<Reference>

Survey (STEP2) on the PCV Penetration Vicinities at High Places in the 1st Floor of Unit 2 Reactor Building at Fukushima Daiichi Nuclear Power Station

July 22, 2013

Tokyo Electric Power Company

TEPCO 東京電力

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.

Survey on PCV penetration vicinities at high places will be performed from **southwest area**, where we have judged there is a possibility that the robot arm may approach from there, based on the results of survey on the upper space in 1st floor of Unit 2 Reactor Building (STEP1) performed on June 18.

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**.

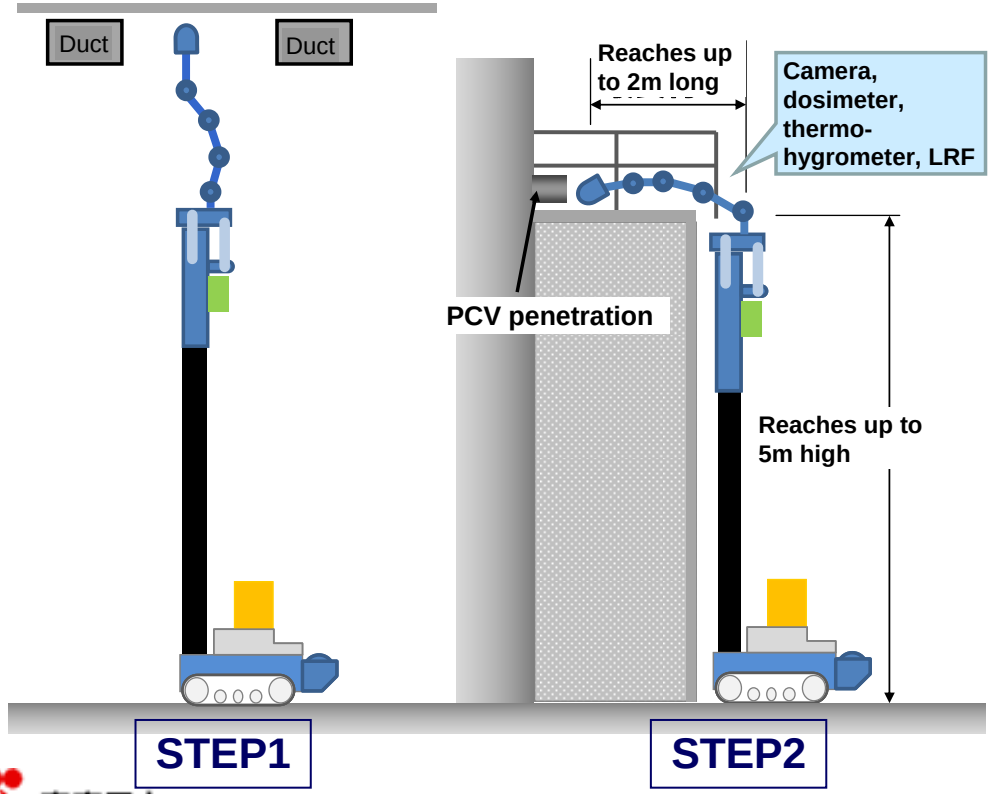
→Information on dose rates and obstacles in the upper space will contribute to efficient creation of work plans.

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. Survey Coverage

	Survey coverage	Survey contents
STEP1	Survey on the upper space	●Dose rate measurement ●Obstacle search
* Whether to proceed to STEP2 will be decided based on the results of STEP1		
STEP2	Survey on the PCV penetration vicinities at high places	●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.

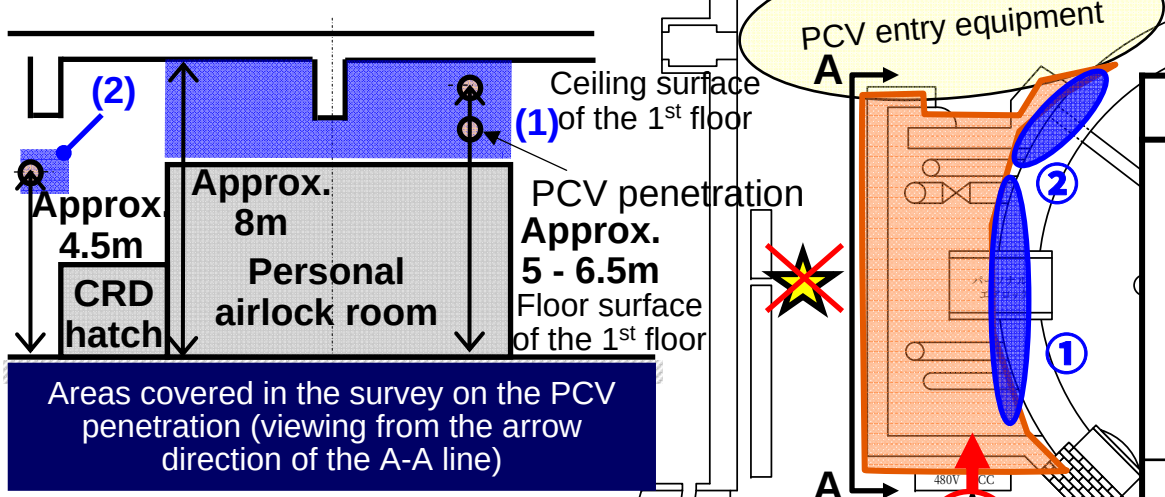
Illustration of survey using the high-access survey robot

