Progress Status of Emergency Safety Measures at Fukushima Daiichi NPS

December 11, 2013
Tokyo Electric Power Company

東京電力
TEPCO

1-1. Decontamination plan within the power station －Characteristics by area－

Area Ⅰ

An area that has a relatively large amount of highly radioactive debris remaining, and has been heavily affected by the influence of direct radiation from the plants and of the fallout contamination. This area also contains a large number of highly radioactive pipes.

Area Ⅱ

An area that is heavily affected by the influence of the fallout contamination.

Area Ⅲ

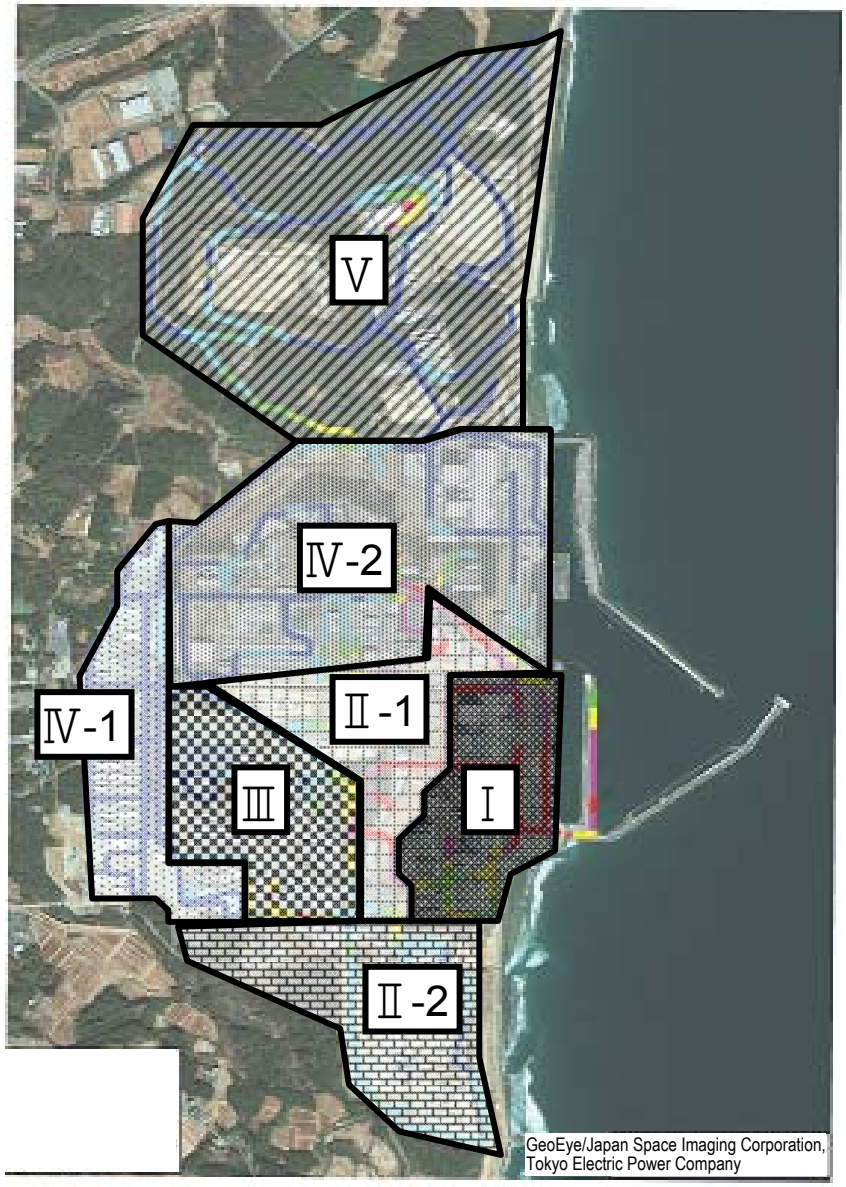
An area that is highly contaminated with beta radiation due to leakage of RO treated water. This area is affected by the influence of the fallout contamination, and also by the influence of highly radioactive facilities and equipment.

Area Ⅳ

An area that is under the remaining influence of the fallout contamination but has a relatively low level of contamination because of decontamination work carried out so far.

Area Ⅴ

An area that is under the remaining influence of the fallout contamination. This area is partly under the influence of the stored debris.



1-2. Decontamination plan – Estimated dose rates after surface soil decontamination, and additional decontamination measures (tentative) –

In consideration of characteristics of the contamination sources (of fallout contamination) within the entire power station and the contamination sources (such as contaminated water leakage locations) in each area, decontamination **such as surface soil removal and asphalt paving** will be carried forward in accordance with facility maintenance situations and implementation plans. Further, radiation doses will be measured after the decontamination, which will be followed by consideration of implementation of additional measures for further radiation dose reduction.

