) → ND(1.1) Below 1/4
Cesium-137: 10 (2013/12/24) → ND(1.0) Below 1/10
Gross β: 60 (2013/ 7/ 4) → 17 Below 1/3
Tritium: 59 (2013/ 8/19) → 5.0 Below 1/10

Cesium-134: 5.0 (2013/12/2) → ND(1.3) Below 1/3
Cesium-137: 8.4 (2013/12/2) → ND(1.0) Below 1/8
Gross β: 69 (2013/8/19) → ND(17) Below 1/4
Tritium: 52 (2013/8/19) → 4.1 Below 1/10

Cesium-134: 2.8 (2013/12/2) → ND(2.0) Below 8/10
Cesium-137: 5.8 (2013/12/2) → ND(2.5) Below 1/2
Gross β: 46 (2013/8/19) → ND(20) Below 1/2
Tritium: 24 (2013/8/19) → 3.1 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(2.3)
Cesium-137: 3.1
Gross β: 30
Tritium: 15 *

Cesium-134: 3.3 (2013/12/24) → ND(1.2) Below 1/2
Cesium-137: 7.3 (2013/10/11) → ND(1.3) Below 1/5
Gross β: 69 (2013/ 8/19) → ND(17) Below 1/4
Tritium: 68 (2013/ 8/19) → ND(2.0) Below 1/30

Cesium-134: 3.5 (2013/10/17) → ND(1.3) Below 1/2
Cesium-137: 7.8 (2013/10/17) → 1.1 Below 1/7
Gross β: 79 (2013/ 8/19) → 20 Below 1/3
Tritium: 60 (2013/ 8/19) → ND(2.0) Below 1/30

Cesium-134: 32 (2013/10/11) → ND(1.8) Below 1/10
Cesium-137: 73 (2013/10/11) → 3.3 Below 1/20
Gross β: 320 (2013/ 8/12) → 63 Below 1/5
Tritium: 510 (2013/ 9/ 2) → 110 Below 1/4

Cesium-134: 4.2
Cesium-137: 17
Gross β: 180
Tritium: ND(100) *

Cesium-134: ND(2.3)
Cesium-137: 11
Gross β: 110
Tritium: 200 *

Cesium-134: 4.2
Cesium-137: 12
Gross β: 210
Tritium: 400 *

* Monitoring commenced in or after March 2014

Cesium-134: 62 (2013/ 9/16)→ 11 Below 1/5
Cesium-137: 140 (2013/ 9/16)→ 37 Below 1/3
Gross β: 360 (2013/ 8/12)→ 470
Tritium: 400 (2013/ 8/12)→ 2,100

Cesium-134: 5.3 (2013/8/ 5) → ND(2.0) Below 1/2
Cesium-137: 8.6 (2013/8/ 5) → ND(1.8) Below 1/4
Gross β: 40 (2013/7/ 3) → ND(20) Below 1/2
Tritium: 340 (2013/6/26) → 3.8 Below 1/90

Cesium-134: 28 (2013/ 9/16)→ 7.0 Below 1/4
Cesium-137: 53 (2013/12/16)→ 34 Below 7/10
Gross β: 390 (2013/ 8/12)→ 470
Tritium: 650 (2013/ 8/12)→ 2,100

Summary of TEPCO data as of April 28

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 April 20-27)

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 (0.52)
Cesium-137: ND (2013) → ND (0.69)
Gross β: ND (2013) → ND (17)
Tritium: ND (2013) → ND (1.8)

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

Cesium-134: ND (2013) → ND (0.61)
Cesium-137: 1.6 (2013/10/18) → ND (0.76) Below 1/2
Gross β: ND (2013) → ND (17)
Tritium: 6.4 (2013/10/18) → ND (1.8) Below 1/3

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

Cesium-134: ND (2013) → ND (0.61)
Cesium-137: ND (2013) → ND (0.56)
Gross β: ND (2013) → ND (17)
Tritium: ND (2013) → ND (1.8)

Cesium-134: ND (2013) → ND (0.62)
Cesium-137: ND (2013) → ND (0.63)
Gross β: ND (2013) → ND (17)
Tritium: 4.7 (2013/ 8/18) → 2.4 Below 6/10

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

【Port entrance】

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

Cesium-134: ND (2013) → ND (0.54)
Cesium-137: ND (2013) → ND (0.62)
Gross β: ND (2013) → ND (17)
Tritium: ND (2013) → 3.0

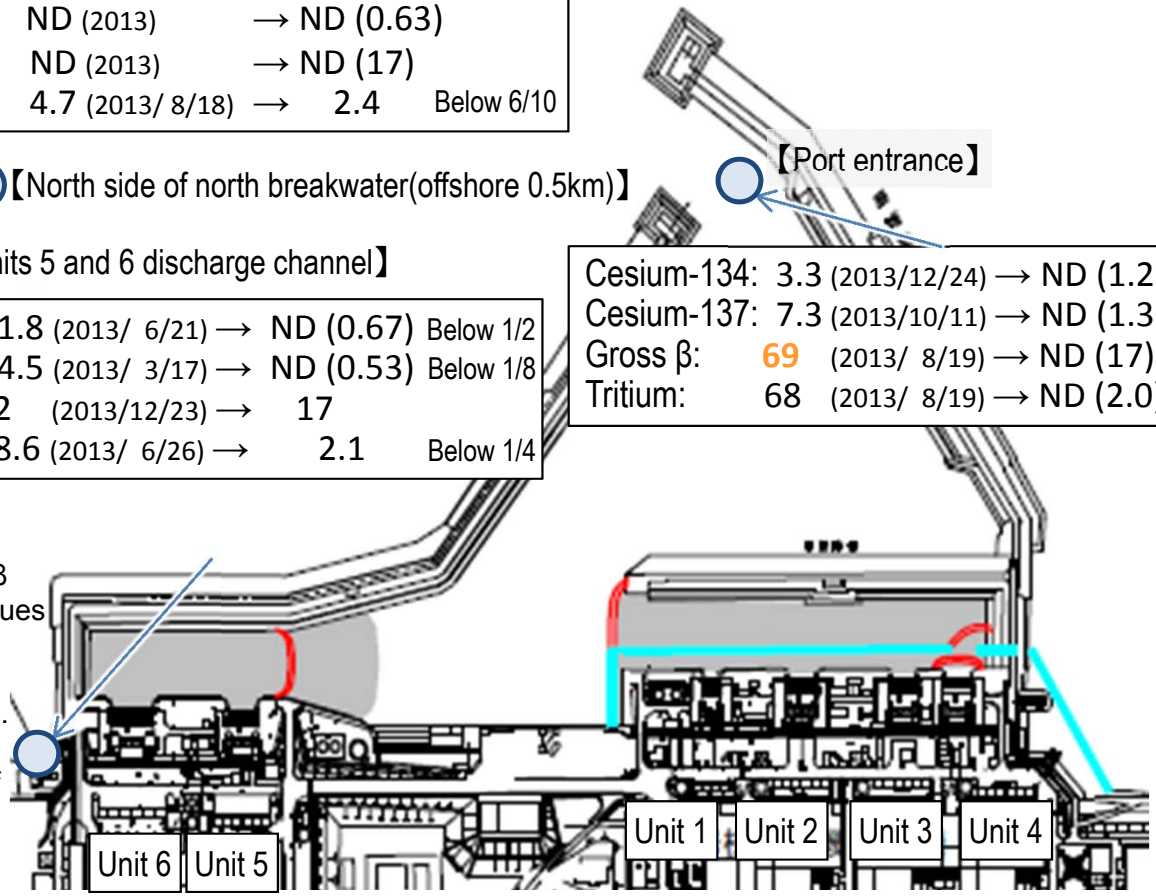
【North side of Units 5 and 6 discharge channel】

