Summary of Decommissioning and Contaminated Water Management

September 25, 2014

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

Main works and steps for decommissioning

Fuel removal from Unit 4 SFP is underway. 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: Rubble removal & dose reduction → Installing FHM* → Unit 4: Fuel removal → Storage and handling

Unit 1: FY2017 Fuel removal will start (under consideration)
Unit 2: After FY2017 Fuel removal will start (under consideration)
Unit 3: FY2015 Fuel removal will start (planned)
Unit 4: 2014 Fuel removal will be completed

FHM*: Fuel-Handling Machine

Fuel Debris (Corium) Removal

Unit 1-3: Dose reduction & Leakage identification → Stop leakage → Fuel debris removal → Storage and handling

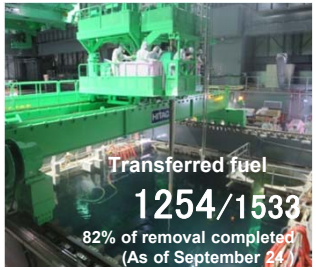
After FY2017
Water stoppage of PCV lower part (under consideration)

Dismantling Facilities

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

Fuel removal from SFP

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



(Fuel-removal operation)

Three principles for contaminated water countermeasures

Countermeasures for contaminated water (Note 2) are implemented with the following three principles:

(Note 2) The amount is decreasing due to measures such as groundwater bypass and water-stoppage of the buildings.

1. **Eliminate** contamination sources

① Multi-nuclide removal equipment

② Remove contaminated water in the trench (Note 3)

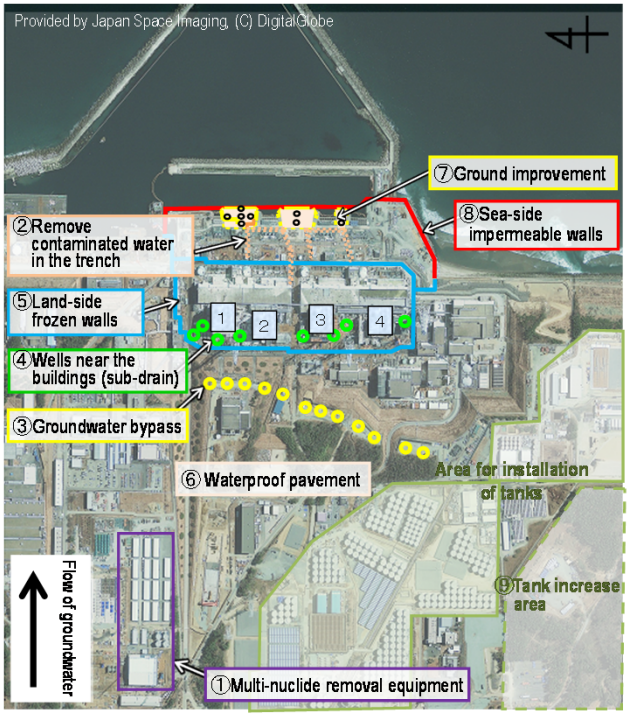
(Note 3) Underground tunnel containing pipes.

2. **Isolate** water from contamination

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

3. **Prevent leakage** of contaminated water

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



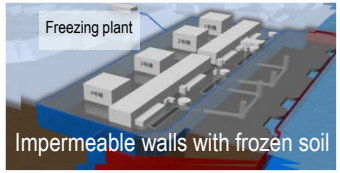
Multi-nuclide removal equipment (ALPS)

- This equipment removes radionuclides from the contaminated water in tanks, and reduces risks.
- It aims to reduce the levels of 62 nuclides in contaminated water to the legal release limit or lower (tritium cannot be removed).
- Furthermore, additional multi-nuclide removal equipment is installed by TEPCO (operation started September 2014) as well as a subsidy project of the Japanese Government (operation will start from October 2014).

(Installation status of the facility to absorb radioactive materials)

Land-side impermeable walls with frozen soil

- The walls surround the buildings with frozen soil and reduce groundwater inflow into the same.
- On-site tests have been conducted since last August. Construction work started in June and the freezing operation will start within FY2014.



(Length: approx. 1,500m)

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

◆ 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. 25-45°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 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).

Test operation of additional multi-nuclide removal equipment began

Regarding the additional multi-nuclide removal equipment (ALPS) having been installed, test operation is proceeding steadily with treatment of contaminated water beginning by one of three systems on September 17. Regarding the remaining two systems, treatment will begin sequentially once preparation is completed.

<Installation status of additional multi-nuclide removal equipment>

Progress toward treatment by high-performance multi-nuclide removal equipment

Installation of high-performance multi-nuclide removal equipment, which will significantly reduce waste generation compared to the multi-nuclide removal equipment (ALPS), is steadily underway. Treatment will begin in mid-October once preparation is completed.

<Installation status of high-performance multi-nuclide removal equipment>

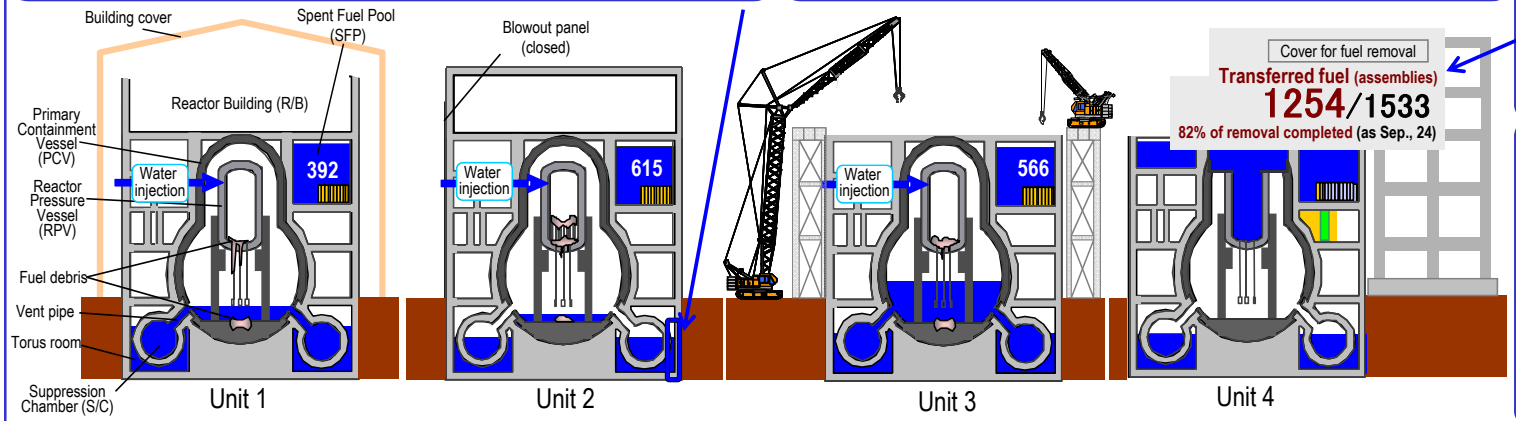
Additional measures to remove contaminated water from seawater pipe trenches

To remove contaminated water in the trenches after building separation by freezing connections between the seawater pipe trenches(Note) and the buildings of Units 2 and 3, measures to control water flow were added to supplement pre-existing ones. As well as controlling water-level variation, which began on September 3, mock-up tests were performed, including injection of space fillers to ensure removal of contaminated water.

(Note) Trench: Tunnel containing pipes and cables

Resumption of fuel removal at Unit 4 Spent Fuel Pool

For the annual inspection of overhead cranes, fuel removal has been suspended.
Removal resumed from September 4; targeting completion within 2014.

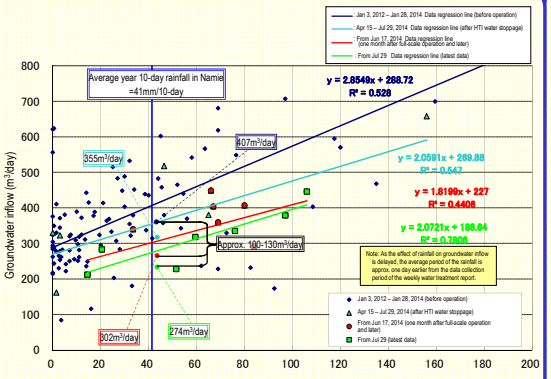


Leakage around Tank Area valves

On September 4 and 9, leakage of contaminated water was detected around the valves at Tank Areas. As these tanks are surrounded by fences and the leakage was detected immediately, the estimated maximum amount is one liter in each case and no leakage to the outside was identified. The inside of the fences for leakage tanks had already been decontaminated.

Inflow into buildings decreased by groundwater bypass

To reduce inflow of groundwater into the buildings and control the increase of contaminated water, groundwater is pumped up on the mountain side of the buildings and released after confirming that the water meets the operation target, which is stricter than the announcement density.
The analysis on the groundwater inflow into the buildings based on the existing data showed that the inflow had decreased by approx. 100-130 tons/day (approx. 50-80 tons at the groundwater bypass if the estimated effect of the water stoppage of the HTI building is approx. 50 tons) by combined effect of the inflow control measures.



<analytical results of groundwater inflow into buildings>

Rubble fell into Unit 3 Spent Fuel Pool

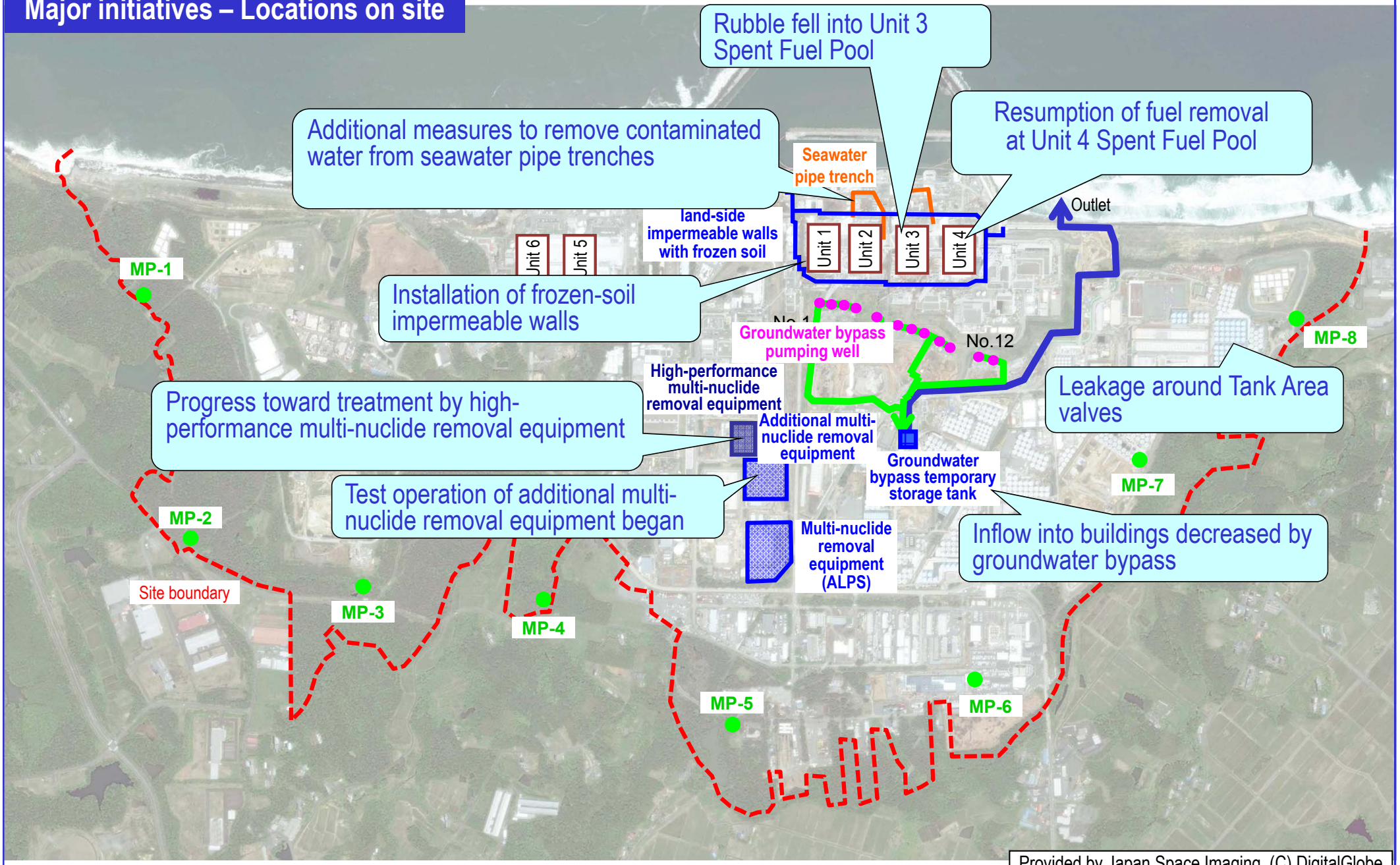
During rubble removal inside the spent fuel pool (SFP) to facilitate fuel removal, the console and other components of the fuel-handling machine (FHM) fell into the pool on August 29.
Though the console fell first onto the cover materials and then onto the fuel rack, analytical results on pool water quality showed little effect on the fuel.

Installation of frozen-soil impermeable walls

Frozen-soil impermeable walls surrounding the buildings are being installed, with freezing targeted to start at the end of this fiscal year. As of September 23, drilling of 462 of 1,545 frozen pipes and installation of 103 pipes had been completed. In addition, regarding chillers for freezing soil, installation of 13 of 30 units was completed.