Area	Average dose rate [μSv/h]		Further dose reduction measures (tentative)
	At present*1	After tree trimming, surface soil removal, and asphalt paving	
Ⅰ	> 100	> 100	- Debris removal - Fortifying the shielding of highly radioactive pipes etc.
Ⅱ-1	10 - 150	3 - 40	- Shielding direct radiation from buildings - Road surface cleaning, and dust collection from sand and soil on the side strips*2
Ⅱ-2	10 - 50	3 - 13	- Road surface cleaning, and dust collection from sand and soil on the side strips*2
Ⅲ	10 - 100	3 - 25	- Road surface cleaning, and dust collection from sand and soil on the side strips*2 - Treatment of relatively highly contaminated water (RO treated water → ALPS treated water) - Fortifying the shielding of highly radioactive facilities etc. [RO facilities]
Ⅳ-1	5 - 10	1 - 13	- Road surface cleaning, and dust collection from sand and soil on the side strips*2
Ⅳ-2	10 - 100	3 - 25	- Road surface cleaning, and dust collection from sand and soil on the side strips*2
Ⅴ	5 - 50	1 - 13	- Review of manners of storing debris etc.

*1: Results obtained in the traveling survey within the power station (November 21, 2013).
*2: To be conducted continuously for the purpose of keeping the area decontaminated after the completion of decontamination work such as asphalt paving.

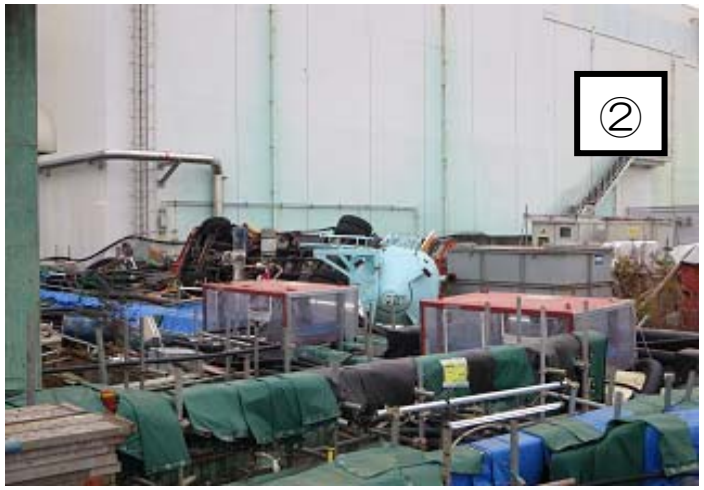
1-3. [Reference 1] Conditions of the seaside area (having ground heights of about O.P. +4m) of Units 1 to 4

Although a temporary storage space for equipment and materials (①) has been secured, the rest of the area is cluttered with debris and rubble (②). Immediate cleanup (decontamination) of the fallout contamination is difficult.

At present, facing work is underway as well as partial debris removal to accommodate the construction of the water shielding wall.

1-4. [Reference 2] Conditions of the surrounding areas (having ground heights of about O.P. +10m) of Units 1 to 4

Although access routes for vehicles and heavy equipment, and a temporary storage space for necessary equipment and materials (①) have been secured, the rest of the area contains large numbers of water transfer pipes and power cables, and is cluttered with debris and rubble (②). Immediate cleanup (decontamination) of the fallout contamination is difficult. At present, removal of discarded vehicles (before removal: ③; after removal: ④), and removal of electric transformers are underway. We are planning to proceed with removal of the other debris and rubble and facing work according to an organized plan.



2-1. Objective in implementing a measure for dose reduction of the Unit 4 Reactor Building operating floor

Shielding material is to be **installed along the vertical surfaces facing Unit 3** since this manner of installation is considered the most effective.