Cesium-134: 1.8 (2013/ 6/21) → ND (0.67) Below 1/2
Cesium-137: 4.5 (2013/ 3/17) → ND (0.53) Below 1/8
Gross β: 12 (2013/12/23) → 17
Tritium: 8.6 (2013/ 6/26) → 2.1 Below 1/4

Cesium-134: 3.3 (2013/12/24) → ND (1.2) Below 1/2
Cesium-137: 7.3 (2013/10/11) → ND (1.3) Below 1/5
Gross β: 69 (2013/ 8/19) → ND (17) Below 1/4
Tritium: 68 (2013/ 8/19) → ND (2.0) Below 1/30

Cesium-134: ND (2013) → ND (0.77)
Cesium-137: 3.0 (2013/ 7/15) → ND (0.63) Below 1/4
Gross β: 15 (2013/12/23) → 15
Tritium: 1.9 (2013/11/25) → ND (1.6)

【Around south discharge channel】



Sea side impermeable wall

Silt fence

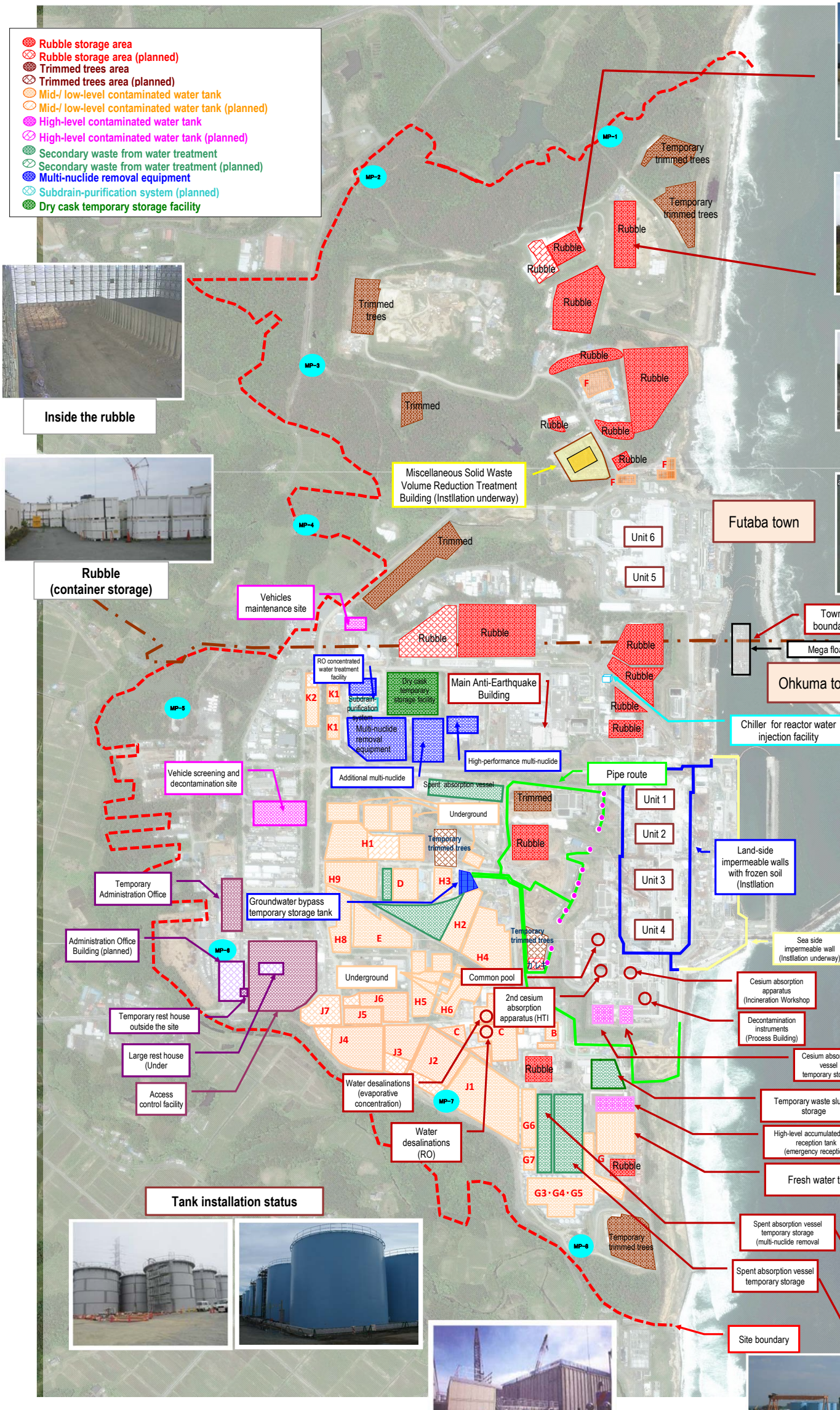
Note: The gross β measurement values include natural potassium 40 (approx. 12 Bq/L). They also include the contribution of yttrium 90, which radioactively balance strontium 90.

