

Fukushima Daiichi Nuclear Power Station Unit 1 Progress of Fuel Removal from Spent Fuel Pool

November 27, 2025

Tokyo Electric Power Company Holdings, Inc.

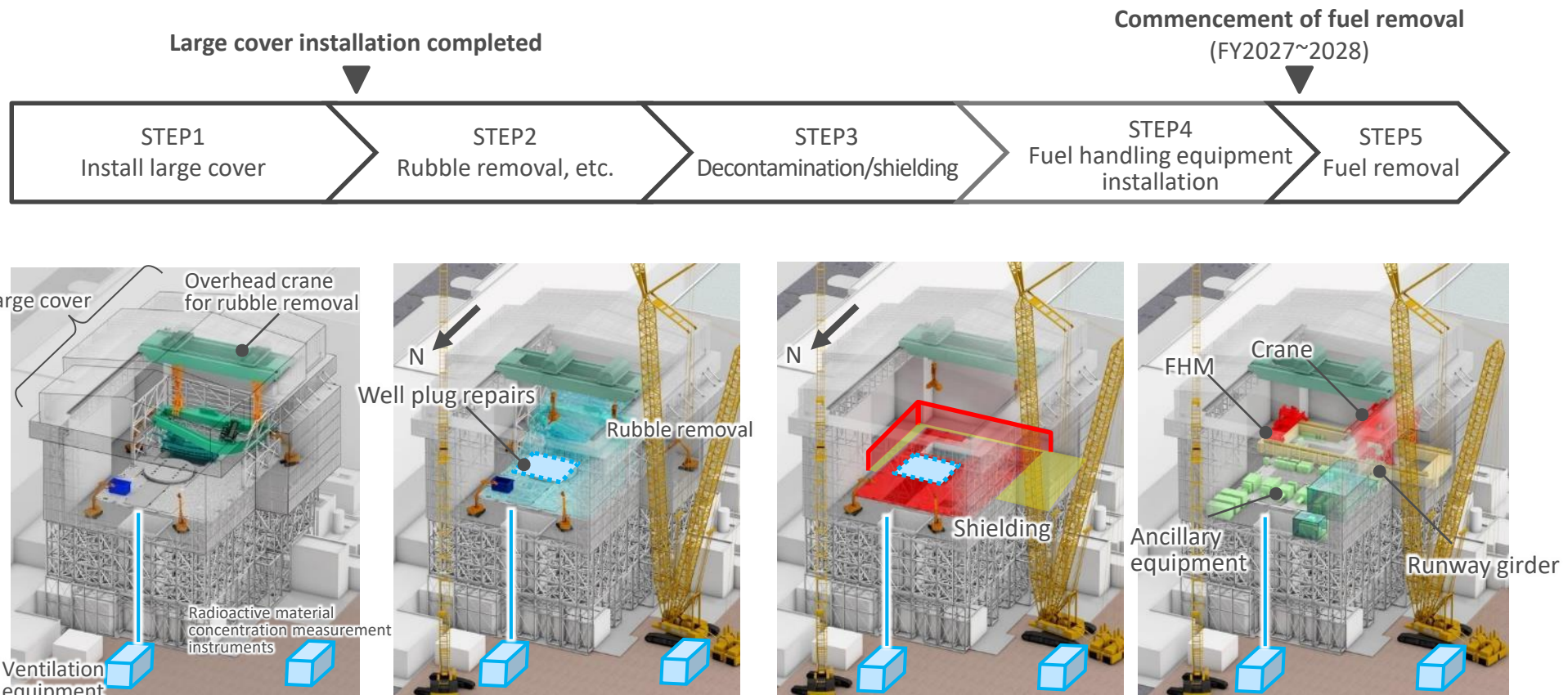


1. Fuel removal from the spent fuel pool plan overview

- The 392 fuel assemblies* are being stored in the Unit 1 spent fuel pool will be removed in order to relocate them to the common pool where they can be cooled and stored in a more stable manner.

* 292 spent fuel assemblies and 100 fresh fuel assemblies

- Prior to fuel removal, a large cover that encompasses the entire reactor building will be built, rubble removed from under the large cover, the operating floor decontaminated/shielded, and fuel handling equipment (fuel handling machine (FHM) and crane) installed.



※These are just concept diagrams and actual location may differ.

2-1. Large cover installation status (on-site)

- Assembly of all 14 blocks of the box ring was completed on October 12, 2025.
- The first of a total of six blocks of the retractable roof was installed on November 7, 2025.

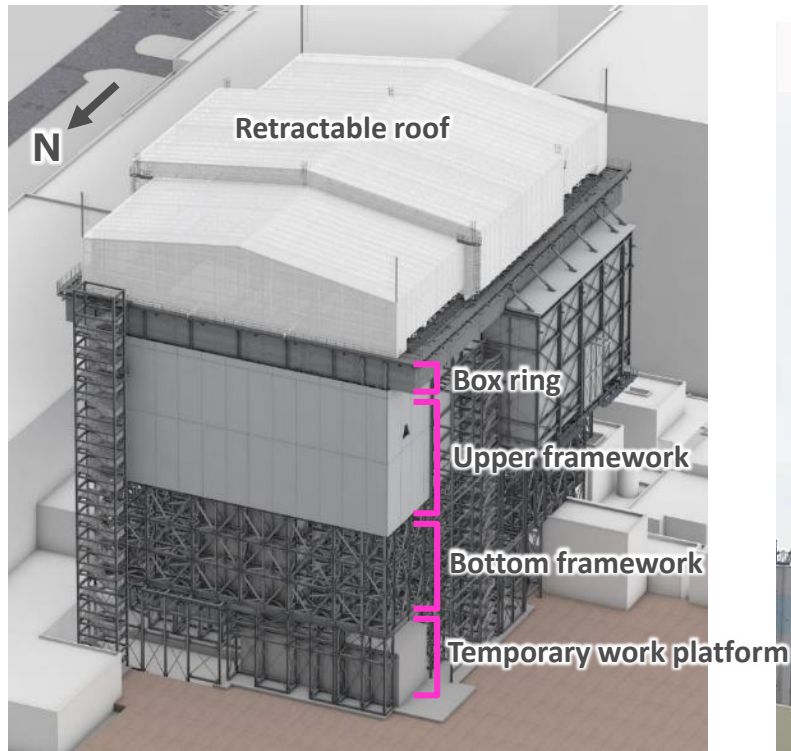
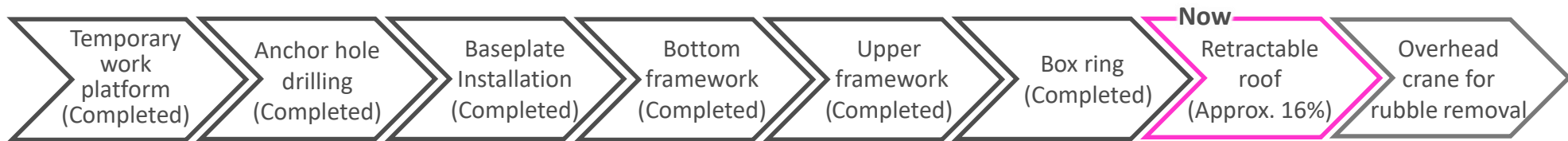


Diagram of the entire large cover



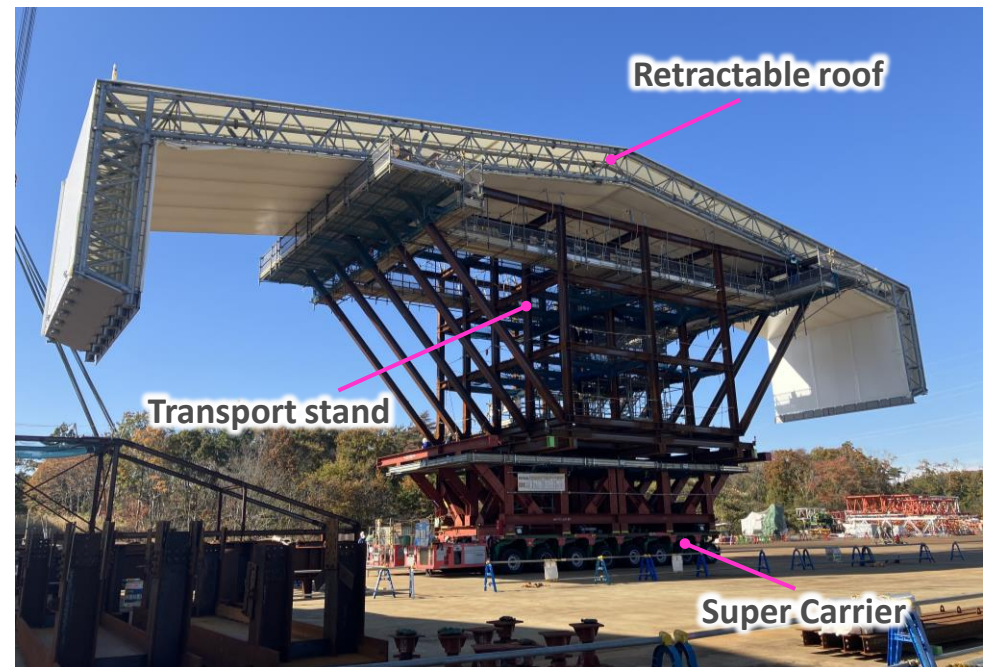
On-site conditions (Northwest side) (Photographed on November 25, 2025)

2-2. Large cover installation status (off-site)

- Pre-assembly of all of the retractable roof blocks was completed on October 10, 2025.