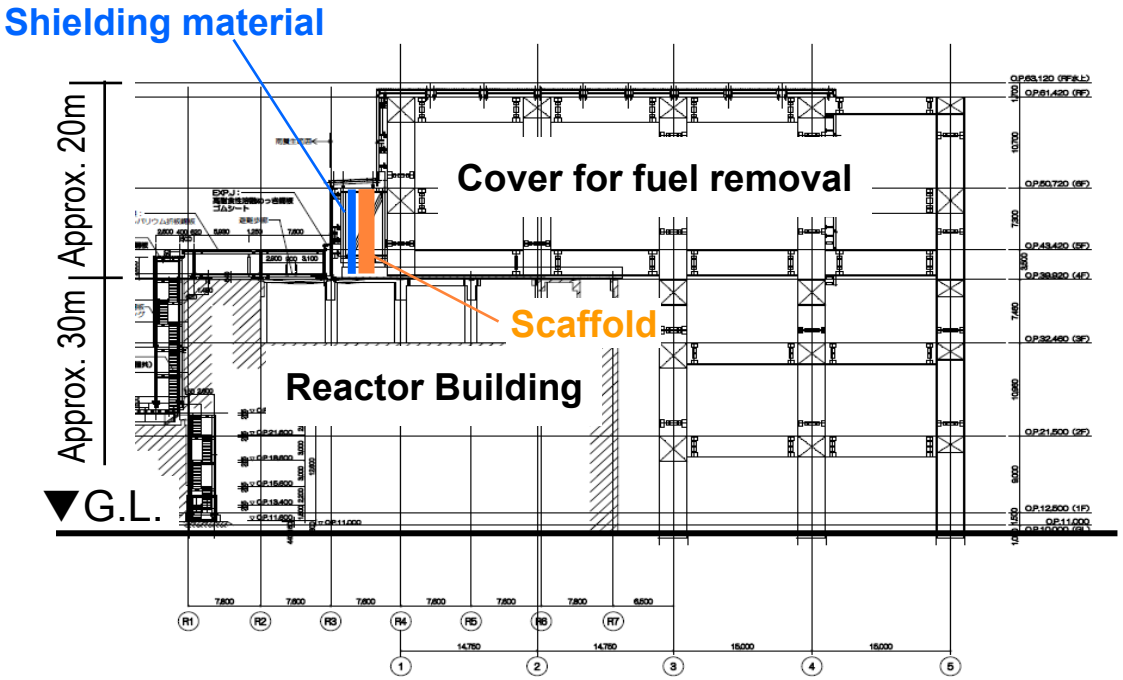
This is intended to reduce the maximum actual dose rate to workers engaged in the fuel removal work, which has been 70 μSv/h, to about one third to a half of this value.

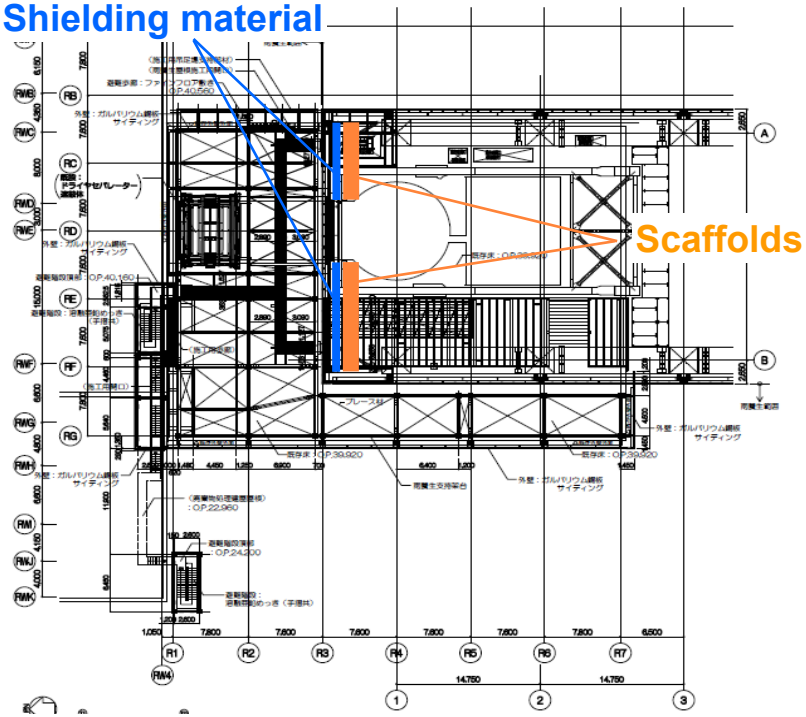
Locations in which to install the shielding material are as follows:

(1) Along the vertical surfaces of scaffolds that are to be newly set up at the Unit 3 facing side inside the cover

