

Fukushima Daiichi Nuclear Power Station Unit 2 PCV Internal Investigation/ Status of Fuel Debris Trial Retrieval

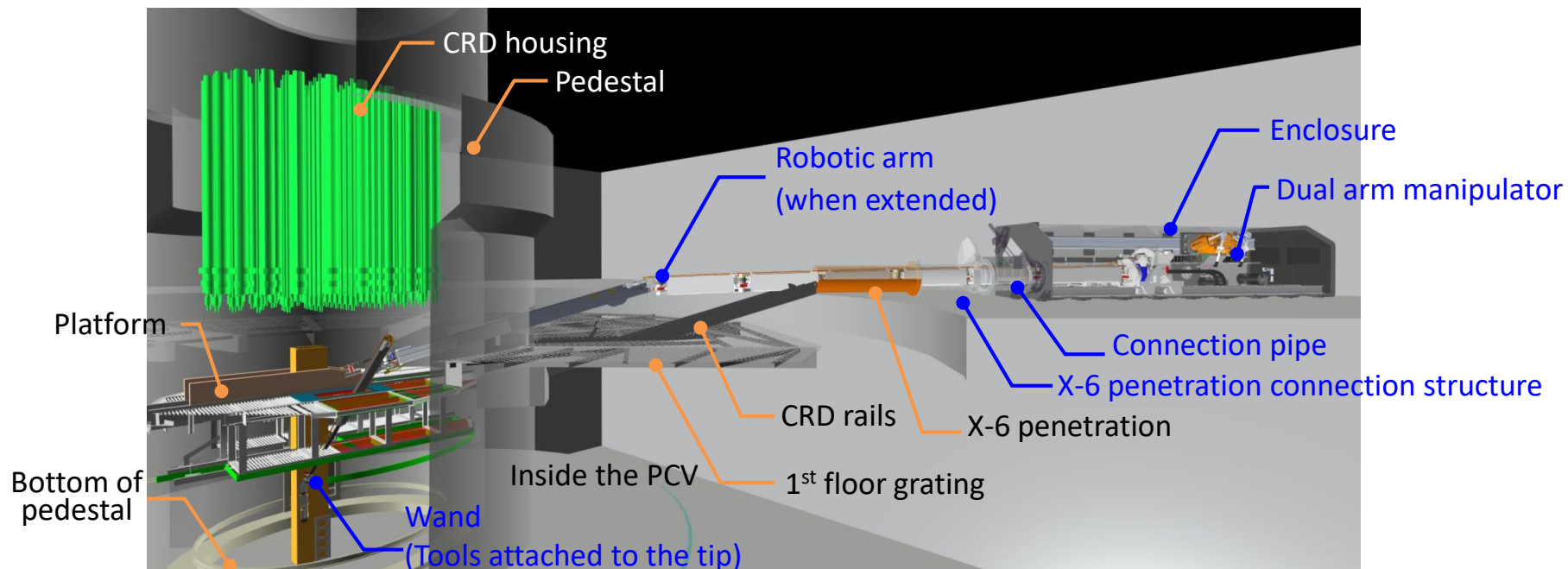
April 23, 2026



International Research Institute for Nuclear Decommissioning
Tokyo Electric Power Company Holdings, Inc.

1. PCV internal investigation and trial retrieval plan overview

- In order to guarantee work safety and prevent the spread of contamination, the following equipment will be installed at the penetration to the Unit 2 primary containment vessel (hereinafter referred to as, "X-6 penetration") that will be used for the PCV internal investigation and also as a preparatory stage of trial retrieval.
 - < Already installed >
 - The X-6 Penetration connection structure isolates the inside of the PCV from the outside
 - The connection pipe shields radiation
 - < To be installed going forward >
 - A metal box that contains the robotic arm (enclosure)
- After installation of the aforementioned equipment, the robotic arm shall be fed into the PCV through the X-6 penetration to remove obstacles inside the PCV while also conducting internal investigations and moving forward with the trial retrieval of fuel debris.



