

<Reference>

# Suspension of Ventilation Facilities Heading toward Dismantlement of the Reactor Building Cover of Unit 1, at Fukushima Daiichi NPS

September 12, 2013

Tokyo Electric Power Company



東京電力

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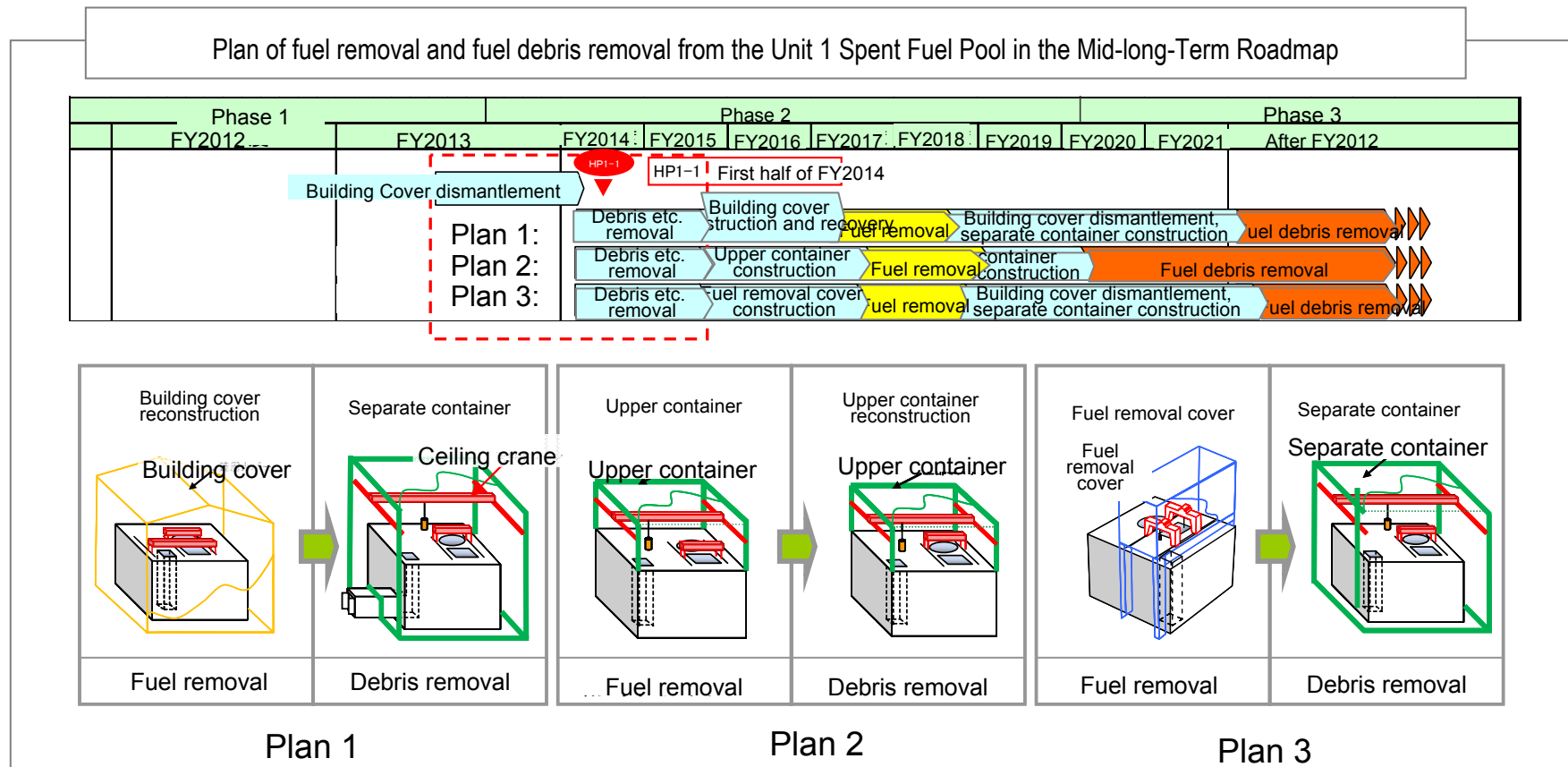
# Progress Report

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- With regards to dismantling the Unit 1 Reactor Building Cover at Fukushima Daiichi Nuclear Power Station, the details of the previous work (on May 9, 2013) are as follows:
  - At the Unit 1 of Fukushima Daiichi Nuclear Power Station, a cover was installed over the Reactor Building in October 2011 for the purpose of preventing radioactive materials from being released.
  - Even now, debris is still scattered on the operation floor in the Reactor Building
  - Advancing toward fuel removal, in order to accelerate debris removal accumulated on the operation floor, dismantlement of Reactor Building cover is necessary.
  - After performing plenty of measurements against radioactivity release, the dismantlement of the cover is estimated to have little impact on the radiation exposure dose at site boundaries attributable to the radioactive materials released from Units 1-3 Reactor Buildings (0.003mSv/year, as of the end of March 2013).
  - Based on the above, the Reactor Building cover will be dismantled for debris removal from the operation floor. The Building cover is planned to be restored after 4 years.
  
- We submitted to Nuclear Regulatory Committee, a plan to dismantle the Building cover on June 24, 2013 (corrected on August 12), and this was approved on August 14, in 2013.
  