<Installation of chillers for freezing>

Major initiatives – Locations on site



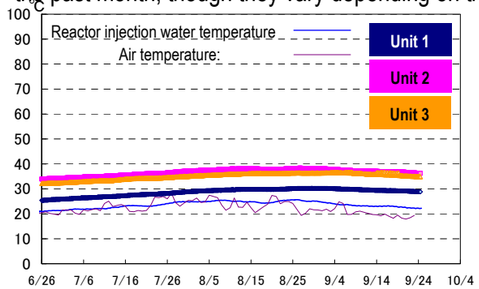
Provided by Japan Space Imaging, (C) DigitalGlobe

* Data of Monitoring Posts (MP1-MP8).
Data of Monitoring Posts (MPs) measuring airborne radiation rate around site boundaries show 1.362 - 4.402μSv/h (August 27-September 23, 2014).
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. Therefore monitoring results at these points are lower than elsewhere in the power plant site.
The radiation shielding panel around the 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 to July 11, since the surrounding radiation dose has largely fallen down due to further cutting down of the forests etc.

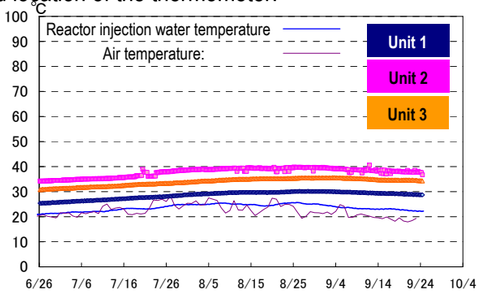
I. Confirmation of the reactor conditions

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



RPV bottom temperatures (recent quarter)



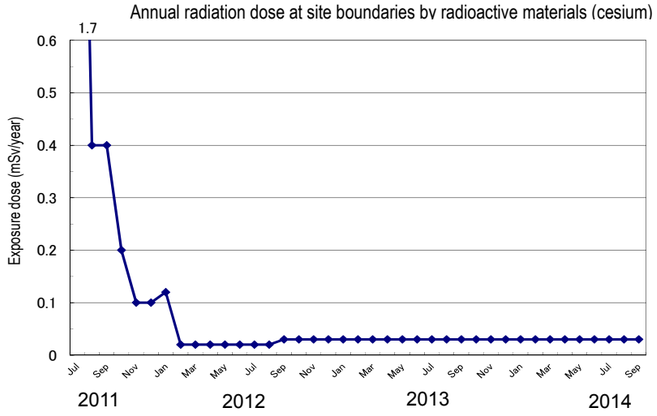
PCV gas phase temperatures (recent quarter)

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

2. Release of radioactive materials from the Reactor Buildings

The density of radioactive materials newly released from Reactor Building Units 1-4 in the air measured at site boundaries was evaluated at approx. 1.4 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.

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



(Reference)

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

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

* Data of Monitoring Posts (MP1-MP8).
Data of Monitoring Posts (MPs) measuring airborne radiation rate around site boundaries show 1.362 - 4.402μSv/h (August 27-September 23, 2014)
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) has been completed.

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

3. Other indices

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

II. Progress status by each plan

1. Reactor cooling plan

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

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

- In April, attempts to remove and replace the thermometer installed at the bottom of the RPV, which had broken in February 2014, failed and the operation was suspended. The estimated cause was fixing or added friction due to rust having formed. To facilitate the task, verification in August using mock-up test equipment and full-scale piping specially prepared for the test, confirmed that the removal was impossible due to rust when the phenomena were replicated. Rust-stripping chemicals also capable of also alleviating drawing tension are currently being selected (the rust-stripping ability and amount of hydrogen generated are being evaluated).
- After confirming the ability of the rust-stripping chemicals to strip rust, work to check whether the mock-up test equipment using full-scale piping can eliminate the thermometer or not, verify the method and train the workers to be involved in the removal will be implemented in late November.

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, the operation of 12 groundwater bypass pumping wells commenced sequentially to pump up groundwater. Release commenced from May 21 in the presence of officials from the Intergovernmental Liaison Office for the Decommissioning and Contaminated Water Issue of the Cabinet Office. As of September 24, 37,599 m^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 100-130m^3/day through measures such as the 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. 20cm compared to the level before pumping at the groundwater bypass started (see Figure 2).
- As the analytical results of the groundwater bypass pumping well No. 12 (sampled on August 28) showed a tritium density of 1,900Bq/L, which exceeded the operational target of 1,500Bq/L for the temporary storage tanks, pumping from that pumping well was suspended from August 29. As the evaluation results on the temporary storage tank side based on the monitoring results showed that the density would not exceed the operational target, pumping resumed from September 20.

Figure 1: Analysis results of inflow into buildings

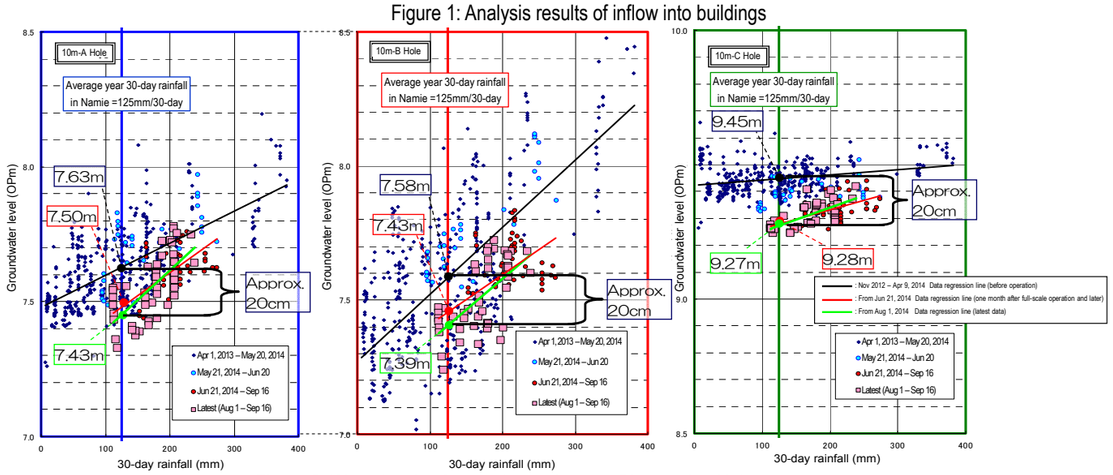


Figure 2: Water levels of groundwater bypass Observation Holes

➢ Construction status of impermeable walls with frozen soil

- To facilitate the installation of frozen-soil 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). As of September 23, drilling at 521 points (for frozen pipes: 462 of 1,545 points, for temperature-measurement pipes: 59 of 315 points) and installation of frozen pipes at 103 of 1,545 points had been completed (see Figure 3).
- Installation of chillers for freezing is underway (from August and scheduled for completion on November 22, installation of 13/30 units had been completed).
- Regarding construction for pipe penetration on the mountain side of the Unit 1-4 buildings, the implementation plan was approved (September 17).

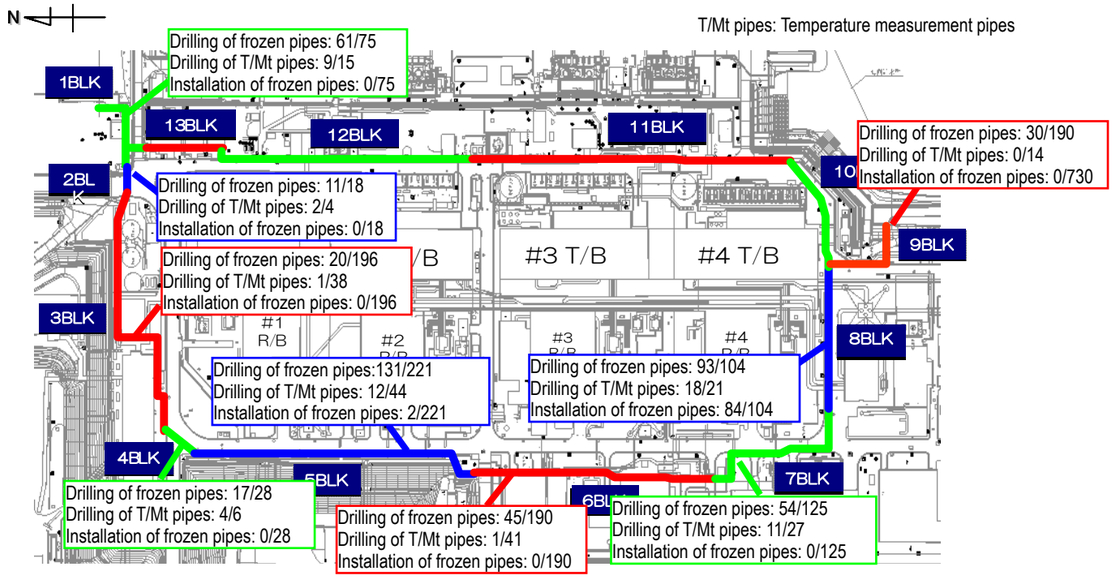


Figure 3: Status of drilling for frozen-soil impermeable walls and installation of frozen pipes

➢ Status of the subdrain system

- On September 8, drilling of new subdrain pits (15 points) was completed.
- Regarding the purification system for subdrain water, successive standby operation (September 5-11) and system operation tests (from September 16) were conducted to check stable operation. As the design specifications were fixed, an application of the implementation plan was submitted on September 17.
- Treated groundwater will be released inside the port after confirming it meets the above operational target. The release will be contingent on the relevant parties reaching agreement.

➢ Operation of multi-nuclide removal equipment

- Hot tests using radioactive water are underway (System A: from March 30, 2013, System B: from June 13, 2013, System C: from September 27, 2013). To date, approx. 142,000 m^3 has been treated (as of September 23, including approx. 9,500m^3 stored in J1(D) tank, which contained water with a high density of radioactive materials at the System B outlet).
- Except for the reverse-cleaning period, all three systems have continued operation (System A: from August 10, System B: from August 1, System C: from June 22). When the differential pressure of the absorption vessel increased, reverse cleaning was conducted as necessary.
- Regarding System C, operation was suspended on September 21 to replace the filters after iron coprecipitation treatment with improved filters.
- To improve the performance of the multi-nuclide removal equipment to remove four radioactive nuclides (excluding tritium) such as iodine 129, which was detected in water treated by the multi-nuclide removal equipment, two additional absorption vessels will be installed in October based on the implant test results at System A.
- Regarding the additional multi-nuclide removal equipment, hot tests using radioactive water are underway (System A: from September 17, System B: scheduled for commencement on September 27, System C: scheduled for commencement in early October) (see Figure 4).
- Regarding the high-performance multi-nuclide removal equipment, a subsidy project of the Ministry of Economy, Trade and Industry, foundation construction (from May 10) and installation of equipment (from July 14) are underway. Hot tests will begin in mid-October (see Figure 5).
- Tests to verify the verification test equipment for the high-performance multi-nuclide removal equipment have continued since August 20.

Figure 4: Overview of additional multi-nuclide removal equipment

Figure 5: Overview of high-performance multi-nuclide removal equipment

➢ Leakage from tank communication valve in G4 Area

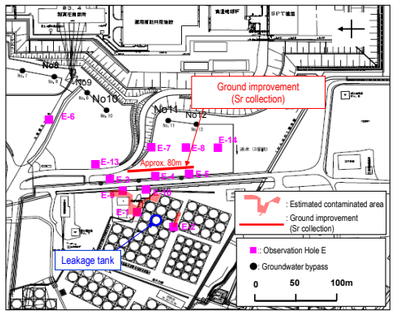
- In G4 Area, when transferring RO concentrated salt water filled in a tank (A4 tank) to a neighboring tank (A5 tank), leakage from a crack at the communication valve body between the A5 tank and a neighboring empty tank (A6 tank) was detected (September 4). As these tanks are surrounded by fences and the leakage was detected immediately, the estimated maximum amount is one liter and no external leakage was identified.

➢ Leakage from closing flange of tank stop valve in D Area

- When transferring RO concentrated salt water to D Area, leakage from the closing flange at the end of the tank communication pipe was detected (September 9). It was stopped by retorquing the stop valve installed at the communication pipe. As the tanks are surrounded by fences and the leakage was detected immediately, the estimated maximum amount is 0.7 liters and no leakage to the outside was identified.

➢ Measures in Tank Areas

- Rainwater under the temporary release standard having accumulated inside the fences in the contaminated water tank area, was sprinkled on site after removing radioactive materials using rainwater treatment equipment since May 21 (as of September 23, a total of 8,980 m^3).
- As a preventive and redundant measure for the water leakage from H4 Area tank in August 2013, ground improvement by materials (apatite), which collects strontium in soil, was completed (September 11) (see Figure 6).
- The destination of C-release channel was switched from outside to inside the port from July 14. The release amount inside the port was also increased from 0.01 to 0.1m^3/s (August 26). As no significant change was identified in the cesium density of seawater at “Unit 1-4 intakes south side (in front of impermeable walls)” near the release point, the seabed soil of the inflow destination has been covered and the inflow from the release outlet is small, it is estimated that the release will cause little stirring.



<Location of the measure>

<Status of drilling>

Figure 6: Ground improvement by apatite

➢ Treatment and removal of contaminated water from seawater pipe trenches

- Contaminated water in the trenches will be removed after building separation by freezing connections between the seawater pipe trenches and the buildings of Units 2 and 3.
- At the seawater pipe trench Unit 2 Vertical Shaft A, additional measures to facilitate freezing are being conducted (cooling by installing additional frozen pipes outside the trench: from September 5 (north side), reduction in water-level volatility by inverter control of pumps: from September 3).
- Mock-up tests for space filling and long-distance pour test are underway.
- At the seawater pipe trench Unit 2 open-cut duct, the freezing operation is underway from June 13.
- At the seawater pipe trench Unit 3 Vertical Shaft A, drilling of holes for frozen and temperature-measurement pipes was completed.