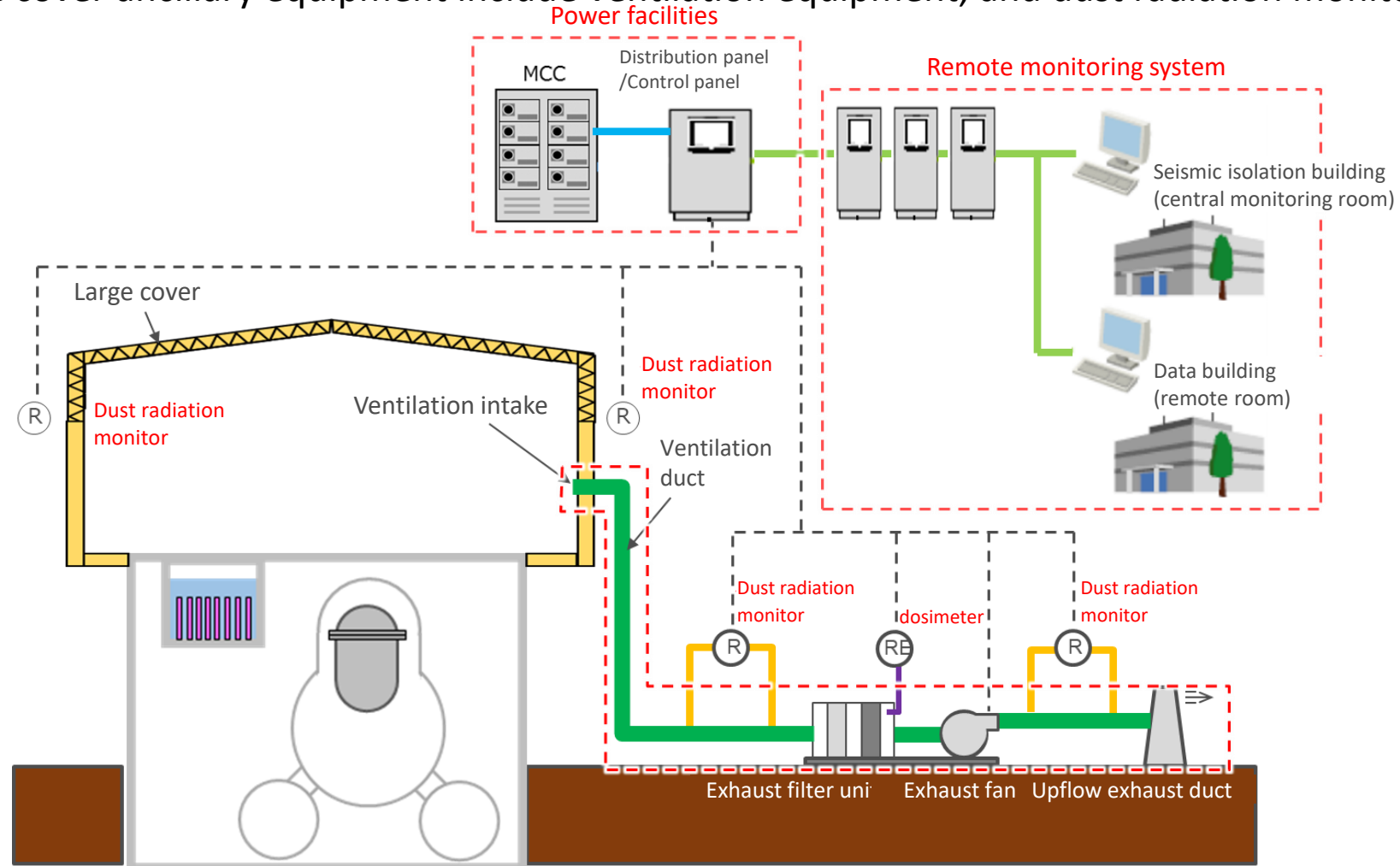
Off-site west gate yard (photographed on November 25, 2025)



Status of retractable roof during loading
(Photographed on November 17, 2025)

3-1. Overview of large cover ancillary equipment

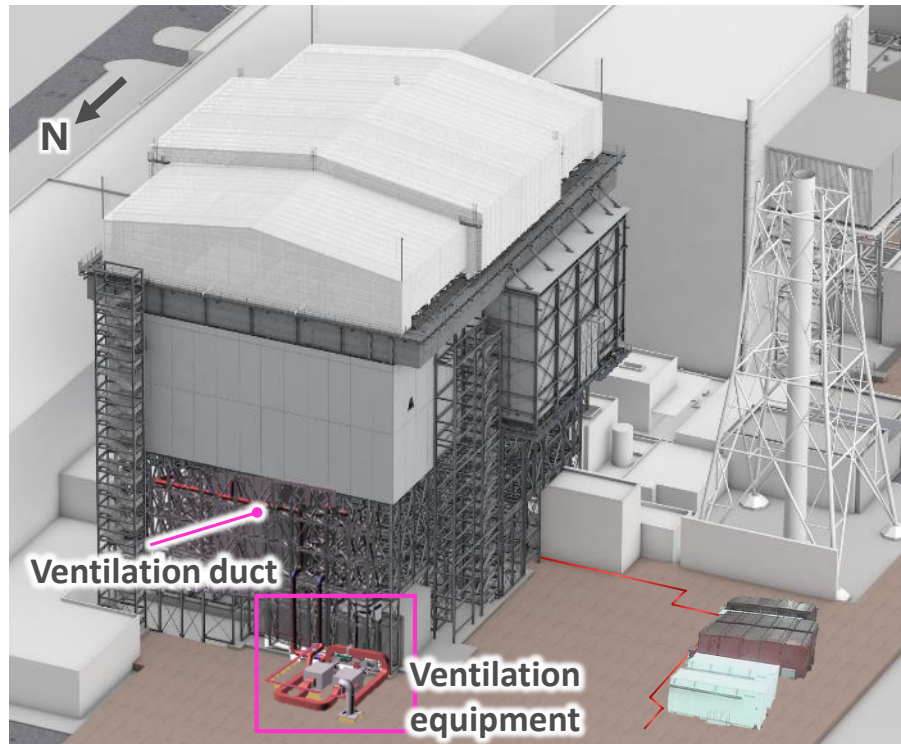
- After installation of the large cover, large cover ancillary equipment will be installed to remove rubble, etc.
- Large cover ancillary equipment include ventilation equipment, and dust radiation monitors, etc.



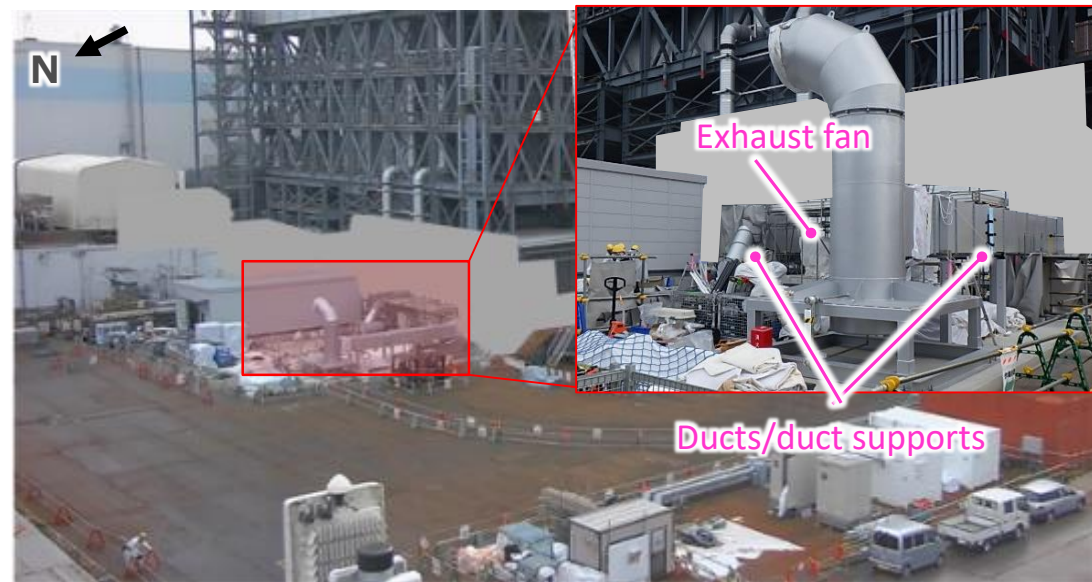
Configuration image of large cover ancillary equipment

3-2. Status of large cover ancillary equipment installation (Ventilation facilities)

- Foundation bolt installation began on July 22, 2025. Installation of these foundation bolts was completed on November 17, 2025. Level adjustment material is now being put in place in preparation for equipment installation, and the duct, duct support installation and cable work is underway.