(2) The handrail part of the FHM (Fuel Handling Machine) trolley

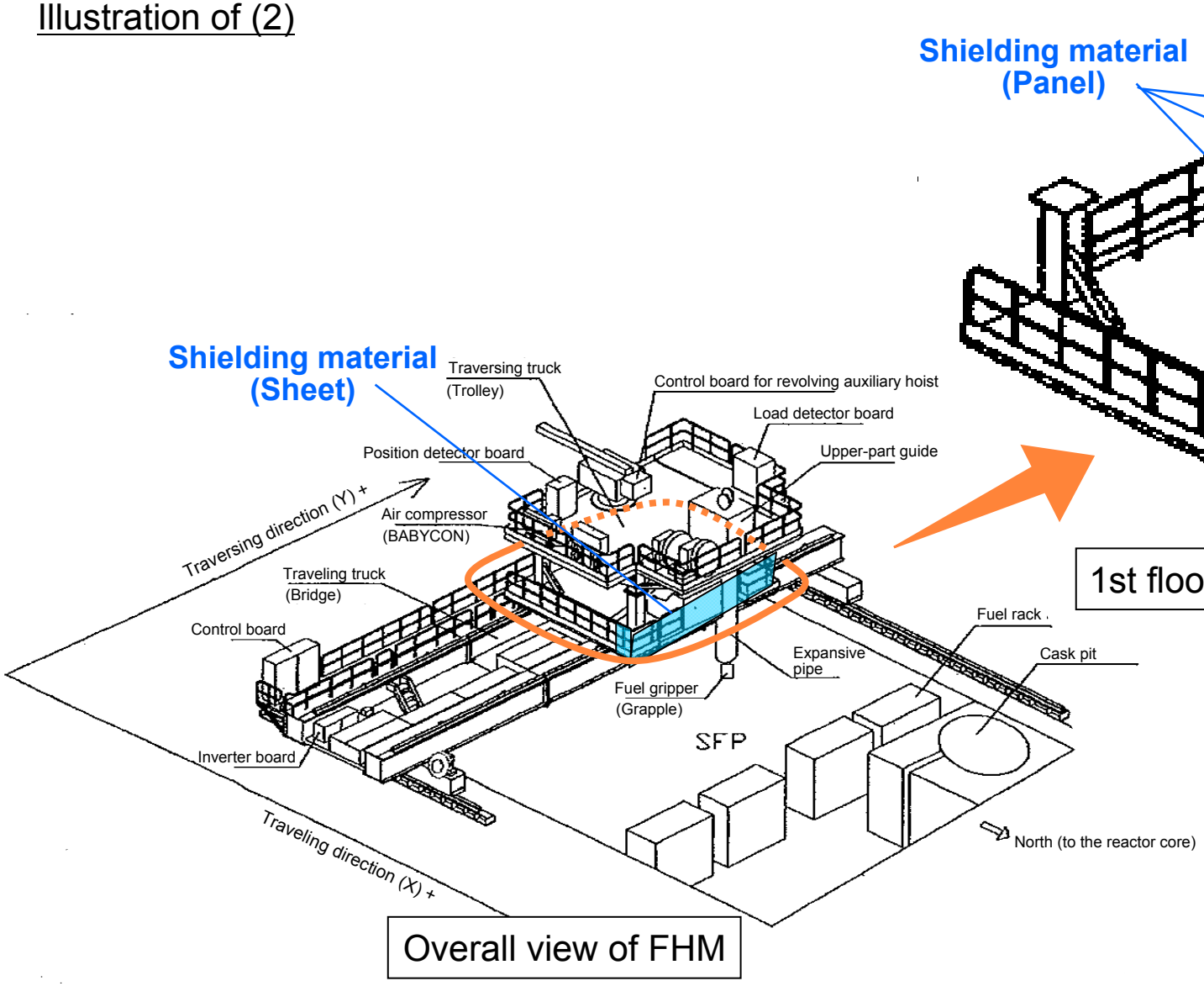
Illustration of (1)



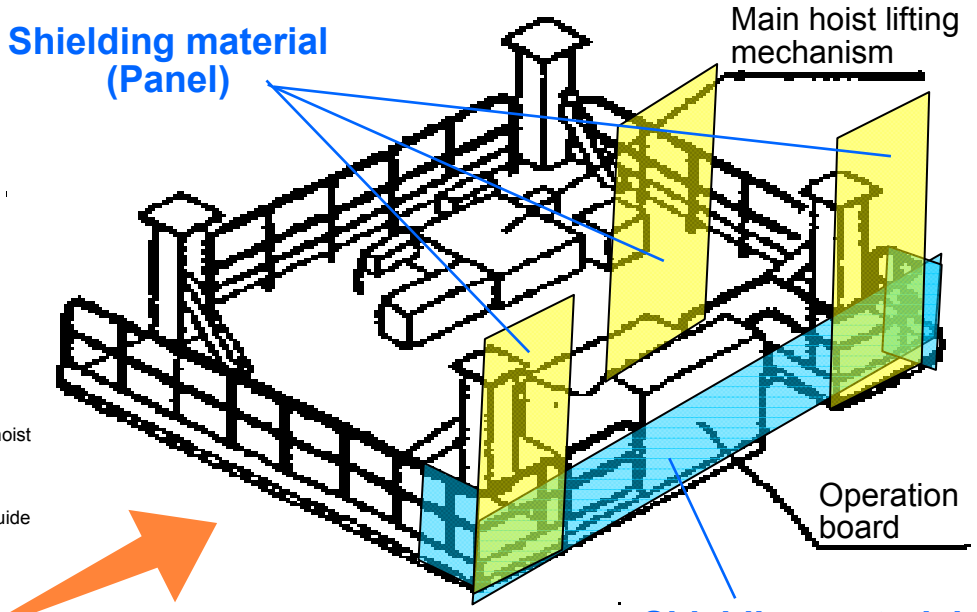


2-2. Objective in implementing a measure for dose reduction of the Unit 4 Reactor Building operating floor

Illustration of (2)