Unit 2 internal investigation/trial retrieval plan overview

2-1. Status of robotic arm tests (performance tests)

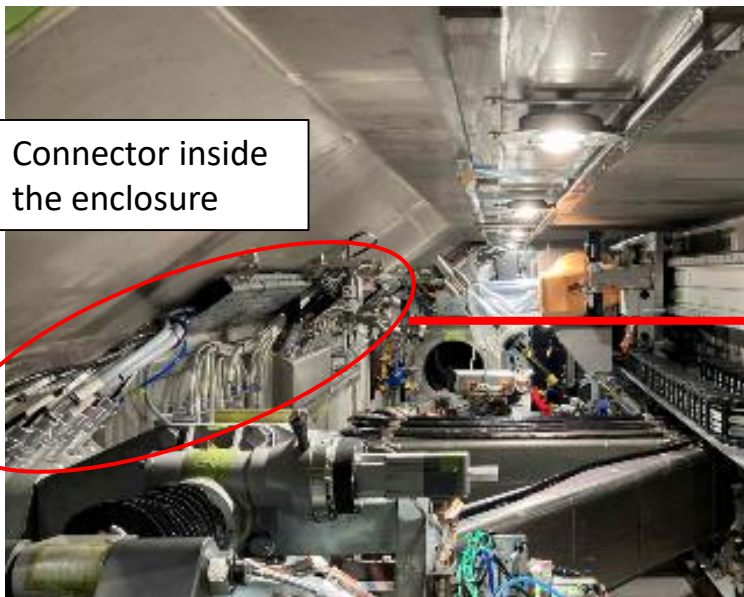
- Performance tests of the robotic arm were completed at the Naraha mockup facility.

Performance tests

Test category	Test	JAEA Naraha
Robotic arm-related	Ability to pass through the X-6 penetration	Completed
	Removing obstructions at the exit for the X-6 penetration using the AWJ	Completed
	Function tests (deflection measurements, etc.)	Completed
	Ability to access the inside of the PCV (accessing the top and bottom of the pedestal)	Completed
	Removing obstructions inside of the PCV (Cutting obstructions inside the PCV after passing through the X-6 penetration)	Completed
Dual arm manipulator-related	Connecting sensor tools to the arms	Completed
	Connecting/removing the external cables to/from the arms	Completed
	Bringing in and removing sensor tools	Completed
	Removing the fixed arm jig	Completed
	Replacing arm cameras/lighting	Completed
	Changing the position of the enclosure camera	Completed
	Forced withdrawal of the arm	Completed
Combined once-through tests (robotic arm + dual arm manipulator)	Sensors/external cables, tools/Installing external cables at the arm	Completed
	Investigation of the top of the pedestal (sensors and wand are installed)	Completed
	Investigation of the bottom of the pedestal (sensors and wand are installed)	Completed
	Constructing an access route (removing obstructions using the AWJ)	Completed
Comprehensive inspection	Comprehensive inspection (maintenance)	Completed
Combined verification tests	Movement checks after comprehensive inspection (maintenance)	Completed

2-2. Status of robotic arm tests (water resistance test status)

- Condensation countermeasures were examined considering the fact that condensation occurs inside the enclosure when the telescopic device is being used.
- As the last part of the test, water was sprayed inside the enclosure to test water resistance. When this was conducted a communications error occurred.
- An investigation into the cause revealed that water seeping inside the connector was the reason for the communications error so caulking was applied to improve water resistance.
- A verification test was performed again after the caulking was applied and the effectiveness of the water resistance countermeasure was confirmed.