Overview of large cover ancillary equipment



Unit 1 Reactor Building NW Yard (photographed on November 13, 2025)

3-3. Status of large cover ancillary equipment installation (Dust radiation monitors)

- Dust radiation monitor (hereinafter referred to as, “dust monitors”) container installation began on July 15, 2025. Dust monitor container installation was completed on July 16, 2025. Dust radiation monitor pipe laying is underway.

- Dust monitor pipe laying: 480m/1600m completed

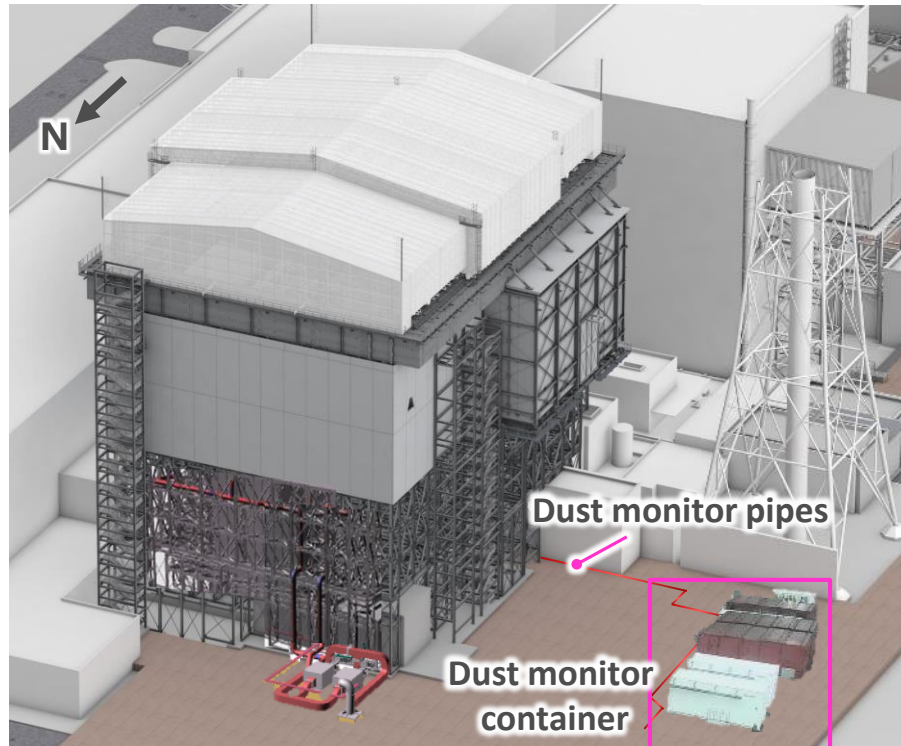
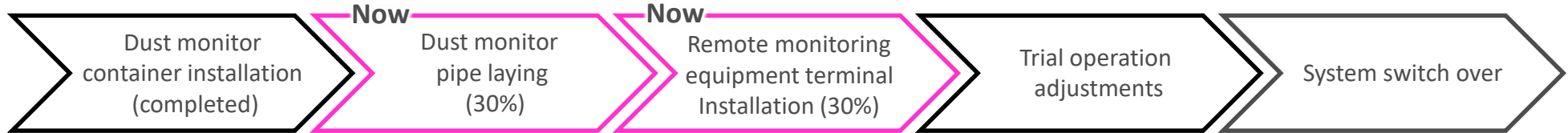
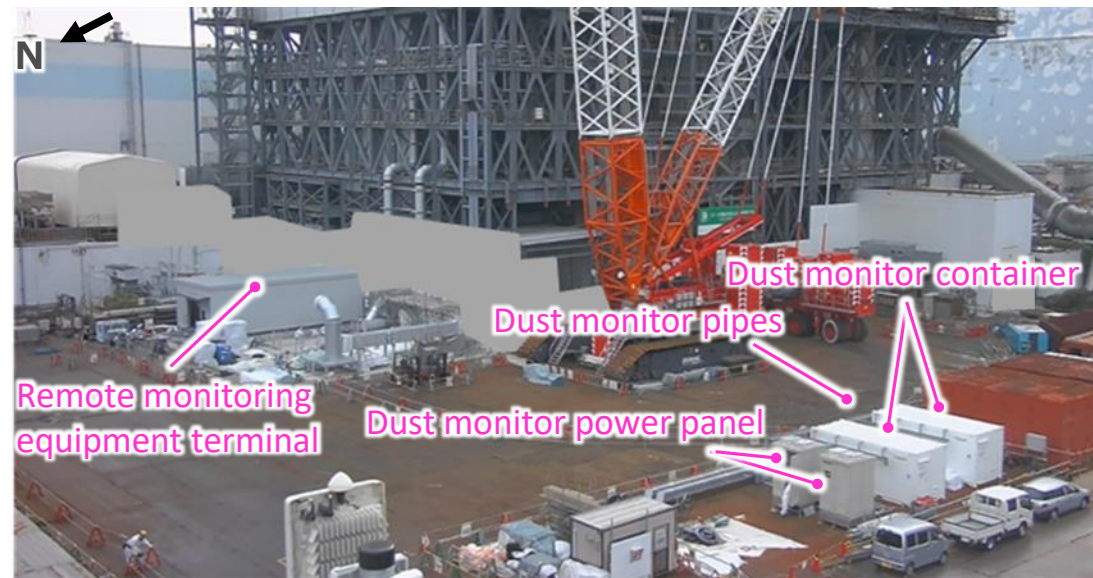


Diagram of large cover ancillary facilities

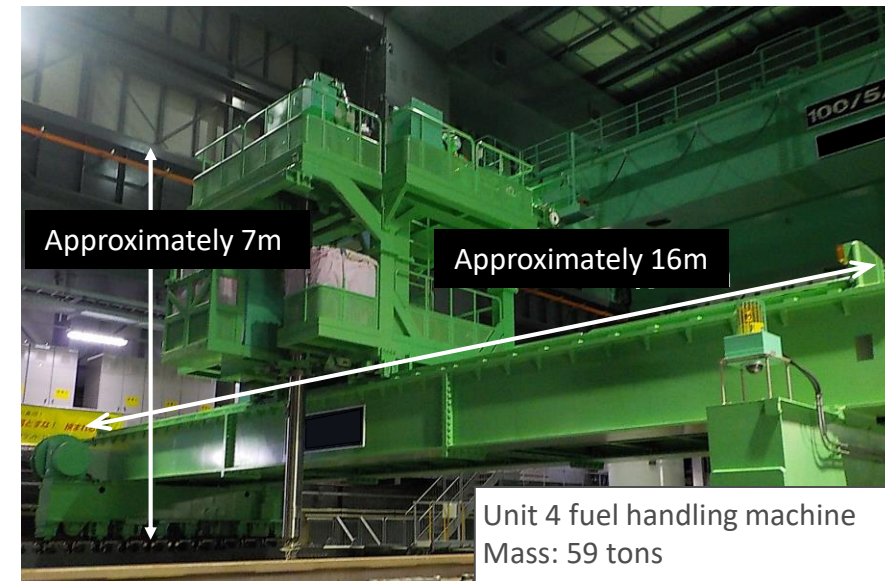


Unit 1 Reactor Building NW Yard (photographed on November 13, 2025)

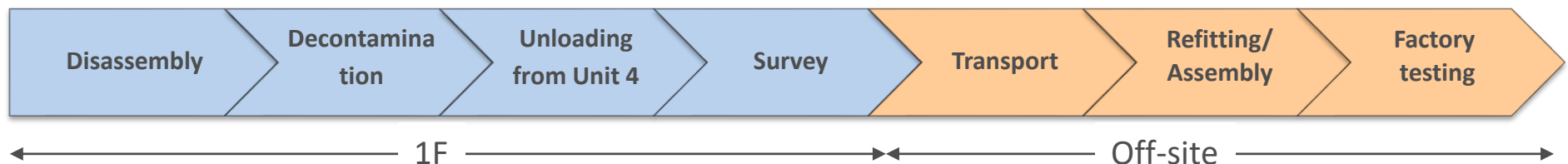
4-1. Repurposing the Unit 4 fuel handling machine for Unit 1

- In order to reduce waste, the fuel handling machine installed at Unit 4 in 2013 will be sent back to the manufacturer to be refitted and repurposed as the fuel handling machine for Unit 1.
- The following considerations are to be made when repurposing:
 - ✓ The equipment transports in accordance with law.※
 - ✓ All equipment taken out resend back to 1F from the manufacturer's factory.
 - ✓ All electrical components instruments, and fuel handling machines, etc. not to be repurposed shall not be transported and stored on site.