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 April 27

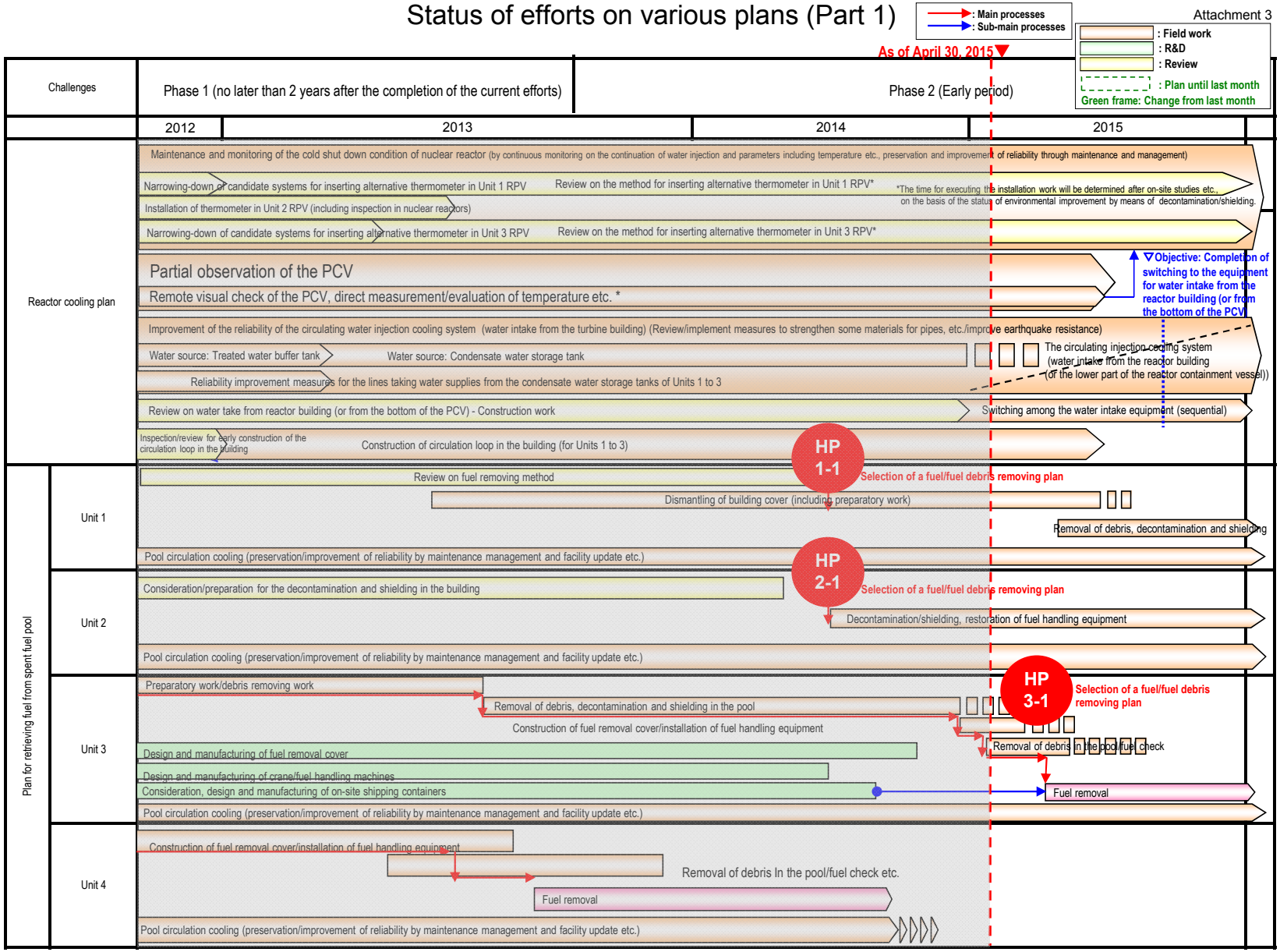
Appendix 2
April 30, 2015

TEPCO Fukushima Daiichi Nuclear Power Station Site Layout

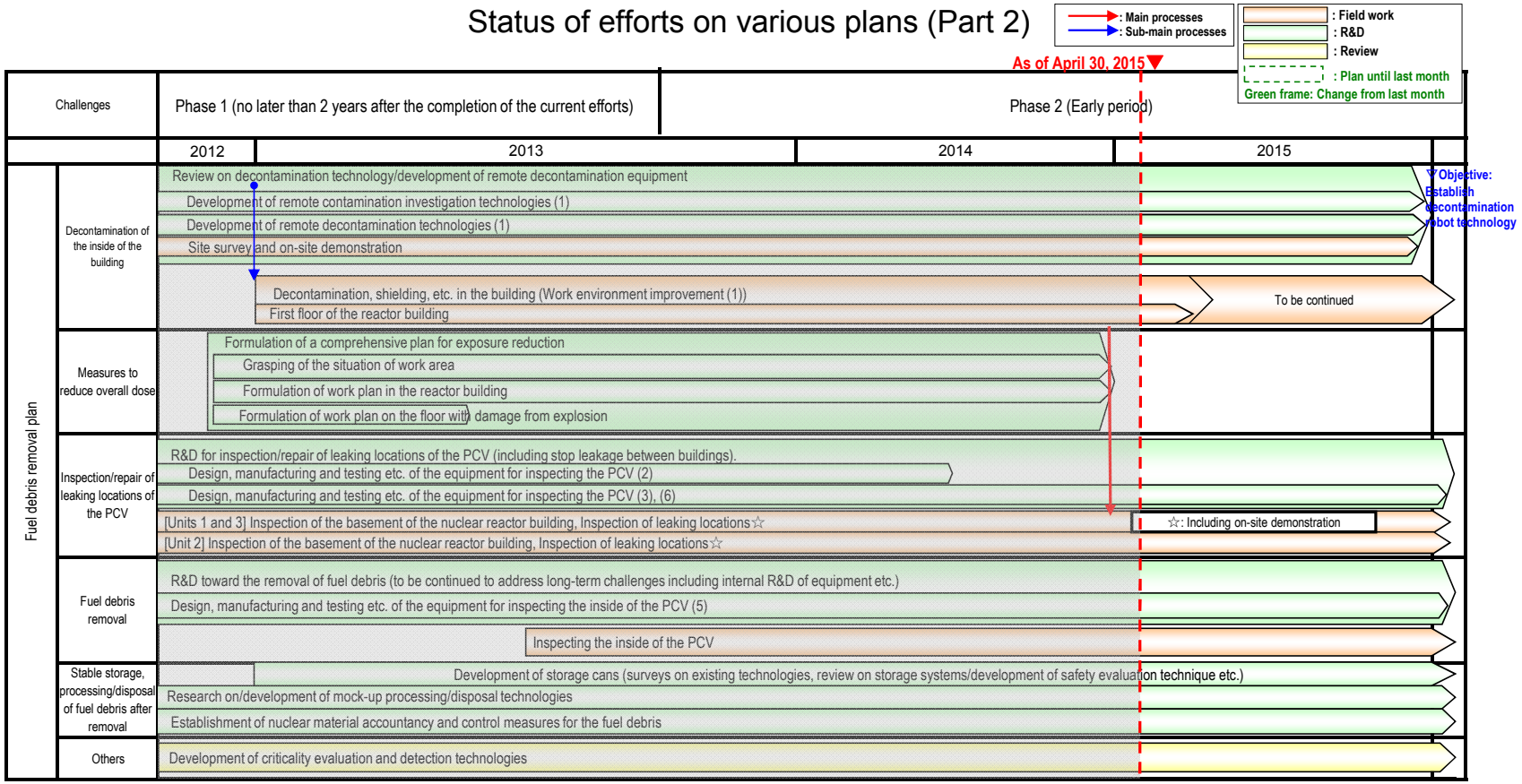


Status of efforts on various plans (Part 1)