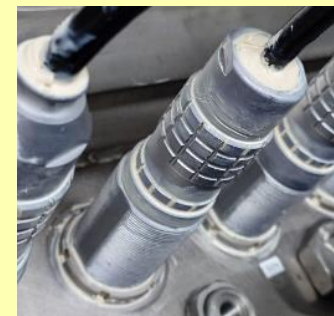
Connector inside the enclosure

Inside the enclosure

※ Photographed from the back of the enclosure



Prior to caulking



After caulking

Connector condition

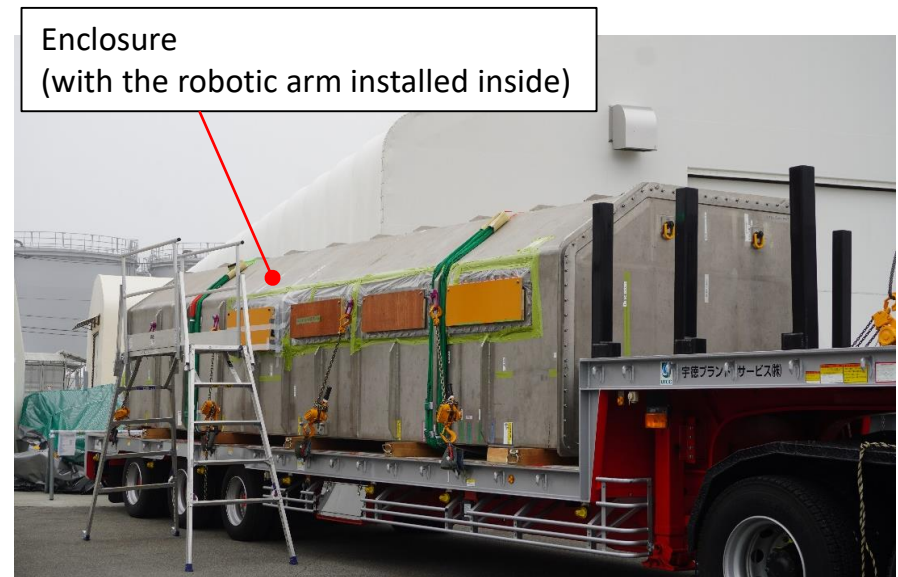
3-1. Installation status of the robotic arm

(Arrival of robotic arm at the Fukushima Daiichi Nuclear Power Station)

- The robotic arm that will be used to conduct an internal investigation of the Unit 2 PCV and also to retrieve fuel debris on a trial basis departed the JAEA Naraha Center for Remote Control Technology Development on April 7, 2026 and arrived at the storage location on-site at the Fukushima Daiichi Nuclear Power Station.
- The equipment was transported to the on-site storage area, and post-transport condition checks were conducted. In addition, following the transport of the robotic arm, the transport of associated auxiliary equipment is currently underway.



Departure from the JAEA Naraha Center
for Remote Control Technology Development

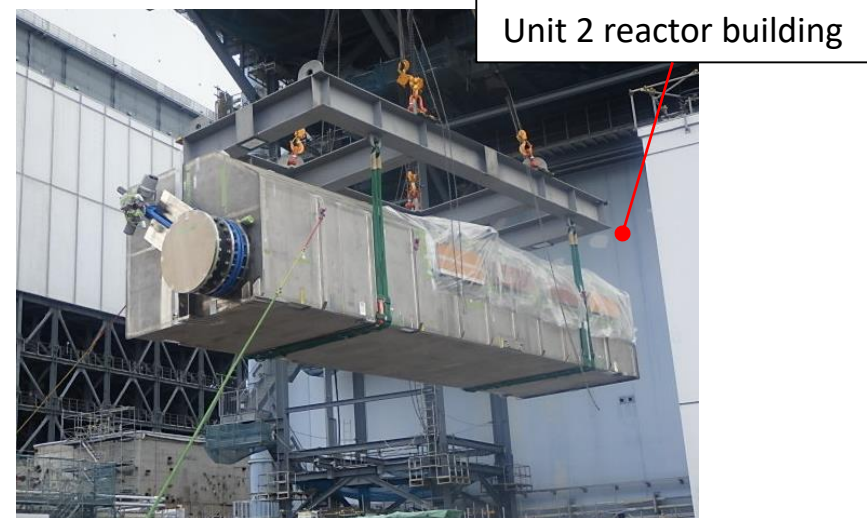
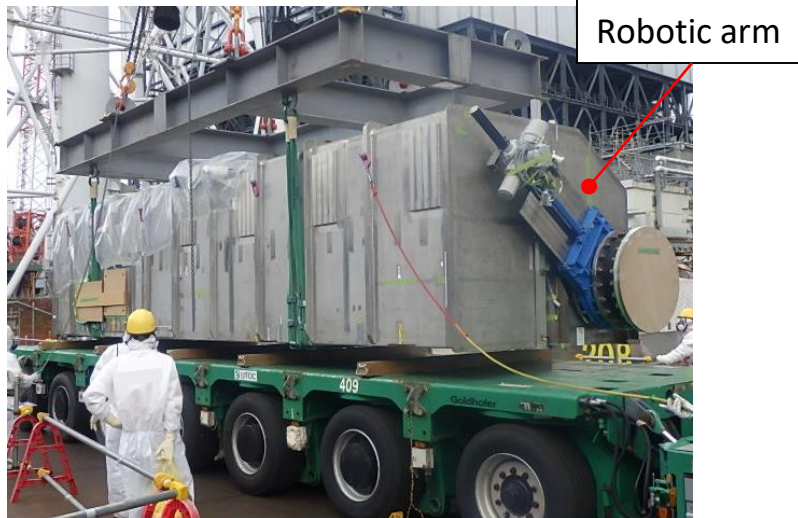