- Prior to the dismantlement of the Building cover, a suspension of ventilation facilities of the Building cover is scheduled on September 17, 2013. The dismantlement of Reactor Building cover is estimated to start at the end of FY 2013.

# 1. Plan of Fuel Removal from the Unit 1 Spent Fuel Pool

- In the Mid-and-long-Term Roadmap toward the decommissioning of Fukushima Daiichi Nuclear Power Units 1-4 (the council for the decommissioning of TEPCO's Fukushima Daiichi Nuclear Power Plant: June 23, 2013), we put an aim to start fuel removal inside the Unit 1 Spent Fuel Pool within FY 2017.
- “Building cover dismantlement” and “Debris removal etc.” are common in all plans.



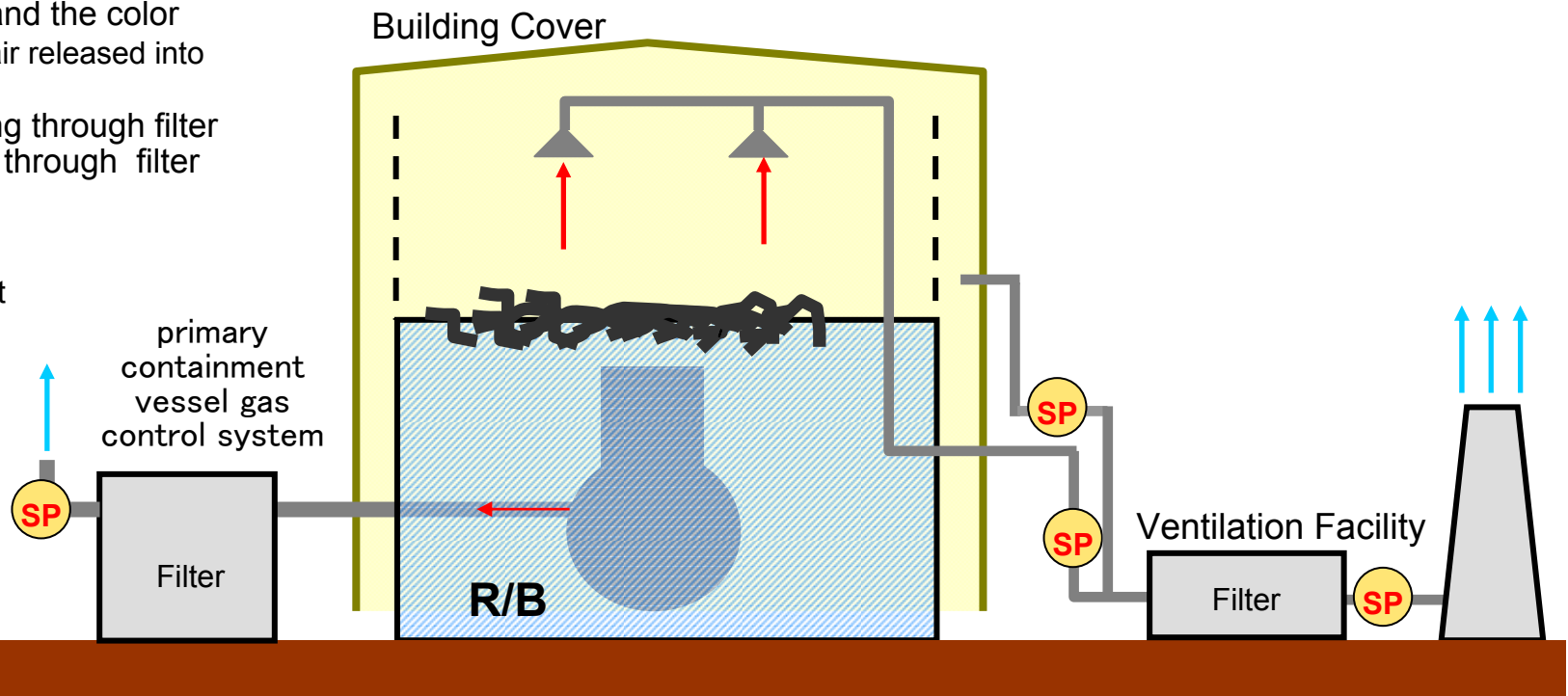
## 2. Installation of Reactor Building Cover at Unit 1

- Cover was installed over the Reactor Building in October 2011 for the purpose of preventing radioactive materials from being released.
- On the Building cover, a **ventilation facility** was installed. The ventilation facility near the ceiling draws air inside the building cover and collect radioactivity through the filter and release the air into the atmosphere.
- **Sampling facilities** are installed for the purpose of monitoring the radioactivity density inside the Building cover.
- “Primary containment vessel gas control system” was installed in December 2011 to prevent radioactivity from being released from the PCV.