※ Equipment will only be transported off-site after confirming that the surface contamination density does not exceed 1/10 of the limit stipulated in the Rules on the Safety and Protection of Specific Nuclear Materials and Facilities at the Tokyo Electric Power Company Holdings, Inc. Fukushima Daiichi Nuclear Power Station.



【Work flow】

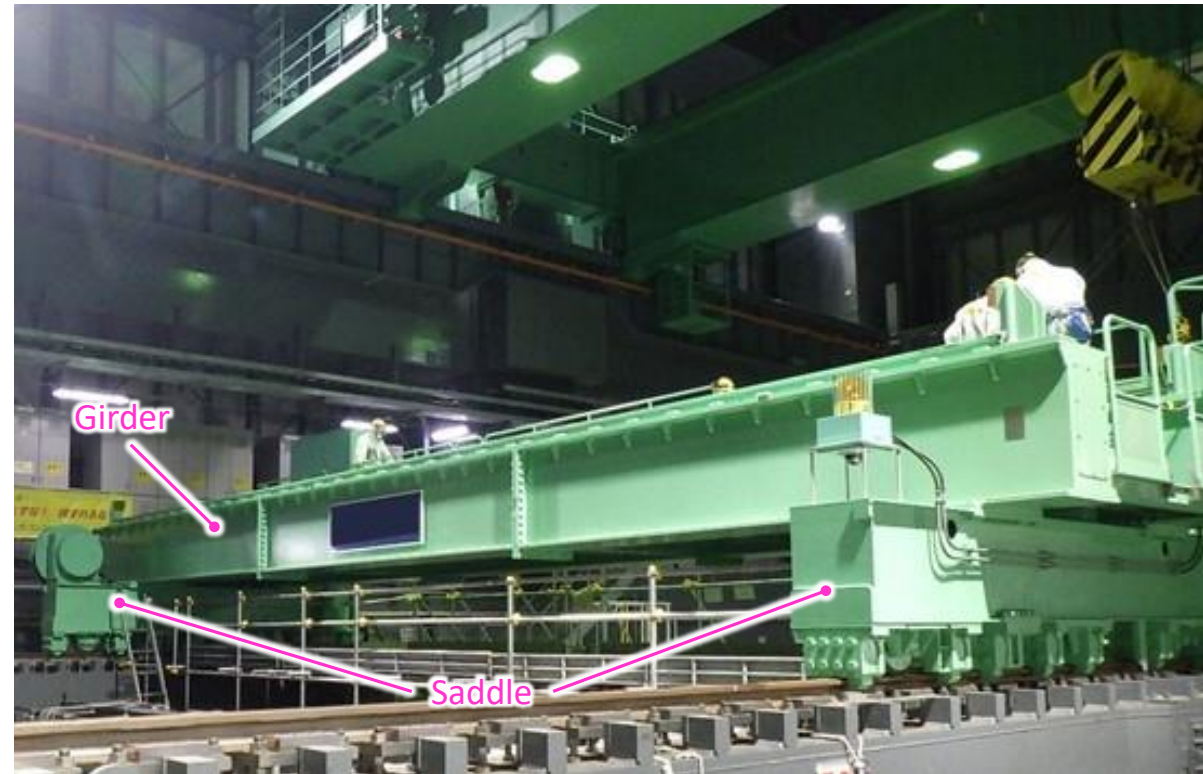


4-2. Repurposing as the Unit 4 fuel handling machine for Unit 1

- On November 4, 2025, we began disassembling and unloading the Unit 4 fuel handling machine.
- We will finish transporting all of the parts and materials to the factory during FY2025.



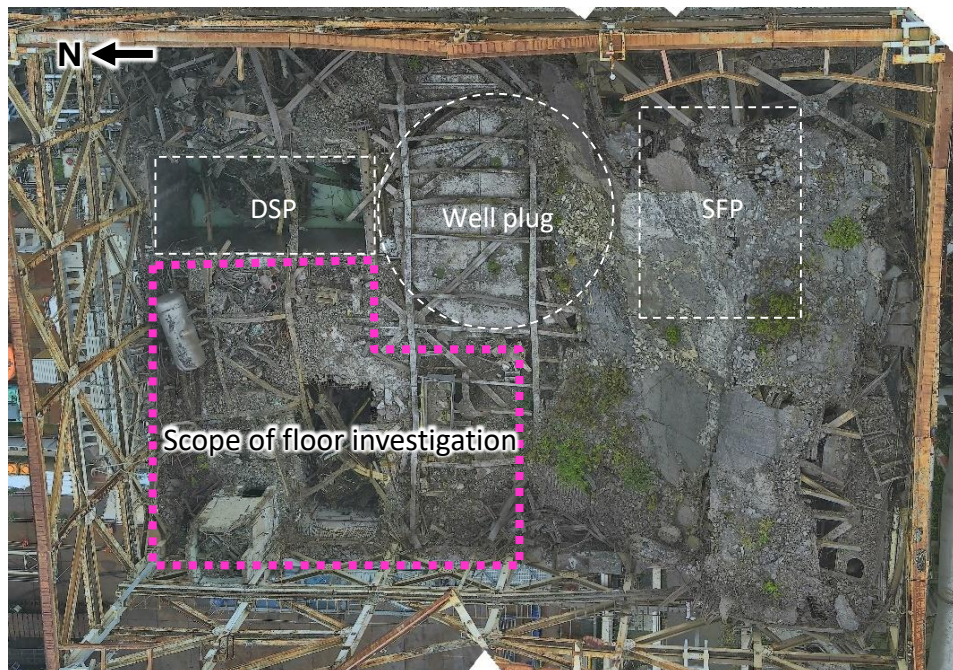
Hoisting the trolley (photographed on November 12, 2025)



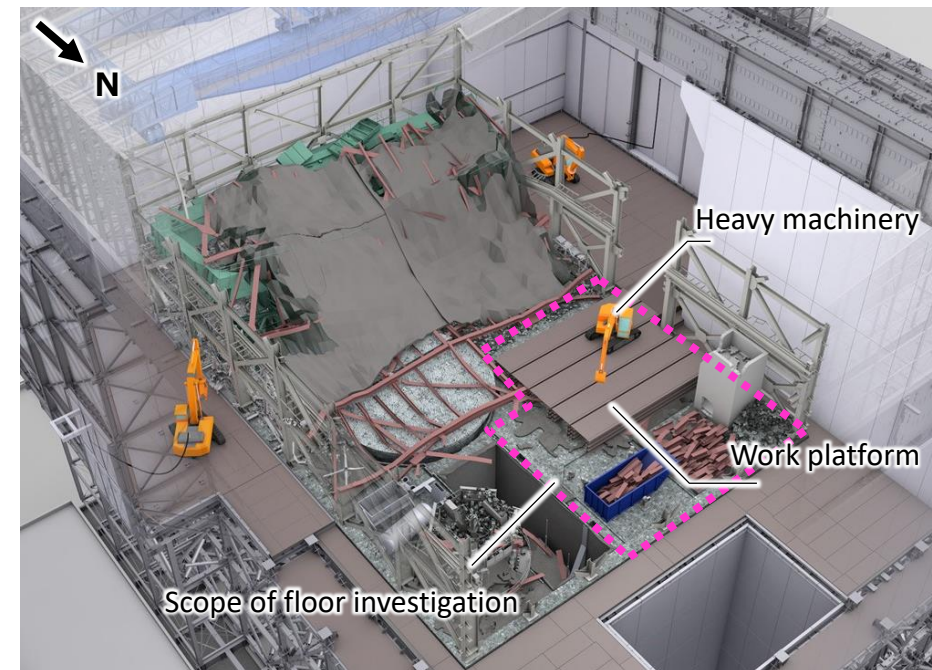
After removal of the trolley (photographed on November 12, 2025)

5-1. Investigation of the north side floor of the operating floor

- During the removal of rubble following the completion of the large cover, rubble that has accumulated on the south side of the operating floor will be temporarily moved to accumulation areas on the north side where it will be sorted, after which it will be carried out from under the cover.
- Rubble removal will be implemented after completion of the large cover. In light of the fact that the upper frame and box ring have been completed, and that the risks of dust dispersion on the operating floor have been reduced. We plan to conduct an investigation that will contribute to our rubble removal plan as part of rubble removal preparations as soon as investigation preparations have been completed.
- A rubble processing platform and heavy machinery will need to be placed on the north side of the operating floor, but the condition of the floor at this time is unknown. Therefore, to prevent having to backtrack, the rubble will be removed and an investigation of the floor will be conducted so that the condition of the floor can be fully inspected.



