

# Fukushima Daiichi Nuclear Power Station

## Unit 1 Primary Containment Vessel Internal Investigation (Non-Submerged Area)

### Status Inside the Pedestal

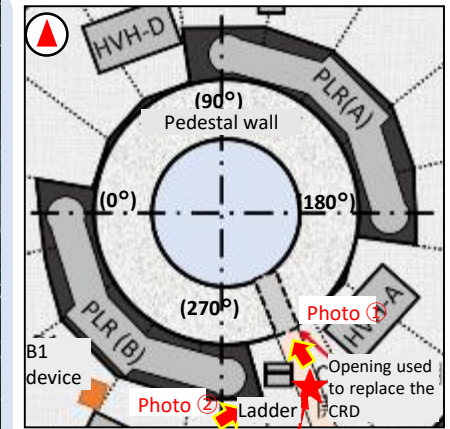
- On February 28, small drones were used to perform an investigation of non-submerged area outside the pedestal of the Unit 1 primary containment vessel (hereinafter referred to as, "PCV") (first day of the investigation). During this investigation, we observed the condition of the PCV penetration (X-6 penetration), the opening used to replace the control rod drive mechanism (CRD) and CRD replacement rails, etc. We have yet to see any substantial damage to equipment or structures within the scope that the investigation was conducted.
- During the internal investigation planned on February 29 (second day of the investigation), the snake-like robot was unable to reach the CRD replacement rails as intended due to issues with paying out the cable. As a result, we decided to perform the investigation after implementing countermeasures.
- After investigating the reason why we were not able to pay out the cable for the snake-like robot it was found that when the cable was being paid out, part of it wrapped around the installation bracket for the guide roller inside the sealed container thereby preventing the cable from being paid out to the PCV.
- At 11:04 AM on March 14, we commenced the Unit 1 primary containment vessel internal investigation (the second day) after implementing countermeasures for the snake-like robot cable issues. At 2:44PM, we completed the second day of the two-day investigation.

< Announced as of March 14 >

- On March 14, we investigated the non-submerged area inside the pedestal using small drones. We observed the status of inner walls of the pedestal, internal structures of the pedestal and fallen control rod drive mechanism (CRD) housing. Inside the pedestal, we found icicle-like adhesions and clump-like objects in the vicinity of the opening used to replace the CRD, and confirmed that there is no substantial damage to the concrete of the inner walls.
- Going forward, we are analyzing the videos taken by the small drones.

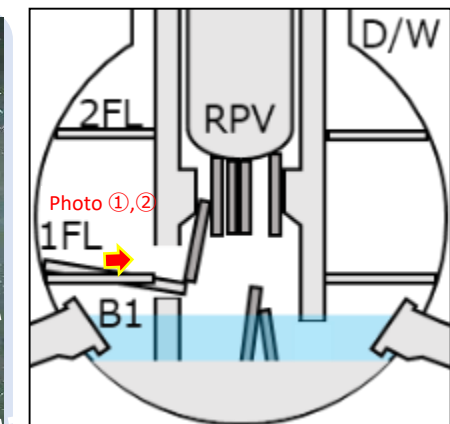
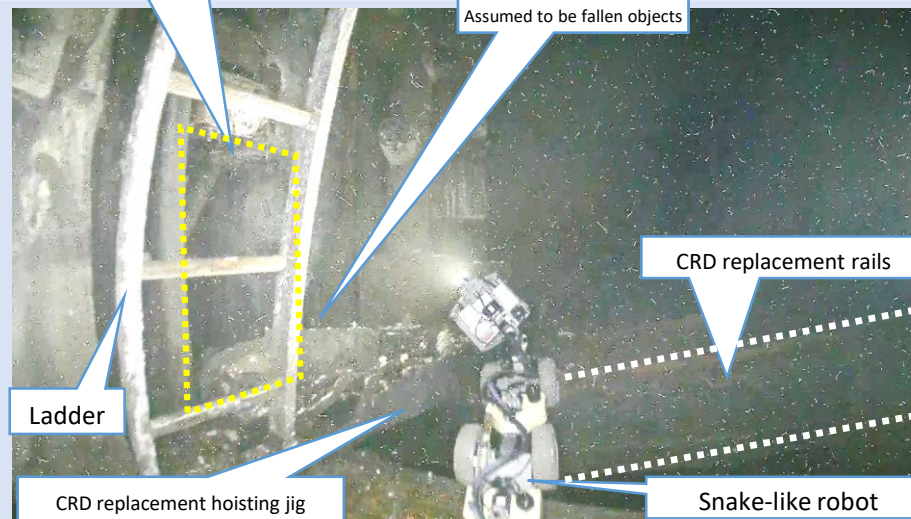
# Investigation Results on March 14 (Around the opening outside the pedestal)

Photo ①: This is a picture of the opening used to replace the CRD taken from outside the pedestal. Although there are fallen objects in front of the opening, there is no substantial damage to the opening walls. The existing structures have experienced some discoloration due to aging, but they retain their original form for the most part.



