Dismantling the Reactor Building cover of Unit 1 of Fukushima Daiichi NPS

July 17, 2014

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Fukushima Daiichi Nuclear Power

東京電力
TEPCO

1. Present Condition of Unit 1 Reactor Building

- There are still heaped debris on the operation floor of building cover.
- Plane-like structures of dropped ceiling are on the operation floor.

Reactor Building cover

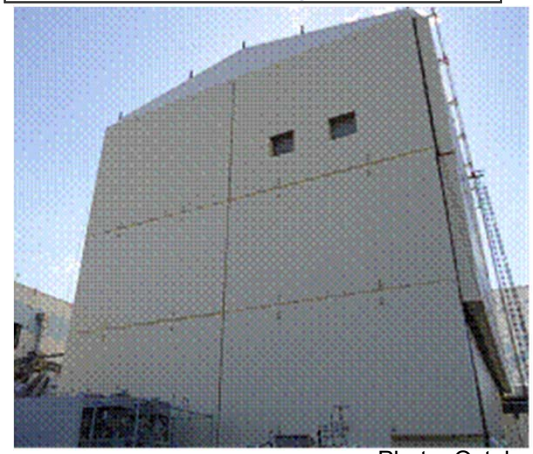


Photo: October, 2011

Operation Floor

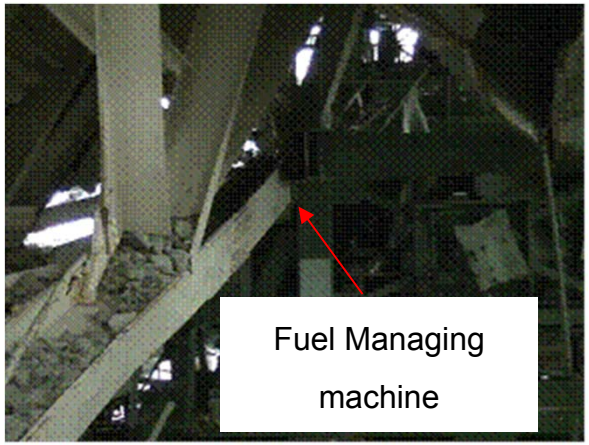
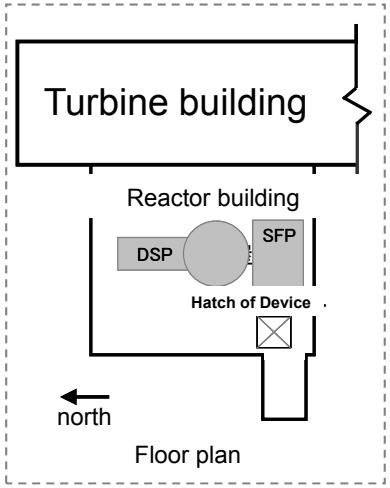


Photo: October, 2012 (balloon survey)



Overview of Operation Floor (northwest side)

Photo: around June, 2011

Overview of Operation Floor (southeast side)

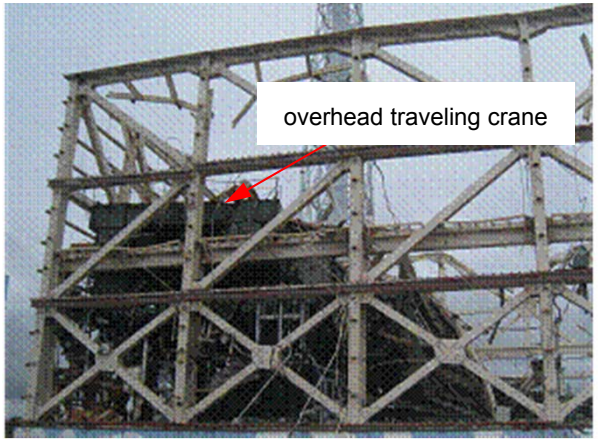
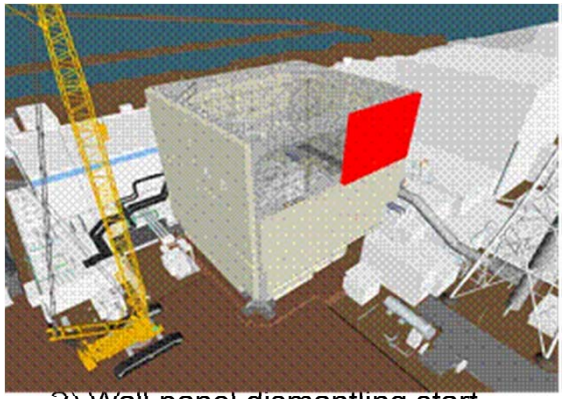