Notes on arrows and the color  
\* An arrow means air released into the atmosphere

↑ : Before passing through filter  
↑ : After passing through filter

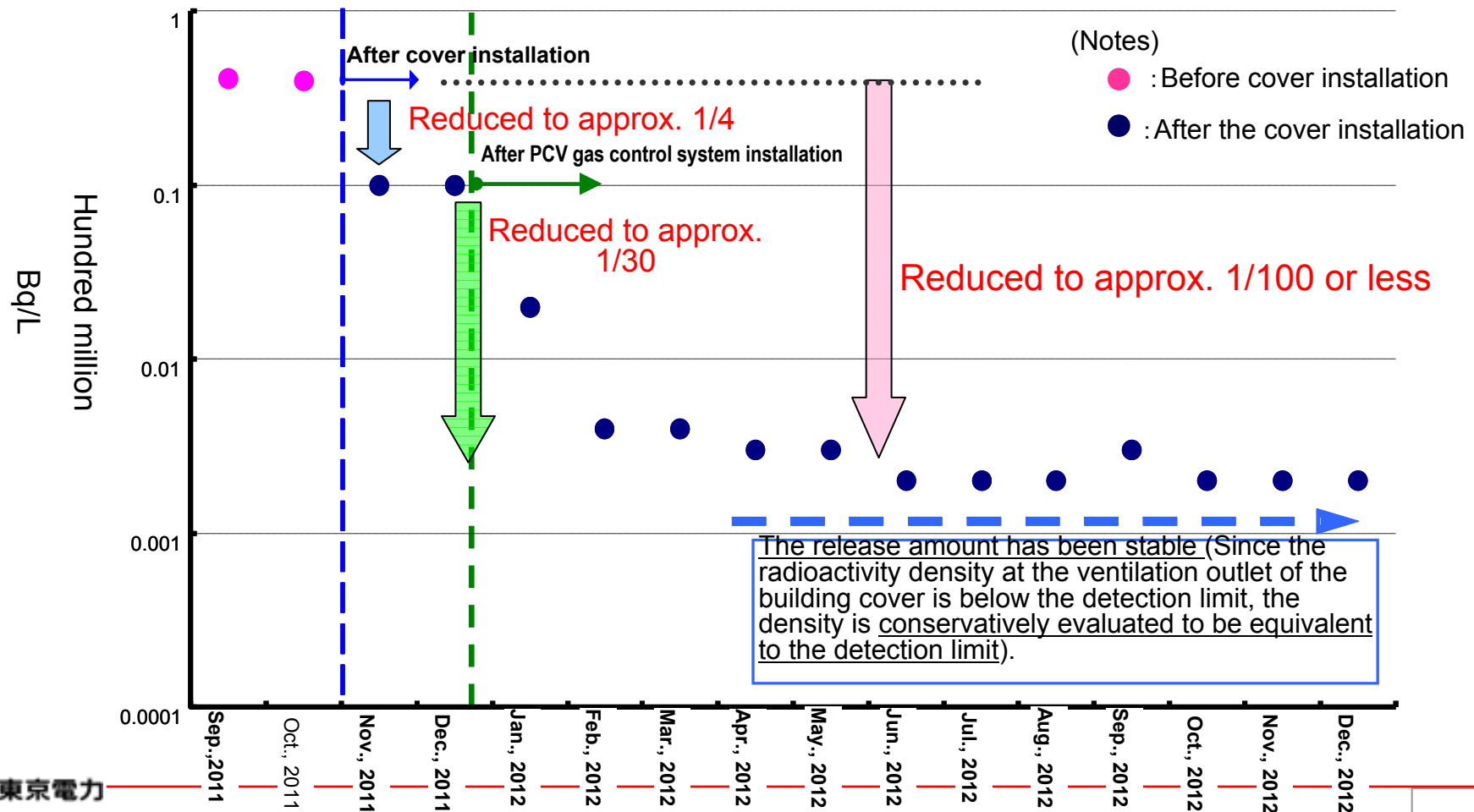
\*SP: Sampling point



Structure overview

### 3. Current Condition of Unit 1 Reactor Building (Comparison of Radioactive Release Amounts Before and After the Building Cover Installation)

- The current radioactive release amount is **approx. 1/100 or less** compared to before the building cover installation.
  - The release amount was reduced to **approx. 1/4** as a result of building cover installation.
  - The release amount was reduced to **approx. 1/30** due to the “decrease in radioactive materials released as a result of continuous reactor cooling” and the “installation of primary containment vessel gas control system”.



## 4. Estimated Radiation Dose at Site Boundaries After the Dismantlement of the Building Cover

- The current radioactive release amount is significantly lower compared to before the building cover installation due to the “decrease in radioactive materials released as a result of continuous reactor cooling” and the “PCV gas control system in operation”.
- Though the radiation dose at site boundaries is estimated to increase after the building cover dismantlement, **there will be little impact on the radiation dose at site boundaries attributable to the radioactive materials released from Units 1,2, and 3 (0.03mSv/year)** considering that measures to prevent radioactive release will be implemented (see page 12 and later).

Condition of Unit 1	Radiation dose at site boundaries attributable to the radioactive release from Unit 1	Radiation dose at site boundaries attributable to the radioactive release from Units 1-3
Before the building cover installation (October 2011)	Approx. 0.1mSv/year	Approx. 0.2mSv/year
Before the building cover dismantlement (average in FY 2012)	Approx. 0.0006mSv/year	Approx. 0.03mSv/year
After the building cover dismantlement (estimate)	Approx. 0.002 to 0.004mSv/year	Approx. 0.03mSv/year*

\* The mean of the amount released in FY2012 is used for the release from Unit 2 and 3.