The scope of floor investigation on the north side of the operating floor

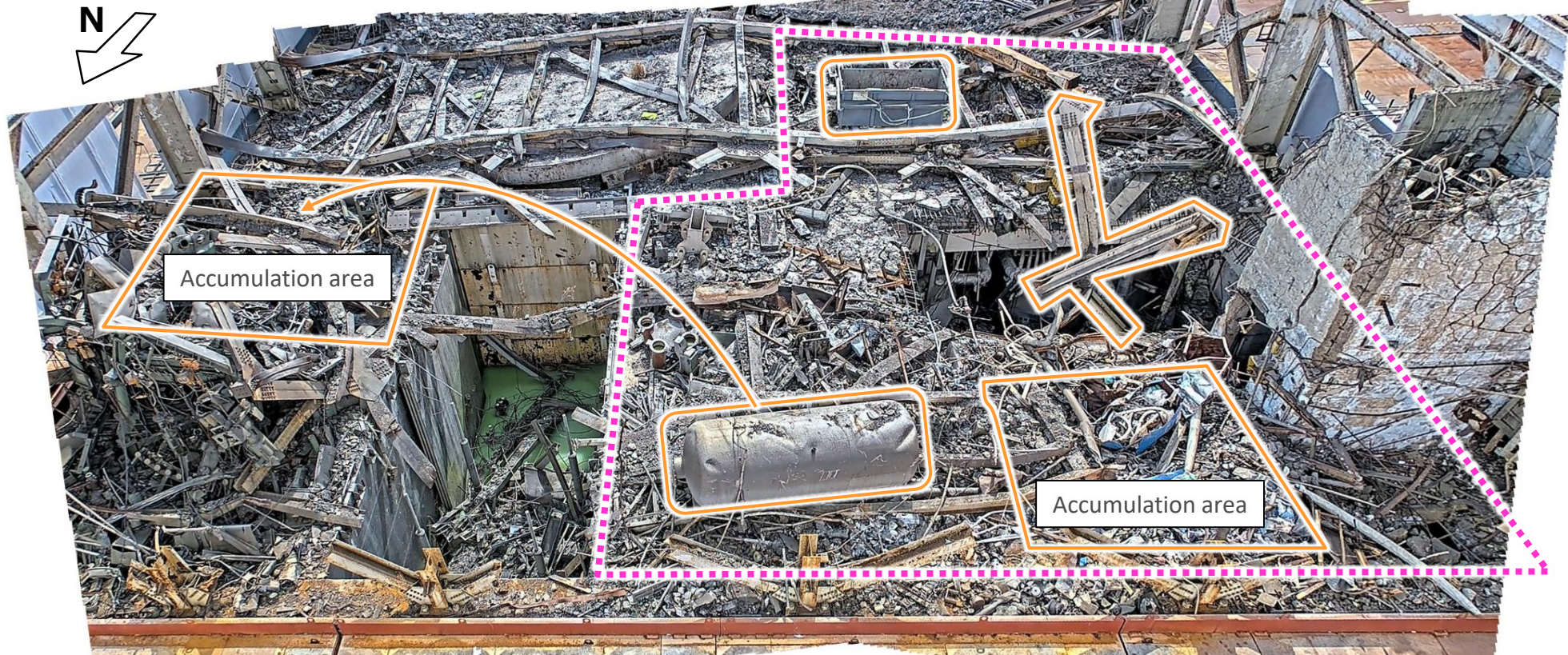


Concept diagram of work platform construction

5-2. Floor investigation details on the north side of the operating floor ①

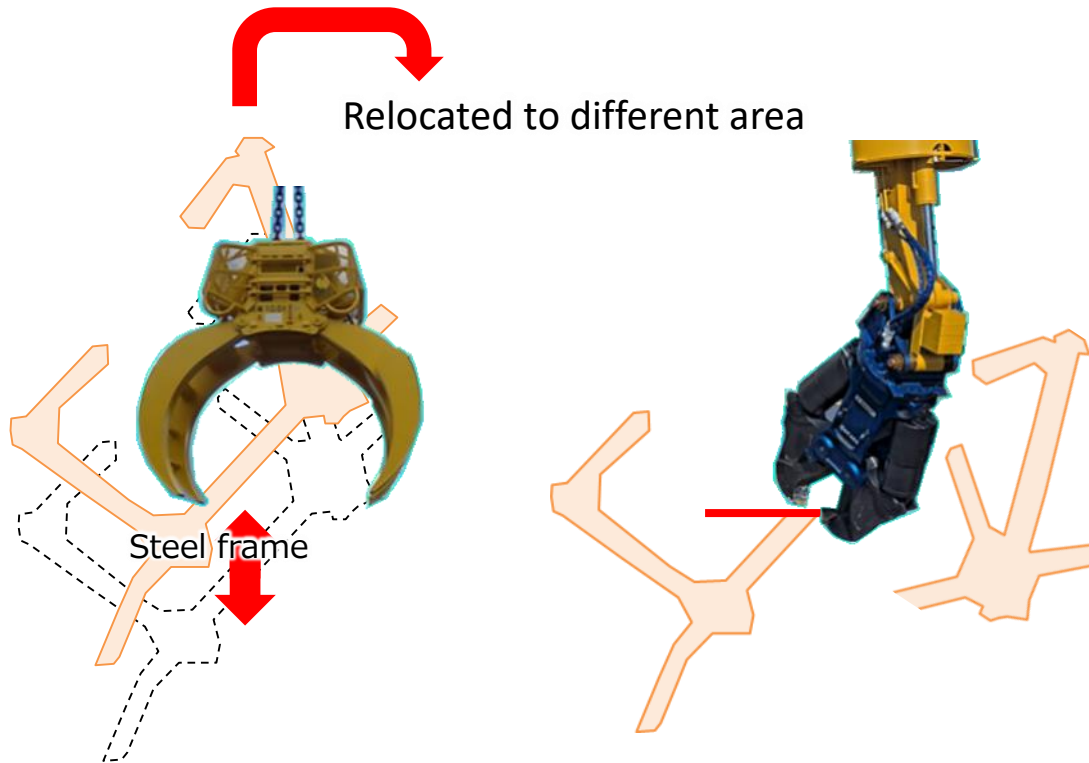
- In order to conduct a floor investigation, rubble in the investigation area shall be relocated to specific accumulation areas underneath the large cover.
- Rubble shall only be moved under the large cover and shall not be taken outside the boundaries of the cover. Work shall entail grasping/cutting/accumulating, which disperses little dust.
- After the rubble has been moved out of the way, visual inspections using cameras etc. will be conducted to determine if there has been significant structural damage to the floor.

 : Scope of floor investigation  : Example of rubble to be relocated



Floor investigation on the north side of the operating floor

■ Concept diagram of rubble relocation work

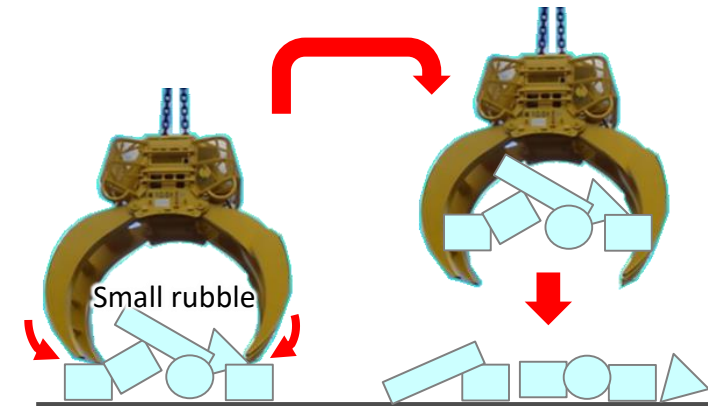


Grasping

A fork grab, etc. will be used to pick up material and relocate it after confirming other pieces of rubble are not stuck to it or hanging off of it.