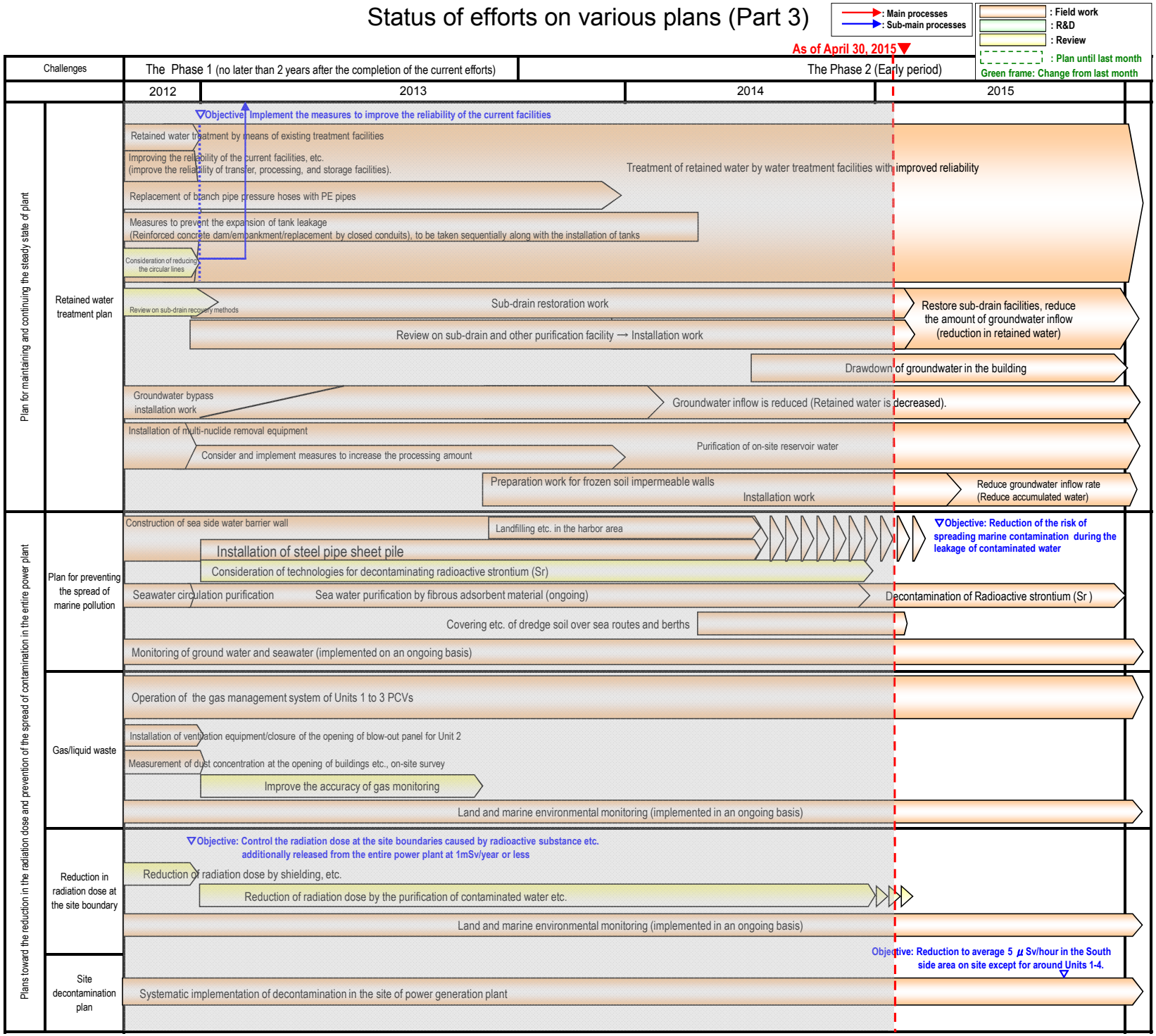
Attachment 3



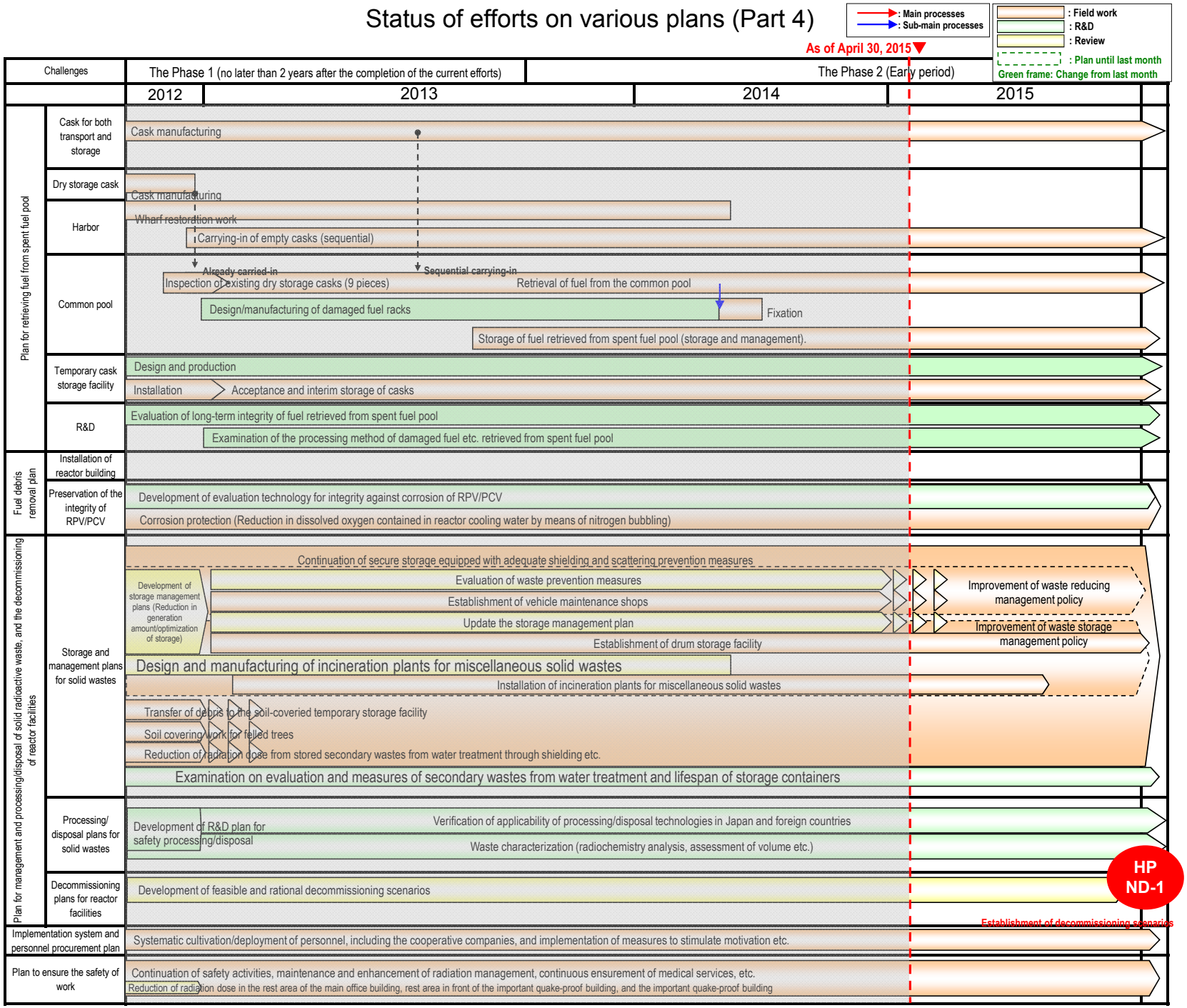
Status of efforts on various plans (Part 2)



Status of efforts on various plans (Part 3)



Status of efforts on various plans (Part 4)



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

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

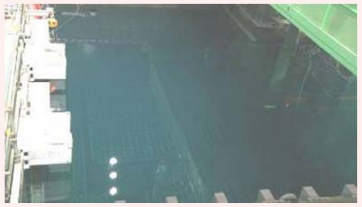
Unit 4

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.

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.

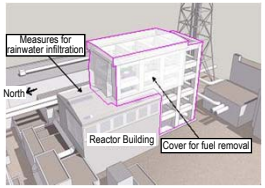

Fuel removal status


Conditions in the Unit 4 SFP

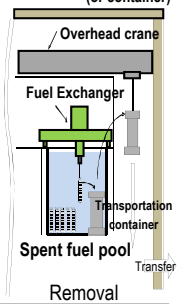
Work is proceeding with appropriate risk countermeasures, careful checks and safety first

Steps toward fuel removal


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



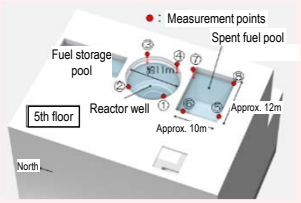
Installation of cover for fuel removal
From Apr. 2012, completed in Nov. 2013



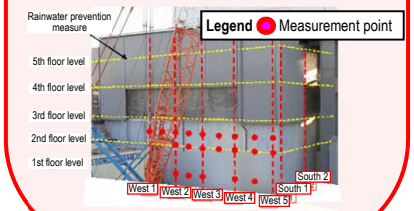
Removal
From Nov. 2013, completed in Dec. 2014

Check of the soundness of the Reactor Building

Regular 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)

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

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

