<Reference ①>
February 28, 2015
Tokyo Electric Power Company

Current Approach toward the Stabilization Decommissioning of Fukushima Daiichi Nuclear Power Units 1-4

In December 2011, we confirmed the accomplishment of the target “release of radioactive materials is under control and radiation doses are being significantly held down”. As for the next step, we have compiled the "Mid-to-long-Term Roadmap toward the Decommissioning of Fukushima Daiichi Nuclear Power Units 1-4" in government and TEPCO Mid-to-Long-Term countermeasure conference. Currently, we are working toward “Phase 1: Period to the start of fuel removal from the spent fuel pool (Target: Accomplish within 2 years after completion of Step 2)”.

[1] Currently, “Cold Shutdown Condition (in the 10s – 30s℃)” is stably maintained at reactors.

- The RPV bottom temperature and the PCV gaseous phase temperatures at Units 1-3 were approx. in the 10s – 30s℃ (as of February 27) which fulfills the requirement of 100℃ or less.
- The steam generation in the PCV is suppressed by controlling the water injection amounts, which contributes to sufficiently low levels of cesium released from Unit 1-3 Reactor Buildings.
- Adequate backup equipment is secured.
  (Water injection pumps: 3 systems; water sources: 2, power supply secured by multiple generating lines, fire engines etc.)
- Even if multiple simultaneous failures of water injection equipment should occur, water injection can be restarted within about 3 hours.

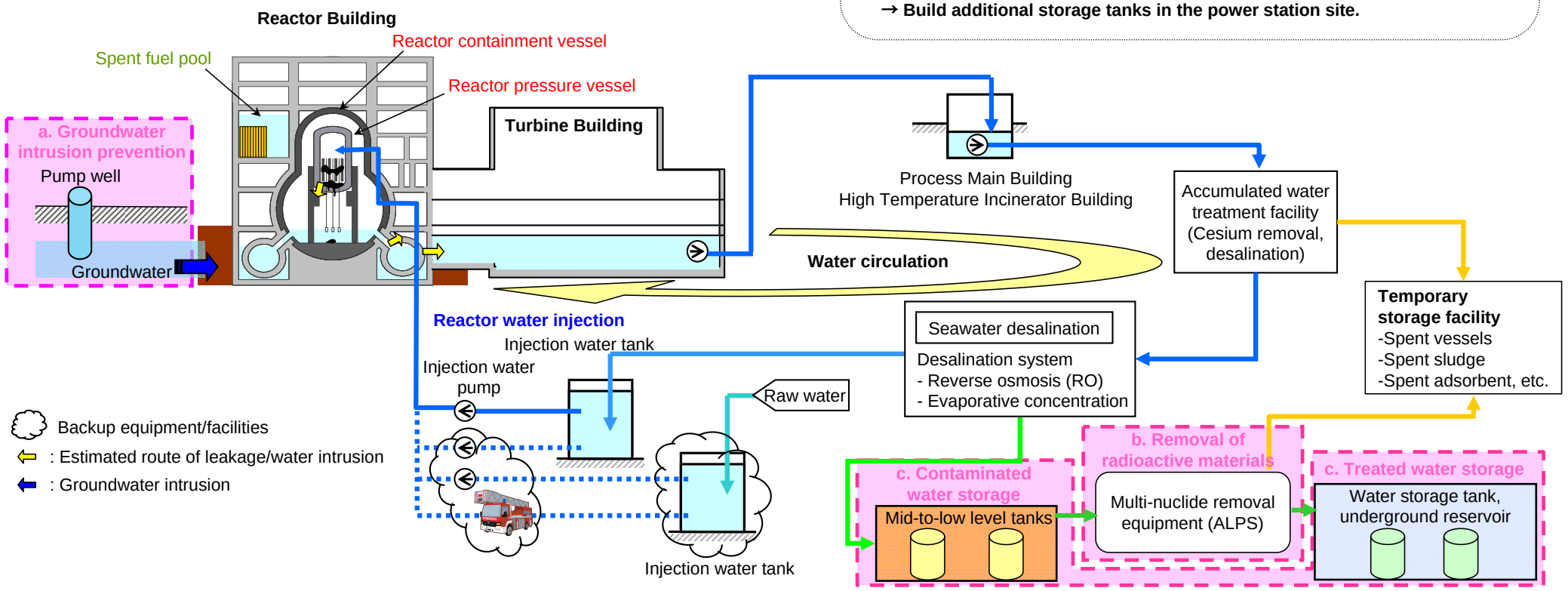
[2] Currently, liquid waste such as accumulated water, etc. is stored or treated (purification treatment) at the water treatment facility in order to reduce radioactive materials. Treatment water generated by purification treatment will be stored in the tanks and managed appropriately by reusing it after desalination, etc.