Snake-like robot standby position  
Enlarged diagram of the first floor inside the Unit 1 PCV (schematic)

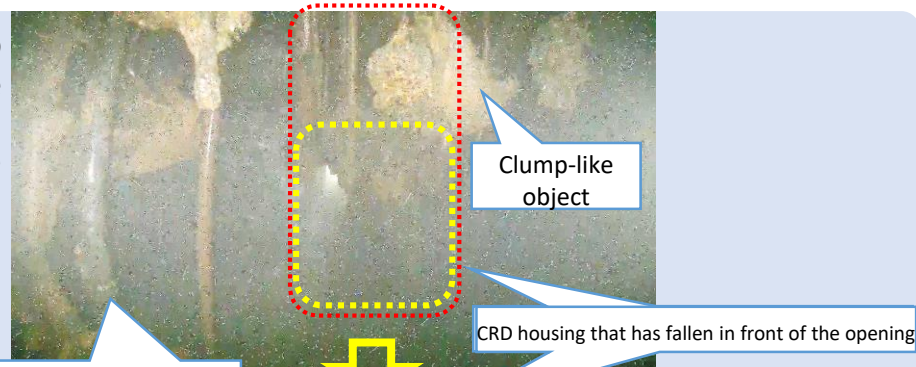
Photo ②: This photo gives a birds-eye view of the snake-like robot in front of the opening used to replace the CRD. Since no major obstructions were found in the vicinity of the CRD replacement rails during the February 28 investigation, the snake-like robot relayed radio signals from the location of the CRD replacement rails as planned.



Cross-section of the inside of the Unit 1 PCV (schematic)

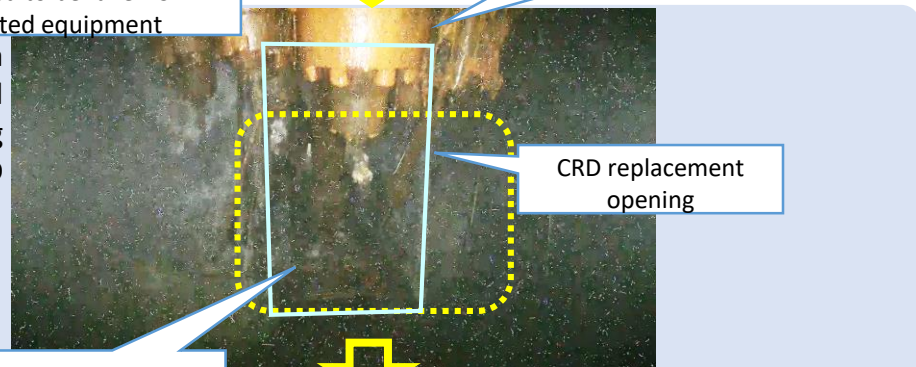
# Investigation Results on March 14 (CRD housing in the vicinity of the CRD opening inside the pedestal)

- Photo ①: This is a photo of the CRD housing that has fallen near the opening used to replace CRD taken from inside the pedestal. Icicle-like adhesions are seen at the top.

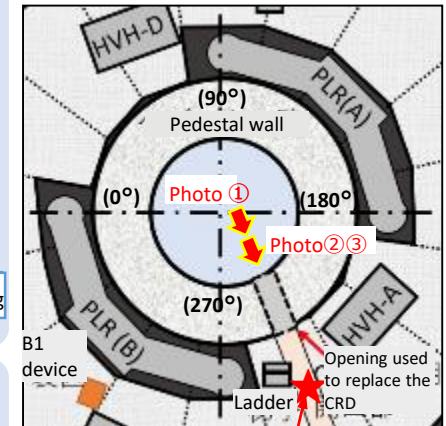
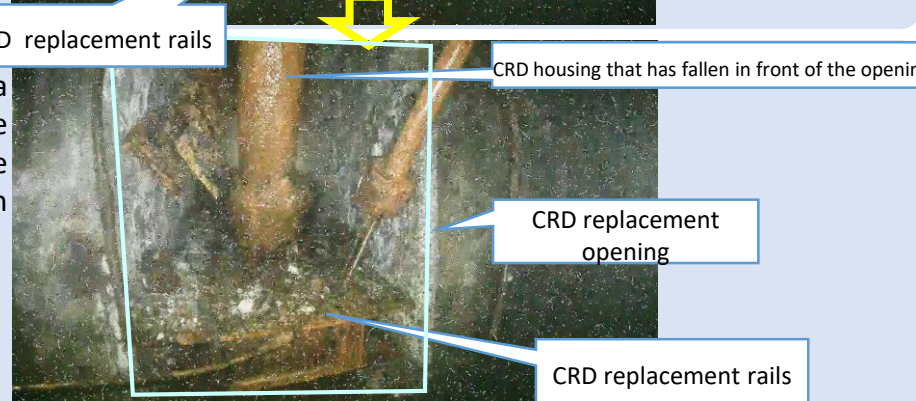