Arrival on-site at the Fukushima Daiichi Nuclear Power Station

3-2. Robotic arm installation status

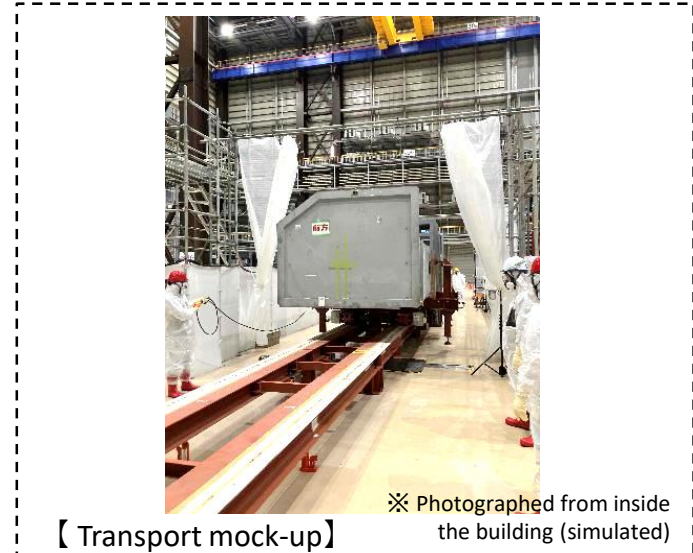
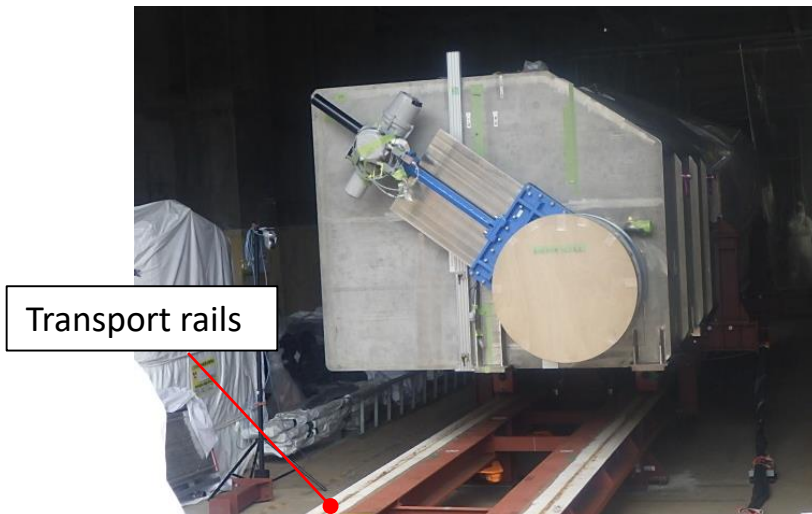
(Transporting of the robotic arm inside the Unit 2 reactor building)

- On April 21, the robotic arm was brought inside the Unit 2 reactor building. After the system was brought inside, it was transported to the southwest area.
- Preparations are currently underway in the southwest area to load the robotic arm onto a remotely operated transport bogie to the northwestern area.



