Evaluation of Unit 2 Fuel Removal Method

2019/10/31

TEPCO

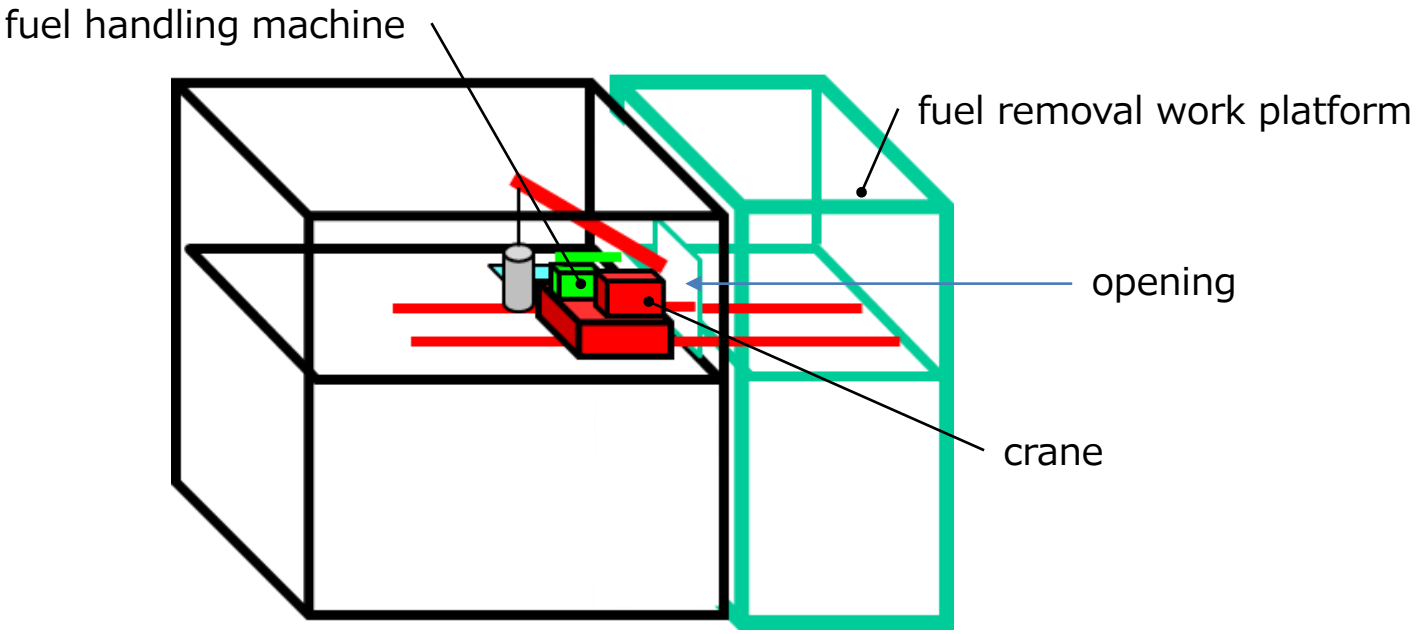
Tokyo Electric Power Company Holdings, Inc.

Summary

TEPCO has selected a fuel removal method that involves the least exposure of workers to radiation and allows for the most efficient handling of the dust that will be released if the reactor building is dismantled.

The fuel removal method selected is the installation of a small opening on the south side of the operating floor via which a crane will be installed. A fuel removal work platform will be constructed for this purpose.