## 5. Radiation Doses in the Surrounding Area

- The radiation doses attributable to the radioactive release from Unit 1 after the building cover dismantlement are estimated as follows.
  - Exposure dose at 5km from Fukushima Daiichi NPS: Approx. 0.0004mSv/year (Approx. 0.00005  $\mu$  Sv/h)
  - Exposure dose at 10km from Fukushima Daiichi NPS: Approx. 0.00016mSv/year (Approx. 0.000018  $\mu$  Sv/h)
- Based on the above, the building cover dismantlement is considered to **have little impact on radiation dose in the surrounding areas**

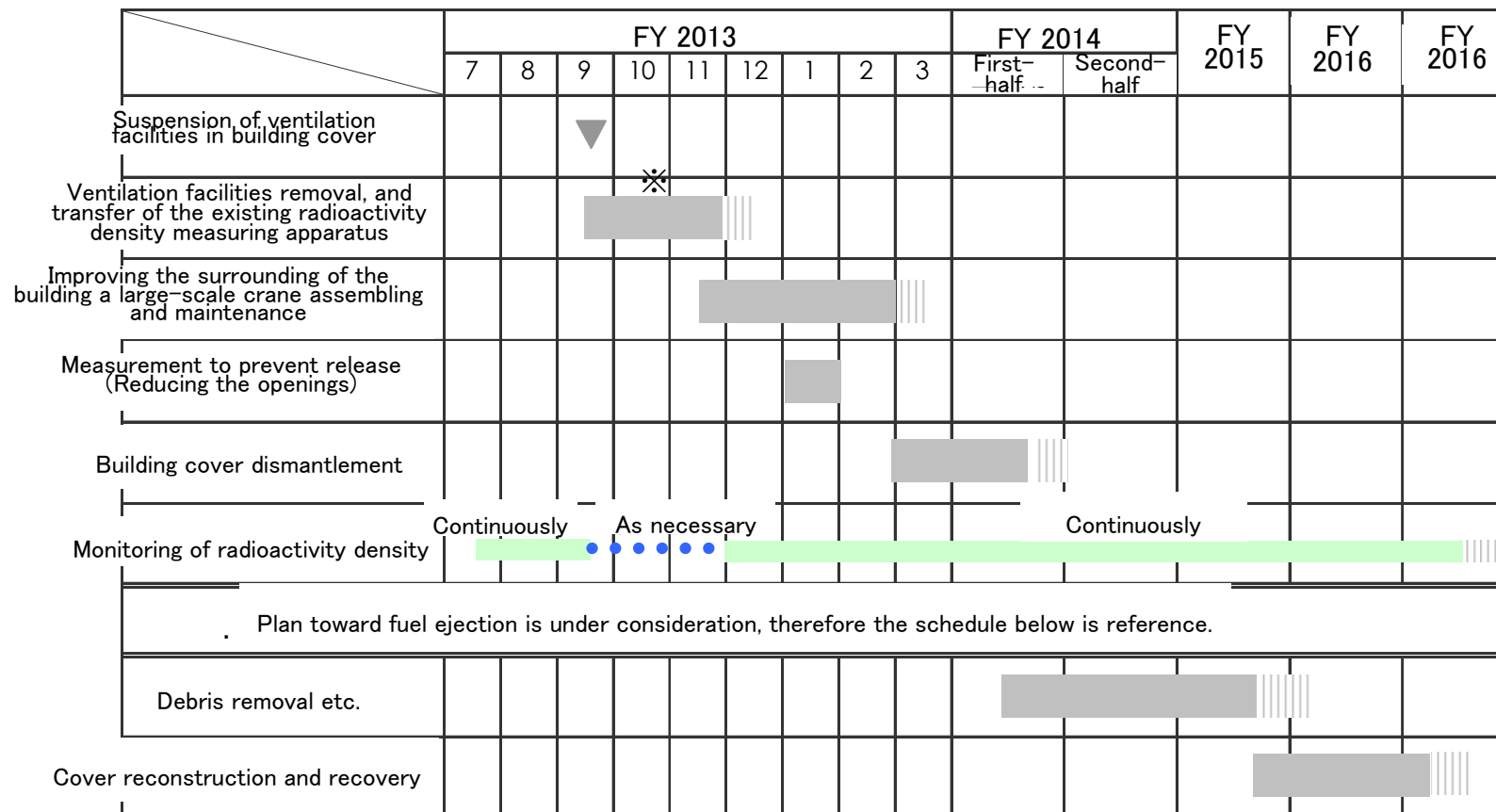
Location	Dose rate ( $\mu$ Sv/h)		Location	Dose rate ( $\mu$ Sv/h)	
	Before dismantlement* <sub>1</sub>	Before dismantlement* <sub>2</sub>		Before dismantlement* <sub>1</sub>	Before dismantlement* <sub>2</sub>
Okuma Town Government Office (Ono)	3.220	Same as the left	Iitate Village Government Office	0.701	Same as the left
Futaba Town Government Office (Shinzan gymnasium)	3.916		Katsurao Village Government Office	0.261	
Tomioka Town Government Office (Tomioka)	2.353		Minamisoma City Hall	0.264	
Naraha Town Government Office	0.193		Tamura City Hall (Funehiki day-care center)	0.102	
Namie Town Government Office	0.133		Kawauchi Village Government Office	0.097	
Hirono Town Government Office	0.128		Kawamata Town Government Office	0.196	

\*1 As of 12:00 AM on August 1, 2013 (Source: Nuclear Regulation Authority website)

\*2 Estimate

## 6. Work Process to Building Cover Removal

- Prior to the dismantlement of the Building Cover, a suspension of ventilation facilities of the Building cover is scheduled on September 17 in 2013.
- In order to monitor radioactivity density on the operating floor continuously, the existing radioactive density measuring apparatus will be transferred after ventilation facility is suspended. (During the transfer, from the middle of September to the end of November, continuous monitor will be unavailable.)
- Dismantlement of Building cover is estimated to start in the end of FY 2013, after the surroundings of the Building are ready for a large-scale heavy equipment to enter, which is used for building cover removal.