Photo: around June, 2011

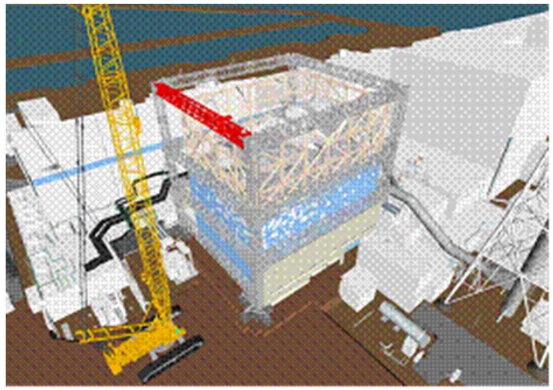
2. Dismantling Procedure

- Dismantling Sequence: Roof Panel first, followed by wall panel, colums and beams.

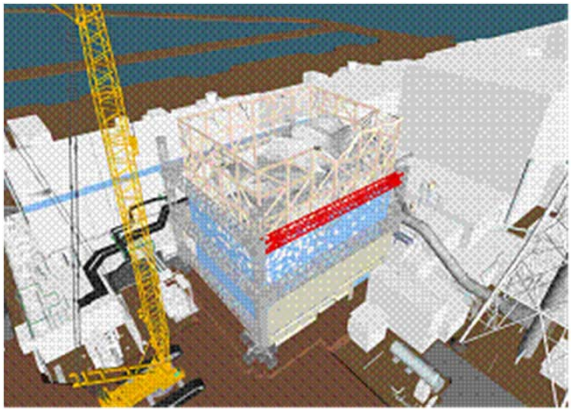
1) Roof panel dismantling start



2) Wall panel dismantling start



3) Frame dismantling start



4) Beams removal *

5) Beams reinstallation *

6) Cover dismantling completed

Followed by debris removal

* Removing beams of building cover to install windbreak sheet, then reinstall the beams with sheets

3. Scatter-Preventing Method during dismantlement ①

< Dispersing scattering inhibitor>

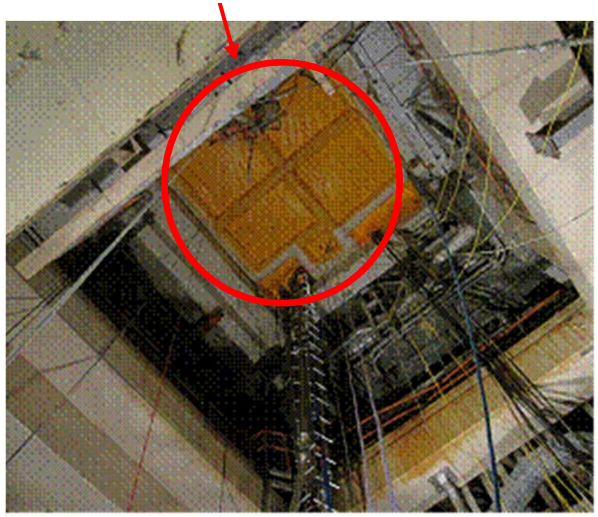
- Dispersing scattering inhibitor to adhere radioactive material

<Reduction of the air volume in the operation floor>

- Contracting opening space of reactor building, [(1)hatch of equipment, (2) double door (3)emergency exit], to reduce the air volume inflowing to the operation floor. (completed on June 4, 2014)

Dispersing scattering inhibitor

Drilling on wall panel and dispersing scattering inhibitor to underneath of debris from side



View from reactor building, first floor

Set a balloon on the opening of device hatch of third floor to contract opening space

3. Scatter-Preventing Method during dismantlement ②

<Sucking debris and dust>

- Suck roof block, sand, and dust, etc. scattering on dropped roof before starting dismantling wall panel.

<Installing sprinkler>

- Preparing for sprinkler installing prior to debris removal.