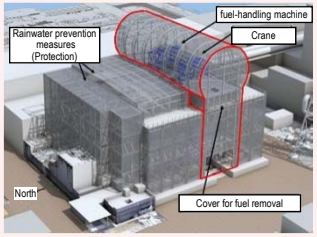


Image of the cover for fuel removal

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. Two roof panels of the Unit 1 Reactor Building (R/B) were removed to facilitate investigation of the rubble status on the R/B top floor. On March 16, the preparatory work for dismantling the Reactor Building cover commenced. The dismantling will commence on May 15. Before starting the dismantling work, measures to prevent spreading will be steadily implemented.
- Regarding Unit 2, to prevent risks of reworking due to change in the fuel debris removal plan, the plan continues to be examined within a scope not affecting the scheduled commencement of removal.

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.


①Spraying anti-scattering agents

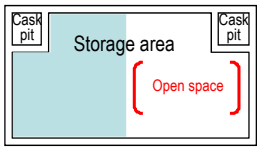

②Removing dust and dirt by suctioning devices


③Preventing dust from being stirred up via a windbreak sheet system by installing additional monitors

④ Enhancing the dust-monitoring

Measures to reduce release

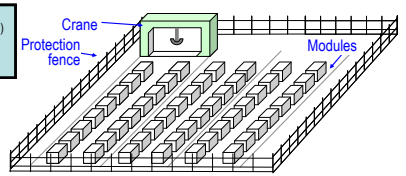
Common pool



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, 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

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.