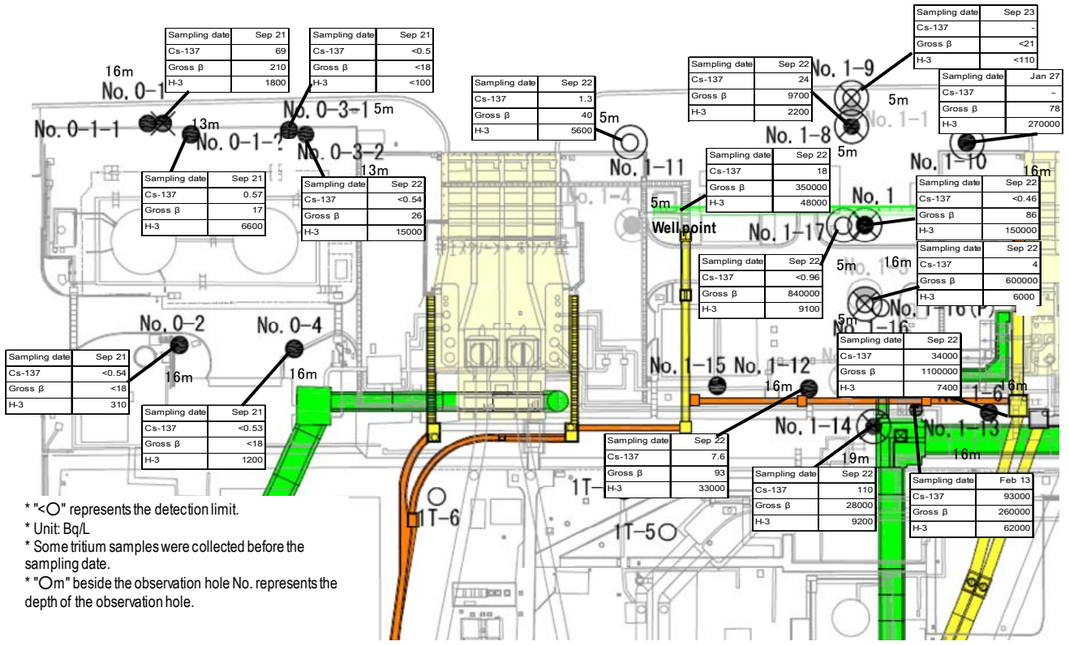
- At the seawater pipe trench Unit 3 Vertical Shaft D, drilling of holes for frozen and temperature-measurement pipes is underway (from May 5).

3. Plan to reduce radiation dose and mitigate contamination

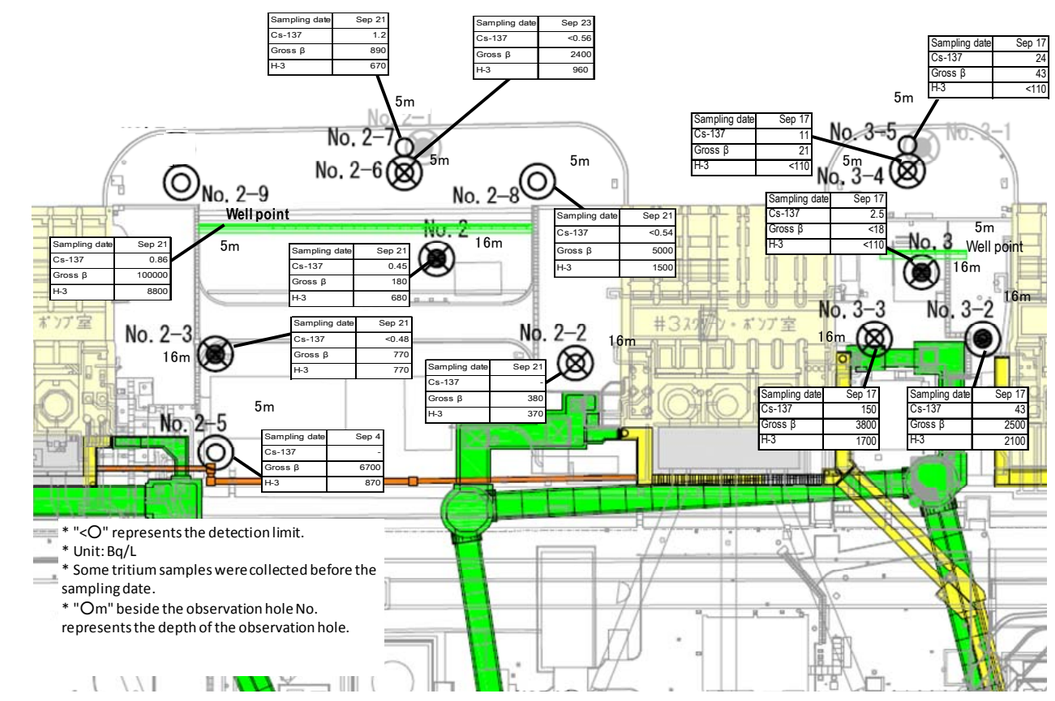
Effective dose-reduction at site boundaries and purification of the port water to mitigate the impact of radiation on the external environment

➢ 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, the density of tritium decreased at all groundwater Observation Holes as in August. Pumping of 1 m^3/day of water from Observation Hole No. 0-3-2 continues.
- Regarding the groundwater near the bank between the Unit 1 and 2 intakes, though the density of gross β radioactive materials at groundwater Observation Hole No. 1-16 increased to 3.1 million Bq/L on January 30, the figure has recently decreased to below one million Bq/L. The density of gross β radioactive materials at groundwater Observation Hole Nos. 1-14 and 1-17 has been increasing since March. There may be a flow from groundwater Observation Hole Nos. 1-16, No.1-17 to the well point. Water pumping from the well point (approx. 50 m^3/day) and the pumping well No. 1-16 (P) (1m^3/day) installed near the Observation Hole No. 1-16 continues.
- Regarding the radioactive materials in groundwater near the bank between the Unit 2 and 3 intakes, the density of gross β radioactive materials is high on the north (Unit 2) side as until August. Water pumping from north of the well point continues (4 m^3/day).
- Regarding the radioactive materials in groundwater near the bank between the Unit 3 and 4 intakes, a low density of radioactive materials has been maintained at all Observation Holes as until August.
- The density of radioactive materials in seawater inside the open channels of Units 1-4 has been declining slightly since last autumn. The density of radioactive materials in seawater at the additional sampling point installed outside the sea-side impermeable walls since March was equivalent to that at the point on the north side of the east breakwater.
- The density of radioactive materials in seawater within the port has been declining slowly as until August.
- The radioactive material density in seawater at and outside the port entrance has remained within the same range as previously recorded.
- Construction to cover the seabed soil within the port is underway to prevent contamination spreading by stirred-up seabed soil. As of September 23, 22% had been completed (see Figure 10). The seabed of the intake open channels had been covered by FY2012.
- To increase the frequency of marine-trend monitoring, a seawater monitor was installed at the port entrance. Since September 4, test operation has been conducted for approximately three months to verify the data, identify troubles and check the operation.



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



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

Figure 7: Groundwater density on the Turbine Building east side

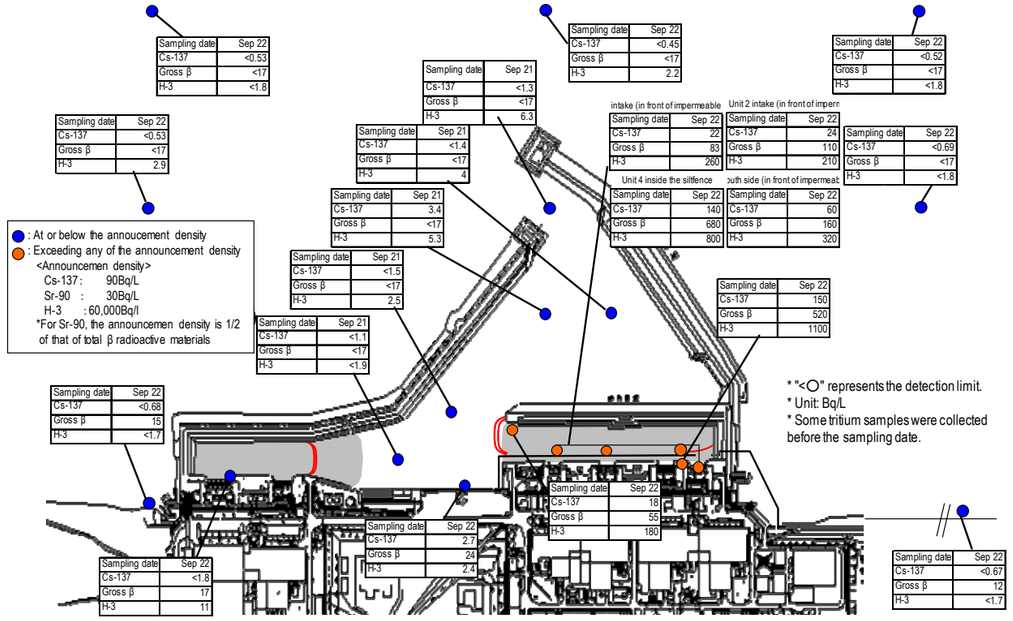
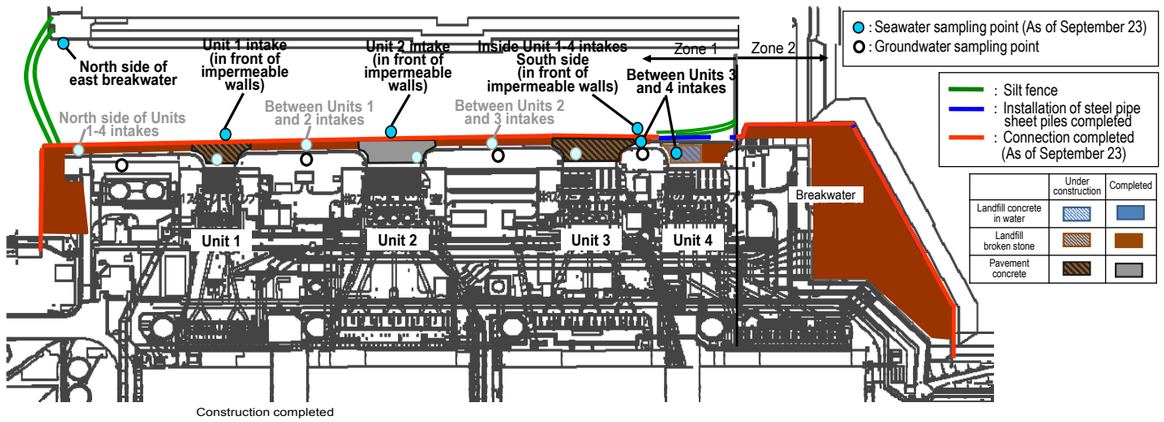


Figure 8: Seawater density around the port



Construction completed

Construction area	Completed area (m²)	Planned area (m²)
Area (1) Covering (A)	41,456 (81.4%)	50,900
Area (2) Covering (D)	0 (0.0%)	129,700
Total	41,456 (23.0%)	180,600

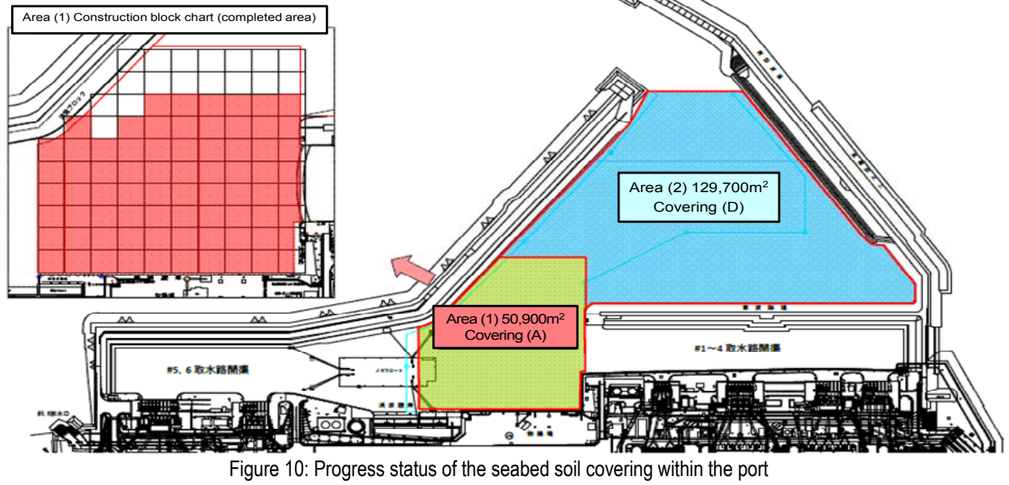


Figure 10: Progress status of the seabed soil covering within the port

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 efforts are being made to complete the process by around the end of 2014

➢ Fuel removal from the Unit 4 spent fuel pool

- Fuel removal from the spent fuel pool (SFP) commenced on November 18, 2013
- Though fuel removal had been suspended since July 1 for the annual inspection of overhead cranes of Unit 4 and the fuel-handling machine (FHM), it resumed from September 4. As of September 24, 1232 of 1331 spent fuel assemblies and 22 of 202 non-irradiated fuel assemblies had been transferred to the common pool. 82% of the fuel removal was completed.
- Inspection of containers for fuel transportation from Unit 4 to the common pool is being conducted (from September 13 and scheduled for completion on October 14). Fuel removal will be temporarily suspended due to the inspection.
- In the common pool, a rack for deformed or damaged fuel was installed (from August 4 to September 19).

➢ Main work to help remove spent fuel at Unit 3

- During rubble removal inside the spent fuel pool (SFP), the console and overhanging pedestal of the fuel-handling machine, which was scheduled for removal, fell (August 29) (see Figure 11). It is estimated that ten spent fuel assemblies may have touched the falling console or overhanging pedestal. The results of continuous monitoring of the radioactive material density within the SFP and the monitoring posts from August 29 to September 18 showed no significant variation.
- Recurrence prevention measures are under consideration.

