

Survey on Upper Space in 1st Floor of Fukushima Daiichi Nuclear Power Station Unit 2 Reactor Building

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Tokyo Electric Power Company



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1. Purpose and background

Purpose

To perform **dose measurements** and **obstacle search** in the upper space of the Reactor Building's 1st floor using a "high-access survey robot", and reflect the results into **decontamination and shielding plans** and **PCV investigation and repairing plans** to be developed later.

This time, in Unit 2 where the radiation dose is relatively low, the west area accessible by the robot will be covered in the survey. Later on, based on the survey results and site conditions, we will determine whether and where to expand the survey and whether and where to apply the robot in the other units.

Background

The national government's project "Integrated Dose Reduction Planning" has given us knowledge that decontamination and shielding of equipment in a higher space are effective in reducing the air dose rate. In the higher space as well, we have items subject to **PCV investigation and repairing**.

→ Information on dose rates and obstacles in the upper space will contribute to efficient creation of work plans.

The high-access survey robot jointly developed by the National Institute of Advanced Industrial Science and Technology and Honda Motor Co. Ltd. will be applied in a joint research conducted by these two companies and TEPCO.



Conditions in upper space in R/B's 1st floor (Unit 2, as an example)

2. Overview of the high-access survey robot

3



Name: High-access survey robot

Developer: - National Institute of Advanced Industrial Science and Technology (an independent administrative institution)
- Honda Motor Co., Ltd.

※The robot will be applied under the joint study agreement of the three parties including TEPCO.

Length	1760 mm
Width	830 mm
Height	1800 mm (when being transported/travelling)
	7030 mm (maximum reach)
Arm length	1730 mm
Weight	1100 kg

[Capabilities] For condition investigation in high and narrow areas, the robot is capable of:

- ✓ Recording still images
- ✓ Measuring dose rates
- ✓ Measuring temperature and humidity
- ✓ Acquiring 3-D data (with LRF; Laser Range Finder)
- ✓ Being remotely controlled via wire communication (also possible via wireless communication)

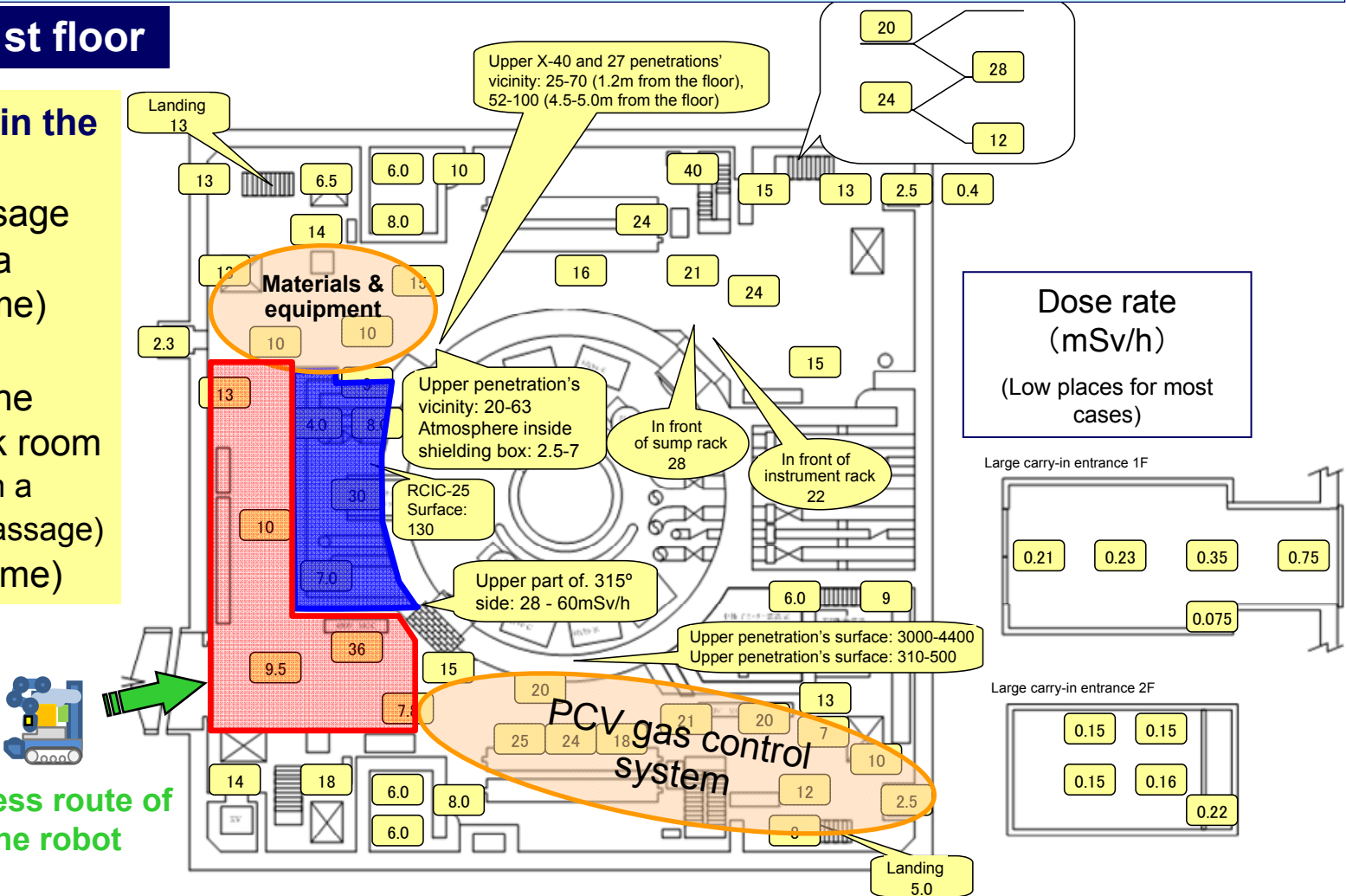
3. Areas covered in the survey (in the first floor of Unit 2 Reactor Building)