3. Areas Covered in the Survey (in the 1st Floor of Unit 2 Reactor Building)

◆Whether to proceed to STEP2 will be decided based on the results of STEP1 if the arm can approach the PCV penetration vicinities at high places on the upper part of the personal airlock room, which is to be surveyed, from candidate location for approaching.

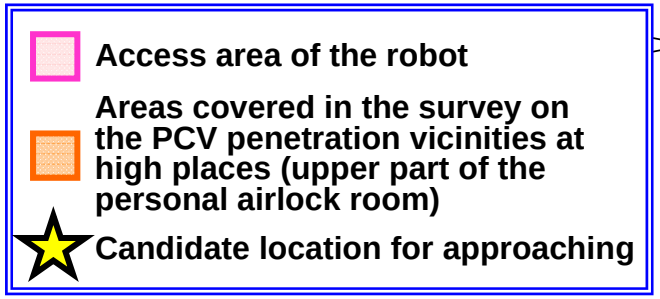
- From West side passage: We have judged that arm cannot approach by avoiding interfering objects.
- From southwest area: We have judged that there is a possibility to approach.

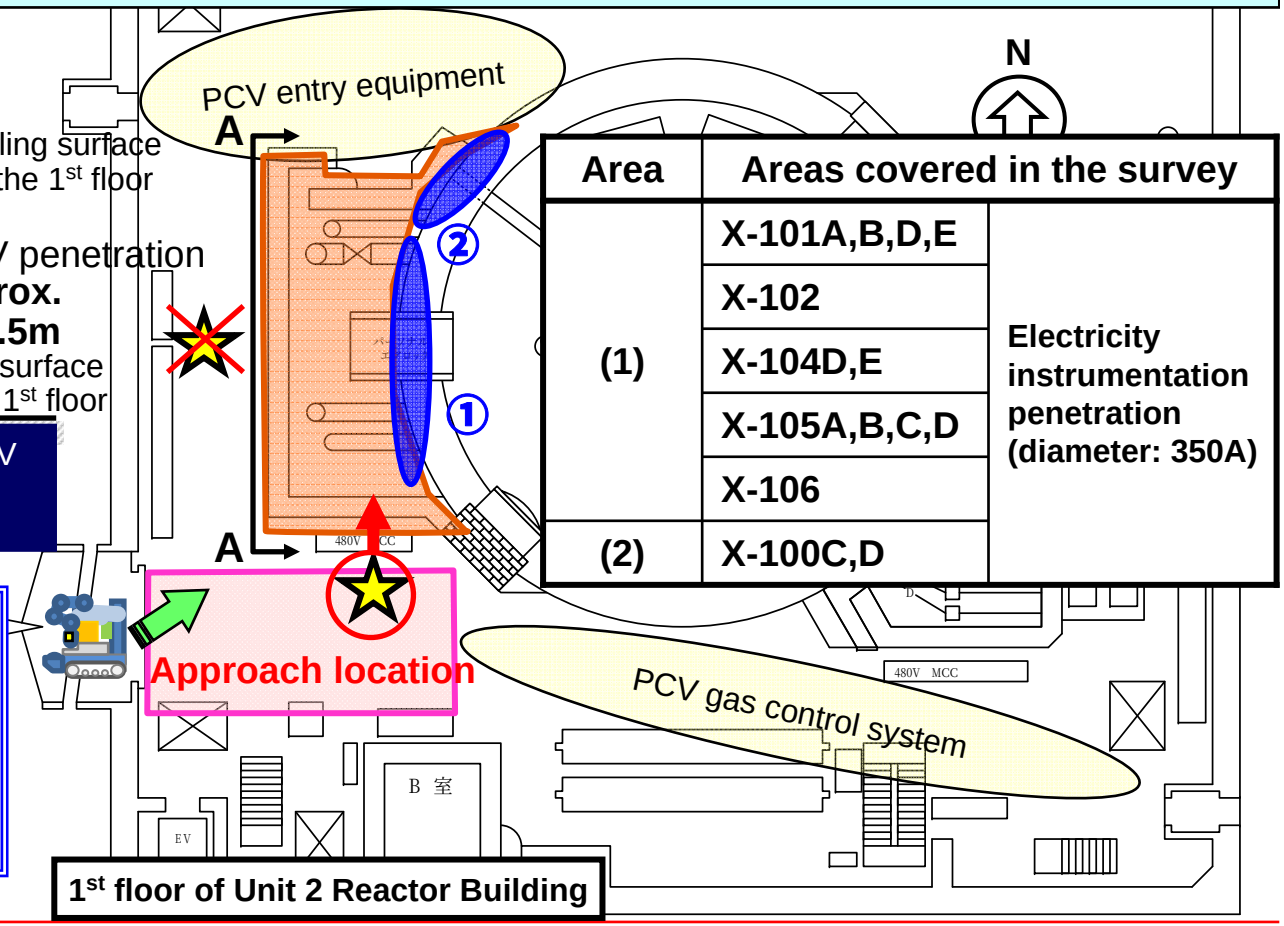
◆As of the PCV penetration (1), condition of a part of the penetration on south side and interfering surrounding objects is expected to be confirmed from approach location, which was selected this time.