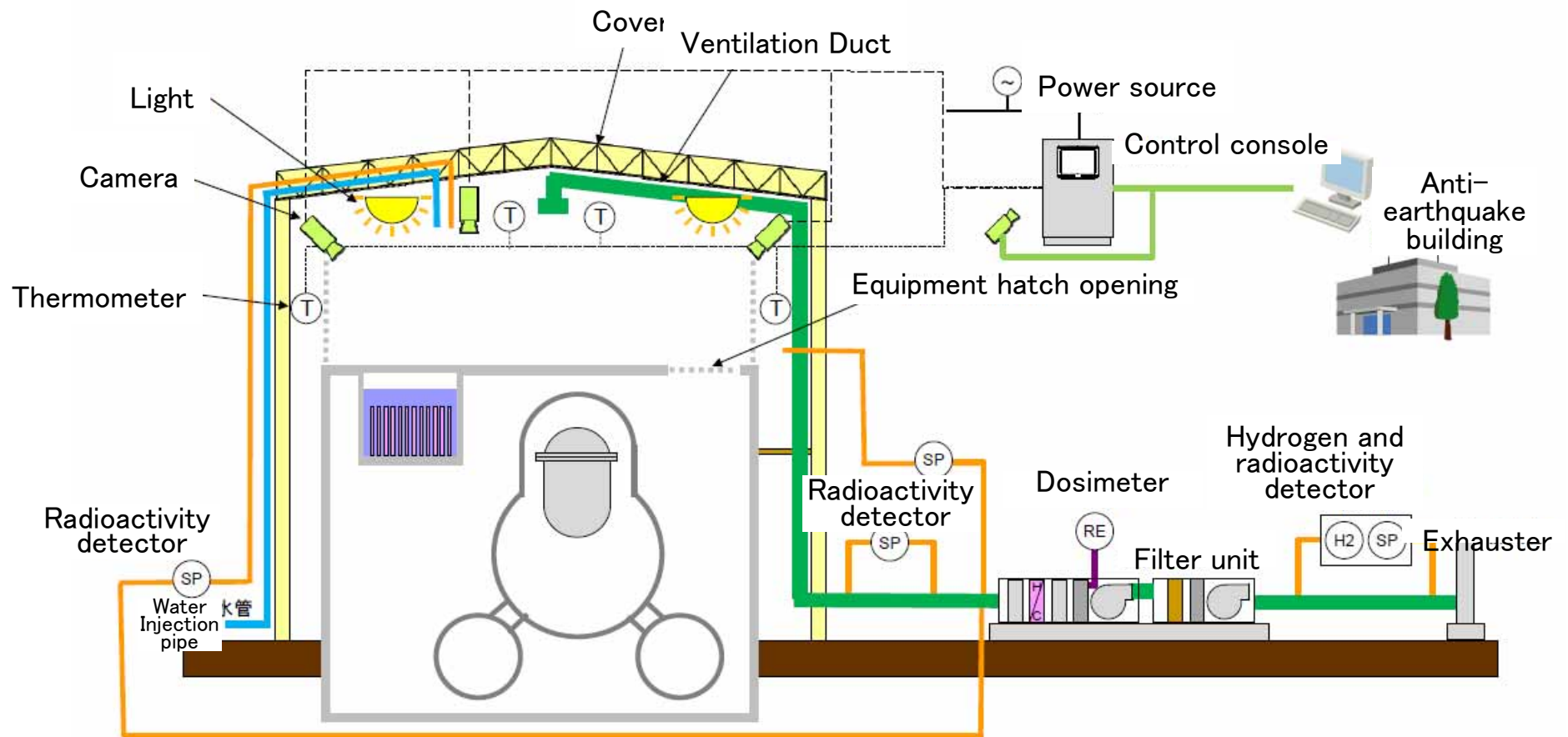


\*Although it is impossible to monitor radioactivity density continuously, we will measure and assess radioactivity density through dust sampler on a regular basis and as necessary.