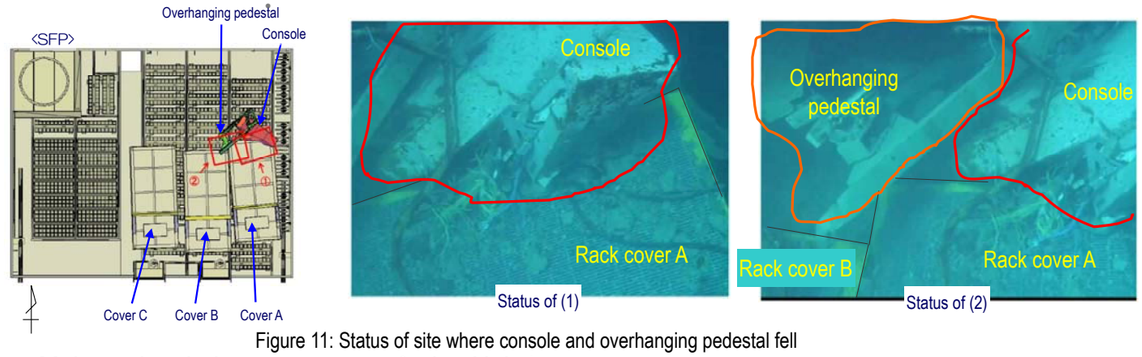


Figure 11: Status of site where console and overhanging pedestal fell

➢ Main work to help remove spent fuel at Unit 1

- Prior to dismantling the building cover, portable continuous dust monitors (1 unit on the Unit 3 south side and 5 units around the site boundaries) and dust samplers (3 units around the site boundaries) were added on September 5 to enhance the monitoring of radioactive material densities. When the monitoring posts or the dust monitors issue an alert, the dismantling work will be immediately suspended, actions such as wearing full-face masks and spraying anti-scattering agents will be taken, and the alert issuance will be notified to the relevant municipalities and the press.
- Details of the outline, risks and measures regarding the dismantling of the building cover will be informed to the relevant municipalities; residents, public and press in advance, and the implementation results will be promptly reported.

[Monitoring system of radioactive materials density]
- Monitoring by dust monitors on operating floors (4 points for each of Units 1 and 3)
- Monitoring by portable continuous dust monitors near Reactor Buildings (3 points)
- Monitoring by portable continuous dust monitors on site (5 points)
- Monitoring posts at site boundaries (8 points)
- Monitoring by portable continuous dust monitors around site boundaries (5 points)
- Measuring by dust samplers around site boundaries (3 points)

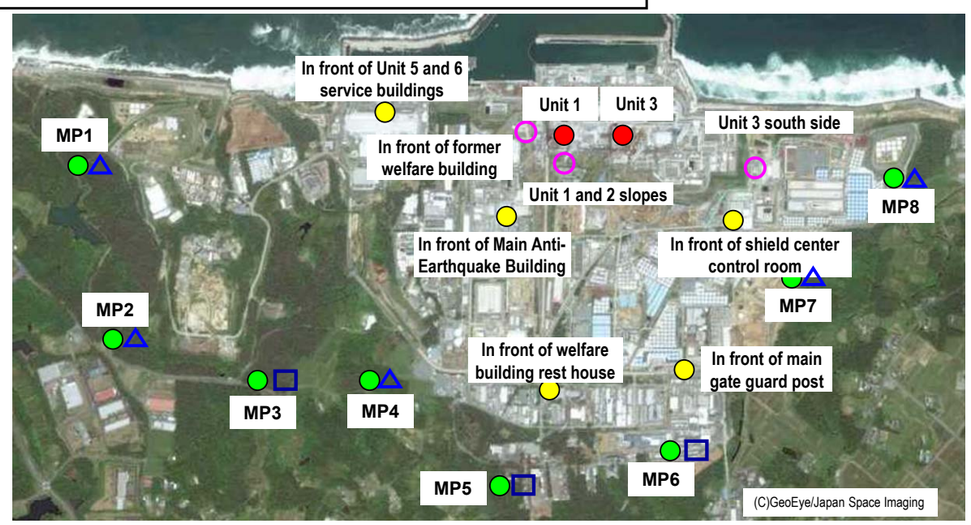


Figure 12: Monitoring system of radioactive material densities related to dismantling of Unit 1 building cover

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)

➢ Results of demonstration of investigative equipment for Unit 2 Suppression Chamber (S/C) lower external surface

- Regarding the investigative equipment for the S/C lower external surface developed by the subsidy project "Development of investigation and repair (water stoppage) technology toward water filling of the Primary Containment Vessel" of the Ministry of Economy, Trade and Industry, a demonstration was conducted on part of Unit 2 S/C (from August 19 to September 4).
- As the investigative equipment repeatedly fell at the 120-degree point and the underwater vision was worse than expected, the actual investigative scope was smaller than planned.
- Within the investigation range, no aperture was found. Based on the noise shown on the monitor screen of the investigative equipment, a trend toward increasing radiation dose on the S/C bottom was identified.

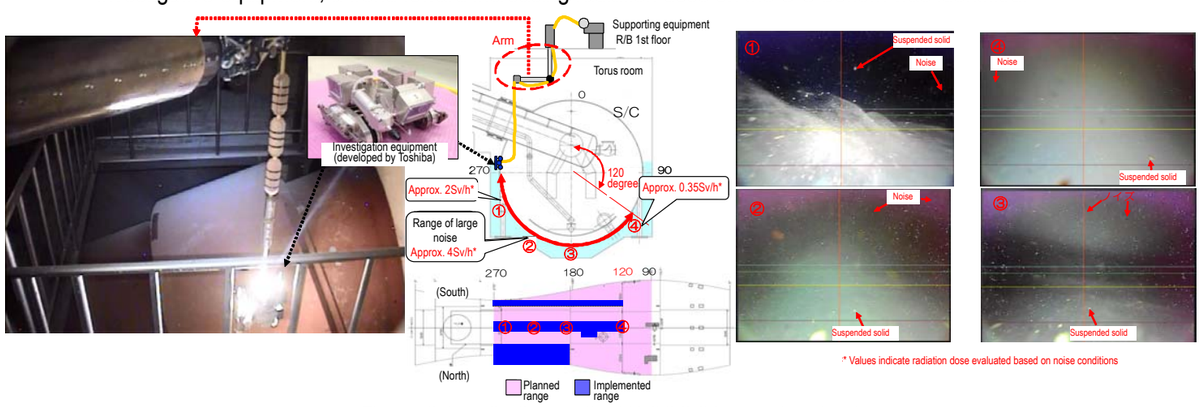


Figure 13: Investigation results of Unit 2 S/C lower external surface

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 August, the total storage volume of concrete and metal rubble was approx. 111,200m^3 (+3,700m^3 compared to at the end of July, area-occupation rate: 65%). The total storage volume of trimmed trees was approx. 79,000m^3 (+1,700m^3 compared to at the end of July, area-occupation rate: 57%). The increase in rubble was mainly attributable to construction to install tanks, impermeable walls with frozen soil and additional multi-nuclide removal equipment. The increase in trimmed trees was mainly attributable to construction to install tanks and additional multi-nuclide removal equipment.

➢ Management status of secondary waste from water treatment

- As of September 23, the total storage volume of waste sludge was 597 m^3 (area-occupation rate: 85%). The total number of stored spent vessels and high-integrity containers (HIC) of multi-nuclide removal equipment was 1,084 (area-occupation rate: 43%).

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 May to July was approx. 12,500 (TEPCO and partner company workers), which exceeded the monthly average number of actual workers (approx. 9,600). Accordingly, sufficient people are registered to work on site.
- It was confirmed with the prime contractors that the estimated manpower necessary for the work in October (approx. 6,200 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 5,800 per month since the last fiscal year (See Figure 14).

* Some works with which contract procedures have yet to be completed are excluded from the October estimate.

- The number of workers is 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 August was approx. 45%.

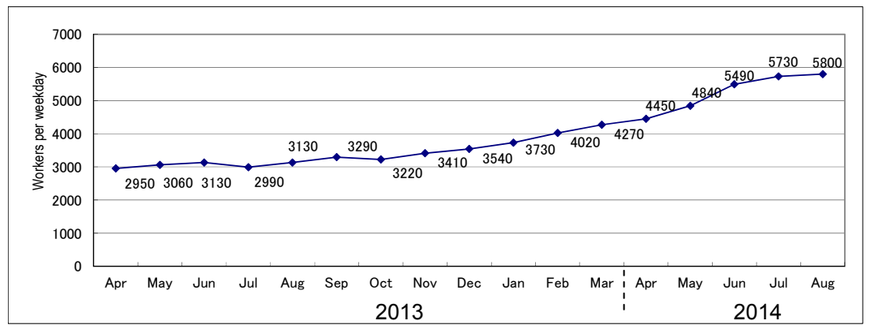


Figure 14: Changes in the average number of workers per weekday for each month since fiscal 2013 (actual values)

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

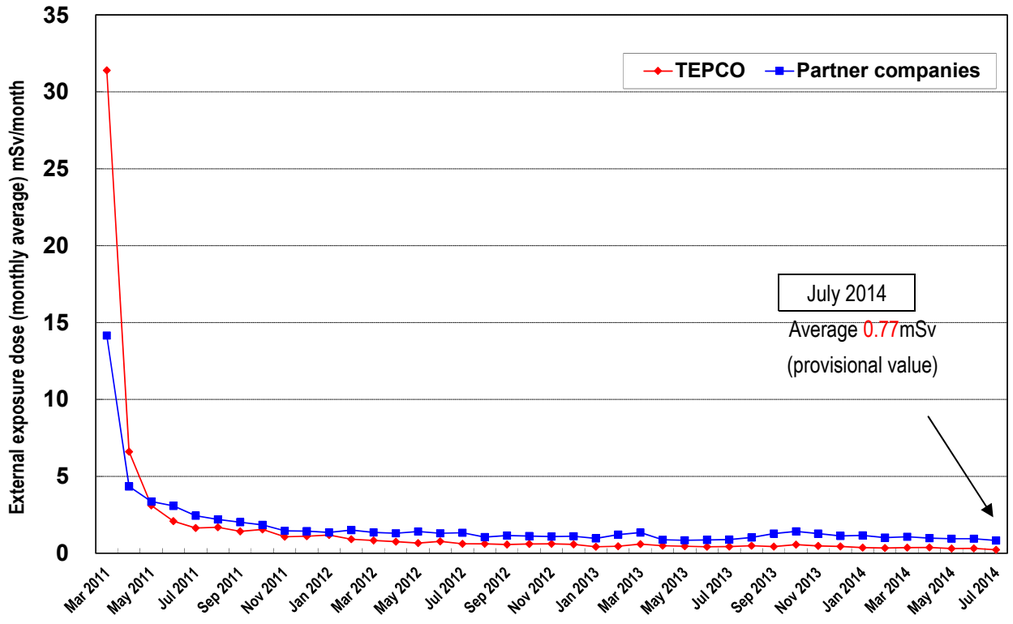


Figure 15: Changes in monthly individual worker exposure dose
(monthly average exposure dose since March 2011)

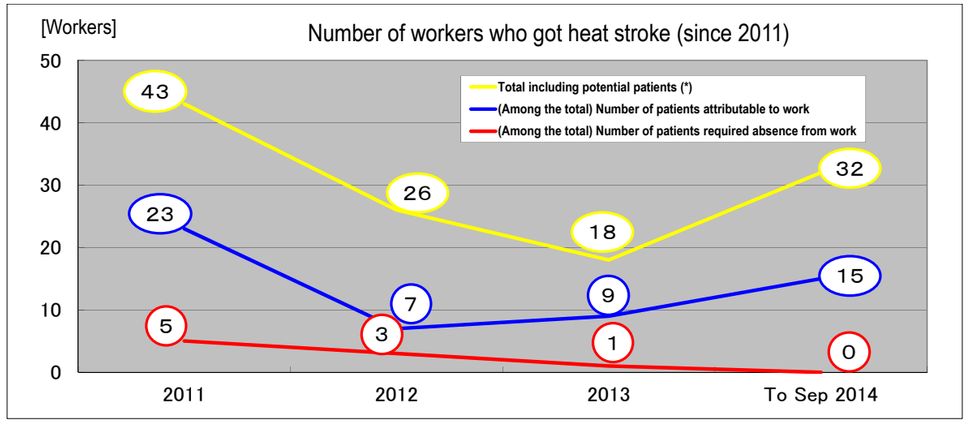
➢ Questionnaire survey of workers to improve the labor environment

- To improve the labor environment of workers on site, a questionnaire survey was launched from August 27 and responses are being collected as required from September. The opinions and feedback collected will be summarized and used to improve the labor environment.

➢ Outbreak status of heat stroke

- This fiscal year, a total of 32 workers had suffered heat stroke as of September 24, 15 of whom due to work and potential patients. Continued measures will be taken to prevent heat stroke. (Last year, 17 workers had heat stroke as of the end of September, 8 of whom attributable to work and potential patients)
- Though the number of workers who got heat stroke increased compared to last year, none were serious enough to require absence from work. (Heat stroke that required absence from work: 5 workers in FY2011, 3 workers in FY 2012, 1 worker in FY2013, 0 worker in FY2014)
- The number of workers who got heat stroke out of 1000 workers from June to September is similar to that in FY2013. (FY 2013: 2.55/1000, FY2014: 2.63/1000)
- As preventive measures, in addition to conventional measures such as using WBGT (*), prohibiting outdoor work from 14:00 to 17:00 and wearing cool vests, unified rules were specified and implemented such as limiting the work time up to two hours when the WBGT value is 25℃ or higher and prohibiting work in principle when the WBGT value is 30℃ or higher, to further outbreak.
- Partner companies also voluntarily implemented the following measures to further prevent heat stroke:
  *Appointing a manager (heat-stroke elimination keeper) to promote preventive measures
  *Assigning dedicated patrol personnel to each work area to measure WBGT values every 30 minutes and call for attention
- Next fiscal year, the measures will be implemented from the beginning of the prescribed period (May). As there were workers who got heat stroke after introducing the unified rules, imposition and thorough compliance with the rule of “going to ER immediately when feeling poorly” will continue and be ensured by repeatedly raising awareness. In addition, assigning a “Heat-Stroke Monitor” for checking the physical conditions of each worker in detail, will also be examined to enhance heat-stroke prevention.