Areas covered in the survey on the PCV penetration (viewing from the arrow direction of the A-A line)

Area	Areas covered in the survey	
(1)	X-101A,B,D,E	Electricity instrumentation penetration (diameter: 350A)
	X-102	
	X-104D,E	
	X-105A,B,C,D	
	X-106	
(2)	X-100C,D	

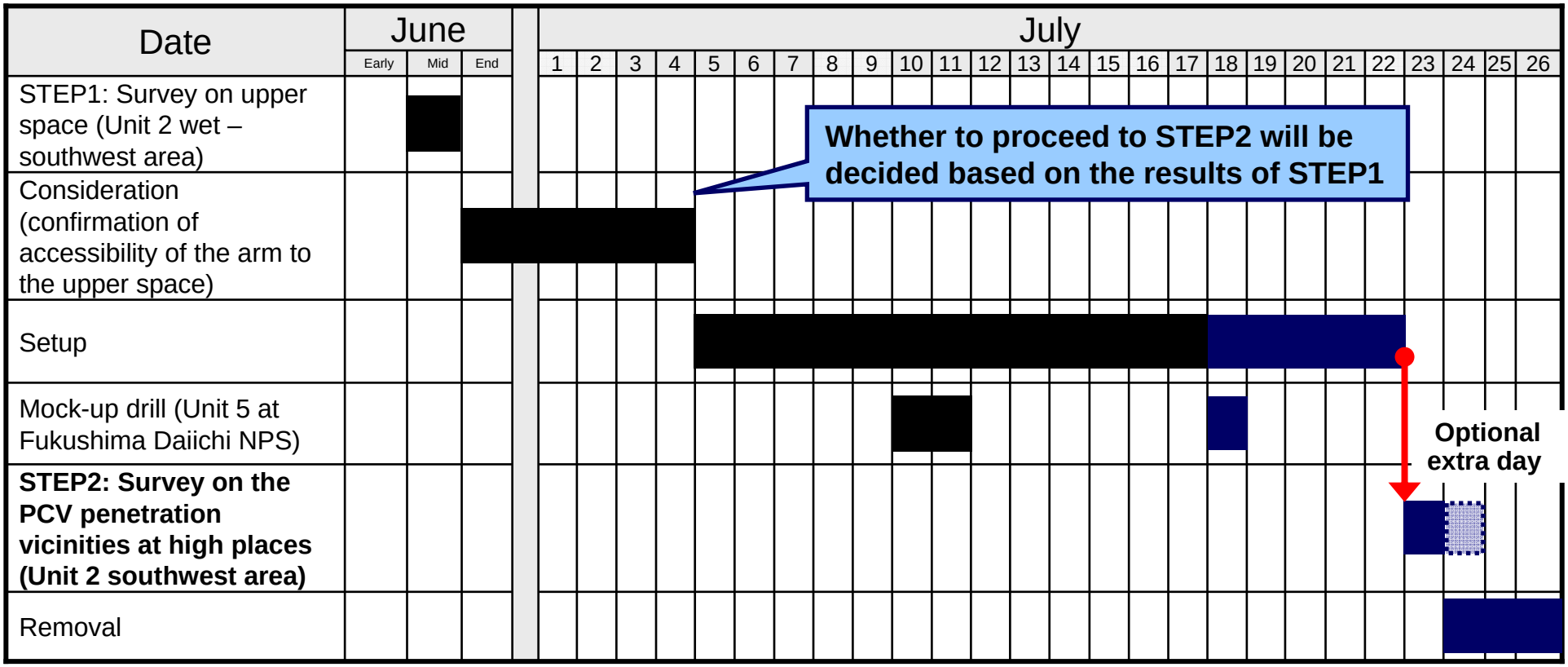




4. Work Plan

Schedule (tentative)

: Planned schedule : Actual schedule



Planned dose

Work on the day	
- Setup and removal at the site	Plan: 2.0mSv/person (7 workers)