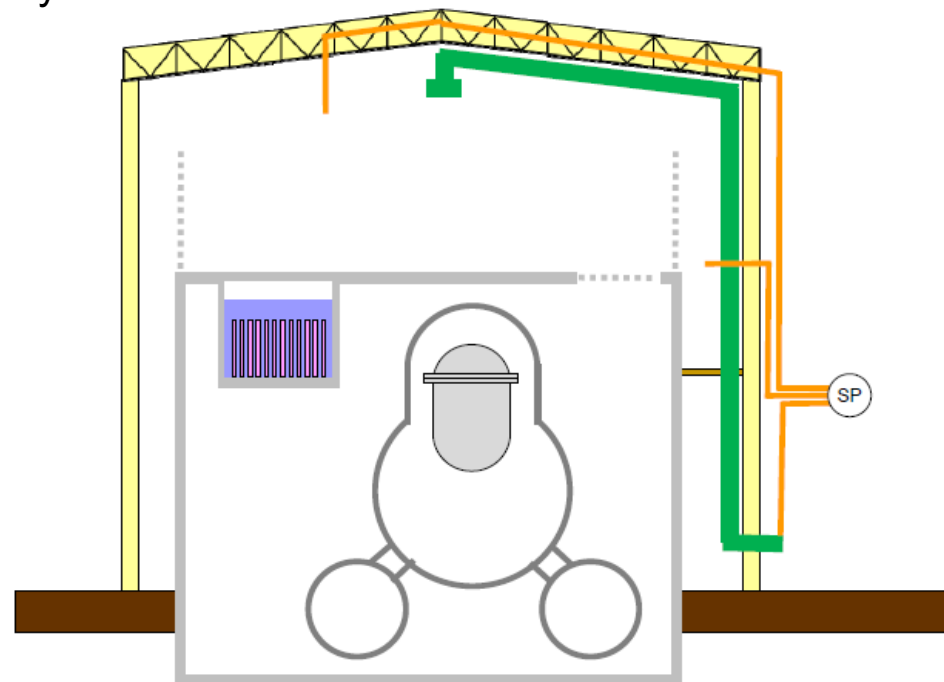
## 7. Current Monitoring of Radioactivity Density

- Current [Until ventilation facilities inside the building cover is suspended (middle of September, 2013)]
- Radioactivity density is continuously monitored, through monitoring facilities installed inside the building cover.



## 8. Monitoring Radioactivity Density (1)

1. From the suspension of ventilation facilities to completion of transfer of radioactivity measuring apparatus (Approx. from the middle of September to the end of November in 2013)
  - Monitoring the effect from suspension of ventilation facilities through monitoring post etc. for several days.
  - Regarding the above, after confirming no effect, we will transfer the existing radioactivity density measuring apparatus. (In case we find a significant change at monitoring facilities, we will resume ventilation facilities and take measures to prevent radioactive release etc.)
  - Although it is impossible to monitor radioactivity density continuously during the transfer, we will measure and assess radioactivity density through dust sampler on a regular basis and as necessary.