WBGT: Index using three perspectives of humidity, radiation heat, and temperature, which significantly impact on the heat balance of human bodies



*: Those who recovered by OS-1 (drinking water) only

Figure 16: Changes in the number of workers who got heat stroke

➢ Fukushima Restoration Meal Service Center Corporation was established

- Aiming to improve and enhance the diet of workers, the Fukushima Meal Service Center, which can provide 3,000 meals for workers, will be established in the Ohgqwqra region of Ohkuma town by the end of FY2014. The Fukushima Restoration Meal Service Center Corporation was established on September 9 to procure ingredients and cook meals at the center and to serve meals at the new Administrative Office Building and the large rest house. By recruiting local residents and preferentially procuring local ingredients, the corporation will help restore the local community.

8. Others

➢ Construction of Naraha Remote Technology Development Center commenced

- Regarding the mock-up test facility (Naraha Remote Technology Development Center) of the remote-control device/equipment necessary for decommissioning the Fukushima Daiichi Nuclear Power Station, which the Japan Atomic Energy Agency (JAEA) is preparing to install in Naraha town, the construction will commence and the groundbreaking ceremony will be held on September 26.

➢ Implementers of the decommissioning project (METI FY2013 supplementary budget) were decided

- Public offerings were made regarding (1) the development of fuel debris criticality-management technology, (2) development of remote-decontamination technology within the reactor buildings, (3) analysis on the property of actual debris, (4) development of non-destructive detection technology of radioactive materials accumulated in the S/C and (5) development of investigative technology inside the primary containment vessel (PCVs) (offering period: August 6 – September 11).
- Following screening by the review board, comprising exerts within and outside Japan, the above five proposals were adopted on September 19.

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 September 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.co.jp/nu/fukushima-np/f1/smp/index-j.html

Sea side impermeable wall
Silt fence

【Port entrance】
【South side in the port】
【East side in the port】
【West side in the port】
【North side in the port】
【In front of Unit 6 intake】
【In front of shallow draft quay】

Cesium-134:	3.3 (2013/10/17) →	ND(2.1)	Below 6/10
Cesium-137:	9.0 (2013/10/17) →	3.4	Below 1/2
Gross β:	74 (2013/ 8/19) →	ND(17)	Below 1/4
Tritium:	67 (2013/ 8/19) →	5.3	Below 1/10

Cesium-134:	3.3 (2013/12/24) →	ND(1.1)	Below 1/3
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) →	6.3	Below 1/10

Cesium-134:	4.4 (2013/12/24) →	ND(1.3)	Below 1/3
Cesium-137:	10 (2013/12/24) →	ND(1.5)	Below 1/7
Gross β:	60 (2013/ 7/ 4) →	ND(17)	Below 1/3
Tritium:	59 (2013/ 8/19) →	2.5	Below 1/20

Cesium-134:	3.5 (2013/10/17) →	ND(1.2)	Below 1/3
Cesium-137:	7.8 (2013/10/17) →	ND(1.4)	Below 1/5
Gross β:	79 (2013/ 8/19) →	ND(17)	Below 1/4
Tritium:	60 (2013/ 8/19) →	4.0	Below 1/20

Cesium-134:	5.0 (2013/12/2) →	ND(1.4)	Below 1/3
Cesium-137:	8.4 (2013/12/2) →	ND(1.1)	Below 1/7
Gross β:	69 (2013/8/19) →	ND(17)	Below 1/4
Tritium:	52 (2013/8/19) →	ND(1.9)	Below 1/20

Cesium-134:	32 (2013/10/11) →	11	Below 1/2
Cesium-137:	73 (2013/10/11) →	18	Below 1/4
Gross β:	320 (2013/ 8/12) →	55	Below 1/5
Tritium:	510 (2013/ 9/ 2) →	200	Below 1/2

Cesium-134:	2.8 (2013/12/2) →	ND(2.0)	Below 6/10
Cesium-137:	5.8 (2013/12/2) →	ND(1.8)	Below 1/3
Gross β:	46 (2013/8/19) →	17	Below 1/2
Tritium:	24 (2013/8/19) →	11	Below 1/2

Cesium-134:	7.2		
Cesium-137:	22		
Gross β:	83		
Tritium:	240	*	

Cesium-134:	6.9		
Cesium-137:	24		
Gross β:	110		
Tritium:	210	*	

Cesium-134:	19		
Cesium-137:	60		
Gross β:	160		
Tritium:	320	*	

* Monitoring commenced in or after March 2014

	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

Summary of TEPCO data as of September 24

Cesium-134:	5.3 (2013/8/ 5) →	ND(2.0)	Below 1/2
Cesium-137:	8.6 (2013/8/ 5) →	2.7	Below 1/3
Gross β:	40 (2013/7/ 3) →	24	Below 6/10
Tritium:	340 (2013/6/26) →	3.9	Below 1/100

Cesium-134:	62 (2013/ 9/16)→	46	Below 8/10
Cesium-137:	140 (2013/ 9/16)→	140	
Gross β:	360 (2013/ 8/12)→	680	
Tritium:	400 (2013/ 8/12)→	800	

Cesium-134:	28 (2013/ 9/16)→	50	
Cesium-137:	53 (2013/12/16)→	150	
Gross β:	390 (2013/ 8/12)→	520	
Tritium:	650 (2013/ 8/12)→	1,100	

Note: The gross β measurement values include natural potassium 40 (approx. 12 Bq/L).

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 September 16-22)

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 (0.71)
Cesium-137: ND (2013) → ND (0.53)
Gross β: ND (2013) → ND (17)
Tritium: ND (2013) → ND (1.8)

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

Cesium-134: ND (2013) → ND (0.86)
Cesium-137: 1.6 (2013/10/18) → ND (0.45) Below 1/3
Gross β: ND (2013) → ND (17)
Tritium: 6.4 (2013/10/18) → ND 2.2 Below 1/2

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

Cesium-134: ND (2013) → ND (0.64)
Cesium-137: ND (2013) → ND (0.52)
Gross β: ND (2013) → ND (17)
Tritium: ND (2013) → ND (1.8)

Cesium-134: ND (2013) → ND (0.69)
Cesium-137: ND (2013) → ND (0.53)
Gross β: ND (2013) → ND (17)
Tritium: 4.7 (2013/ 8/18) → 2.9 Below 6/10

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

【Port entrance】

Cesium-134: 3.3 (2013/12/24) → ND (1.1) Below 1/3
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) → 6.3 Below 1/10

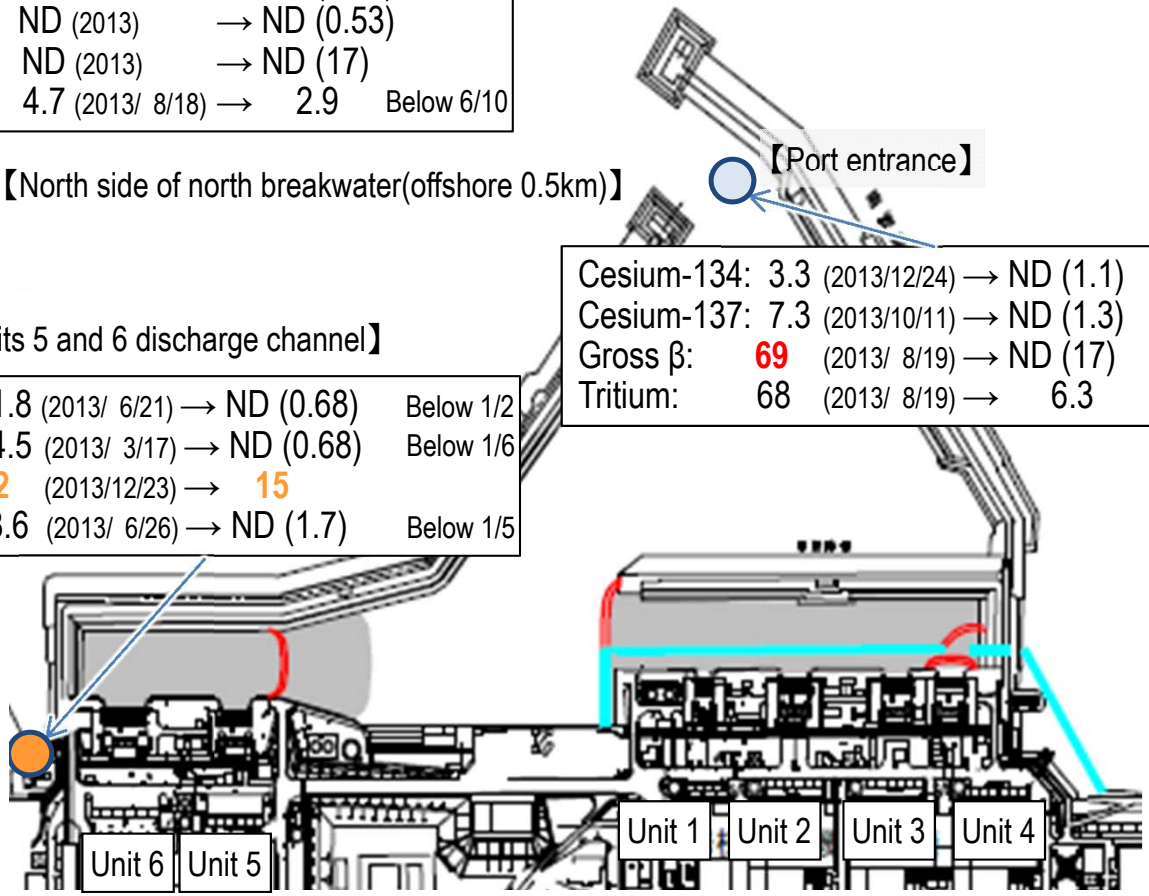
【South side of south breakwater(offshore 0.5km)】

Cesium-134: ND (2013) → ND (0.44)
Cesium-137: ND (2013) → ND (0.69)
Gross β: ND (2013) → ND (17)
Tritium: ND (2013) → ND (1.8)

【North side of Units 5 and 6 discharge channel】

Cesium-134: 1.8 (2013/ 6/21) → ND (0.68) Below 1/2
Cesium-137: 4.5 (2013/ 3/17) → ND (0.68) Below 1/6
Gross β: 12 (2013/12/23) → 15
Tritium: 8.6 (2013/ 6/26) → ND (1.7) Below 1/5

Cesium-134: ND (2013) → ND (0.64)
Cesium-137: 3.0 (2013/ 7/15) → ND (0.67) Below 1/4
Gross β: 15 (2013/12/23) → 12 Below 8/10
Tritium: 1.9 (2013/11/25) → ND (1.7) Below 9/10



Sea side impermeable wall

Silt fence

【Around south discharge channel】

Note: The gross β measurement values include natural potassium 40 (approx. 12 Bq/L).

Summary of TEPCO data as of September 24

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

Appendix 2

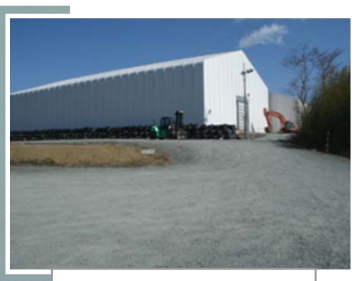
September 25, 2014

TEPCO Fukushima Daiichi Nuclear Power Station Site Layout

- Rubble storage area
- Rubble storage area (planned)
- Trimmed trees area
- Trimmed trees area (planned)
- Mid-/ low-level contaminated water
- Mid-/ low-level contaminated water tank (planned)
- High-level contaminated water tank
- High-level contaminated water tank (planned)
- Multi-nuclide removal equipment
- Treatment facility for sub-drain water (planned)
- Dry cask temporary storage facility

Inside the rubble storage tent

Rubble (container storage)



Rubble storage tent

Temporary soil cover type storage

Rubble (outdoor accumulation)

Solid waste storage

Rubble (outdoor accumulation)

Temporary trimmed trees storage pool

Trimmed trees (outdoor accumulation)

Miscellaneous Solid Waste Volume Reduction Treatment Building (Instllation underway)

Futaba town

Unit 6

Unit 5

Trimmed trees

Vehicles maintenance site

Rubble

Town boundary

Mega float

Ohkuma town

Purification system for subdrain water

Dry cask temporary storage facility

Main Anti-Earthquake Building

Multi-nuclide removal

High-performance multi-nuclide removal equipment (planned)

Additional multi-nuclide removal equipment (planned)

Chiller for reactor water injection facility

Pipe route

Vehicle screening and decontamination site

Spent absorption vessel temporary storage

Underground reservoirs

Temporary trimmed trees storage pool

Unit 1

Unit 2

Unit 3

Unit 4

Land-side impermeable walls with frozen soil (Instllation underway)

Frozen soil impermeable wall demonstration test

Sea side impermeable wall (Instllation underway)

Temporary Administration Office Building (planned)

Groundwater bypass temporary storage tank

Administration Office Building (planned)

Cesium absorption apparatus (Incineration Workshop Building)

Decontamination instruments (Process Building)

Temporary rest house outside the site

Common pool

2nd cesium absorption apparatus (HTI Building)

Cesium absorption vessel temporary storage

Large rest house (Under construction)

Access control facility

Water desalinations (evaporative concentration)

Water desalinations (RO)

Temporary waste sludge storage

High-level accumulated water reception tank (emergency reception)

Mid-/ low-level fresh water tank

Spent absorption vessel temporary storage

Spent absorption vessel temporary storage (multi-nuclide removal equipment, etc.)