Cutting

If the connection is not severed, attachments like cutters etc. will be used to cut the frame into pieces.



Accumulation (small rubble)

Small rubble will be grabbed with a bucket or grab fork, etc. and moved to accumulation areas so that the condition of the floor can be inspected.

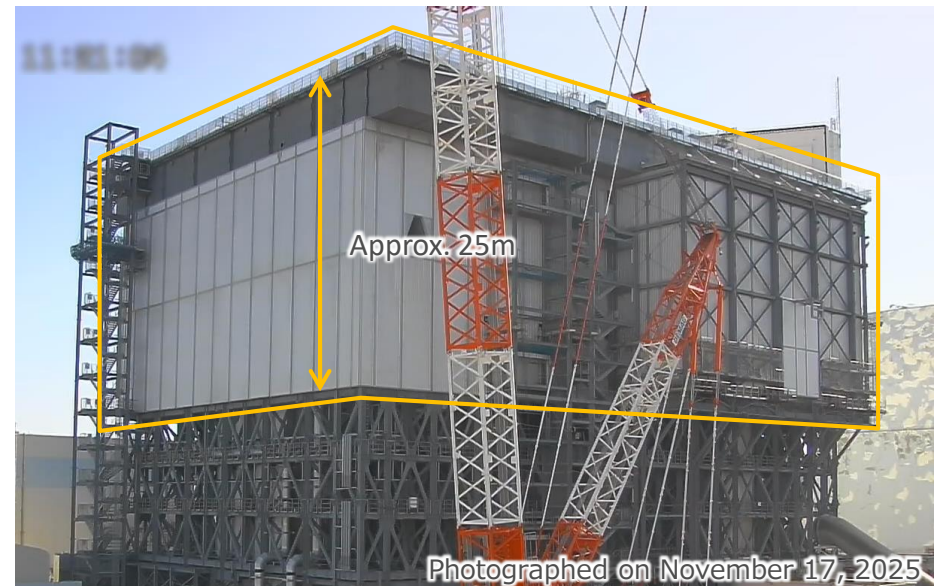
5-4. Dust dispersion prevention measures ①

- Between 2018 and 2020 some of the rubble on the Unit 1 operating floor was already removed, and no significant changes in dust concentrations were detected during this work.
- The same countermeasures will be implemented during this investigation when handling rubble on the operating floor. Furthermore, in lieu of a wind prevention fence (operating floor + 4 meters) that is typically erected to prevent wind from coming in, the wall of the large cover will now provide 25 meters of wind barrier for the operating floor.

Objective	Dust dispersion prevention	Wind prevention	Dust dispersion prevention
Countermeasures implemented this time	Spraying of dust prevention agents (once a month)	Large cover wall (operating floor + 25m)	Spraying of water (when alarm is sounded)
Conventional countermeasures	Spraying of dust prevention agents (once a month)	Wind prevention fence (operating floor + 4m)	Spraying of water (when alarm is sounded)



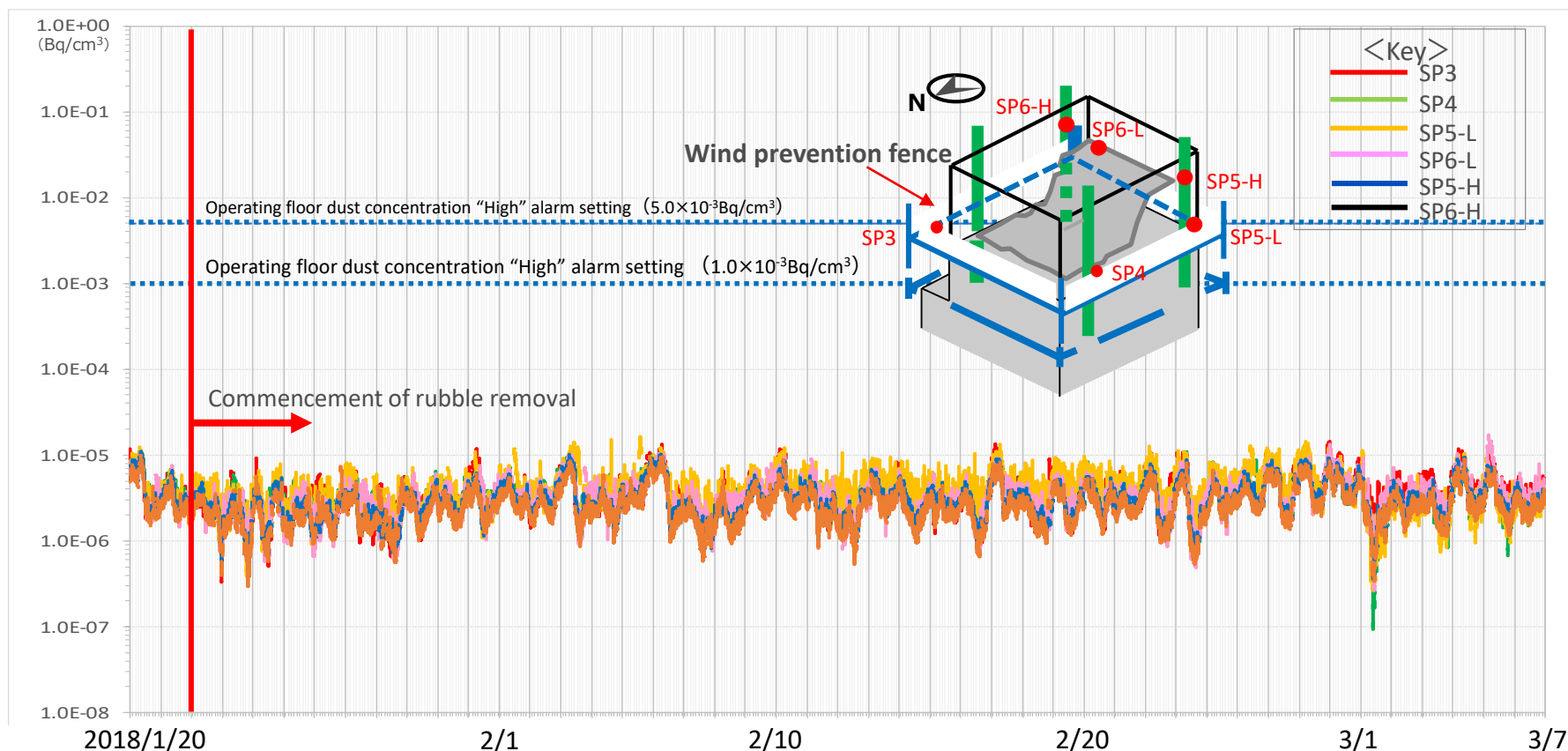
Wind prevention fence construction



Large cover construction

5-5. Dust dispersion prevention measures ②

- The following chart shows the representative operating floor dust concentrations recorded during past rubble removal work.
- There were no significant changes in dust concentration, and concentrations trended below the “High” alarm setting ($1.0 \times 10^{-3} \text{ Bq/cm}^3$).