Structure Overview

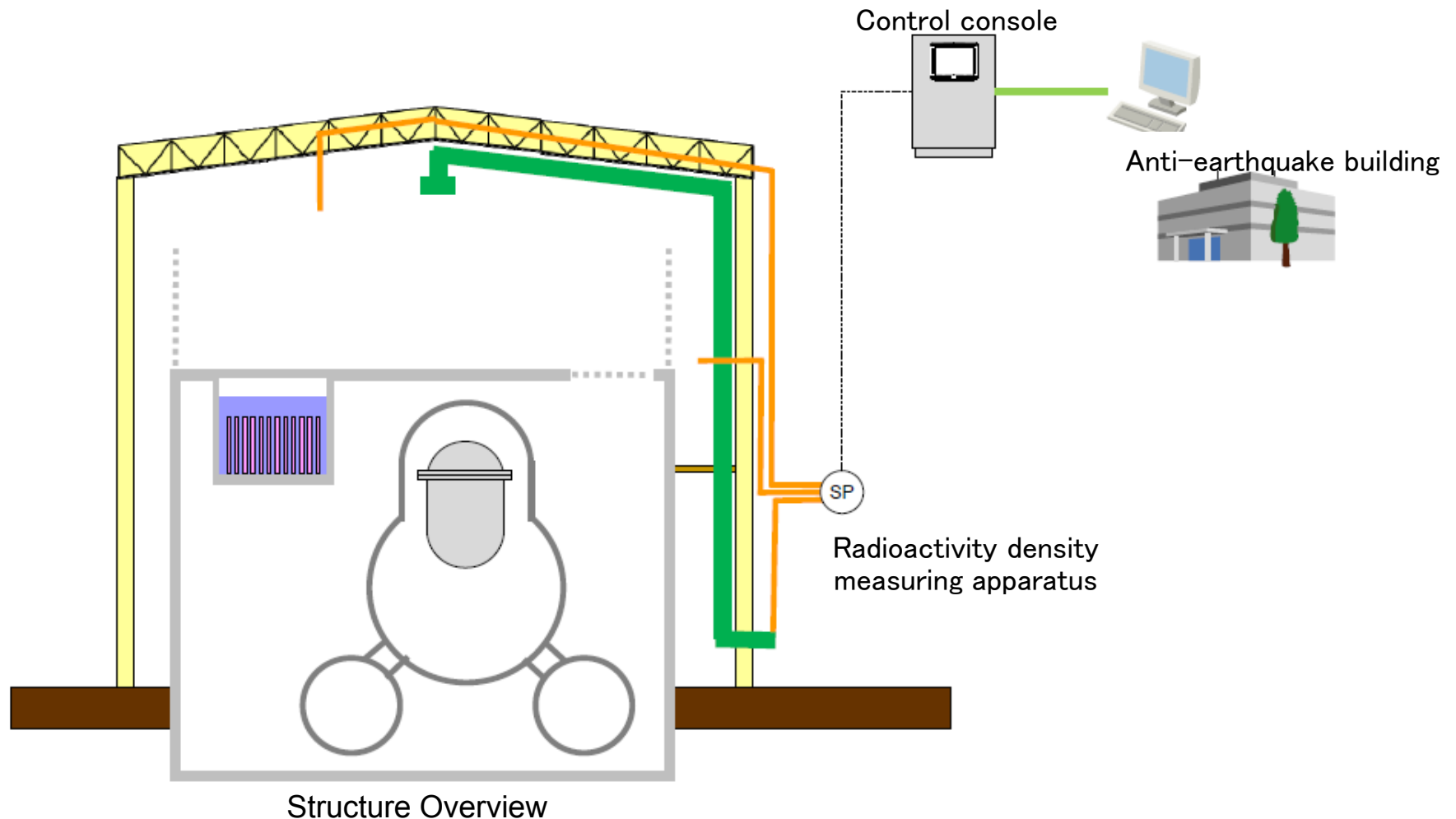


Dust sampler

## 8. Monitoring Radioactivity Density (2)

2. From completion of the transfer of radioactivity measuring apparatus to beginning of the Building cover removal (Approx. from the end of November to the end of FY 2013)

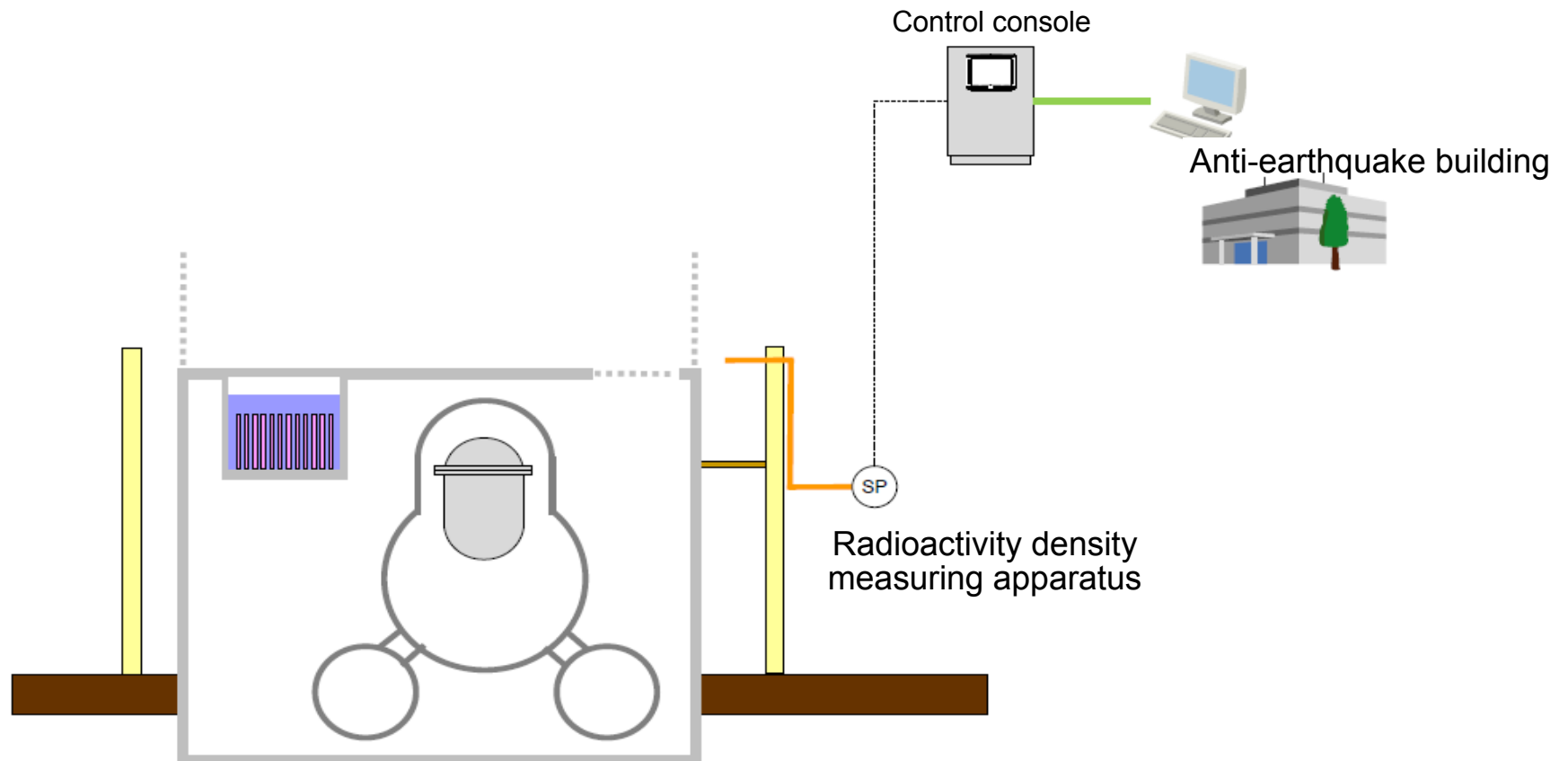
- Continuous monitoring of radioactivity density through the transferred monitoring facilities



## 8. Monitoring Radioactivity Density (3)

3. From beginning of building cover removal to Building cover reconstruction and recovery  
(Approx. from the end of FY 2013 to FY 2017)

- In succession, radioactivity density will be continuously monitored through the transferred monitoring facilities.
- After recovery of building cover, radioactivity density will be continuously monitored, switching to new monitoring facilities.