Assumed to be fallen CRD related equipment

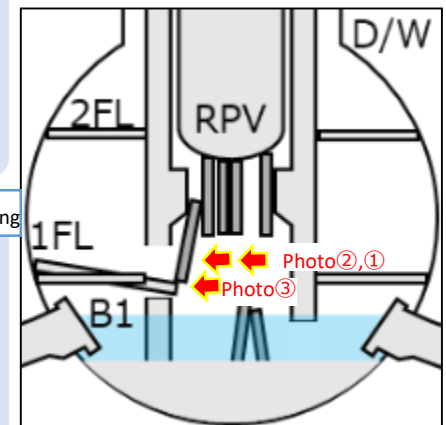
- Photo ②: This is a photo of the area surrounded by the yellow dotted line in photo ①. The CRD housing fell with multiple pieces of CRD related equipment.



- Photo ③: This is a photo of the area surrounded by the yellow dotted line in photo ②. It appears that the bottom of the CRD housing fell on top of the CRD replacement rails.



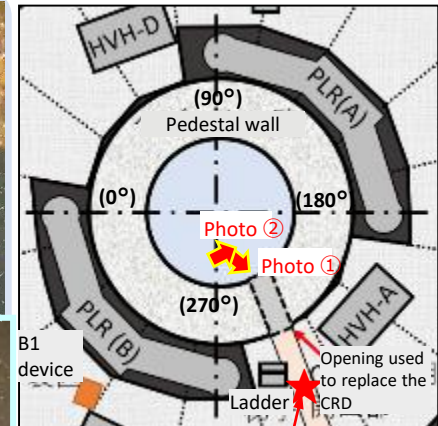
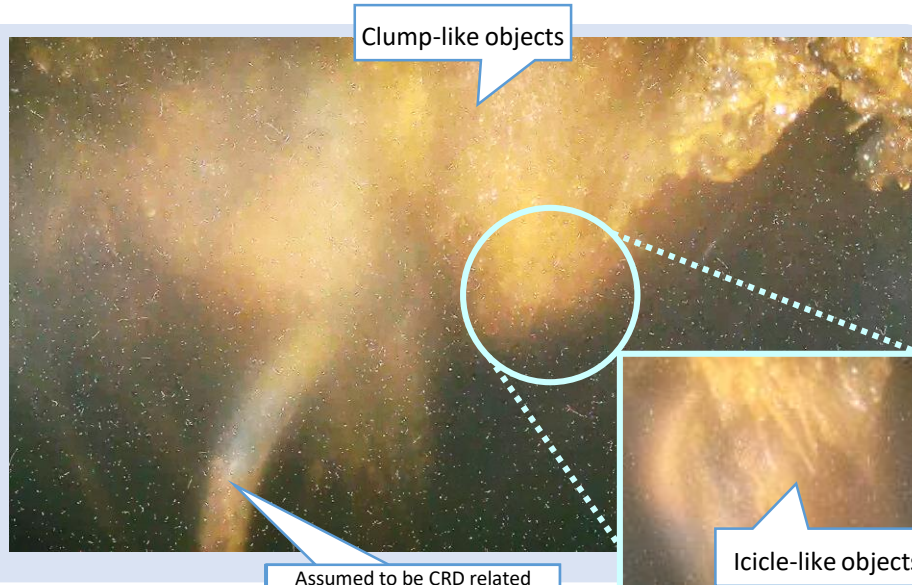
Snake-like robot standby position  
Enlarged diagram of the first floor inside the Unit 1 PCV (schematic)



Cross-section of the inside of the Unit 1 PCV (schematic)