Site boundary

MP-1 MP-2 MP-3 MP-4 MP-5 MP-6 MP-7 MP-8

H1 H2 H3 H4 H5 H6 H8 H9 D E F G G3・G4・G5 G6 J C B

Tank installation status

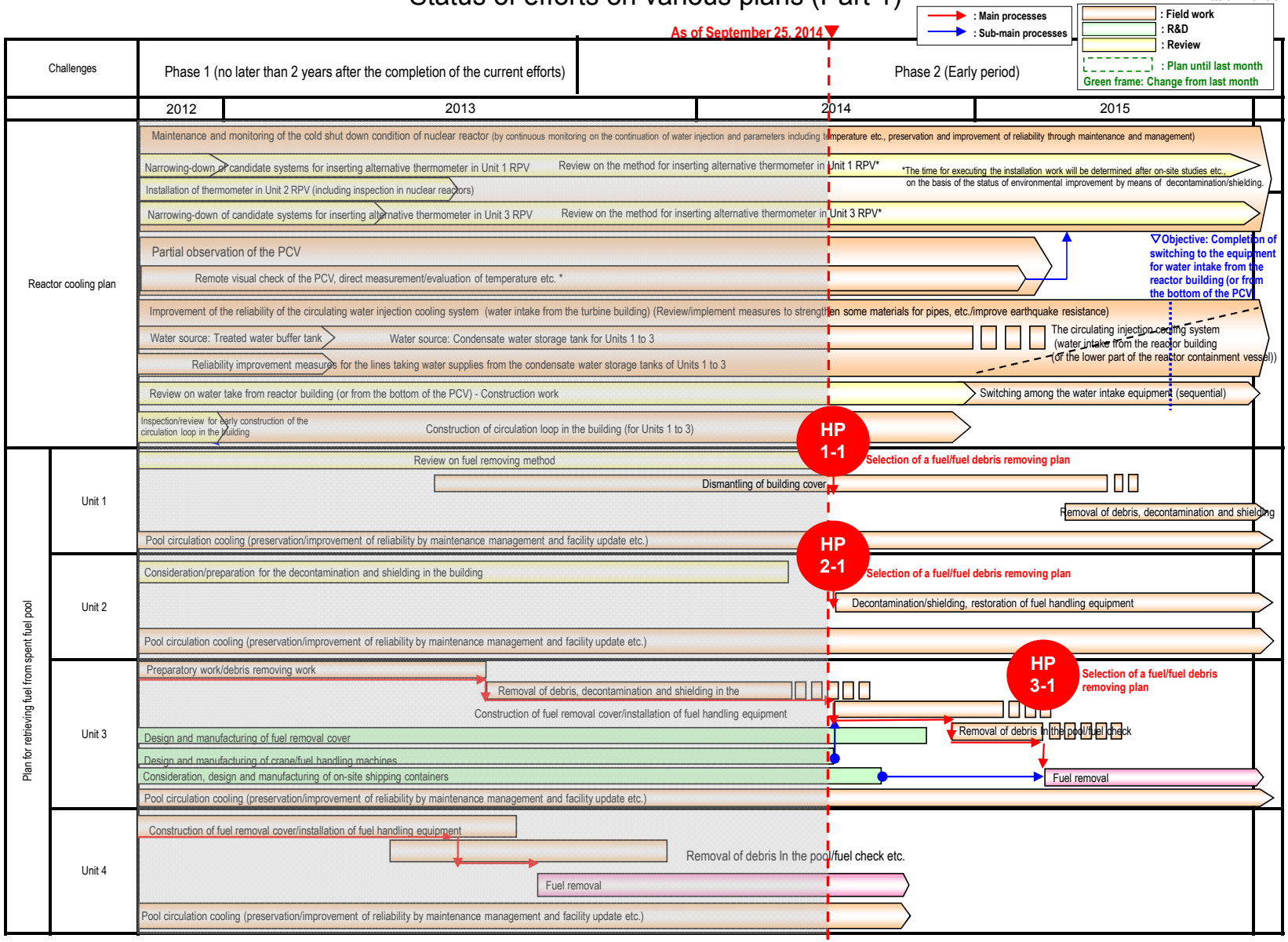
Temporary waste sludge storage

Provided by Japan Space Imaging Corporation, (C)DigitalGlobe

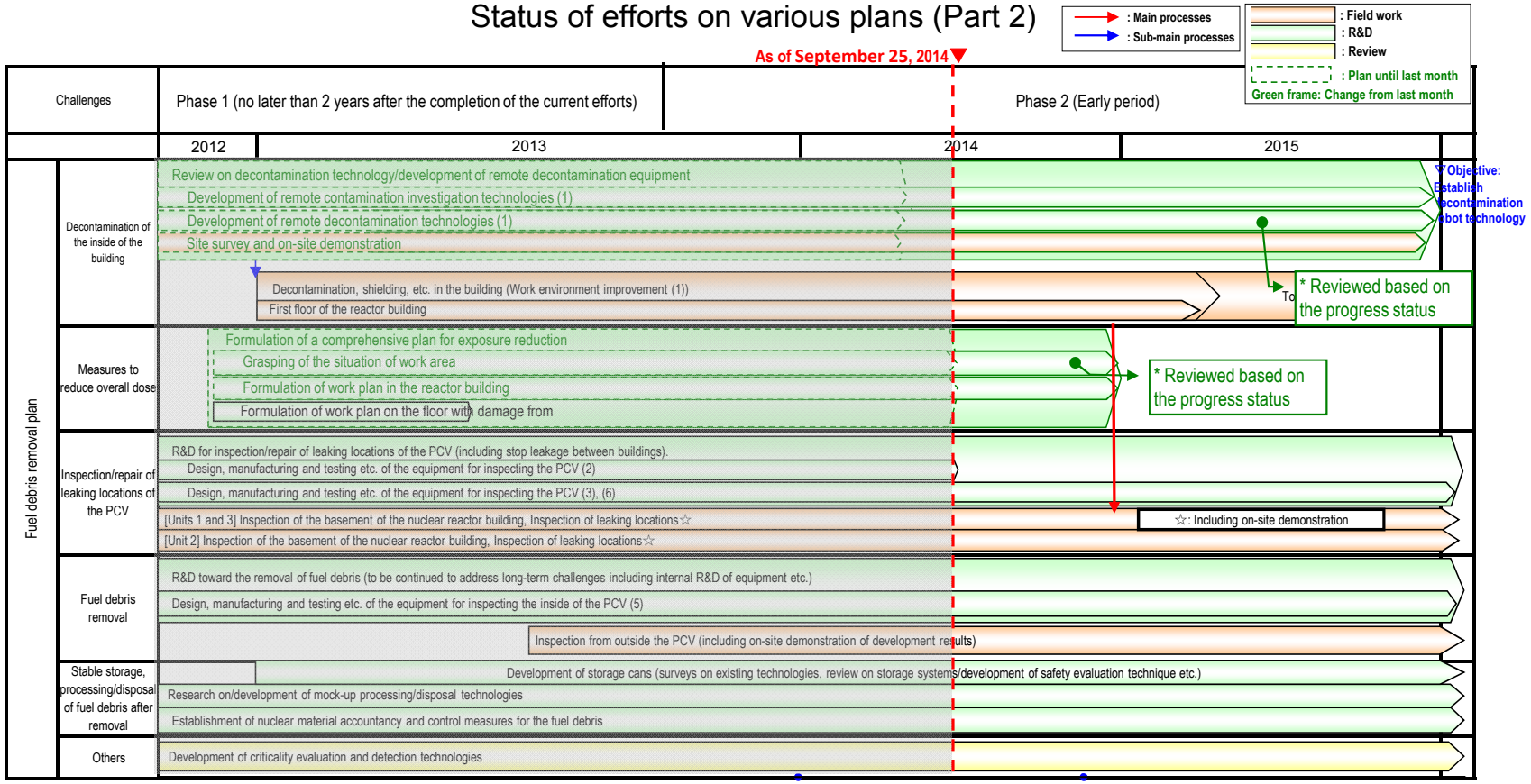
0m 100m 500m 1000m

Status of efforts on various plans (Part 1)

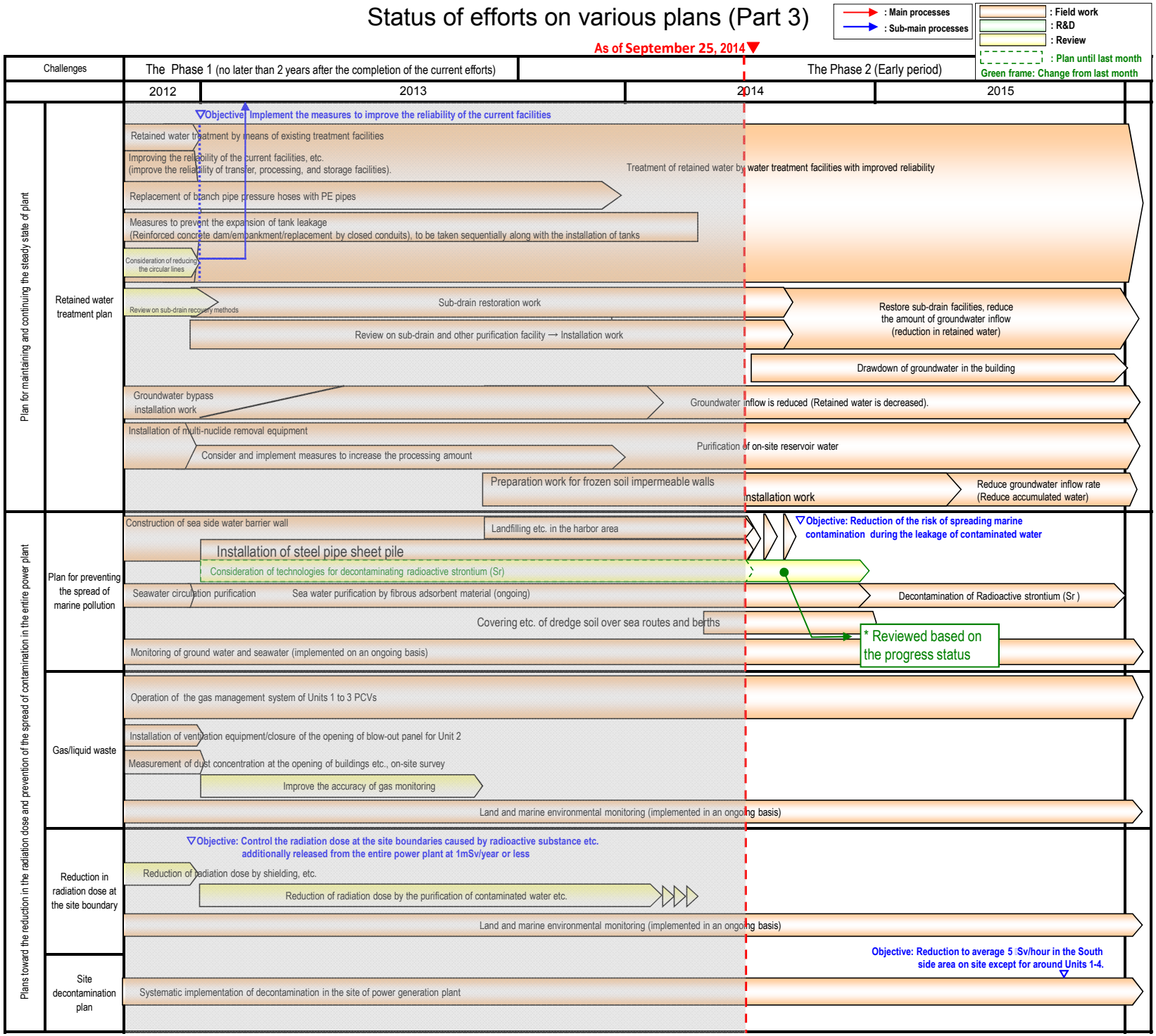
Attachment 3



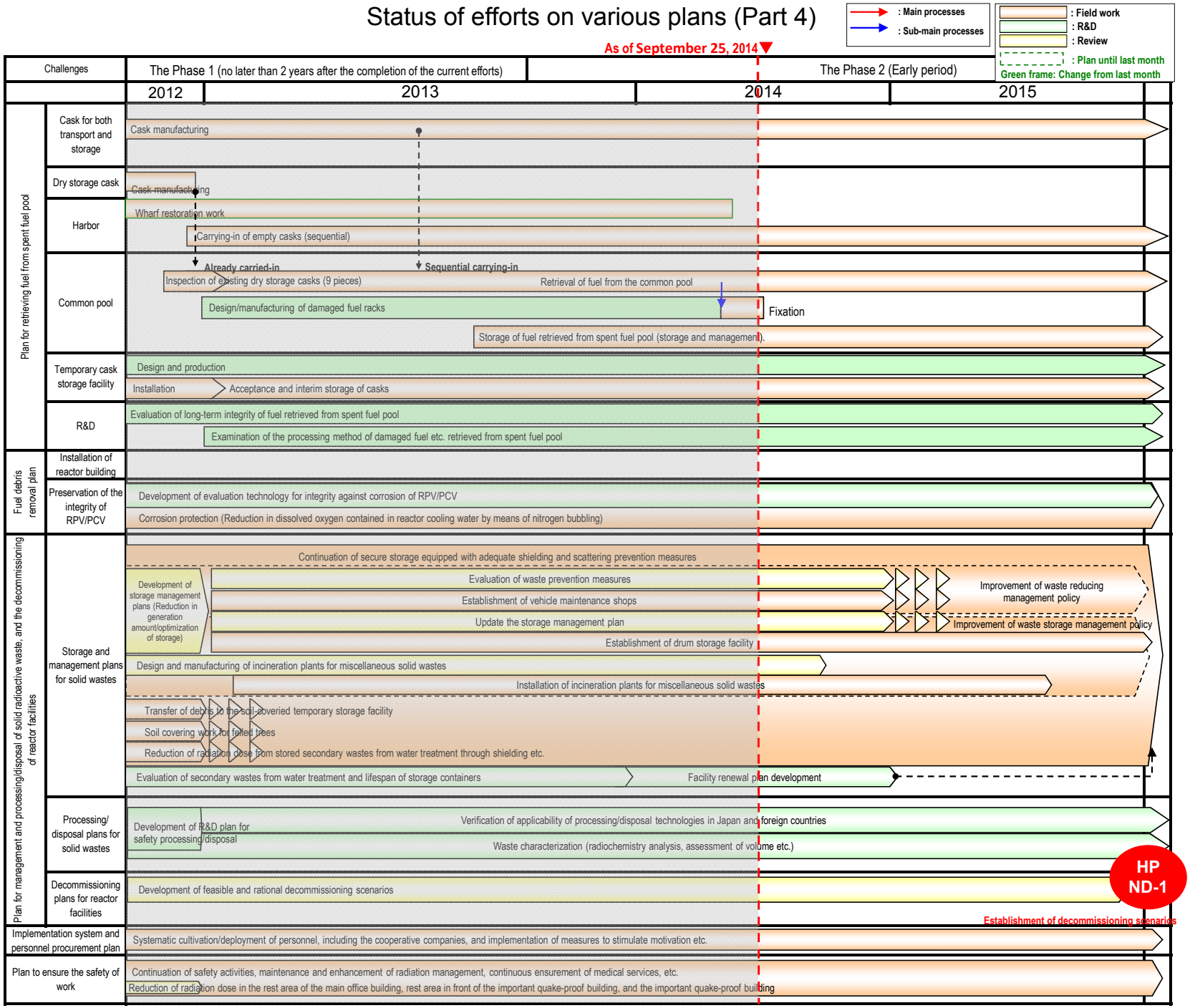
Status of efforts on various plans (Part 2)



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 Spent Fuel Pool (Unit 4, November 2013)

Unit 4

In the Mid- and Long-Term Roadmap, the target of Phase 1 involved commencing fuel removal from inside the spent fuel pool (SFP) of the 1st Unit within two years of completion of Step 2 (by December 2013). On November 18, 2013, fuel removal from Unit 4, or the 1st Unit, commenced and Phase 2 of the roadmap started.
As of September 24, 1,232 of 1,331 spent fuel assemblies and 22 of 202 new fuel assemblies have been transferred to the common pool, meaning 82% of the removal has been completed to date.