- In case retrieval of robot is necessary	Plan: 5.0mSv/person (2 workers)

5. Overview of the Survey

◆Implementation date

July 23 (Tue), 2013 [Optional extra day: June 24 (Wed), 2013]

◆Devices to be used

1 high-access survey robot and 1 PackBot robot

◆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)

[Reference (1)] Survey Results of STEP1 (West - Southwest Area)

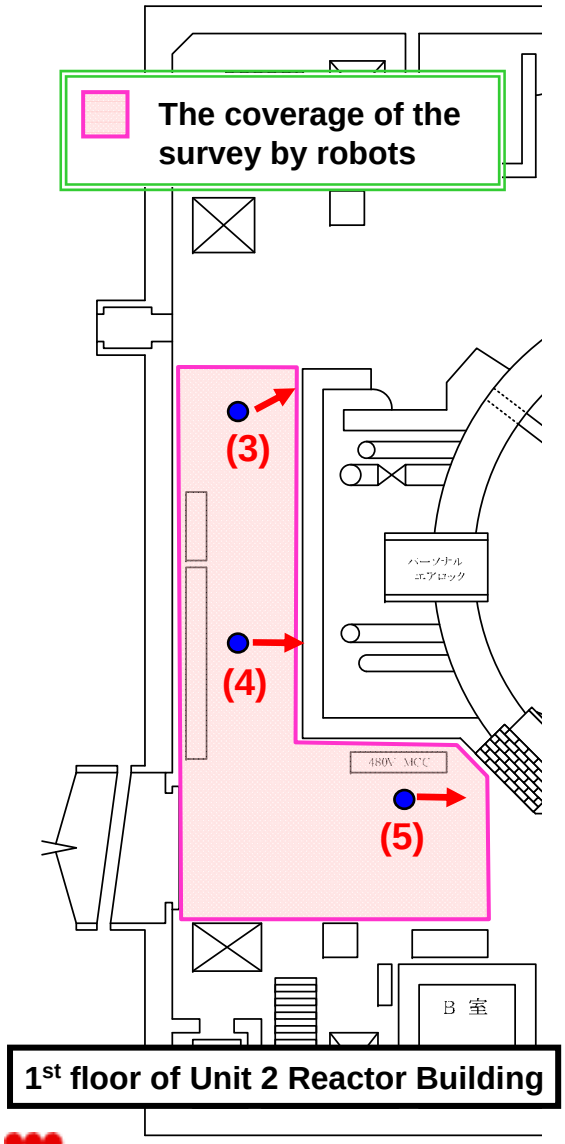


Photo taken at the upper side of the wall side of (3) (4.0m above the floor)