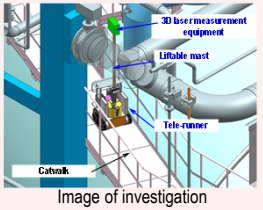
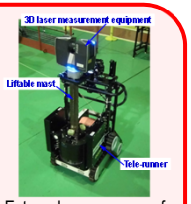


Image of investigation



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

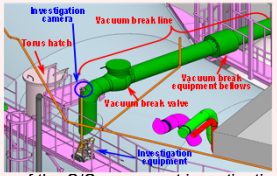
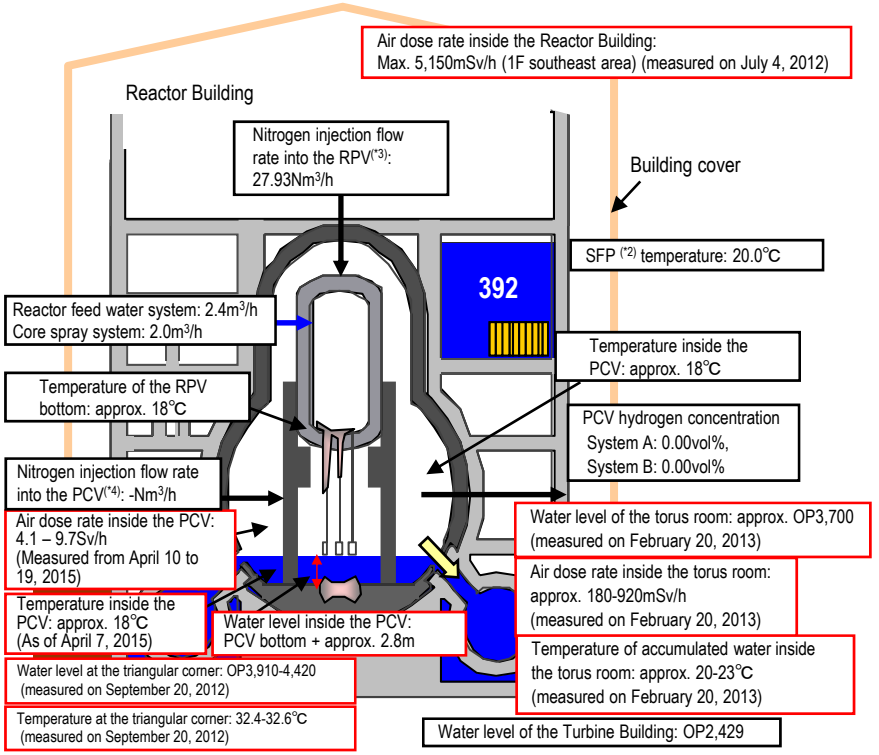


Image of the S/C upper part investigation

Unit 1



* Indices related to the plant are values as of 11:00, April 28, 2015

Status of equipment development toward investigating inside the PCV

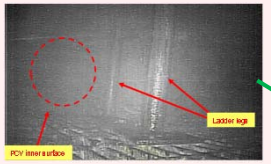
Prior to removing fuel debris, to check the conditions inside the Primary Containment Vessel (PCV), including the location of the fuel debris, investigation inside the PCV is scheduled.

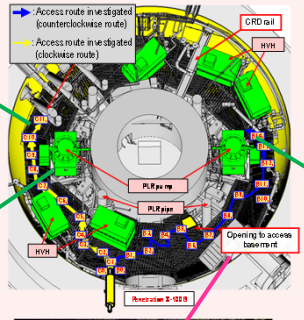
[Investigative outline]

- 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

April 30, 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

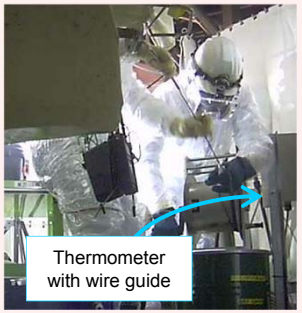
Installation of an RPV thermometer and permanent PCV supervisory instrumentation

(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 will be monitored for around one month to check for any change.

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

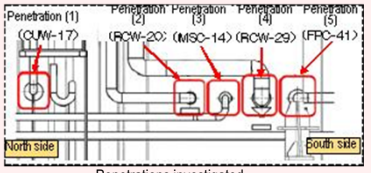
- Some of the permanent supervisory instrumentation for PCV could not be installed in the planned locations due to interference with existing grating (August 13, 2013).
- The instrumentation was removed on May 27, 2014 and new instruments were reinstalled on June 5 and 6, 2014. The trend of added instrumentation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

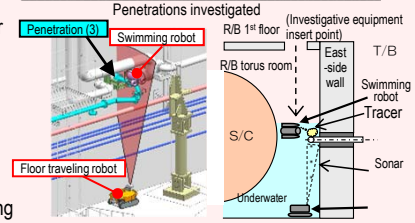
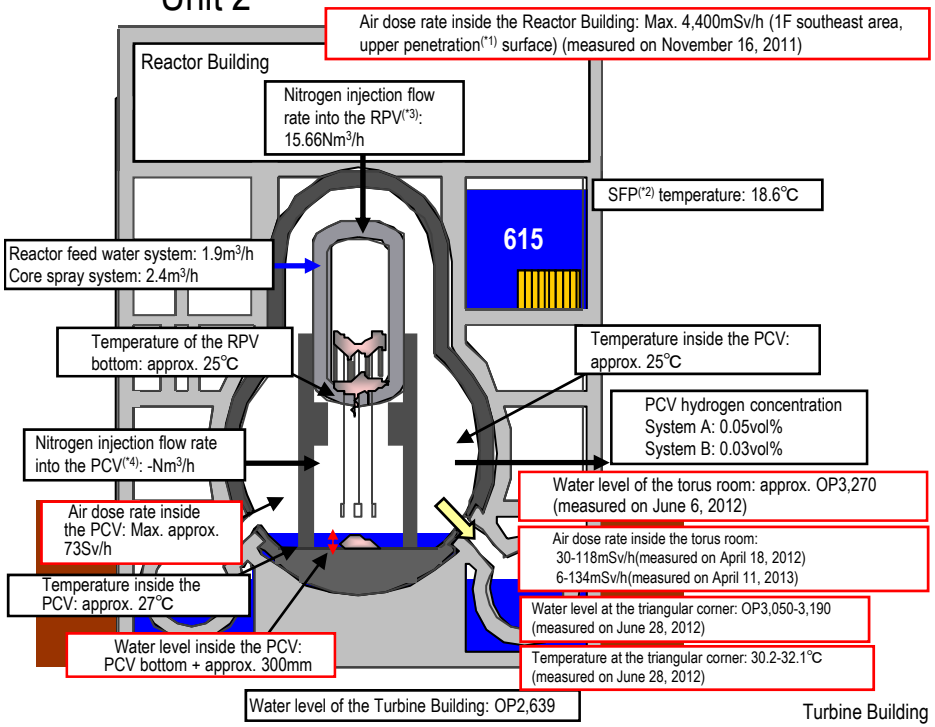