Though fuel removal has been suspended since July 1 due to annual inspection of the overhead cranes, it resumed on September 4. There is no change in the scheduled removal completion within 2014.
Since the procurement of storage casks was partially prolonged, the common pool run out of space. The plan was changed to transferring new fuel assemblies (all remaining 180 fuel assemblies) in the Unit 4 spent fuel pool to Unit 6.


Fuel removal status

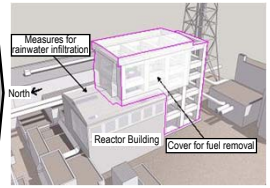

Loading the transportation container onto the trailer

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

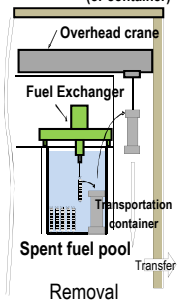
Work is proceeding with appropriate risk countermeasures, careful checks and safety first

Steps toward fuel removal


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



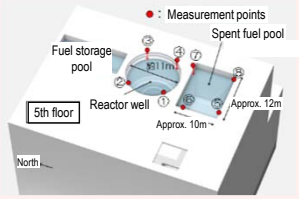
Installation of cover for fuel removal
From Apr. 2012, completed in Nov. 2013



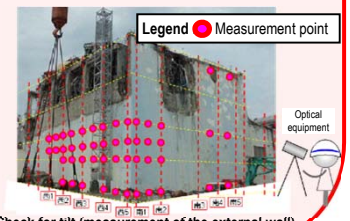
Removal
Commenced in Nov. 2013

Check of the soundness of the Reactor Building

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



Check for tilt (measurement of the water level)



Check for tilt (measurement of the external wall)

Unit 3

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

Before removal of the large rubble

After removal of the large rubble

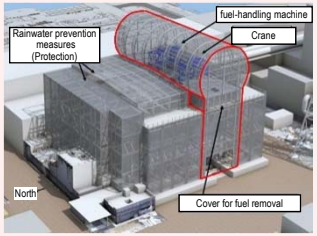


Image of the cover for fuel removal

Units 1 and 2

- Regarding Unit 1, to remove rubble from the top of the operating floor, there are plans to dismantle the cover over the Reactor Building is planned. Prior to dismantling, the ventilation system of the cover was suspended (September 17, 2013).
  Dismantling will be launched once preparation is complete.
  When the building cover is dismantled and the rubble is removed, sufficient measures to prevent radioactive materials from scattering will be taken and monitoring will be conducted.
- Regarding Unit 2, based on the progress of decontamination and shielding within the Reactor Building, the facilities will be inspected and a concrete plan examined and prepared.

Dismantling of the cover over Reactor Building Unit 1

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


①Spraying anti-scattering agents

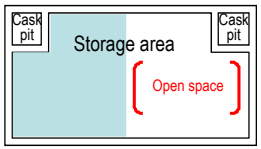

②Removing dust and dirt by suctioning devices


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

④ Enhancing the dust-monitoring system by installing additional monitors

Measures to reduce release

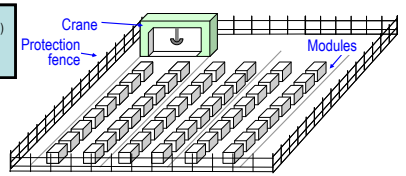
Common pool



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

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

Temporary dry cask (*3) storage facility



Spent fuel is accepted from the common pool

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

<Glossary>
(*1) Operating floor: During regular inspection, the roof over the reactor is opened while on the operating floor, fuel inside the core is replaced and the core internals are inspected.
(*2) Cask: Transportation container for samples and equipment, including radioactive materials.

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

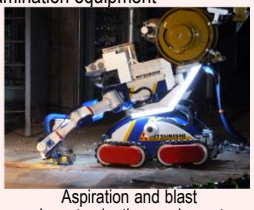
September 25, 2014
Secretariat of the Team for Countermeasures for Decommissioning and Contaminated Water Treatment

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

Demonstration of decontamination equipment

(1) Demonstration of suction and blast decontamination equipment

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



Aspiration and blast decontamination equipment

(2) Dry ice-blast decontamination equipment

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

Dry ice blast decontamination equipment

(3) High-pressure water decontamination equipment

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

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

High-pressure water decontamination equipment

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

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

Leak point

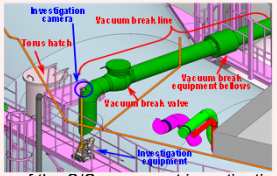
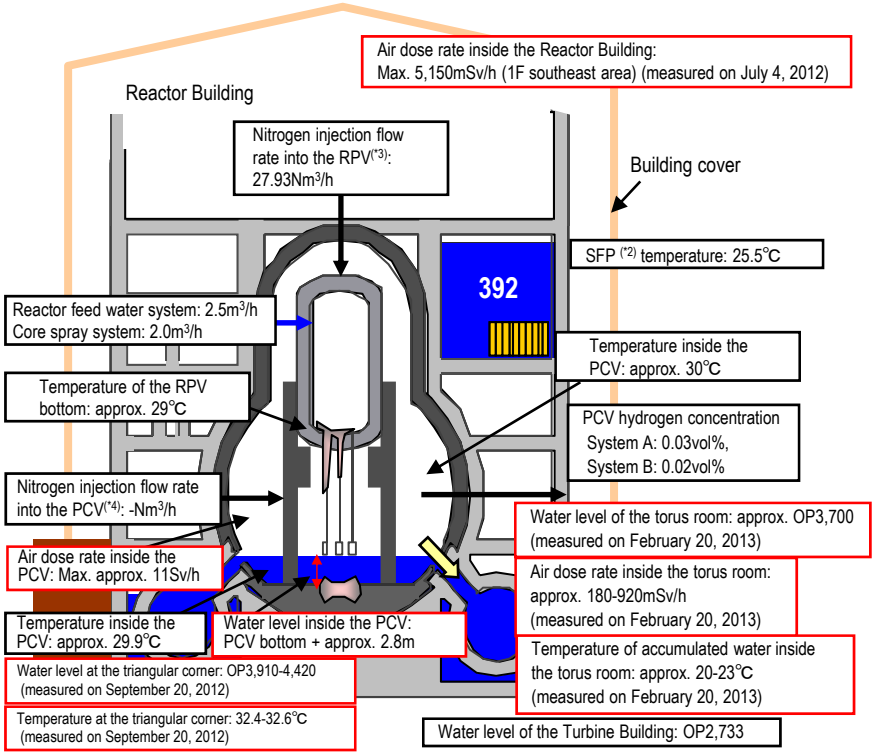


Image of the S/C upper part investigation

Unit 1



* Indices related to the plant are values as of 11:00, September 24, 2014

Status of equipment development toward investigating inside the PCV

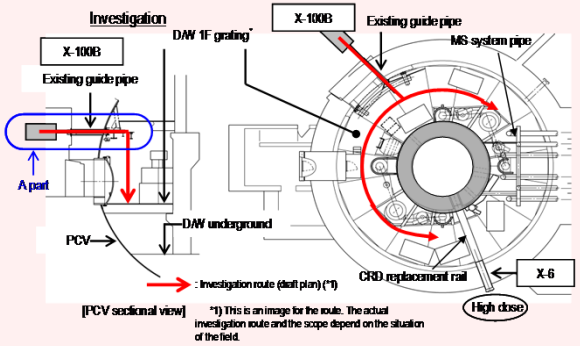
Prior to removing fuel debris, to check the conditions inside the Primary Containment Vessel (PCV), including the location of the fuel debris, investigation inside the PCV is scheduled. For Unit 1, where fuel debris may spread outside the pedestal, an investigation of the external side will commence.

[Investigative outline]

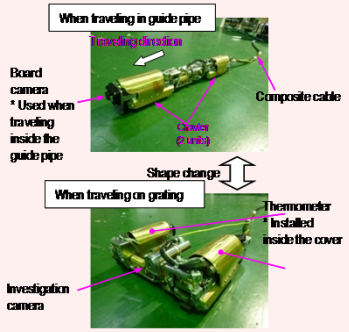
- Inserting equipment from Unit 1 X-100B penetration(*5) to investigate in clockwise and counter-clockwise directions.

[Status of investigation equipment development]

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



Investigative route inside the PCV (draft plan)



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

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

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

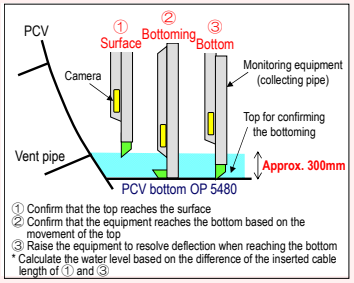
Installation of an RPV thermometer and permanent PCV supervisory instrumentation

(1) Replacement of the RPV thermometer

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

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

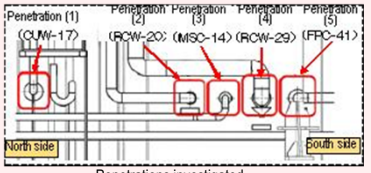
- Some of the permanent supervisory instrumentation for PCV could not be installed in the planned locations due to interference with existing grating (August 13, 2013).
- The instrumentation was removed on May 27, 2014 and new instruments were reinstalled on June 5 and 6. The trend of added instrumentation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



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

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

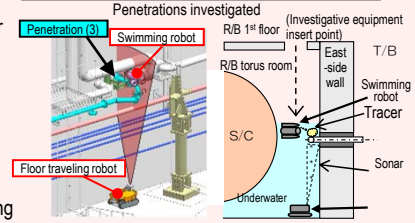
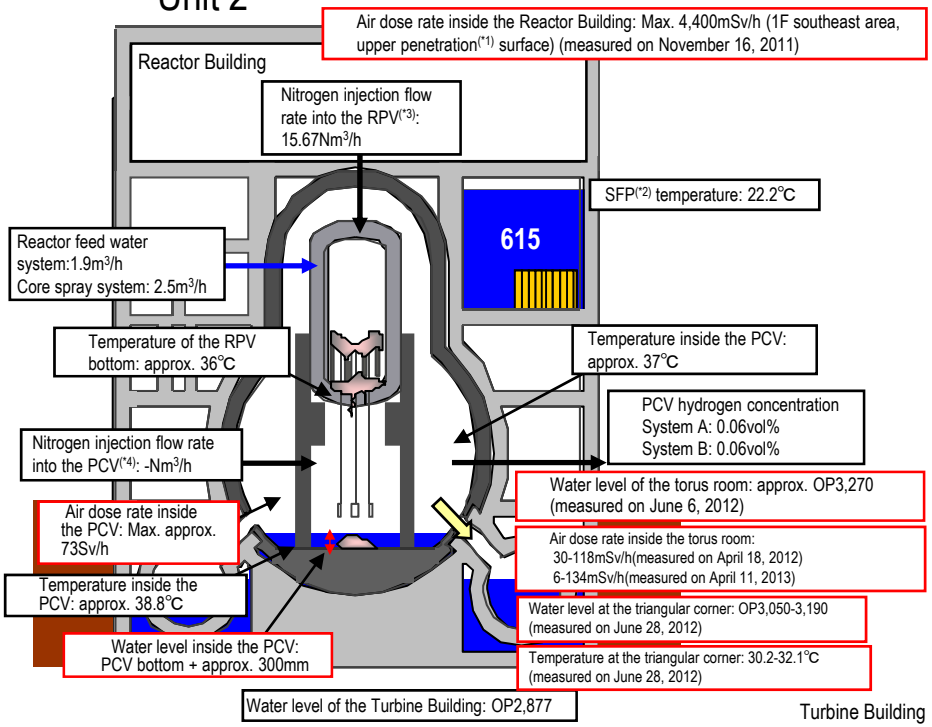


Image of the torus room east-side cross-sectional investigation

Unit 2



* Indices related to plant are values as of 11:00, September 24, 2014

Status of equipment development toward investigating inside the PCV

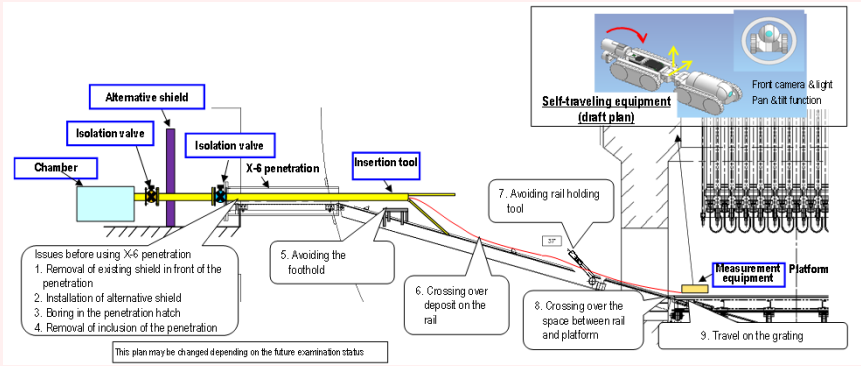
Prior to removing fuel debris, to check the conditions inside the Primary Containment Vessel (PCV), including the location of the fuel debris, investigations inside the PCV are scheduled. For Unit 2, where fuel debris is unlikely to have spread outside the pedestal, the focus will be placed on investigating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