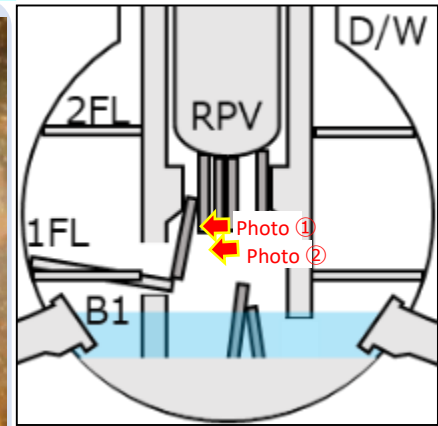
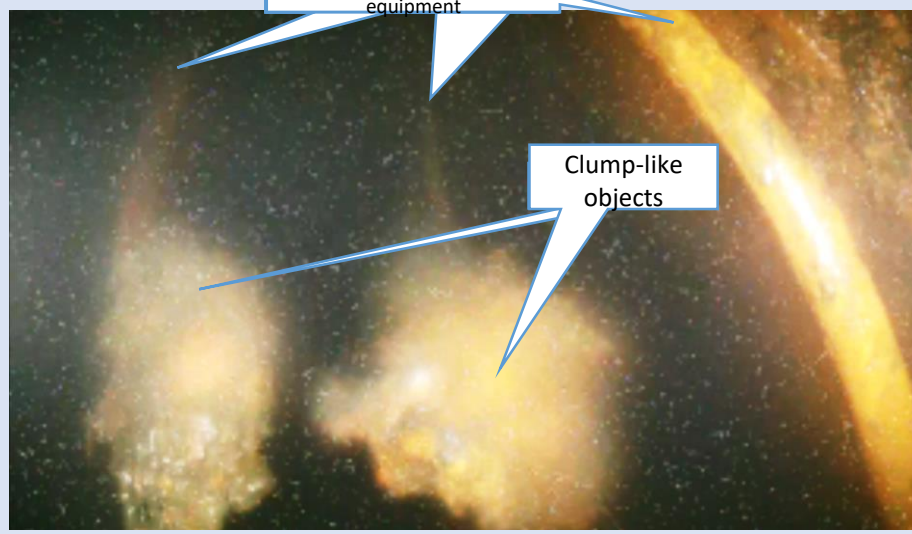
# Investigation Results on March 14 (Clump-like objects in the vicinity of the CRD opening inside the pedestal)

■ Photo ①: There are clump-like objects on top of the CRD housing that has fallen in the vicinity of the opening used to replace the CRD. Icicle-like objects are seen partly on the clump-like objects. Since they concentrate around the top, it is assumed that these objects migrated downward from above.



Snake-like robot standby position  
Enlarged diagram of the first floor inside the Unit 1 PCV (schematic)

■ Photo ②: These are clump-like objects that are further inside the pedestal than the CRD housing that has fallen in the vicinity of the opening used to replace the CRD. They are hanging off of the CRD related equipment. As with photo ①, it is assumed that these objects migrated downward from above.

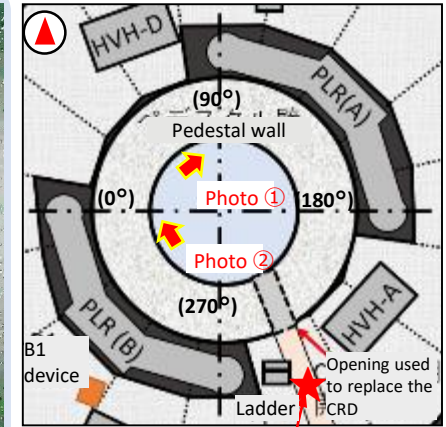
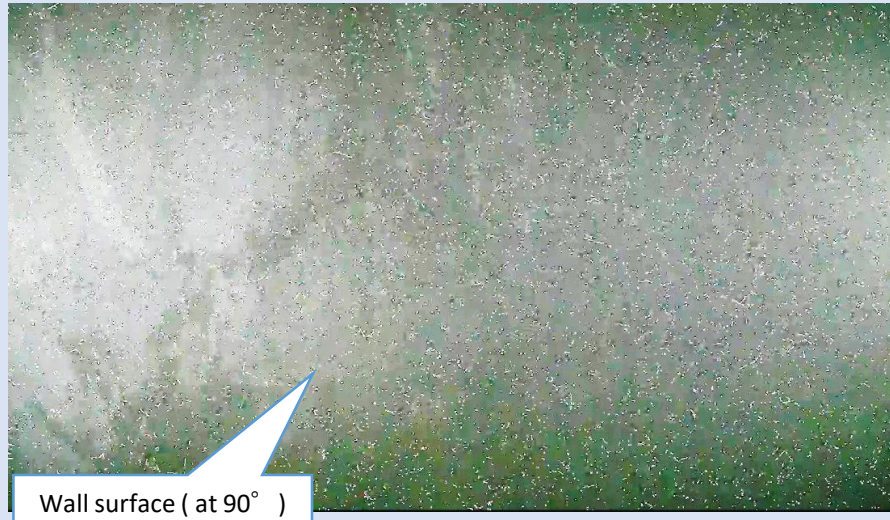