- The highly radioactive water accumulated in the building basement is treated to be used for reactor cooling. The contaminated water generated in this process treated and stored.

a. Prevent groundwater flow into the building
  → **Develop a groundwater bypass**

b. Remove the radioactive materials in the contaminated water
  → **Install multi-nuclide removal equipment**

c. Storage of contaminated water/treated water
  → **Build additional storage tanks in the power station site.**

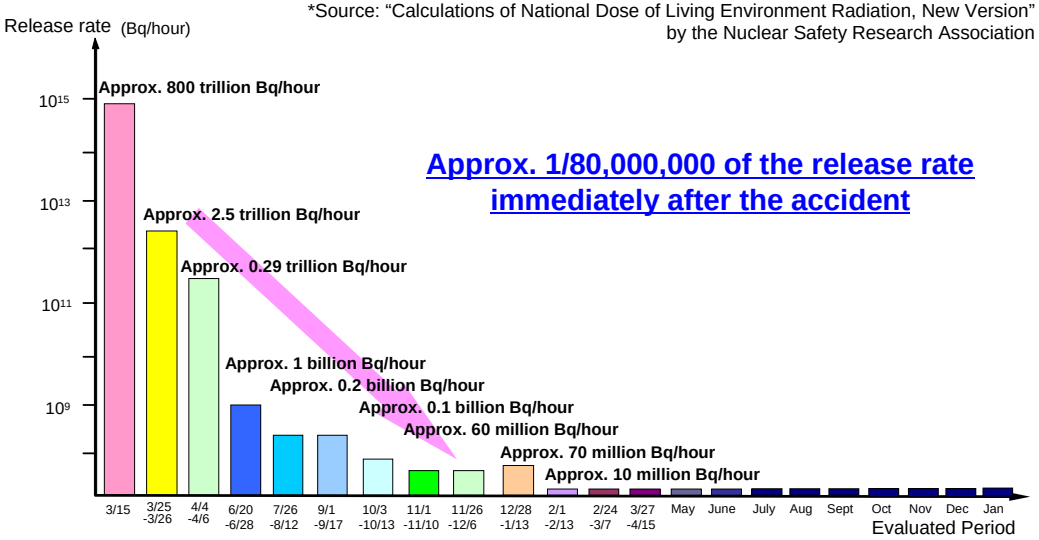


<Overview of the Circulating Injection Cooling System to Maintain Cold Shutdown Condition at Reactors>

[3] By the end of FY2012, we targeted to reduce effective dose at the site boundary caused by additional release from the overall site and radioactive waste generated after the accident to be below 1mSv/year for total amount of gaseous, liquid, and solid waste.

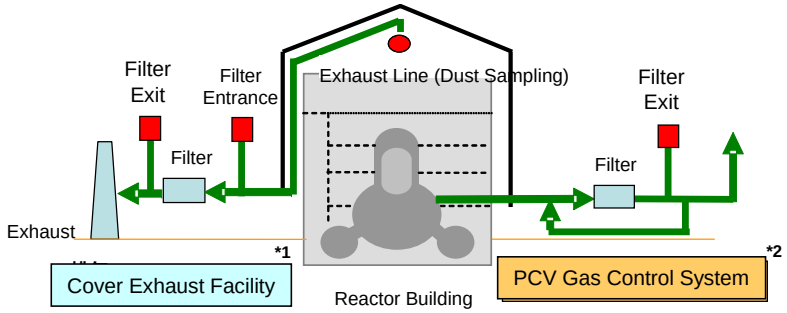
- Taking into account variable factors and other contributing elements, total emissions from Units 1-3 have been assessed to be a maximum of approximately 10 million becquerel/hour.
- This is approximately 80 millionth of the release rate right after the accident. Since February, a level has been maintained below this count.
- Based on this, the radiation exposure at the site boundary is assessed to be 0.03mSv/year. This is approximately 1/70 of the annual exposure from natural radiation (average of approx. 2.09mSv/year in Japan *) (excluding the effect of radioactive materials already released until now).