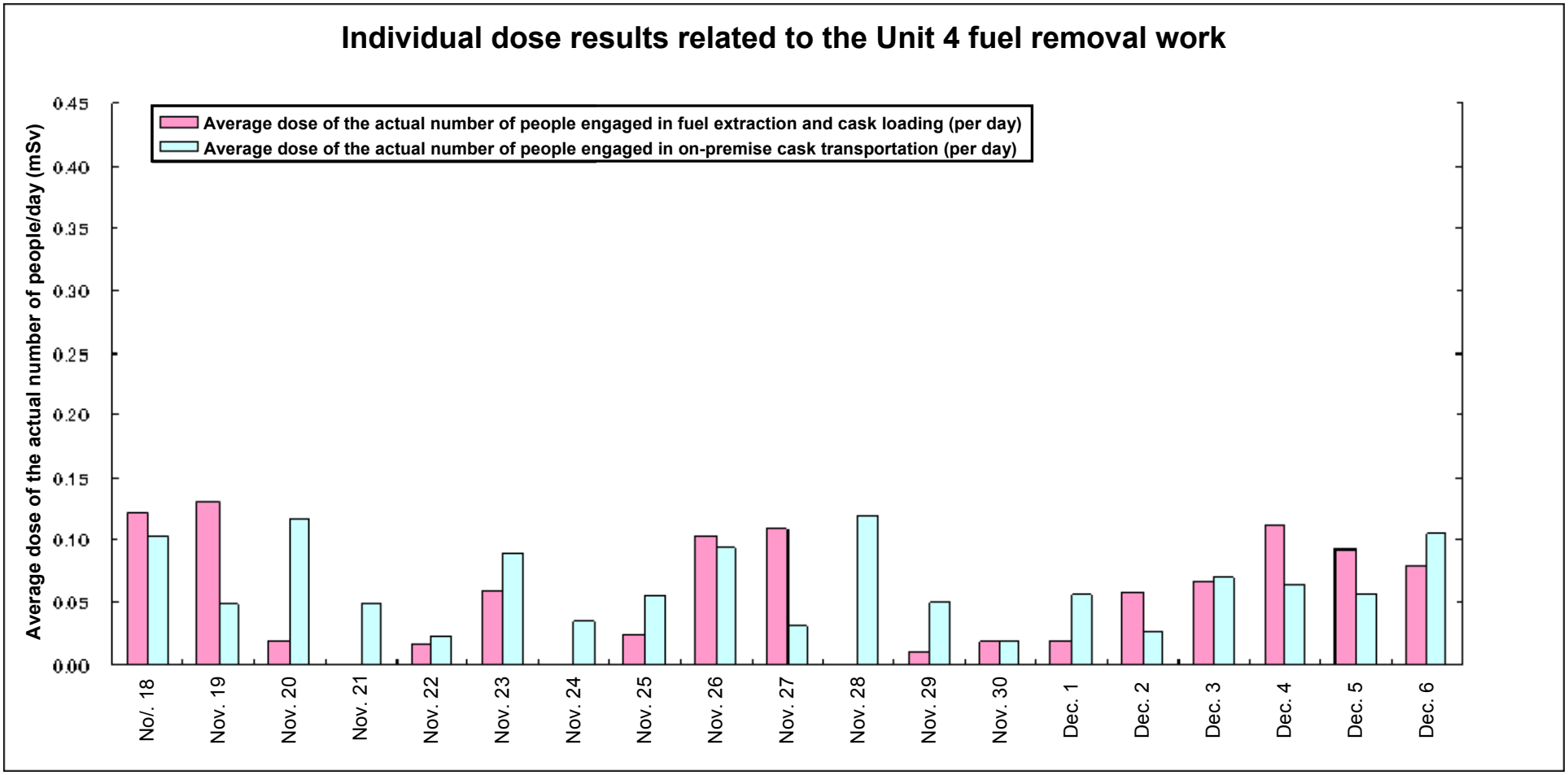


Overall view of FHM



1st floor of the trolley

2-3. Individual dose results related to the Unit 4 fuel removal



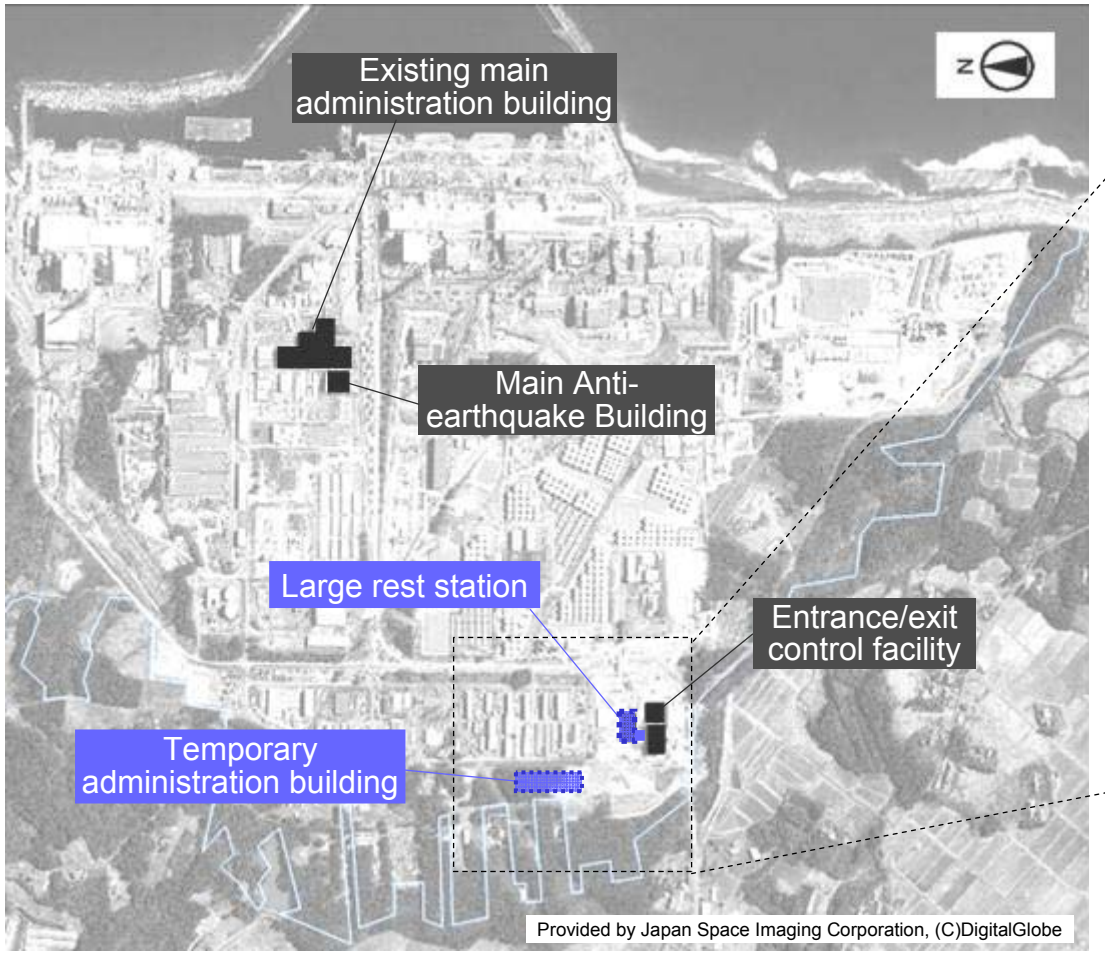
- With respect to the fuel extraction and cask loading work, the individual daily average dose was 0.1mSv/day, and the average accumulated dose during the past work period was approx. 0.26mSv.
- With respect to the on-premise cask transportation work, the individual daily average dose was 0.1mSv/day, and the average accumulated dose during the past work period was approx. 0.43mSv.

2-4. Radiation exposure related to the Unit 4 fuel removal

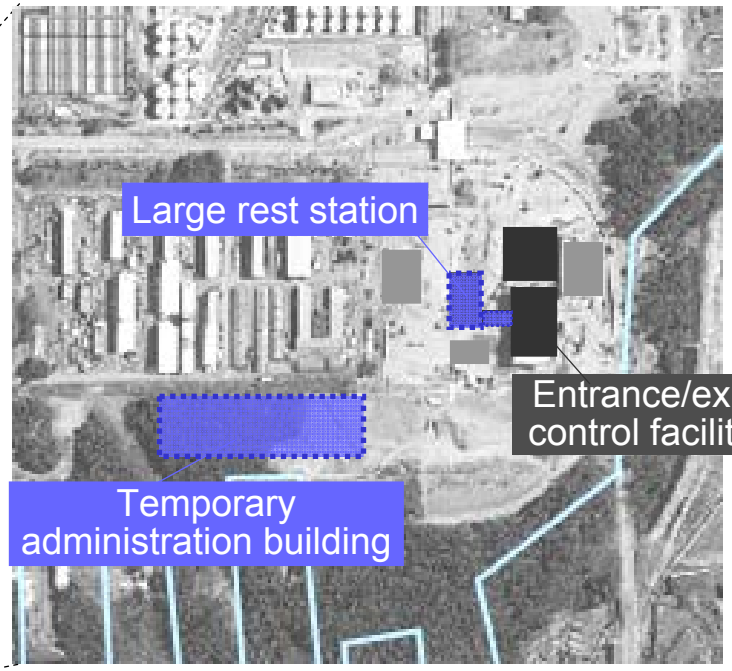
- The individual daily average doses during the past work period were 0.1mSv/day both in the fuel extraction and cask loading work and in the on-premise cask transportation work.
- Given that the fuel removal work takes a long time period to be completed, we are planning to reduce radiation exposure by reducing the environmental dose rate (to about one third to a half) through implementation of shielding in the operating floor. [The dose reduction is expected to have effect mainly on the fuel extraction and cask loading work, which is carried out on the operating floor.]
- The average accumulated doses during the past work period of about 20 days were approx. 0.26mSv in the fuel extraction and cask loading work and approx. 0.43mSv in the on-premise cask transportation work. The average dose of the workers engaged in the Unit 4 fuel-related work (either the fuel extraction and cask loading work or the on-premise cask transportation work) is 0.36mSv, which is about a half of the average dose (0.74mSv) of all of the workers who worked in the Fukushima Daiichi NPS during the same period.