Debris/dust suction device

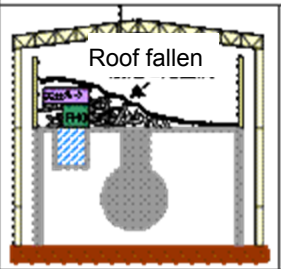
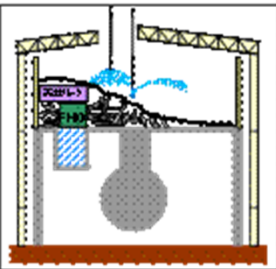
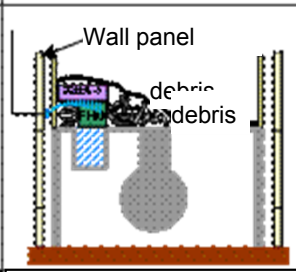
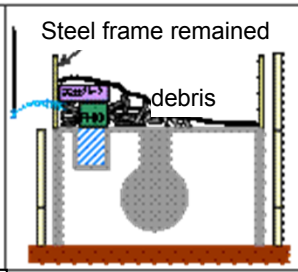
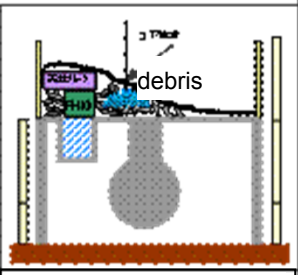
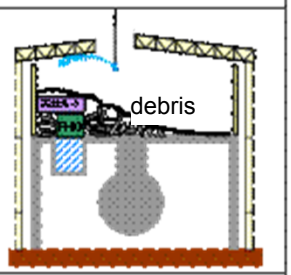
Sprinkling (imaginary picture)

4. Process of dispersion of the Scattering inhibitor during dismantlement of the Reactor Building cover

- The area of radioactive material scattering during dismantlement is supposed to be …
  1) on the debris dropped
  2) under the debris dropped
  3) on the cover to dismantle

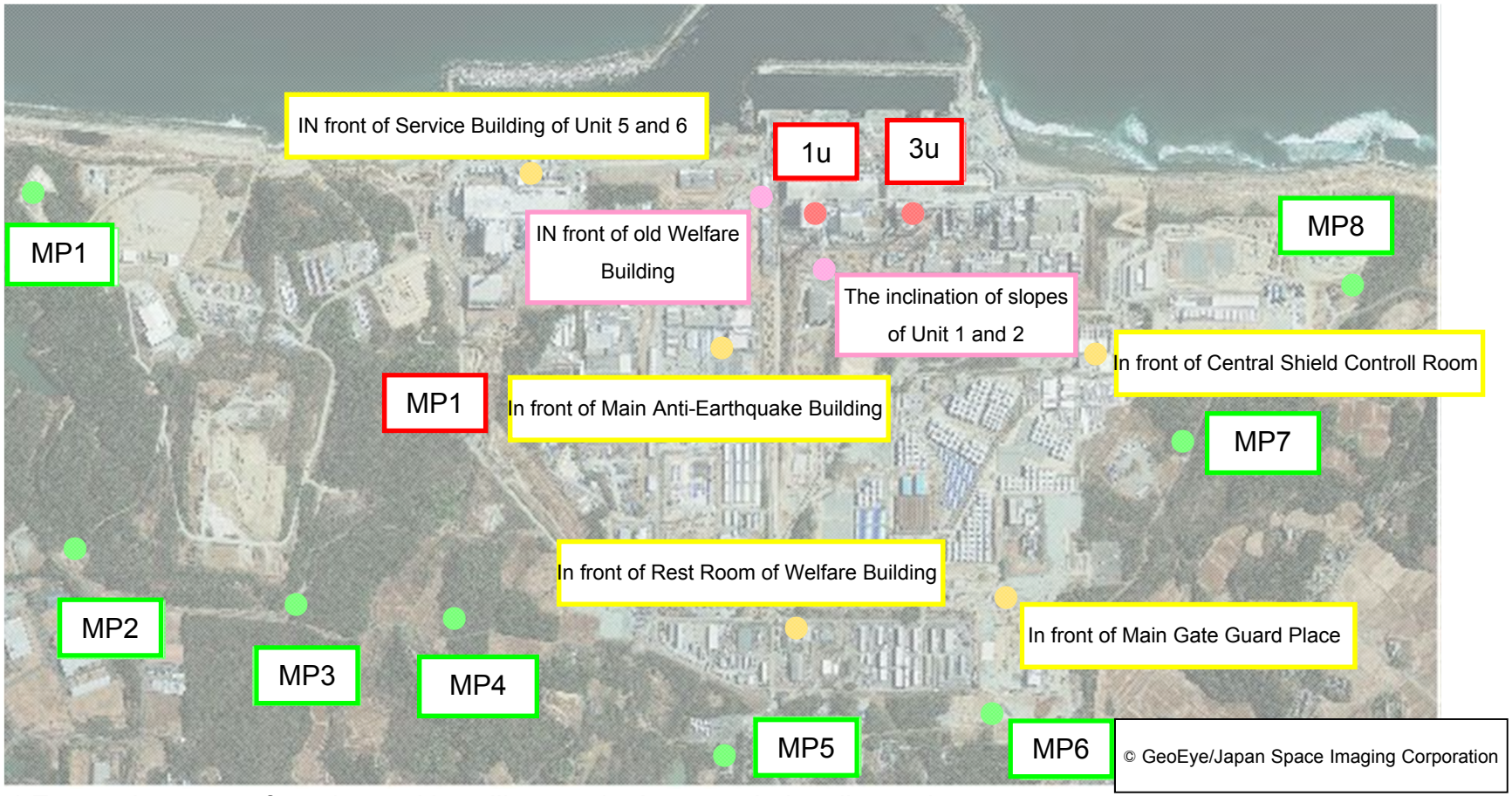
  → Fix radioactive material with scattering inhibitor