Transporting the robotic arm from the storage location on-site to the Unit 2 reactor building

Hoisting the robotic arm into the Unit 2 reactor building



After transporting the equipment into the Unit 2 reactor building

【 Transport mock-up 】

※ Photographed from inside the building (simulated)

4. Work schedule

- On-site work will be performed using large devices that are completely remotely operated, and the difficulty level of the work is extremely high, so maintenance tasks are being performed on a mockup of the facility that assumes the risks.
- Visibility during camera replacement is being checked, and training on using the manipulator to replace the cameras, as well as operations to withdraw the camera in the event of emergency, are underway. Furthermore, based on the telescopic device troubles, a simulated environment is being used to conduct training on robotic arm and ancillary equipment installation.
- Since verification tests have been completed, the robotic arm was transported to Fukushima Daiichi Nuclear Power Station. Afterward, the equipment was transported the Unit 2 reactor building, and transportation operations inside the building are currently being conducted.
- Thereafter, approximately three to four months will be required for installation. We plan to commence PCV internal investigations and debris sampling during the summer of 2026.

		FY 2026			
		Q1	Q2	Q4	Q4
Robotic arm	Inspection/maintenance, etc., and any additional development required based upon once-through tests/test results				
	Arrival at the Fukushima Daiichi Nuclear Power Station				
	Installation preparation, etc./ access route construction				
	Internal investigation/debris sampling				

: Completed

: Commencement and completion dates under review

1. Isolation chamber installation

2. Opening of the X-6 penetration hatch

3. Removal of deposits from inside the X-6 penetration

Removing deposits/cables from inside the X-6 penetration

- Deposits pushed with low/high-pressure water
- Cables removed with Abrasive water jet
- Cables pushed with dozer rod

4. Installation of X-6 penetration connection structure and connection pipe

The connecting structure and connection pipe will be installed at the X-6 penetration and the boundary will be changed from the isolation chamber to the connection structure.

5. Installation of telescopic device
6. Trial retrieval (debris sampling using telescopic device)

7. Robotic arm installation

8. Internal investigation/debris sampling using robotic arm

① Internal investigation

Remove obstructions (CRD rails, electric wire conduits, etc.) using abrasive water jet attached to end of the arm

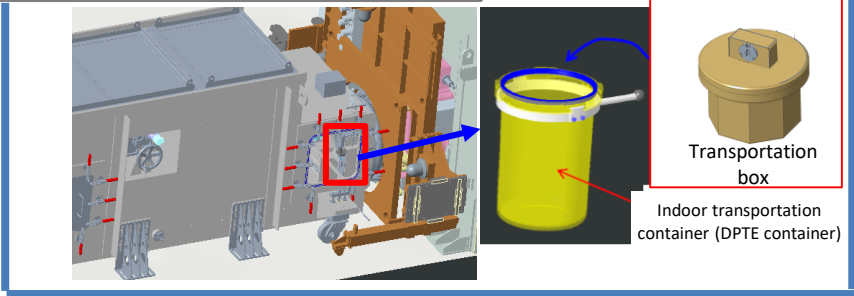
(Note)
Isolation valve: Valve installed to separate the inside of the PCV from the outside
Abrasive Water Jet: Combines high pressure water with an abrasive to improve cutting ability