Image of the torus room east-side cross-sectional investigation

Unit 2



* Indices related to plant are values as of 11:00, April 28, 2015

Status of equipment development toward investigating inside the PCV

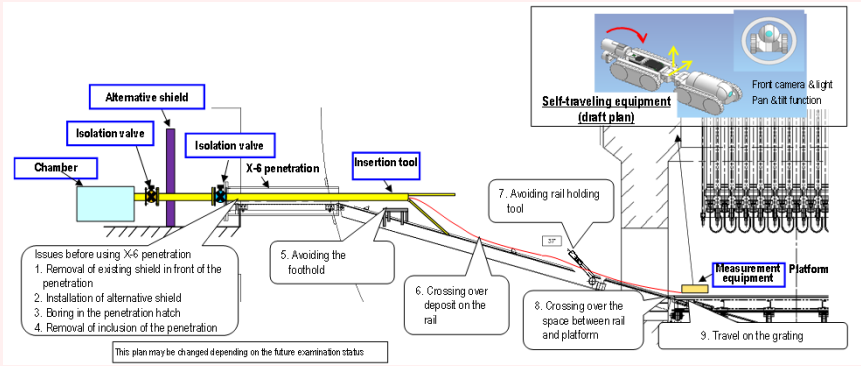
Prior to removing fuel debris, to check the conditions inside the Primary Containment Vessel (PCV), including the location of the fuel debris, investigations inside the PCV are scheduled.

[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

April 30, 2015
Secretariat of the Team for Countermeasures for Decommissioning and Contaminated Water Treatment
4/6

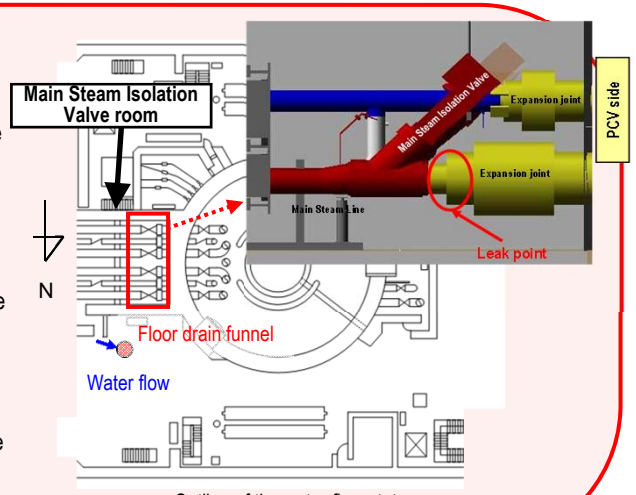
Immediate target	Identify the plant status and commence R&D and decontamination toward fuel debris removal

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

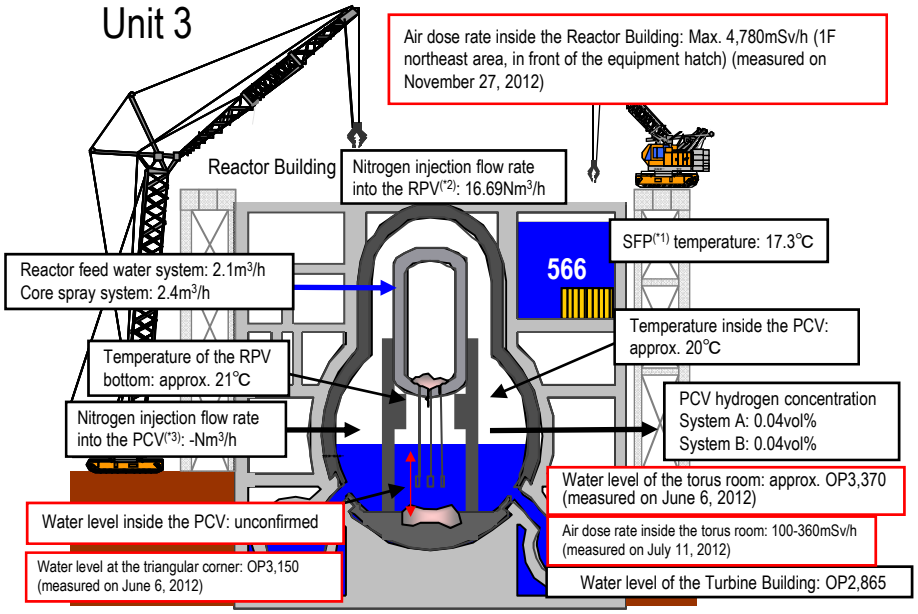
* Main Steam Isolation Valve: A valve to shut off the steam generated from the Reactor in an emergency

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, April 28, 2015

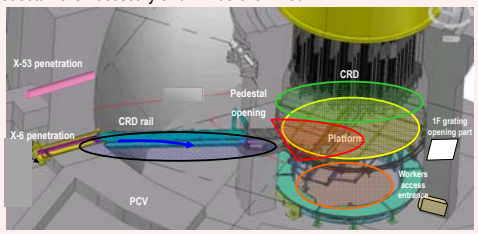
Status of equipment development toward investigating inside the PCV

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

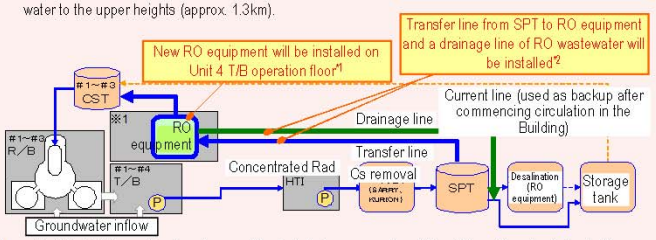
Progress toward decommissioning: Work related to circulation cooling and accumulated water treatment line

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

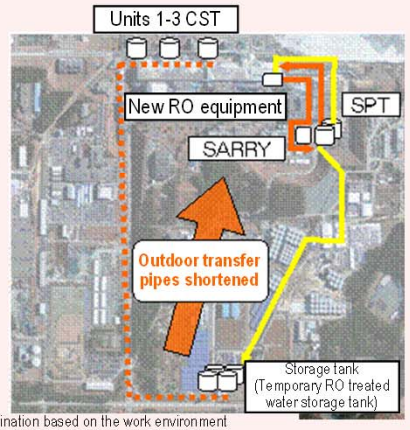
Work to improve the reliability of the circulation water injection cooling system and pipes to transfer accumulated water.