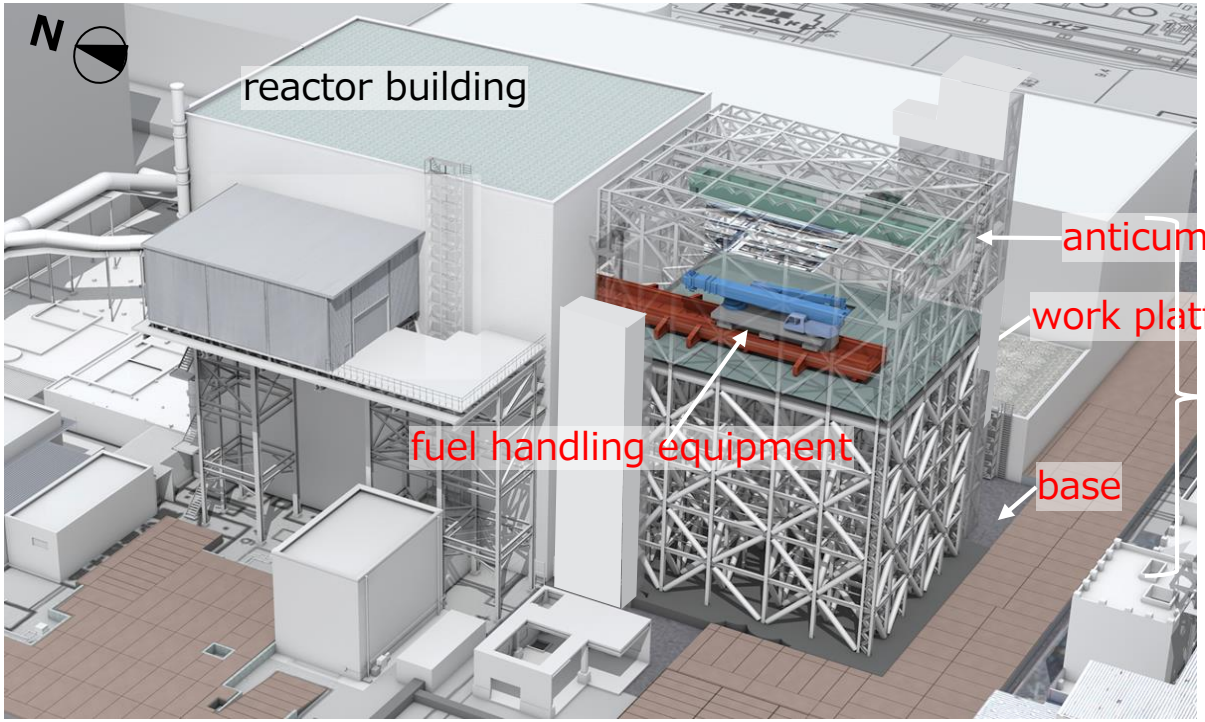
TEPCO will firm up details of the plan and conduct a detailed examination of the fuel removal process within this fiscal year.



Conceptual diagram of the selected fuel removal method

Overview of the selected fuel removal method (1)

- None of the upper part of the reactor building will be dismantled. After installing a work platform and anticum on the south side, fuel and transport containers will be handled via a small opening on the south outer wall.
- By deploying boom crane-type fuel handling equipment, the opening on the south outer wall will be small, avoiding the need to dismantle structural components of the building such as columns or beams.
- Assembly and maintenance work of the fuel handling equipment can be conducted on the fuel removal work platform, minimizing workers' radiation exposure.



Red labels: newly added facility

Image of fuel removal work platform

Overview of the selected fuel removal method (2)

- Fuel and transport containers will be handled with fuel handling equipment that will be remotely operated.
- The fuel handling equipment will run on a runway track between the reactor building operating floor and the anticum of the fuel removal work platform.
- A newly installed loading / unloading entrance on the fuel removal work platform will be used to suspend the transport container.