● In Unit 2 for which R/B interior decontamination and PCV investigation are to be conducted first, the high-place survey using the robot will be conducted in the R/B 1st floor. The survey covers an area currently accessible by the high-access survey robot, which continues from the west-side passage to the southwest area, in the R/B 1st floor.

Unit 2 R/B 1st floor

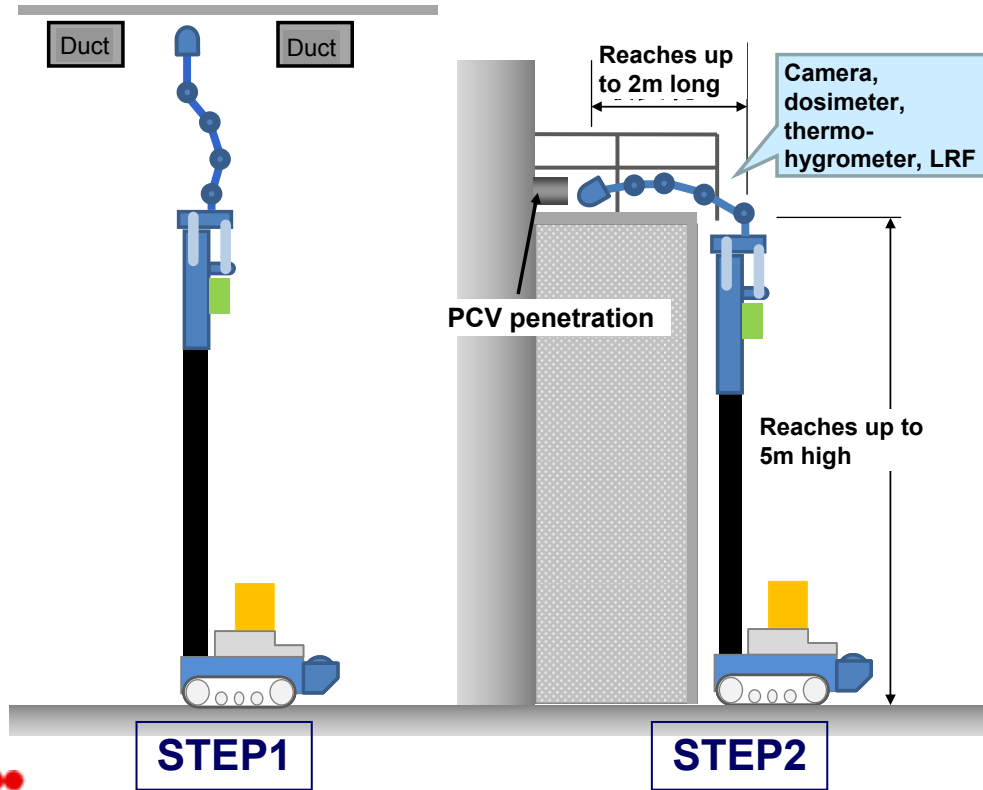
Areas covered in the survey

- West-side passage
- Southwest area (within a red frame)
- Upper part of the personnel airlock room (to be checked with a camera from the passage) (within a blue frame)



4. Survey coverage

	Survey coverage	Survey contents
STEP1	Survey on the upper space	<ul style="list-style-type: none"> ● Dose rate measurement ● Obstacle search
※Whether to proceed to STEP2 will be decided based on the results of STEP1		
STEP2	Survey on the PVC penetration vicinities at high places	<ul style="list-style-type: none"> ● Dose rate measurement ● Obstacle search



- ① [STEP1] While obtaining information on conditions of the upper space, the arm will perform dose rate measurement and obstacle search up to the highest point it can reach without being blocked by equipment.
- ② Based on the results (still images) of STEP1, the upper space will be checked as to whether there is any room accessible by the arm.
- ③ [STEP2] Survey will be conducted with the arm positioned close to PCV penetrations at high places.

Illustration of survey using the high-access survey robot

5. Survey outline

◆ Implementation date

June 18 (Tuesday), 2013 [Optional extra day: June 19 (Wednesday), 2013]

◆ Devices to be used

1 high-access survey robot and 1 PackBot robot

※1 Quince2 robot to be used for restoring communication with the robot when the communication is lost

◆ Implementation unit

9 TEPCO employees (5 at Main Anti-Earthquake Building and 4 on site)

5 Cooperative company employees (2 at Main Anti-Earthquake Building and 3 on site)

◆ Planned dose

Planned dose [mSv/person]	No. of people	Tasks
2.0	7	Setup, removal and moving of robots
5.0	2	Retrieval of robots in case of trouble (inside R/B) (assigned to 2 people from those stationed at Main Anti-Earthquake Building)