- Dispersion plan of the scattering inhibitor

Target	1) On debris dropped		2) under debris dropped			3) Building block dismantled
Figure						
outline	Before dismantling, drilling on roof panel and dispersing scattering inhibitor	With dismantling roof panel, dispersing scattering inhibitor over debris	Before dismantling , drilling on wall panel and dispersing scattering inhibitor under debris from side	With dismantling wall panel, dispersing scattering inhibitor under debris from side	Dispersing scattering inhibitor over debris through gap between roof slab or pit of concrete debris.	Before removing building block, dispersing scattering inhibitor on them
note					With dismantling building cover, investigating debris condition and deciding to implement or not.	If it is confirmed that there is little radioactive matter, we review the necessity of dispersing.

5. Monitoring system of radioactivity density

- monitoring at dust monitor on operation floor (each 4 points for Unit 1 and 3)
- monitoring at dust monitor near the reactor building (2 points)
- monitoring at dust monitor inside the site (5 points)
- monitoring at monitoring posts on the border of the site (8 points)

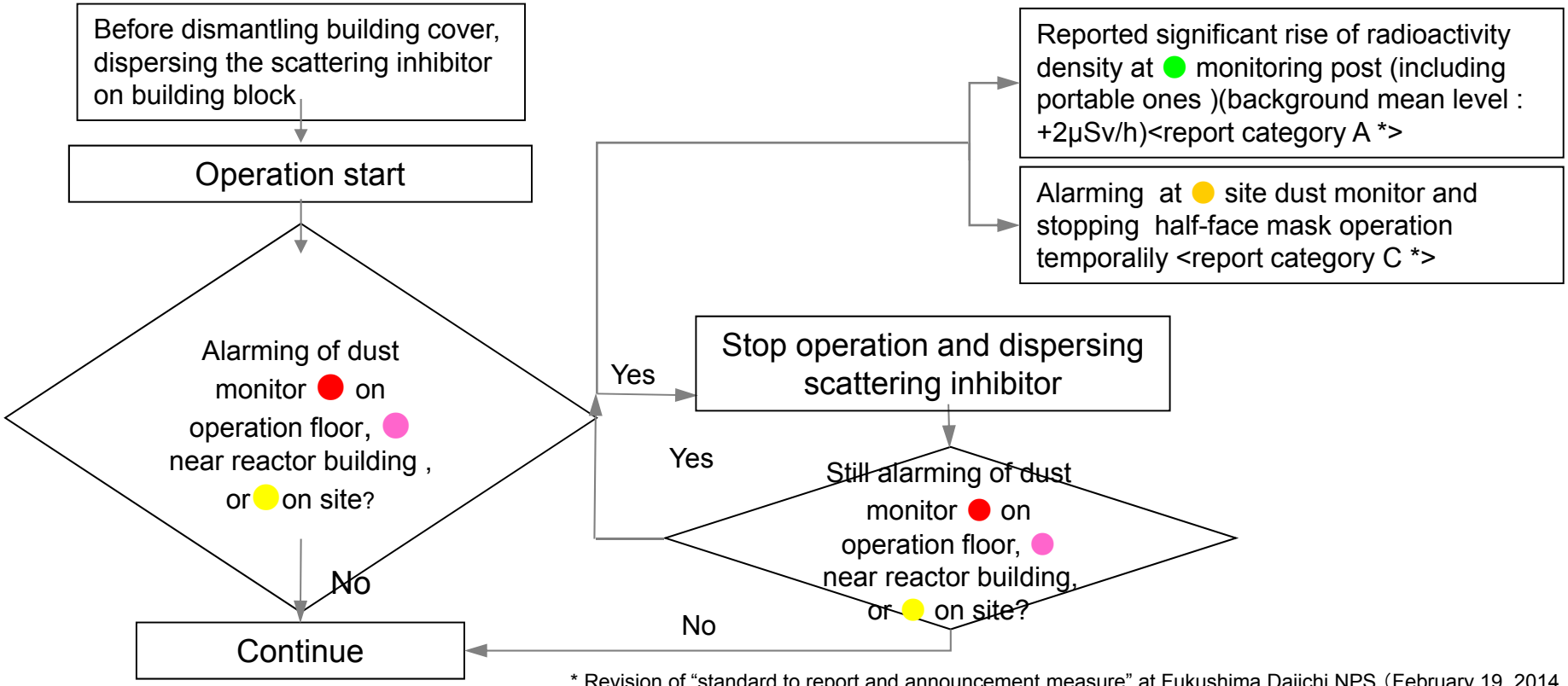


* Except the terms of moving and installing monitoring spot during dismantlement

6. Radioactivity density monitoring during Dismantlement of the Reactor Building cover

- Monitoring continuously at ● monitoring post, and dust monitor (● on operation floor, ● near reactor building, and ● on site).

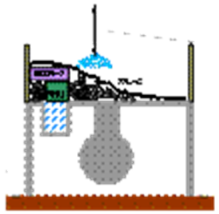
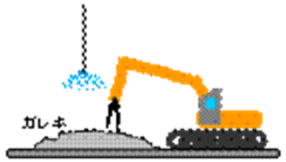
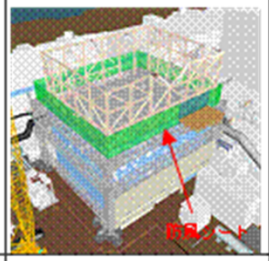
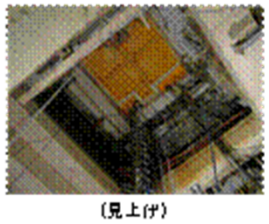
(see page 7 for the color index)



* Revision of "standard to report and announcement measure" at Fukushima Daiichi NPS（February 19, 2014
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140219_11-j.pdf

- In order to improve safety and reliability of operation, we will dismantle carefully. For example, we will do trend monitoring after dismantling the second roof panel for significant period, and start another dismantling.