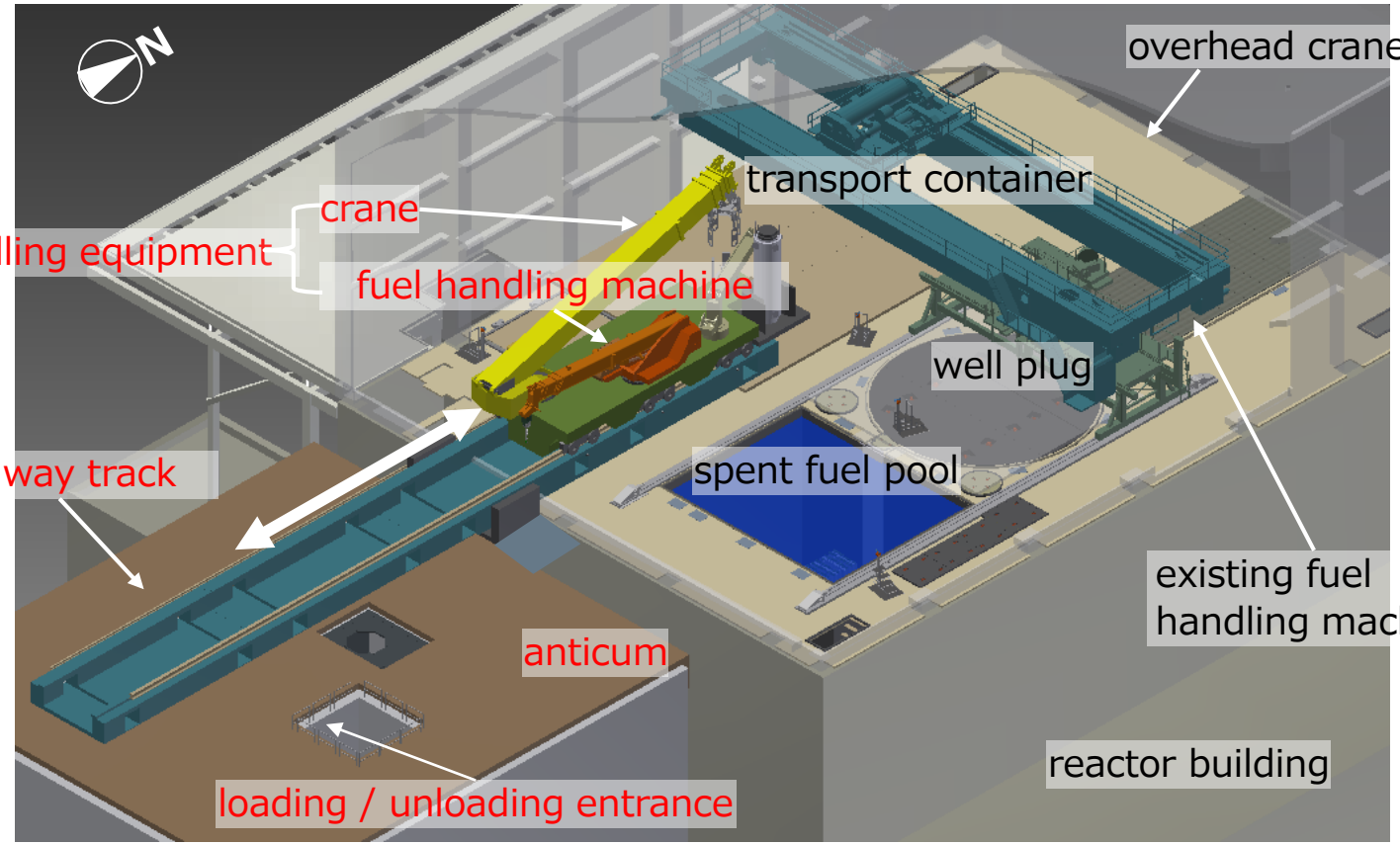


Diagram of planned fuel handling equipment

APPENDIX

- Considered plans
- Consideration points
- Evaluation results

APPENDIX – Considered plans

The fuel removal method from the Unit 2 reactor was selected from a short list of two options:

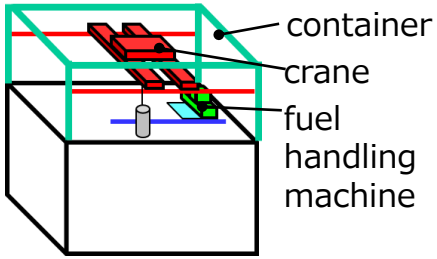
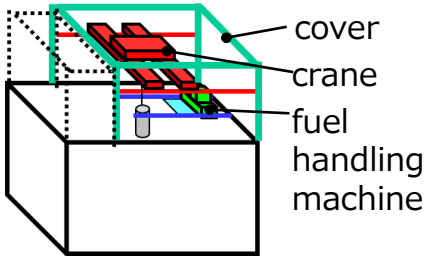
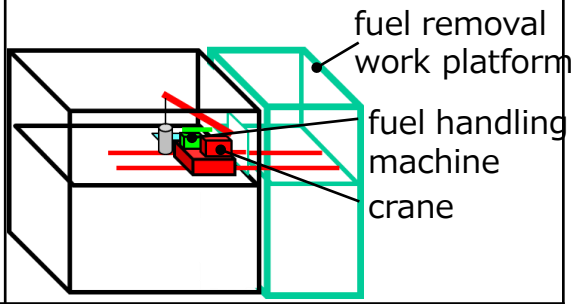
Ⅰ) Using the same containers for fuel and fuel debris

Ⅱ) Using separate containers for fuel and fuel debris

The basic design of the former plan had not yet been finalized. Therefore, plan Ⅱ was selected to allow the fuel removal work to commence as early as possible.