3-1. Setting up of a temporary administration building

Site layout



Layout



Layout (one part enlarged)

3-2. Setting up of a temporary administration building

General information on the facility

Construction work already commenced (in November 2013)
Scheduled to start operation in June 2014

Item	Planned specification
Building construction	Steel construction with 2 aboveground floors
Building size	Total floor area: Approx. 14,000m^2 Building area: Approx. 7,000m^2
Capacity	About 1,000 people
Dose inside building	Radiation uncontrolled area

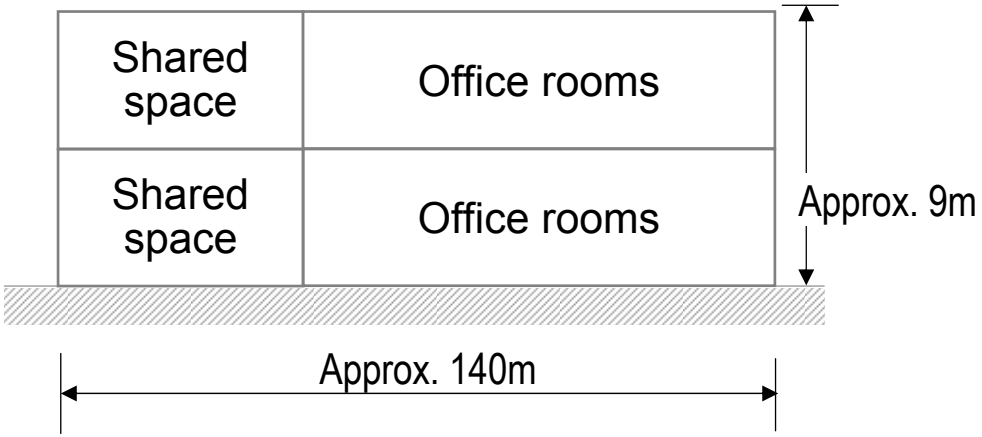


Illustration of the cross section

4. Setting up of a large rest station

General information on the facility

Commencement of construction work: January 2014
Scheduled to start operation in December 2014

Item	Planned specification	Note
Building construction	Steel construction	
Building size	Total floor area: Approx. 6,400m^{2}* Building area: Approx. 900m^{2}*	9 aboveground floors (The 8th and 9th floors are for machinery rooms.)
Capacity	1,200 people	The total capacity of this facility and the existing rest station is 2,000 people.
Dose inside building	Radiation uncontrolled area	