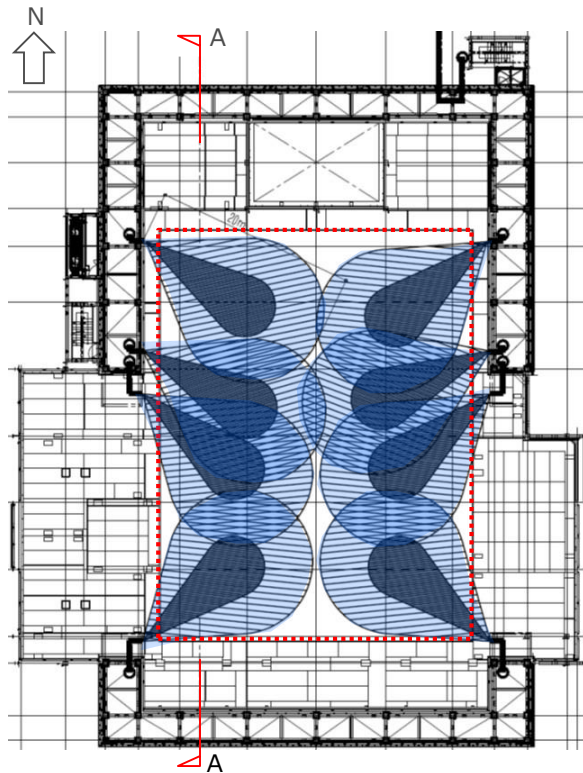


Concentrations of radioactive substances in the air on the operating floor

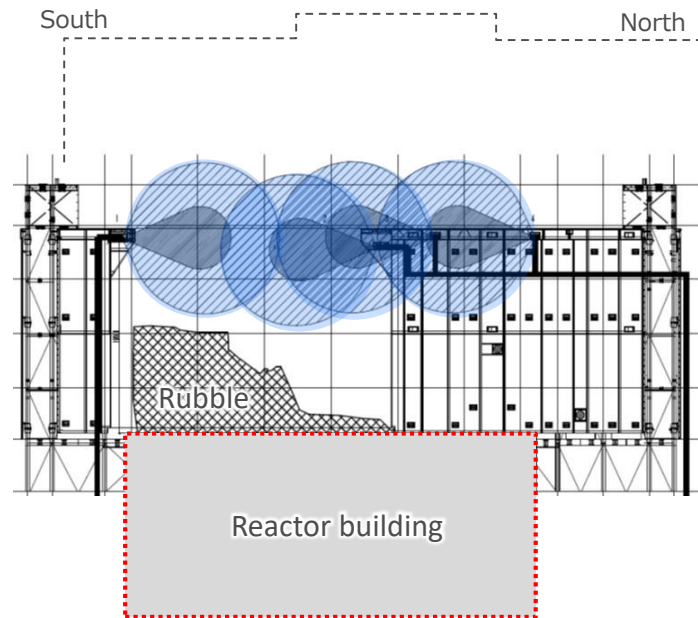
(Excerpt from materials used during the March 30, 2018 Specific Nuclear Monitoring and Assessment Review meeting)

5-6. Dust dispersion prevention measures ③

- If an operating floor dust monitor alarm sounds during investigation of the floor on the north side of the operating floor, work will immediately be halted, water sprayed. After completion of construction of the retractable roof, in addition to spraying, the retractable roof closed.
- In addition to spraying water as mentioned above, if there is the fear of dust dispersion, water sprinklers will also be used to wet the rubble directly.



A floor plan of dispersion area of the water sprinkler system



Cross section(A-A) of dispersion area of the water sprinkler system



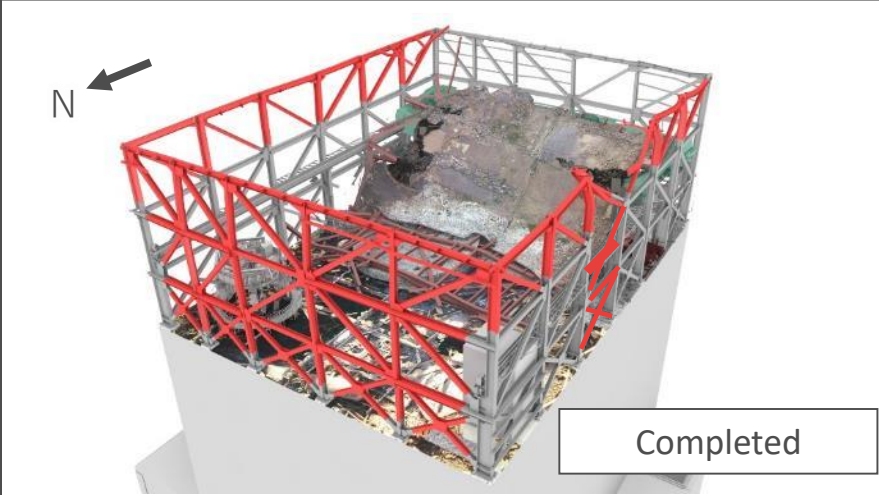
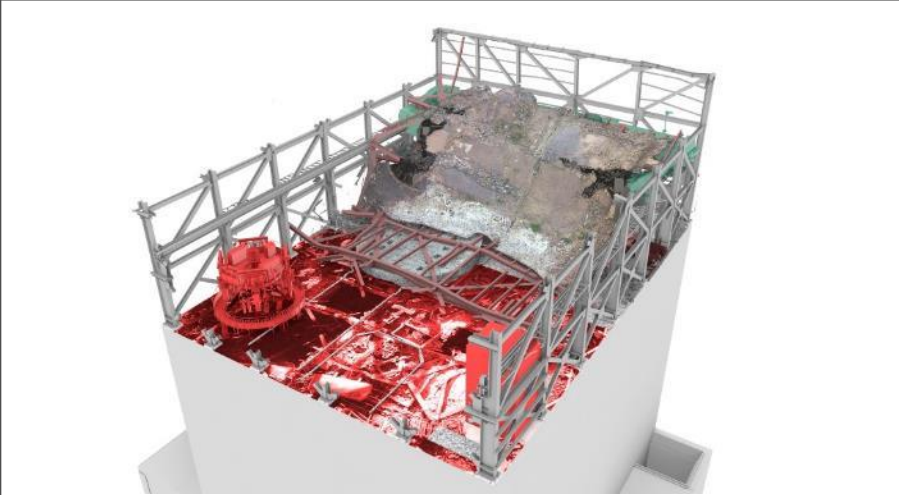
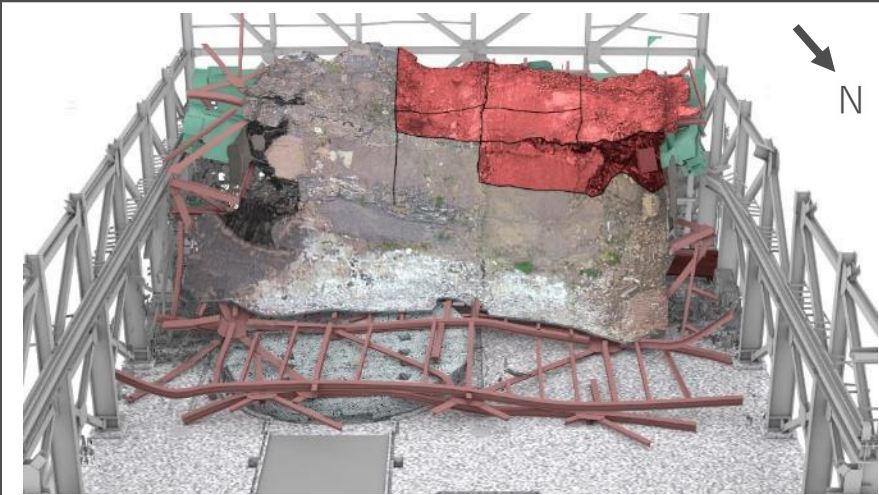
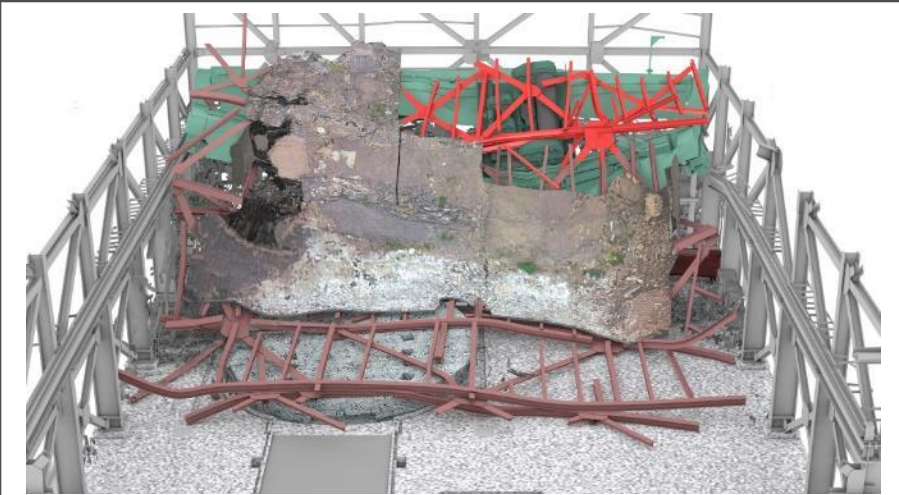
Status of the water sprinkler system dispersing water and mist

6. Schedule

- Retractable roof construction and ventilation equipment installation is underway onsite.
- A floor investigation on the north side of the operating floor will commence as soon as preparations have been completed.