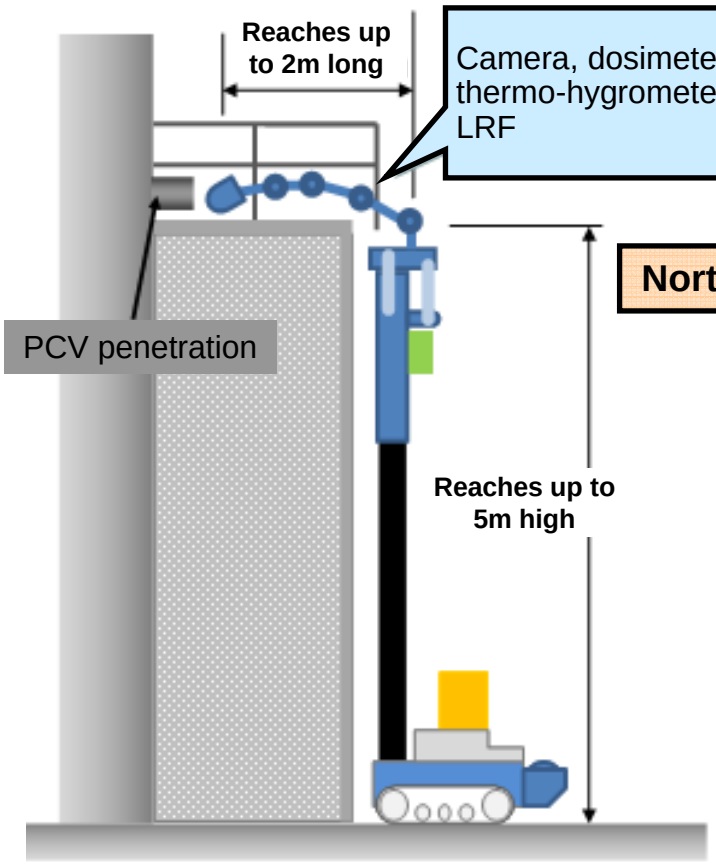
Photo taken at the upper side of the wall side of (4) (4.0m above the floor)

Photo taken at the wall side of (5) (3.5m above the floor)

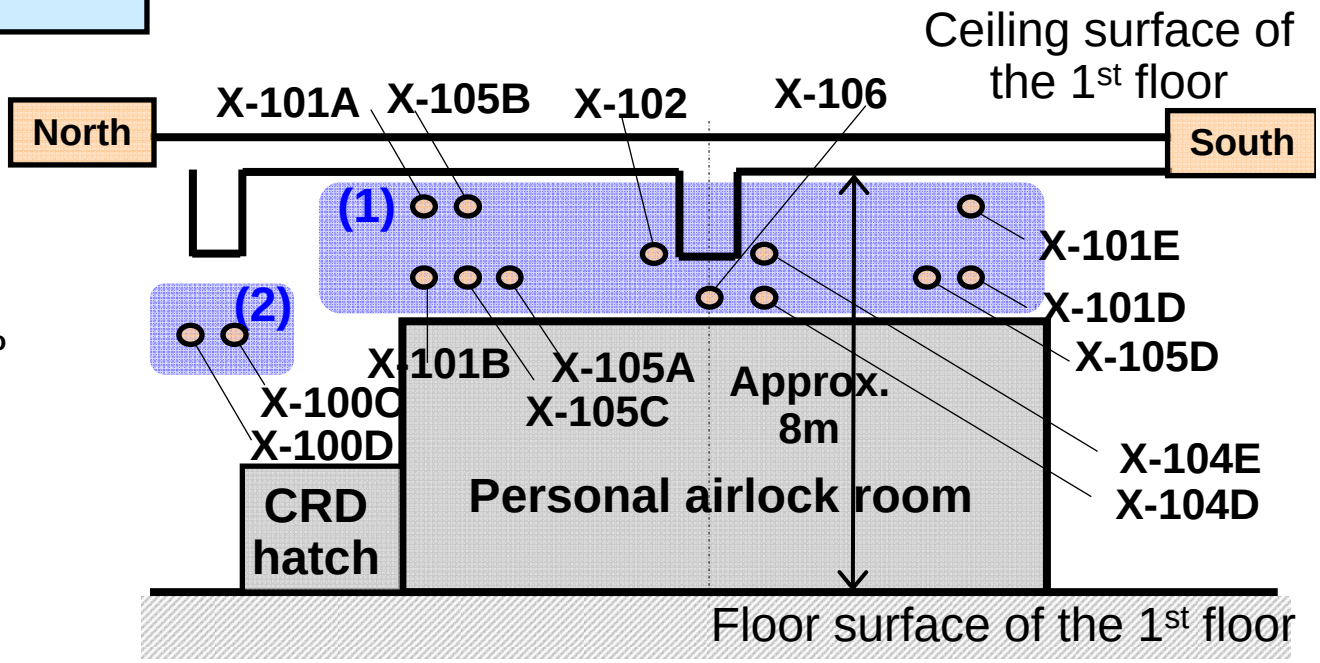
The survey was performed on June 18, 2013.

[Reference (2)] Survey Method at the Site

- Survey will be performed using the arm progressed into the narrow part at high places inside of the Reactor Building.



Survey image



* Only the PCV penetration is indicated as ○.

Positions of the PCV penetration