[Investigative outline]

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

[Status of investigative equipment development]

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



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

<Glossary>
(*1) Penetration: Through-hole of the PCV (*2) SFP (Spent Fuel Pool)
(*3) RPV (Reactor Pressure Vessel) (*4) PCV (Primary Containment Vessel)
(*5) Tracer: Material used to trace the fluid flow. Clay particles

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

September 25, 2014
Secretariat of the Team for Countermeasures for Decommissioning and Contaminated Water Treatment
4/6

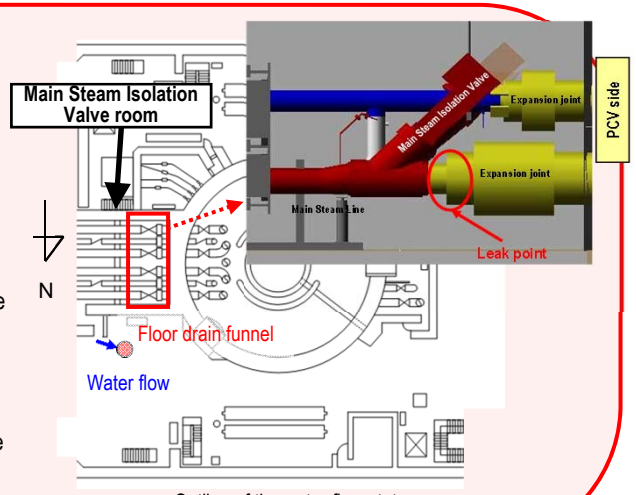
Immediate target	Identify the plant status and commence R&D and decontamination toward fuel debris removal

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

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

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

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



Outline of the water-flow status

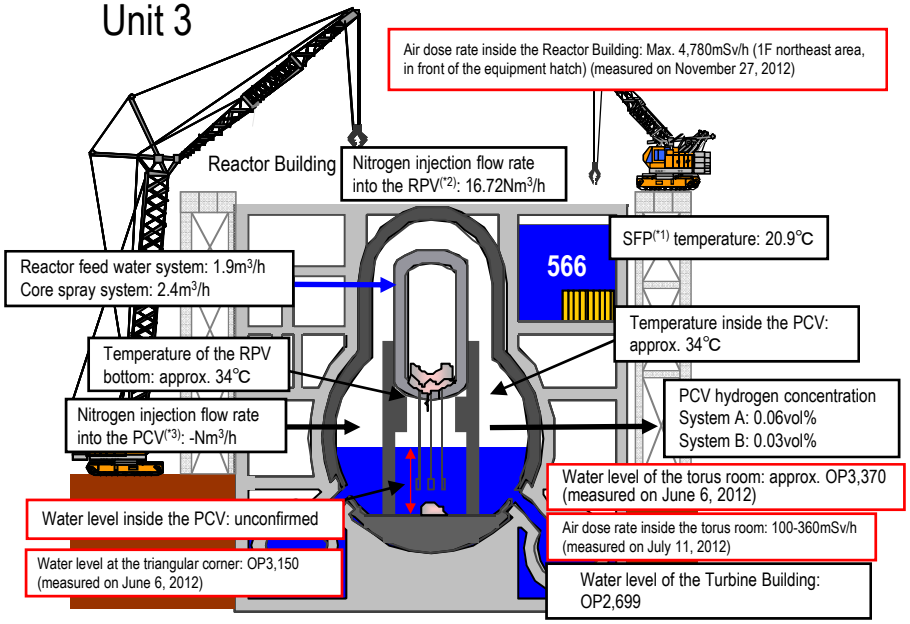
* Main Steam Isolation Valve: A valve to shut off the steam generated from the Reactor in an emergency

Decontamination inside R/B

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

Robot for investigating the contamination status (gamma camera mounted)

Unit 3



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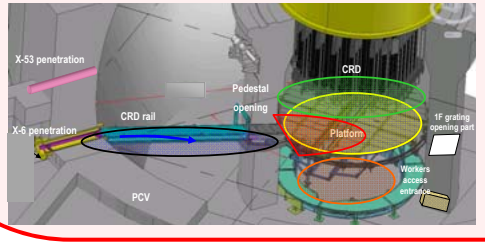
Status of equipment development toward investigating inside the PCV

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

[Steps for investigation and equipment development]

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

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



<Glossary>
(*1) SFP (Spent Fuel Pool)
(*2) RPV (Reactor Pressure Vessel)
(*3) PCV (Primary Containment Vessel)

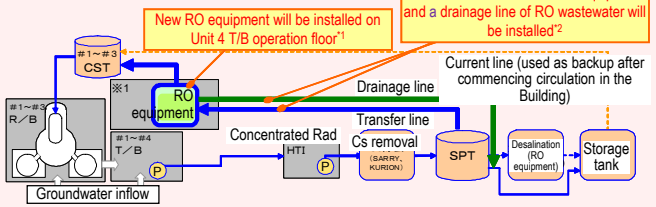
Progress toward decommissioning: Work related to circulation cooling and accumulated water treatment line

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

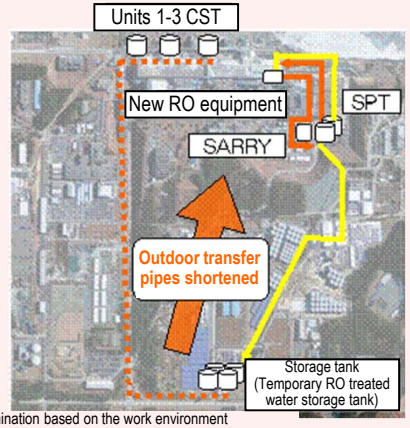
Work to improve the reliability of the circulation water injection cooling system and pipes to transfer accumulated water.

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

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

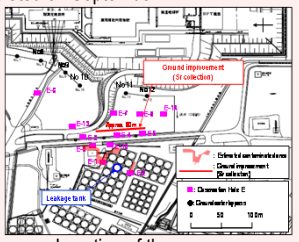


*1 Unit 4 T/B operation floor is one of the installation proposals, which will be determined after further examination based on the work environment
*2 A detailed line configuration will be determined after further examination



Measures in Tank Areas

- As a preventive and redundant measure for the water leakage from H4 Area tank in August 2013, ground improvement by materials (apatite), which collects strontium in soil, was completed on September 11.



Location of the measure

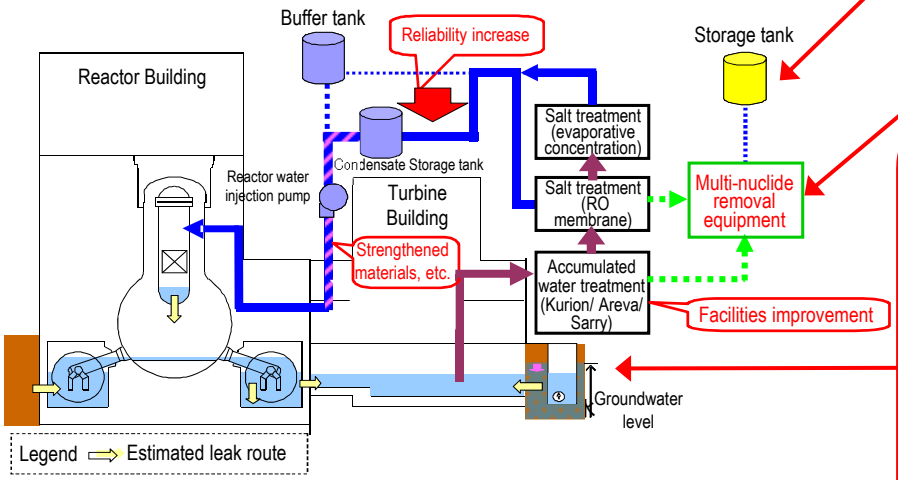
Status of drilling

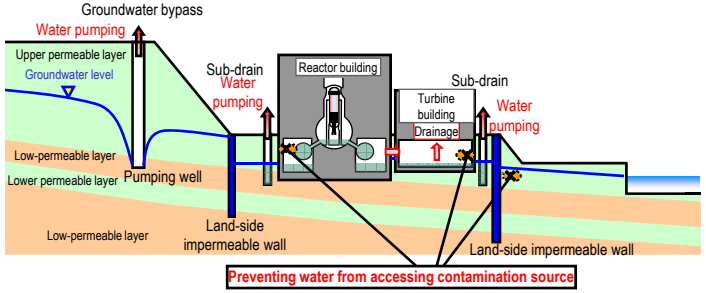
Installation status of additional and high-performance multi-nuclide removal equipment

- Regarding the additional multi-nuclide removal equipment, hot tests using radioactive water are underway.

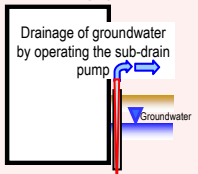
(System A: from September 17, System B: scheduled to commence on September 27
System C: scheduled to commence in early October)

- Regarding the high-performance multi-nuclide removal equipment, a subsidy project of the Ministry of Economy, Trade and Industry, foundation construction (from May 10) and installation of equipment (from July 14) are underway. Hot tests will begin in mid-October.



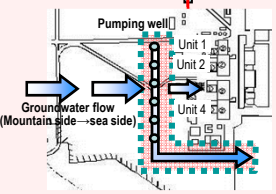


Preventing groundwater from flowing into the Reactor Buildings



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

Reducing groundwater inflow by pumping sub-drain water



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

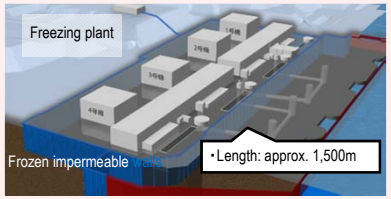
The pumped up groundwater is temporarily stored in tanks and released after TEPCO and a third-party organization have confirmed that its quality meets operational targets.

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 surrounding the buildings on the land side is planned.

Targeting efforts to commence freezing at the end of this fiscal year, drilling holes to install frozen pipes commenced from June 2.

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

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

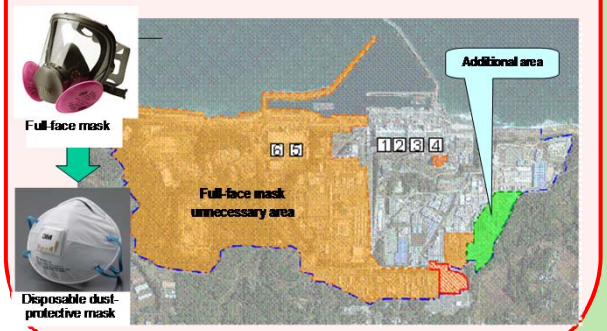
Progress toward decommissioning: Work to improve the environment within the site

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

Expansion of full-face mask unnecessary area

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

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



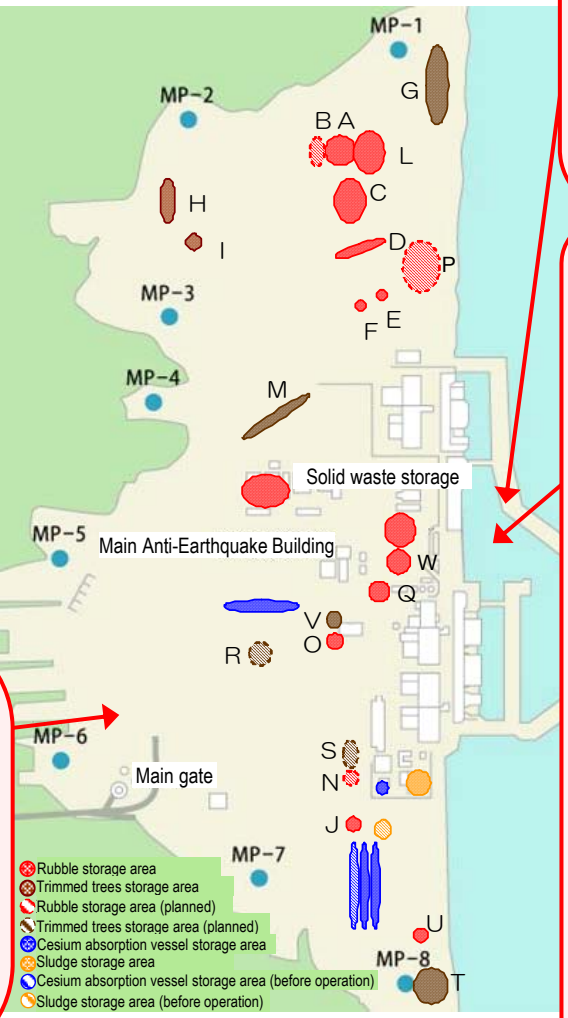
Full-face mask unnecessary area

Transfer to New Administrative Office Building near the field

To share information with the field and expedite the response to issues, a New Administrative Office Building is under construction on the site of Fukushima Daiichi Nuclear Power Station.

For the portion completed on June 30, approx. 400 staff members, including those of TEPCO's water treatment related sections who had worked at Fukushima Daini Nuclear Power Station, transferred and started work from July 22. The construction will be completed at the end of September.

External and internal appearances of the New Administrative Office Building



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)

(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 14, 2013 – April 25, 2014, treatment of cesium and strontium.
Freezing toward water stoppage commenced on April 2.
Unit 3: November 15, 2013 – July 28, 2014, treatment of cesium.
Water stoppage for Unit 3 will be reviewed considering the situation at Unit 2.