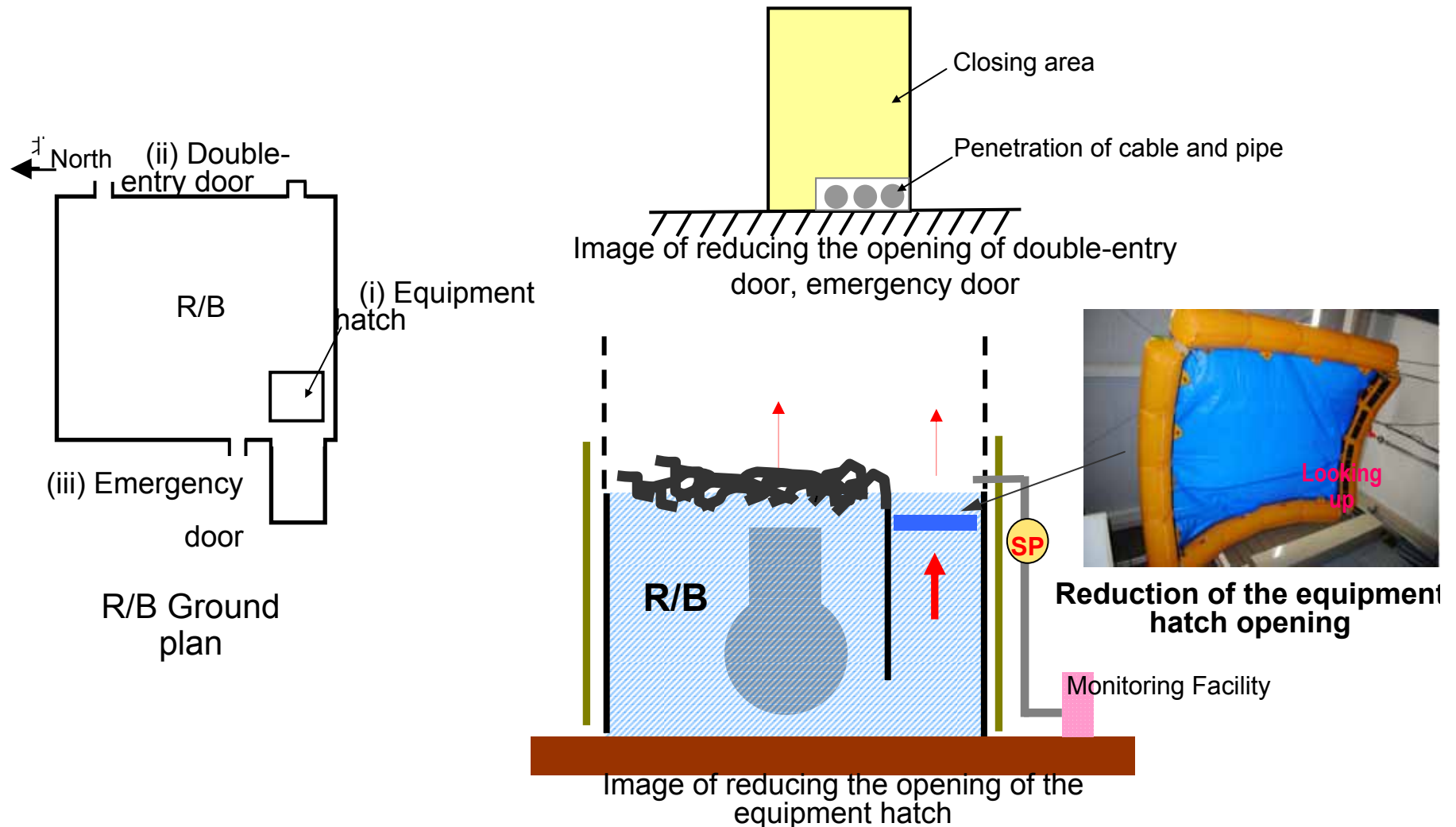


Structure Overview

## 9. Measures to Prevent Radioactive Release (1)

### [Measure to prevent radioactive release from the Reactor Building (Newly implemented)]

Radioactive release is mitigated through **reducing the opening** in the Reactor Building [(i) Equipment hatch, (ii) Double-entry door, (iii) Emergency door ).



## 9. Measures to Prevent Radioactive Release (2)

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### **[Measure to prevent radioactive release during debris removal (newly implemented)]**

- During debris removal, anti-scattering agent will be sprayed onto the building to prevent radioactive release .

### **[Monitoring of radioactivity density]**

- The monitoring facility on the building cover has been partially relocated to continuously monitor the radioactivity density.
- The continuous monitor of the radioactivity density **near the operating floor and Reactor Building** (similarly to Unit 3)\*.

### **[Revise how to spray anti-scattering agent (prevent dust release during debris removal) ]**

- Anti-scattering agent will be sprayed, not only before, but **also after debris removal**\*.
- If a radioactivity density monitor issues an alarm during debris removal, anti-scattering agent will be sprayed, after confirming the measurement of other observation monitors\*.
- Spraying anti-scattering agent at the same dilution concentration as Unit 3\*.

\*Recurrence prevention measures of “dust increase during debris removal at the Unit 3” will be applied to Unit 1 as well.