Cross-section of the inside of the Unit 1 PCV (schematic)

\*Videos taken inside the PCV flickers due to radiation and appears foggy due to moisture (fog)

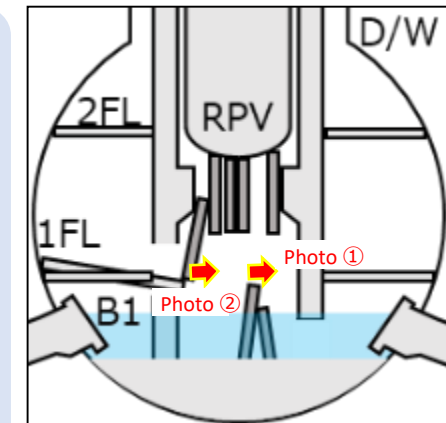
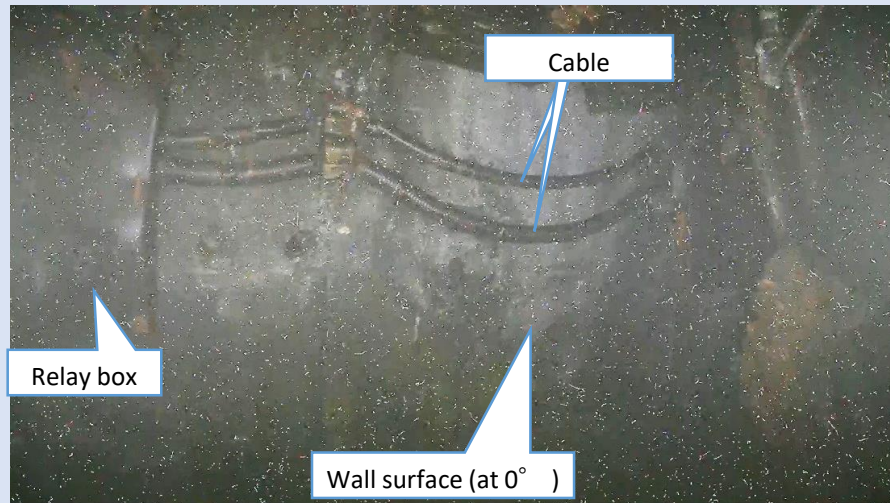
# Investigation Results on March 14 (Pedestal wall inside the pedestal)

- Photo ①: This is a photo of the pedestal wall at 90° inside the pedestal. Although there is some discoloration, but no significant damage is observed, and the concrete is still present. No equipment are found since there had been no equipment installed on this wall prior to the disaster.



Snake-like robot standby position  
Enlarged diagram of the first floor  
inside the Unit 1 PCV (schematic)