There were two potential approaches to using separate containers for fuel removal and fuel debris removal. Taking several factors into account, such as radiation exposure, construction time and dust management, TEPCO decided to access the fuel from the southern part of the reactor without dismantling its upper part.

APPENDIX – Considered plans

Plan	Ⅰ	Ⅱ	
		A	B
Image			
Overview	Entire upper part of the operating floor is dismantled, and a container that covers the entire operating floor is installed.	Entire upper part of the operating floor is dismantled, and a cover is installed over part of the operating floor.	Small opening is made on the south side of the operating floor with a frame for inserting the crane into the operating floor from the south.
Fuel removal	NFT-12B (capable of storing 12 assemblies) Manual work	NFT-12B (capable of storing 12 assemblies) Manual work	On-site transport container (in the Unit 3 case, capable of storing 7 assemblies) Work around the pool remotely handled
Frame scale	Steel frame: Over 7,000t Foundation and ground improvement: required	Steel frame: 3,000t Foundation and ground improvement: not required	Steel frame: 2,500t Foundation and ground improvement: required

APPENDIX – Consideration points

The fuel removal methods were comprehensively evaluated on the basis of the following four priorities and against other factors, including the fuel removal period.

Measures to protect against dust dispersal

- ✓ The reliability of measures to combat dust dispersal occurring during the dismantling of the reactor building needs to be evaluated.

Exposure of workers to radiation

- ✓ In the operating floor survey conducted between November 2018 and February 2019, background radiation seemed to have stabilized at lower levels than those measured in previous surveys. However, as the levels are still quite high, the estimated exposure needs to be quantitatively evaluated.

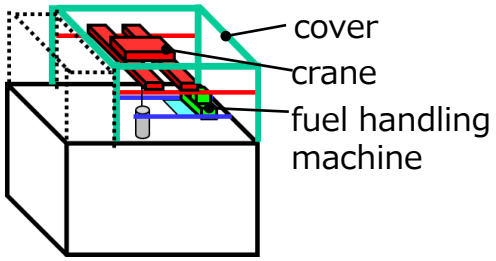
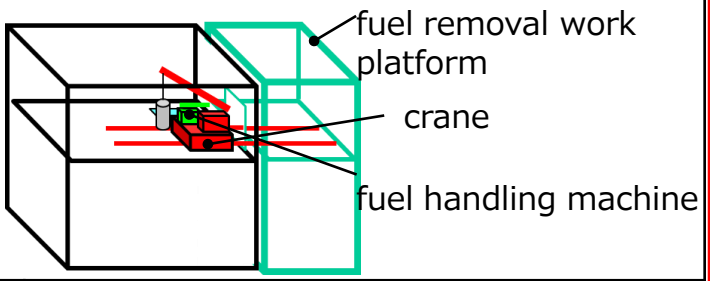
Measures to protect against rainwater seepage

- ✓ The quantities of rainwater seeping into the reactor building during fuel removal work must be evaluated in conjunction with the measures taken to suppress the inflow of accumulated water in the building.

Construction yard

- ✓ The impact of the construction on other decommissioning work taking place around the reactor building needs to be qualitatively assessed.

APPENDIX – Evaluation results

Plan		Ⅱ			
		A		B	
Image					
Evaluation	Dust	○	• Manage by anti-dust scattering measure and dust monitoring	◎	• Work is possible while dust is completely managed within the building and anticum
	Exposure	△	• High • Estimated exposure until work completion: **55 Sv･per person**	○	• Low • Estimated exposure until work completion: **46 Sv･per person**
	Rainwater	△	• Stagnant water is generated by rainwater inflow **(approx. 2,000~3,000m³/year)**	○	• Almost no rainwater inflow
	Construc-tion yard	△	• Need to take account of other work	○	• Western yard can be shared
	Construc-tion period	△	• Construction period needs reviewing	○	• **Shorter than Plan A**
	Fuel removal period	○	• **Short**	△	• **Longer than Plan A**