	FY2025												FY2026							
	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	Second half	
Implementation plan	Fuel handling machine installation implementation plan																			
Large cover installation/ rubble removal	Removal of surrounding steel frame												Operating floor north side floor investigation							
	Additional SFP gate covering												Rubble removal							
	Main steel frame construction (Bottom framework, upper framework, box ring, retractable roof)																			
													Rubble removal overhead crane installation							
	Work yard preparations, pre-assembly in off-site yard, transport, etc.																			
Large cover ventilation equipment installation	Large cover ventilation equipment installation																			
Crane and fuel handling machine design and manufacturing	Fuel removal equipment deliberation/design/manufacturing [off-site]																			
													Unit 4 fuel handling machine transport							

■ The following shows all of the rubble removal steps

<p>STEP1: Removal of outer steel frame</p>  <p>Completed</p>	<p>STEP2: Operating floor north side preparations</p> 
<p>STEP3: Roof slab removal (pieces on top of trolley)</p> 	<p>STEP4: Roof frame removal (pieces on top of trolley)</p> 

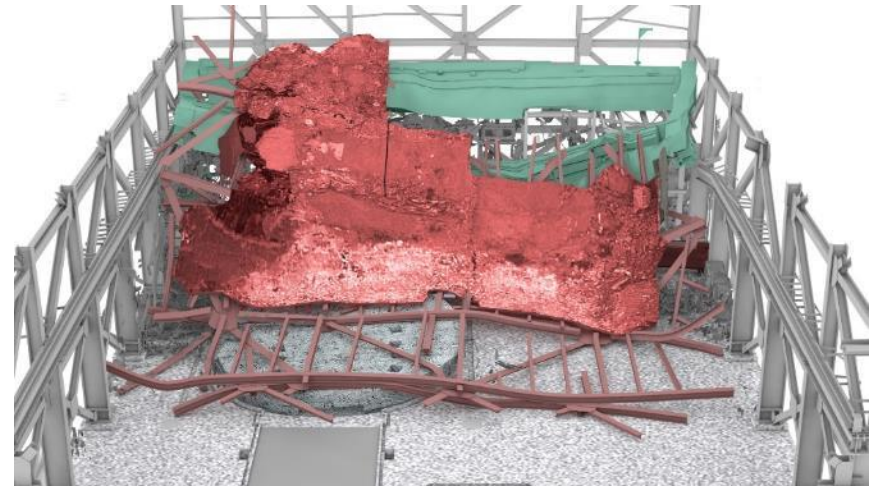
※Actual conditions may differ from the diagram

- The following shows all of the rubble removal steps

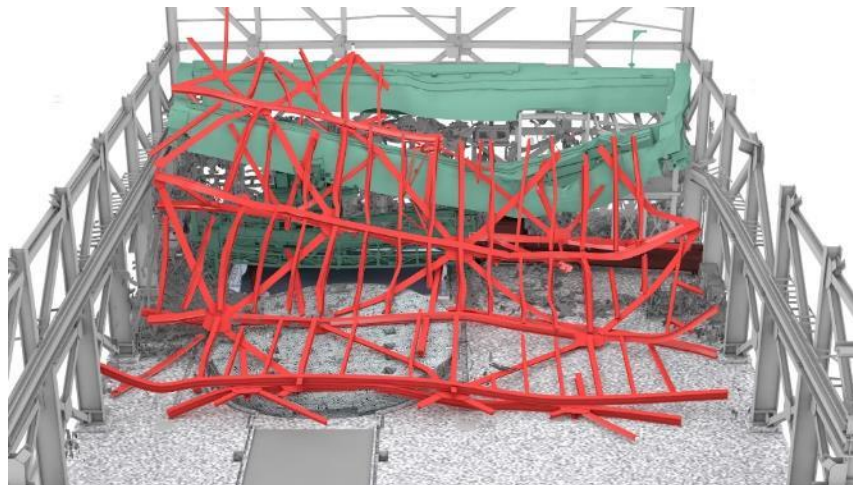
STEP5: Overhead crane trolley removal



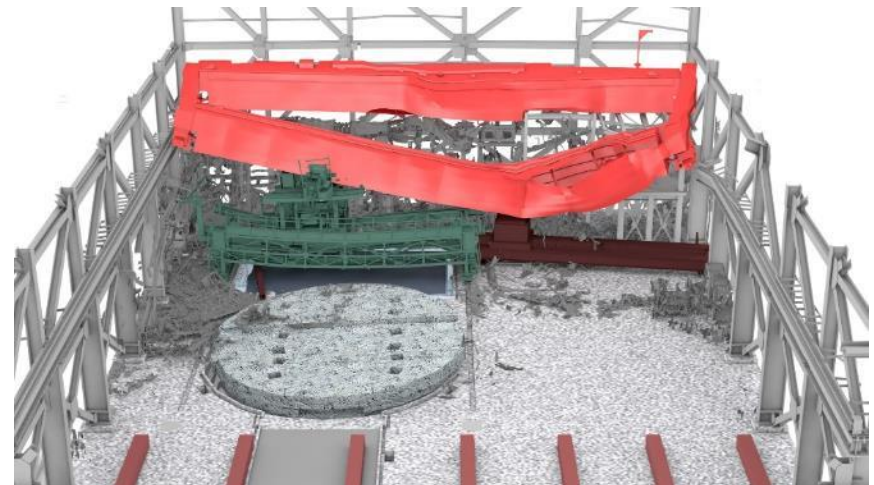
STEP6: Roof slab removal (entire)



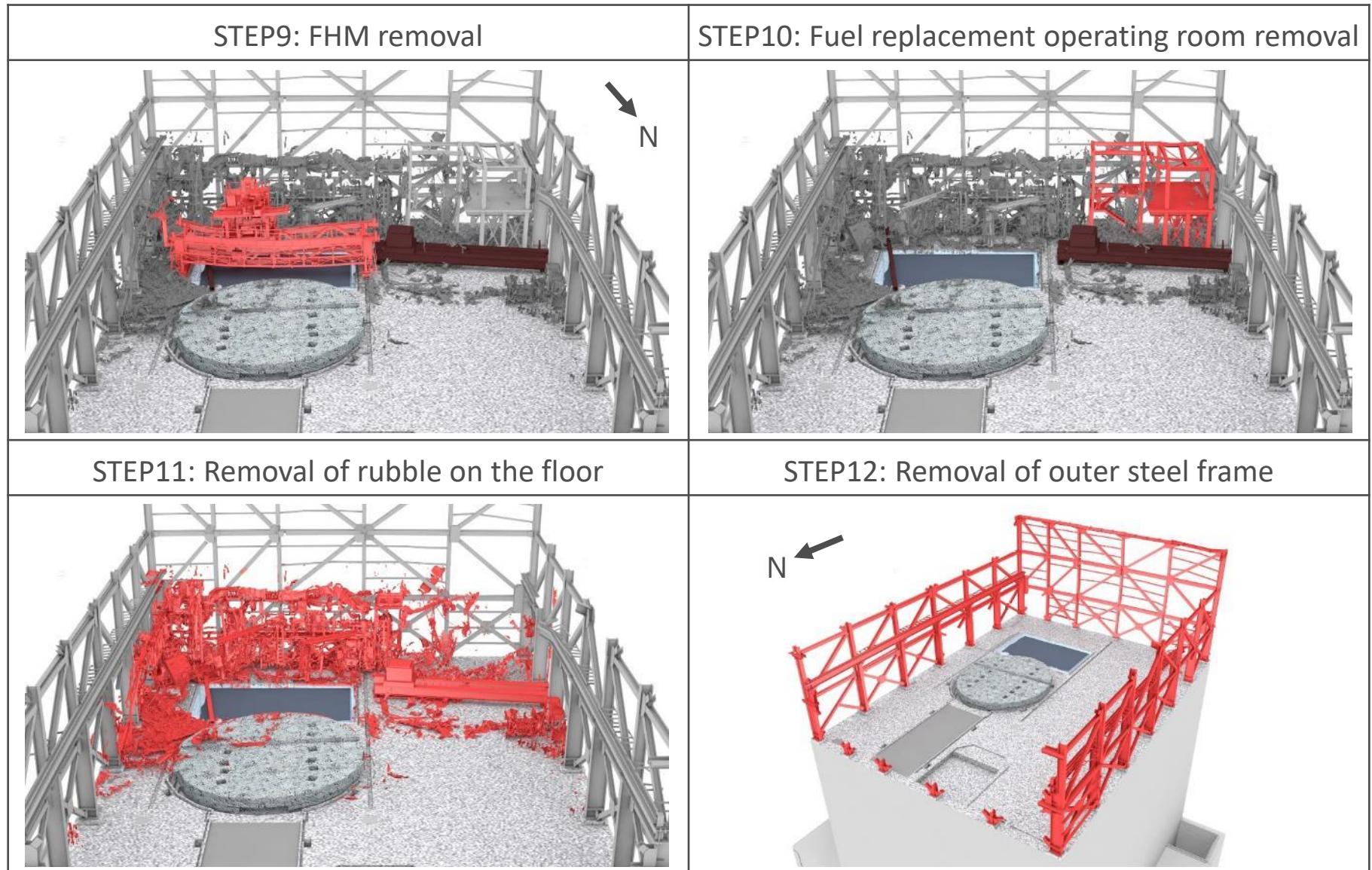
STEP7: Roof frame removal (entire)



STEP8: Overhead crane girder removal



- The following shows all of the rubble removal steps



※Actual conditions may differ from the diagram