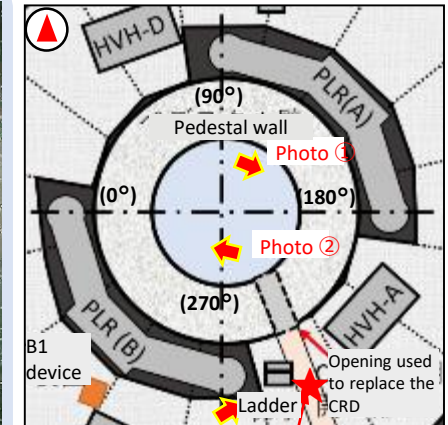
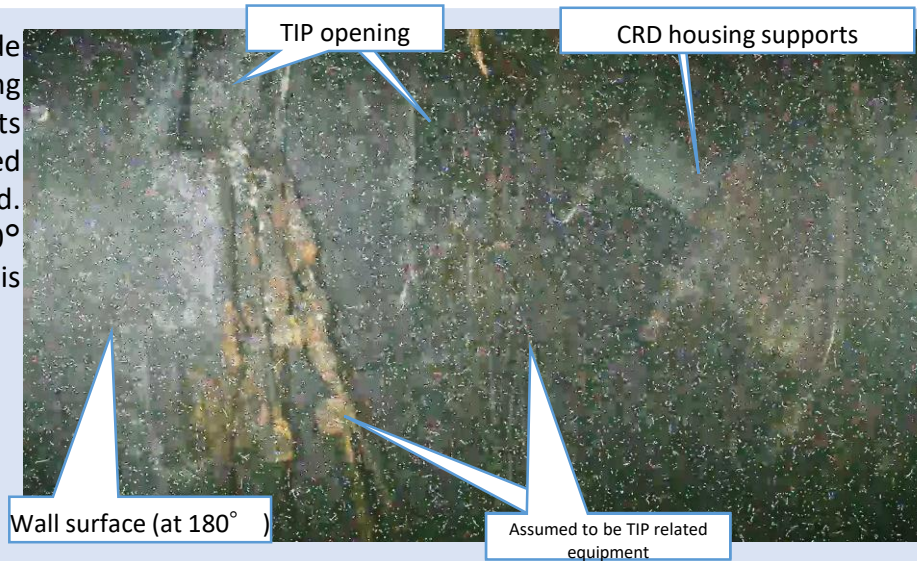
- Photo ②: This is a photo of the pedestal wall at 0° inside the pedestal. As with photo ①, there is some discoloration but no significant damage is observed, and the concrete is still present. Cable relay box, which is assumed to be discolored and deformed, are observed.



Cross-section of the inside of the  
Unit 1 PCV (schematic)

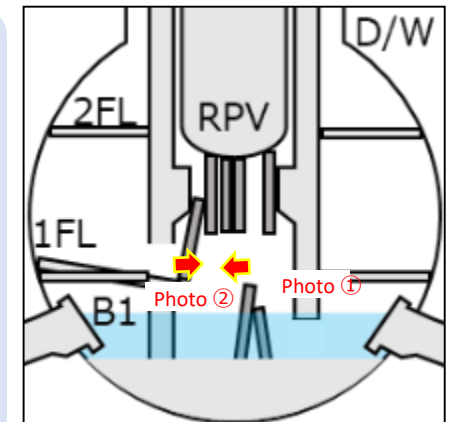
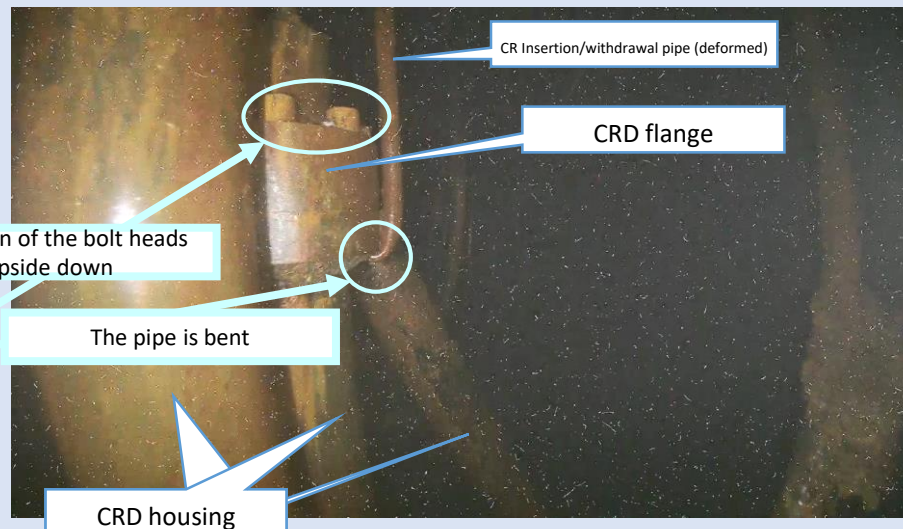
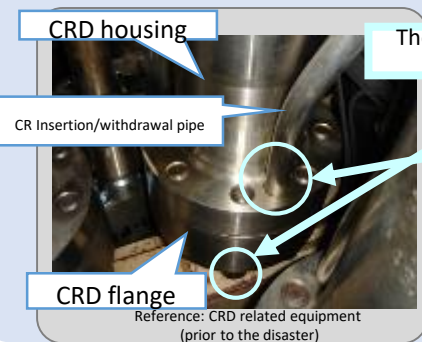
# Investigation Results on March 14 (Structures inside the pedestal)

Photo ①: This is a photo of inside the pedestal at 180°. The existing TIP opening can be seen, and objects assumed to be TIP related equipment are hanging downward. Similarly with the pedestal wall at 0° and 90°, no significant damage is observed.