② debris sampling using robotic arm

End of fuel debris recovery device
<Metal brush> <Vacuum chamber>

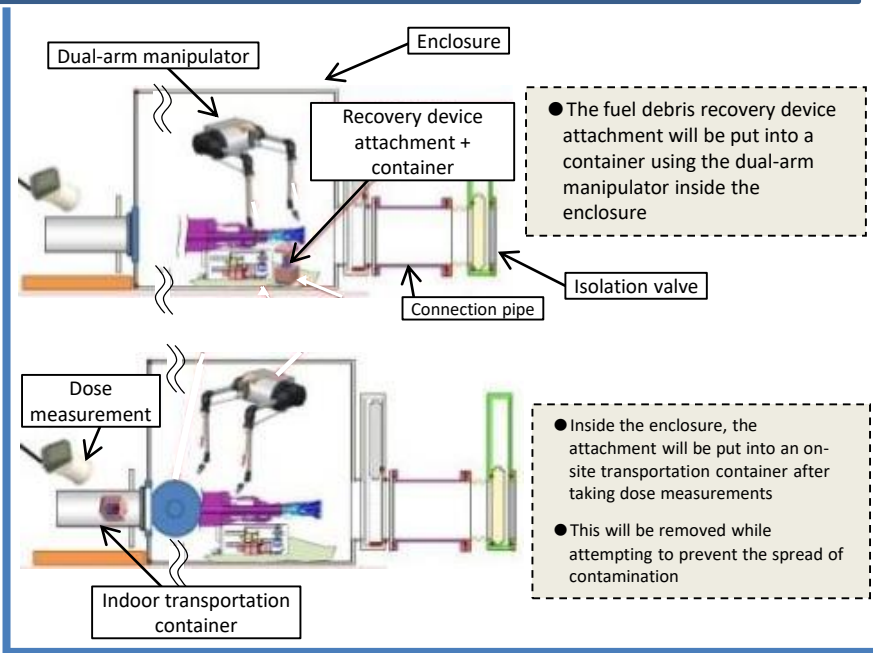
↓ (From Step 6 on the previous slide)

9-1. Collection of fuel debris

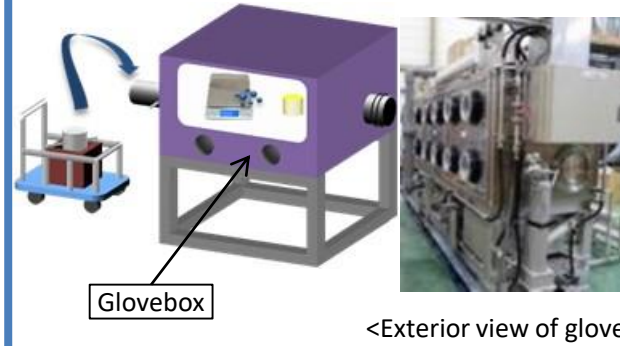


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9-2. Inserting the fuel debris recovery device attachment into a container, Inserting into an on-site transportation container/Dose measurements

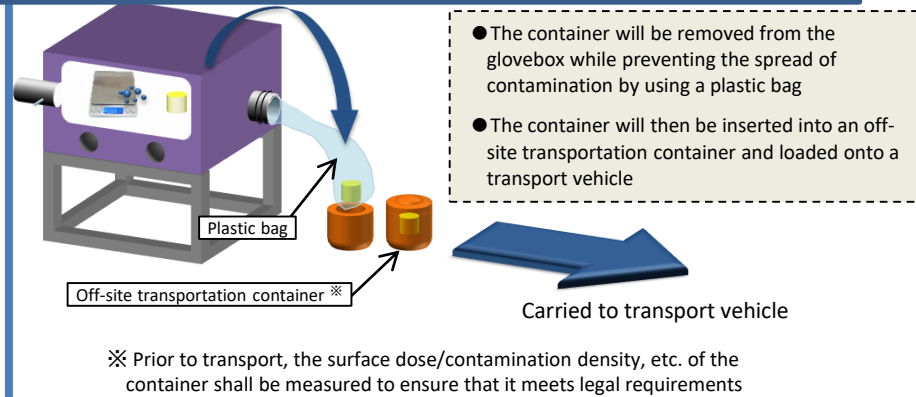


10. Insertion into glovebox/Measurement



- The collected samples will be put into a negative pressure glovebox
- The samples will be subjected to various measurements inside the glovebox and then put into a container

11. Container removal/Insertion into transportation container /Removal from premises



12. Off-site transport and off-site analysis

(Note)

DPTE Container is an abbreviation of “Double Porte pour Transfert Etanche”. By opening/closing the lid of the container and double door of the glove box at the same time, it allows the items to be transferred while maintaining a sealed environment.