*Source: "Calculations of National Dose of Living Environment Radiation, New Version" by the Nuclear Safety Research Association



Approx. 1/80,000,000 of the release rate immediately after the accident

<Release Rates of Radioactive Materials (Cesium) Per Hour from the PCVs of Units 1 to 3>



<Cover Exhaust Facility and PCV Gas Control System Equipped to the Unit 1 Reactor Building>

*1 Facility extracting the gas inside the cover in order to make air inside the cover clean and releasing fresh air through a filter.
*2 Facility extracting the gas in PCV in order to reduce radioactive material leakage from PCV and releasing fresh air through a filter.

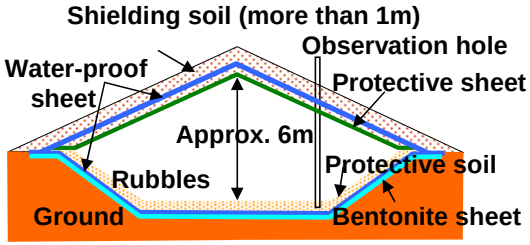
- The debris, etc. gathered during restoration work is stored in the temporary storage area after being sorted by radiation dose rate and composition (trimmed trees are separated into trunk and branches/leaves). (Concrete/metal: 59,000m^3, trimmed trees: 72,000m^3 (as of December 27, 2012))
- Transfer of debris to a temporary storage facility shielded by soil and sandbags was started in order to reduce radiation doses at site boundaries. We plan to move the more highly contaminated debris currently stored near the site boundaries further away from the site boundaries.

Measures to reduce radiation dose at site boundaries

Debris and trimmed trees
- Highly contaminated debris stored near the site boundaries will be moved further away from the boundaries.
- Highly contaminated debris will be stored in the temporary storage facility covered with soil. (*Preparation for 2 facilities has been completed and debris transfer was started (since September 5)).
- The trimmed trees which may affect the radiation dose at the site boundaries will be covered with soil
- Other measures are considered such as volume reduction treatment and reuse (installation of incinerator, etc.)

Condition of 1st facility (Photo taken on January 16)

Condition of 2nd facility (Photo taken on January 16)



Temporary storage facility covered with soil

Tanks and equipment
- Equipment layout to mitigate the radiation dose at the site boundaries
- Additional shielding

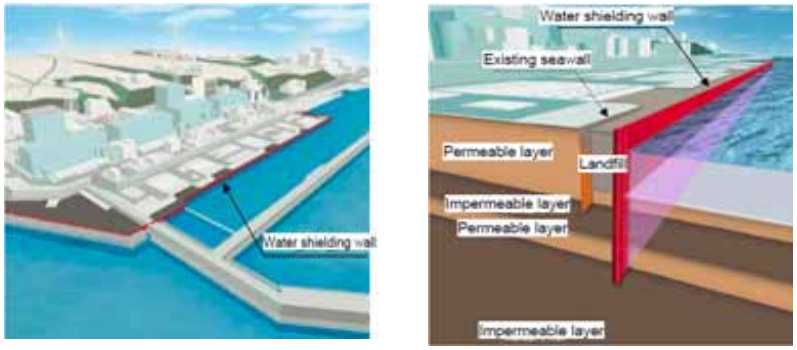
Mitigation of radioactive materials emission
- Covering up buildings
- Protection cover installation on the openings of buildings

Installation of Unit 1 reactor building cover

[4] We are working to mitigate sea water contamination.