- 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

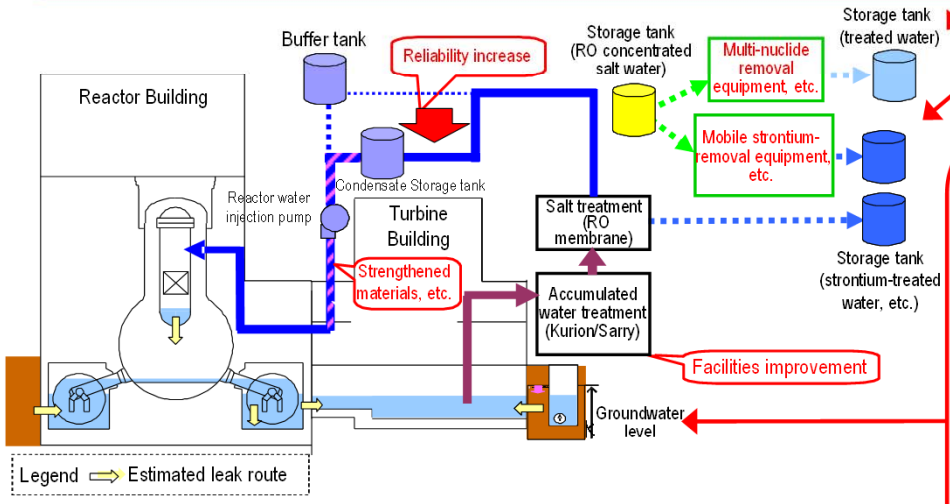
- Enhanced rainwater measures were implemented, including increasing the height of fences to increase the capacity to receive rainwater and installing rain gutters and fence cover to prevent rainwater inflow. Though a total of 300mm of rainfall was recorded by typhoon Nos. 18 and 19, no outflow of contaminated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

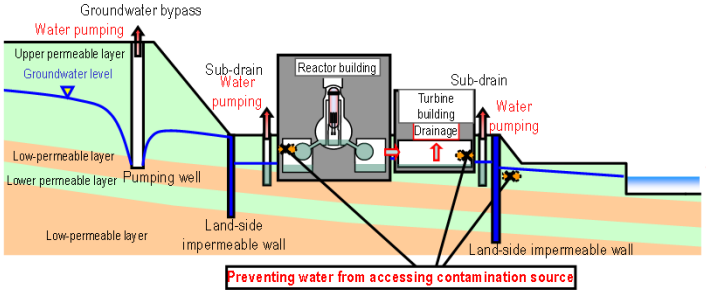
Before installing the fence cover

After installing the fence cover

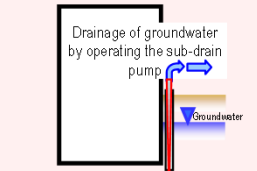
Regarding contaminated water purification

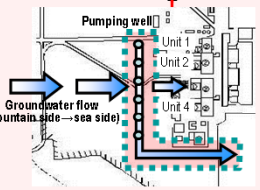
Contaminated water (RO concentrated salt water) is being treated using 7 types of equipment including the multi-nuclide removal equipment (ALPS). The effective dosage at the site boundary attributed to tanks (evaluated value) should hit the target of less than 1mSv/year by the end of the current fiscal year. (80% of the RO concentrated salt water will have been treated as of the end of March.) The treatment of RO contaminated salt water, with the exception of 3 percent of the total (approximately, 20,000 tons) which includes rich sea water foulants produced at an early phase of the accident, will be completed by the end of May.





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.

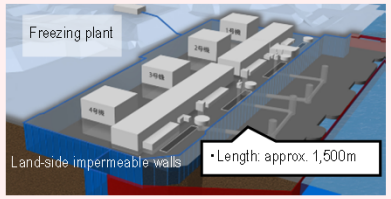
The pumped up groundwater is temporarily stored in tanks and released after TEPCO and a third-party organization have confirmed that its quality meets operational targets.

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.

Installing land-side 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.

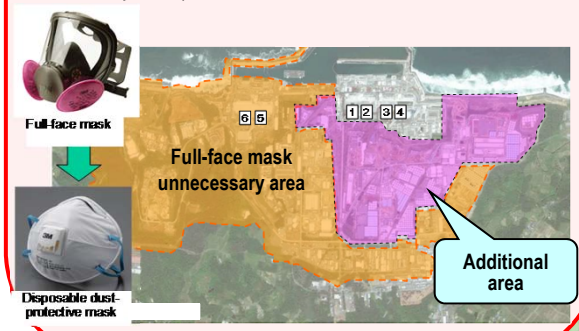
Progress toward decommissioning: Work to improve the environment within the site

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.

Continuous dust monitors will be installed in the planned additional area and after confirming the dust density, the area will be specified as the full-face mask unnecessary area. In tank areas, wearing disposable dust-protective masks will be allowed outside the fences and within the fences of the tank areas for treated water from multi-nuclide removal equipment (scheduled end of May, 2015).



Full-face mask unnecessary area

Expansion of work areas for women

Regarding female workers engaging in radioactivity-related jobs at the Fukushima Daiichi Nuclear Power Station, there has been no onsite work area since the East Japan Great Earthquake due to the increased radioactivity rate. However, improved work environment conditions mean female workers have been allowed to work within limited onsite areas since June 2014.

Based on the improved onsite work environment and the reduced potential for internal exposure, work areas for female workers will be expanded site-wide, excluding specified high-dose works and those for which the radiation dose exceeds 4mSv per exposure (from November 4, 2014.)

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.
  Unit 4: February 14 – March 21, 2015 - tunnel sections were filled.
  April 15, 2015 - filling of opening apertures commenced.