Snake-like robot standby position  
Enlarged diagram of the first floor inside the Unit 1 PCV (schematic)

Photo ②: This photo shows the CRD housing that has been reversed from its original position. The insertion/withdrawal pipe is deformed.



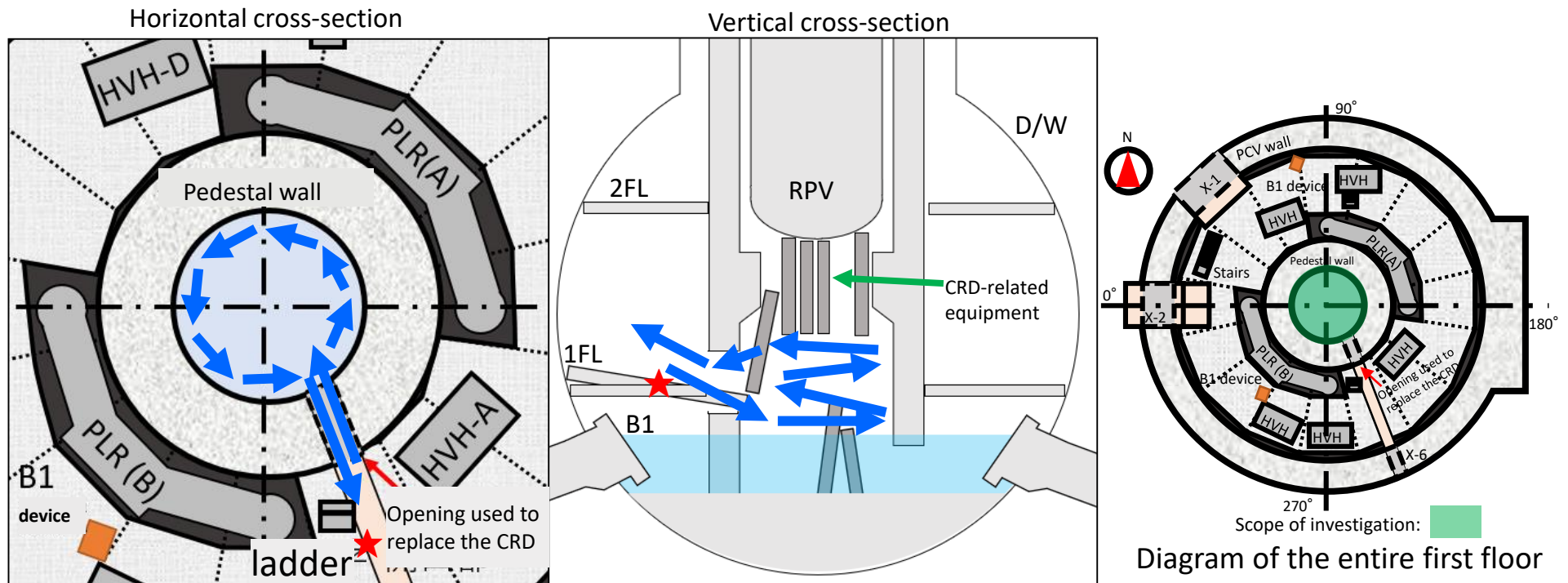
Cross-section of the inside of the Unit 1 PCV (schematic)

\*TIP (Traversing in-core prove) ... An equipment which measures the neutron flux distribution in the (vertical) direction of the axis of the nuclear reactor

\*Videos taken inside the PCV flickers due to radiation and appears foggy due to moisture (fog)

## (Reference) Investigation route (inside the pedestal)

- The investigation of the inside of the pedestal will be conducted using the third and fourth drones
  - Investigation target: Inner walls of the pedestal, internal structures of the pedestal, and condition of the fallen CRD housing
  - Snake-like robot relays radio signals from around the CRD replacement rails
  - The third drone will be used to take as much footage of the inside of the pedestal as possible, and the fourth drone will be used to photograph places of interest found with the third drone
  - Upper structures will be photographed as much as possible, but since the camera is attached to the front of the drone, it will not be able to take pictures directly above it.



