Preparation for fuel removal from the spent fuel pool in Unit 3 reactor building at Fukushima Daiichi Nuclear Power Station

Demonstration of fuel handling machine and crane

January 18, 2016
Tokyo Electric Power Company
1. Outline of Fuel Removal at Unit 3 in Fukushima Daiichi

**Preparation for and Implementation of Fuel Removal**

**MAJOR MILESTONES**

**Step 1**  Removal of large pieces of rubble

**Step 2**  Decontamination & shielding

**Step 3**  Installation of cover & fuel handling system

**Step 4**  Fuel removal

Cover for spent fuel removal at Unit 3
2. Removal of large pieces of rubble on the operating floor

- Complete view of operating floor
- Complete view of north side of reactor building

Before removal

After removal

Completion of removal on the operating floor (Oct. 11, 2013)
2. Removal of large pieces of rubble from the spent fuel pool

- Started operations on Dec. 17, 2013
- Removal of the remaining fuel handling machine, the largest piece of rubble (25t) on Aug. 2, 2015
- Completion of rubble removal with a crane on Nov. 21, 2015
3. Decontamination and shielding (in progress)

- Oct. 15, 2013 - Started decontamination (collecting and suction of, cutting of small rubble) of operating floor by remote-controlled, unmanned, heavy machinery

### Decontamination devices

- Decontamination

### Main devices used for decontamination

<table>
<thead>
<tr>
<th>Rubble accumulation</th>
<th>Small rubble suction</th>
<th>Cutting &amp; suction</th>
<th>Cutting with high-pressure water &amp; suction</th>
<th>Rubble collection</th>
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<tbody>
<tr>
<td><img src="image1" alt="Diagram" /></td>
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<td><img src="image3" alt="Diagram" /></td>
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### Shielding

- Shield

![Diagram](image6)
4. Cover used for fuel removal

Cover for fuel removal at Unit 3

Gateway for transportation cask

Supporting Base for cover

Crane

Fuel handling machine

Spent fuel pool

Operation of fuel removal at Unit 3

Spent Fuel Pool

Unit 3 Reactor building

Transportation Cask

East-west cross section

North-south cross section
5. Cover, fuel handling system and other procedures

- Step I: Planning to install shield on the operating floor by remote control
- Steps II ~ III: Main work spaces on operating floor with high radiation doses
- Step IV onwards: Operating floor and approx. 6m high space will be the main work spaces

![Diagram showing steps of installation process](attachment:image.png)
6. Cover Installation Training

- Conducted at Onahama Bay

Installation of roof parts

Installation of girder
7. Rubble removal and fuel removal

**Rubble removal**
- Cutting & moving
- Sucking
- Filling cask after removal

**Fuel removal**
- Washing the surface of cask & drying
- Loading the cask onto a truck, putting on the second lid & transporting to the common pool manually
At Fukushima Daiichi, fuel removal will be conducted by a remote control system using cameras. Therefore, remote control training was conducted at the factory in advance (Feb. through Dec. in 2015).

- Fuel handling training
- Transportation cask handling training
- Rubble removal training
9. Timeline for fuel removal

- **2012**: Removal of large pieces of rubble on the operating floor
- **2013**: Decontamination & shielding
- **2014**: Removal of large pieces of rubble from the spent fuel pool
- **2015**: Fuel handling training using remote control system at the factory
- **2016**: Installation of cover and fuel handling system
- **2017**: Cover installation training at Onahama Bay
- **2018**: Removal of small pieces of rubble

The timeline also includes the following events:

- **Fuel handling training using remote control system at Unit 3**