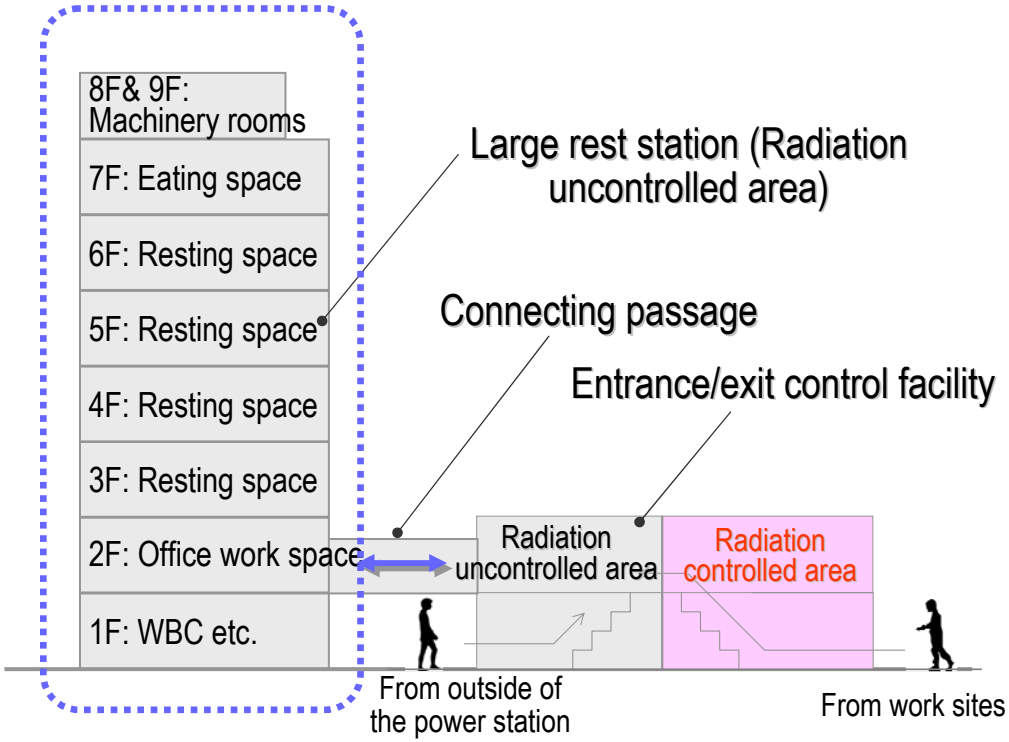
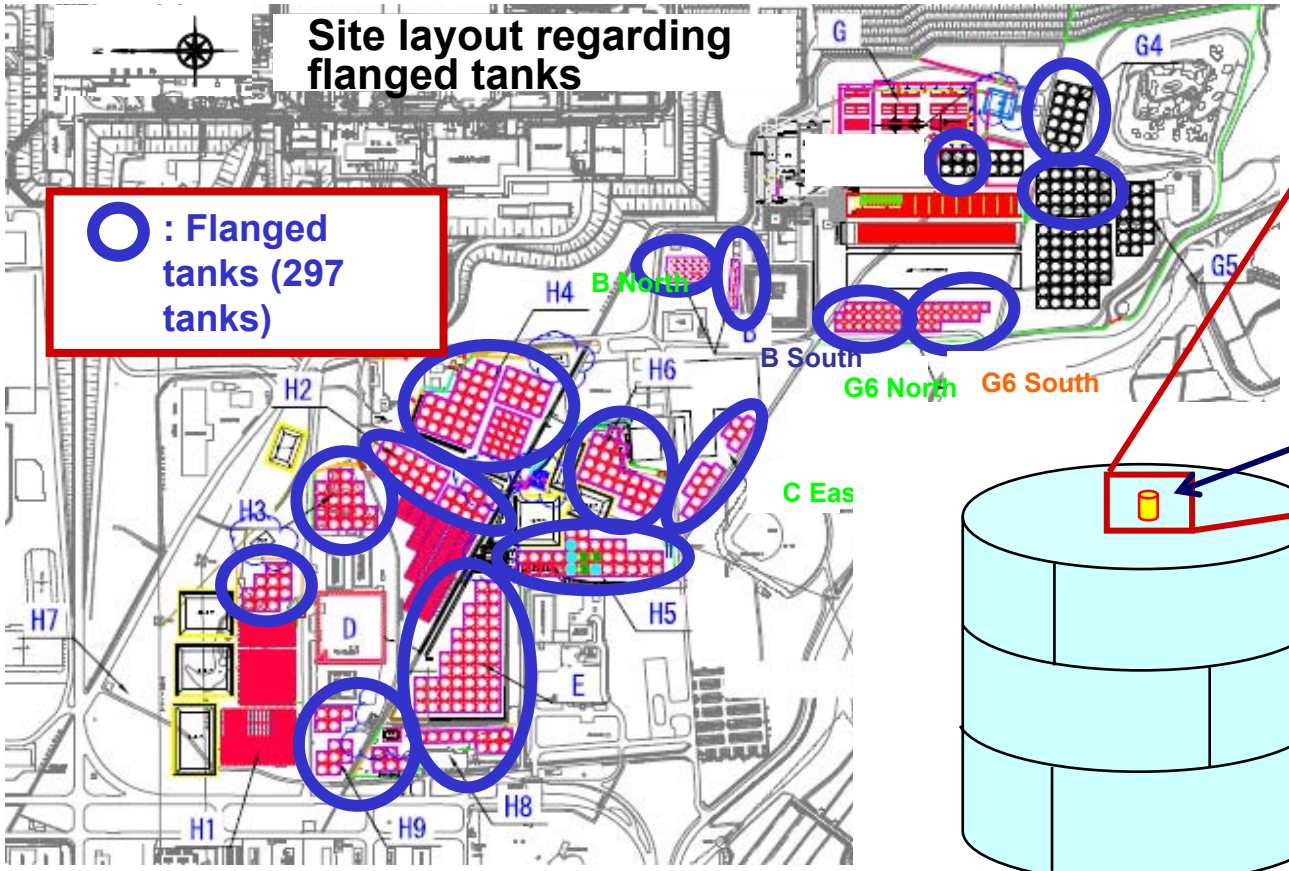
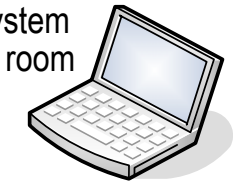


Illustration of the relationship between the entrance/exit control facility and the large rest station

* Excluding the connecting passage part

5. Installation of water level gauges in flanged tanks





Installation of water level gauges in the flanged tanks was completed, and monitoring operation using the water level gauges has been started sequentially since December 9. We will evaluate the water level data to improve the settings of alarms etc.