Snake-like robot standby location: ★ Flightpath: →

Enlarged view of the inside of the pedestal in the Unit 1 PCV first floor diagram

\* Flightpath and investigation targets may be changed depending on field conditions

## (Reference) Internal Structure of the Pedestal before the Accident

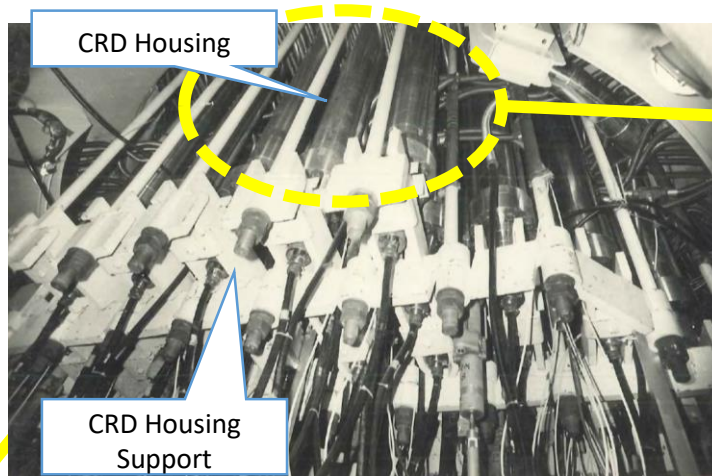
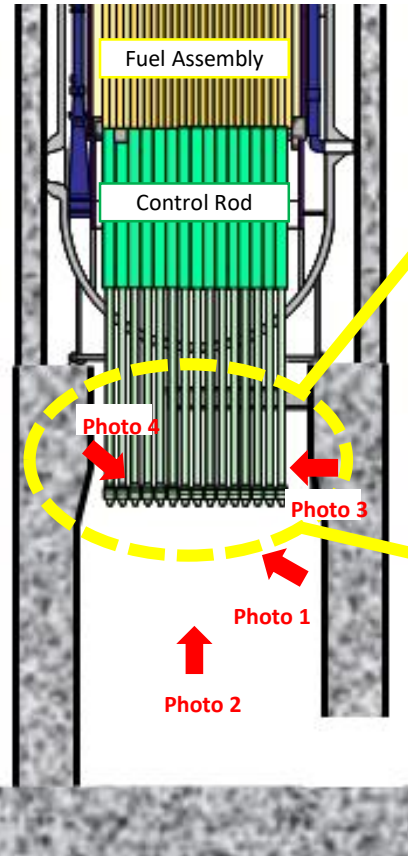


Photo 1. CRD housing support and CRD housings (at the time of the construction)



Photo 2. Looking up toward the upper pedestal (at the time of construction)

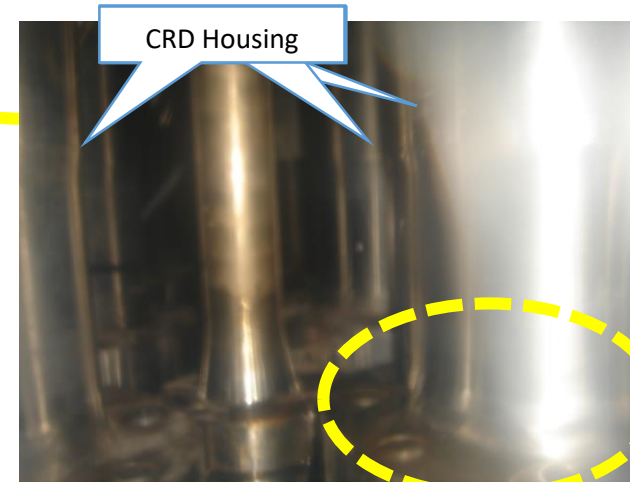


Photo 3. CRD housings (before the accident)

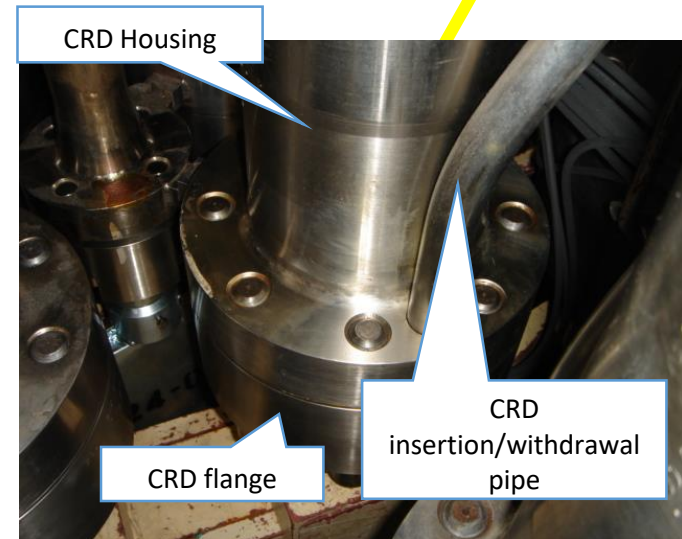


Photo 4. CRD related equipment (before the accident)