Installation of water shielding wall

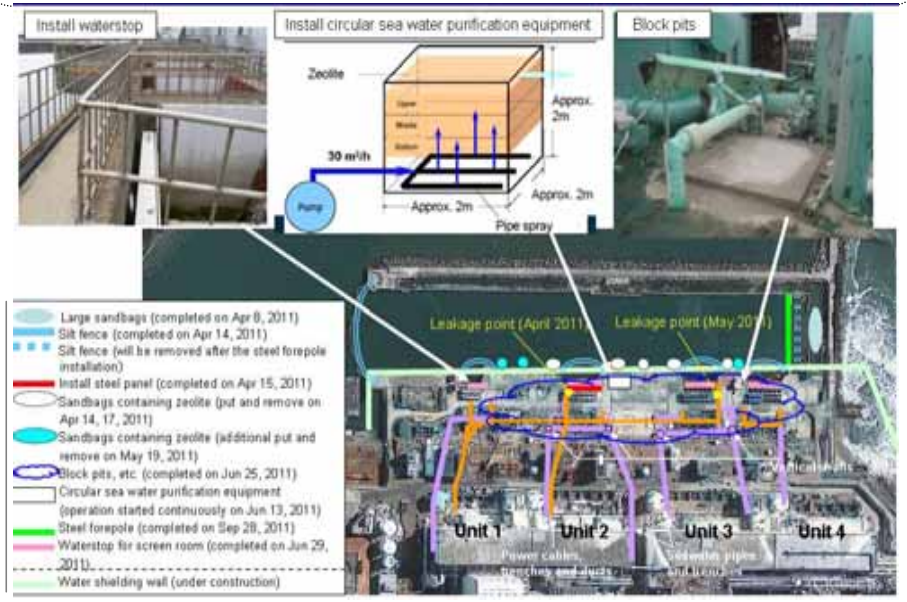
- An water shielding wall has been installed to prevent the spread of oceanic contamination in case of groundwater contamination.
  (Full construction started since April 25, 2012)



Water shielding wall (Simulated image)

Measures to prevent the spread of contamination in front of the intake channels

- Covering work has been completed using solidified soil to prevent the dispersion of marine soil that contains highly concentrated contaminant in the area in front of the intake channels for Units 1-4 and Units 5 & 6.
- Purification utilizing fiber cesium adsorbent is planned in order to reduce contaminant concentration in the water intake open conduit at Unit 1-4.



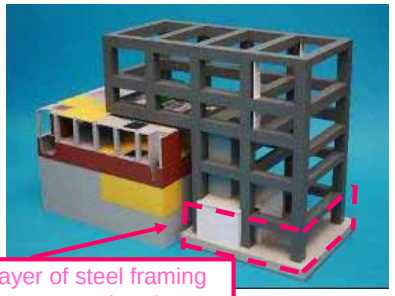
Reinforcement to Prevent Scattering Liquid Containing Radioactive Materials

[5] Currently, we are continuously cooling the spent fuel pool. Hereafter, we will be starting fuel removal from the spent fuel pool.

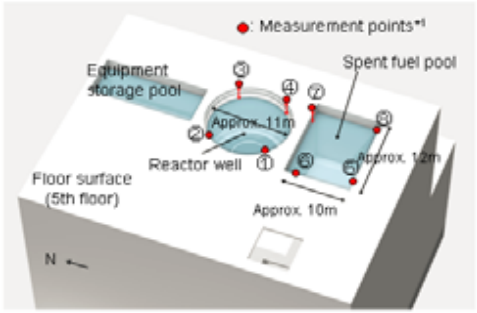
Unit 4

- Steel framing construction for the cover to be installed for fuel removal at Unit 4 has been started. (Since January 8)
- Fuel removal from Unit 4 spent fuel pool is targeted to be started in November 2013.
- Soundness inspection of the Reactor Building is conducted 4 times a year on a regular basis.

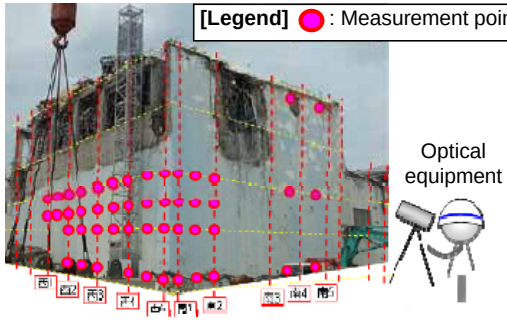
The first layer of steel framing completed (January 14)



Simulated image of the cover to be installed for fuel removal



Building tilt measurement (water level measurement)



Building tilt measurement (outer wall measurement)

Unit 3

- Platform installation and debris removal from the upper part of the Reactor Building are ongoing towards the installation of cover for fuel removal at Unit 3.

Unit 3 Reactor Building (January 29)

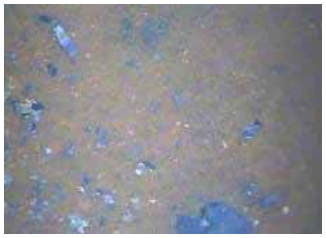
Simulated image of the cover to be installed for fuel removal

[6] We are promoting understanding of the conditions of each units and work toward fuel debris removal.