7. Scatter-Preventing Method during debris removal (under consideration)

	Debris removing area			common		
measures for scattering prevention	wetting		suction	Reduction of the air volume		wetting
Figure						
how	Dispersing the scattering inhibitor	Spraying water mist	Local Exhauster	Windbreak sheet	Simple balloon	sprinkler
when	- Before and after the operation day - Just before operation	- While cutting and crushing debris	-While cutting and crushing debris -Facet sealed was open	—	—	- Rising density or alarming of dust monitor (emergency) -Holding moisture is needed (regularly)
where	-Operation area of the day -Cut on and crush debris -outcrop of debris	-Cut on and crush debris -outcrop of debris	-Cut on and crush debris -outcrop of debris	Install windbreak sheet on beams	Opening of device hatch, to operation floor	Operation floor
note		Spraying method is under consideration	Detail is under consideration	Specification is under consideration	Installed before starting dismantling	Construction method is under consideration

We will mock up of debris removal and consider the method of dispersing and frequency.

8. Comparison of Scatter-Preventing Methods (Unit 3 and Unit 1)

		Unit 3 *1	Unit 1
Scattering inhibitor *3	Dilution Concentration	1/10	
	Quantity of Dispersion	1.5kg/m2	< 1.5kg/m2 *2
	Frequency	■ dispersing to operation area, before and after operation	■ dispersing to operation area, before and after operation ■ dispersing before operation such as cut and crush debris to prevent rise of radioactive density ■ to whole area, a time per month to keep the adherence of scattering inhibitor
water spraying		Not use	use
Local Exhauster		Not use	use
Windbreak Sheet		Not use	use
Sprinkler		Not use	use
other		—	Contracting opening space to operation floor

*1 It is the standard after reinforcing measure based on the event of high dust density (August, 2013)
*2 It is 1.5kg/m2 in principle, but if it is dry in operation floor, more frequently.
*3 We consider whether there is more effective inhibitor than the one used on previous units. In case of using another inhibitor, we will decide dilution concentration and spraying amount based on experimental results.