Unit 1

- In order to consider the way to inspect and repair the PCV leakage points, we inserted image scope, etc. via penetration leading to the torus room and conducted investigation. (June 26, 2012)
- We installed thermometers as a monitoring instrument and obtained photos and directly measured data; ambient temperatures, radiation dose rate, accumulated water temperatures, water level, sampling and analysis of the water, etc. (October 9-13, 2012) inside the PCV.

Torus room bottom part
(June 26, 2012)



PCV bottom part
(October 11, 2012)

Unit 2

- Inspection was conducted inside the PCV by inserting an image scope through a penetration hole. (Jan 19, Mar 26, 27, 2012)
- RPV thermometer to replace the existing broken thermometer was installed as a monitoring instrument. (November 6, 2012)
- For the purpose of improving the reliability of PCV ambient temperature thermometer, a new PCV thermometer was installed as a monitoring instrument. (November 6, 2012)

RPV Thermometer Installation Condition
(October 3, 2012)

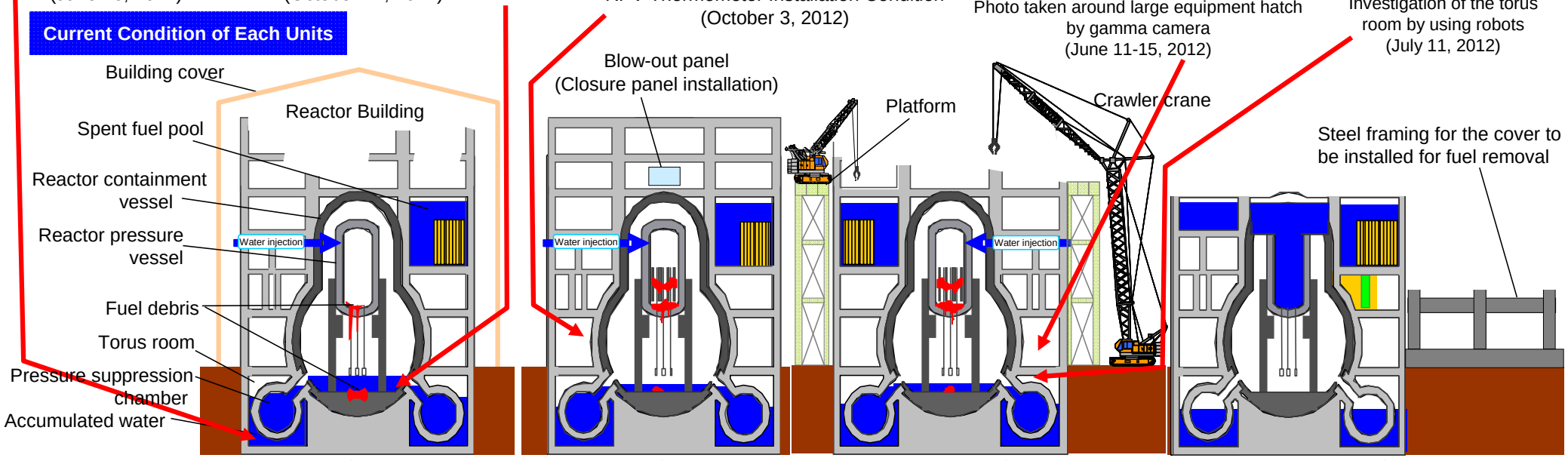
Unit 3

- Investigation of the contamination condition inside the Reactor Building was conducted by using robots (June 11-15, 2012), and decontamination sample was sampled in order to select the best decontamination method (June 29-July 3, 2012).
- In order to review how to inspect and repair the PCV leakage points, the accumulated water level inside the torus room was measured (June 6, 2012), and investigation of the torus room was conducted by using robots (July 11, 2012).

Photo taken around large equipment hatch
by gamma camera
(June 11-15, 2012)

Investigation of the torus
room by using robots
(July 11, 2012)

Current Condition of Each Units



As of 11:00 AM, February 27

Reactor	Temperature at RPV bottom part: 17.3℃	31.0℃	30.1℃	No Fuel
	Temperature in PCV: 18.7℃	31.5℃	28.6℃	
Fuel Pool	9.0℃	11.0℃	8.1℃	19℃