Outline of Water Injection to Reactors by Fire Engines

<Legend>

- : Water supply
- : Hose installation only (no water supply)
- : Water pumping to fire engine tank
- : Move of fire engine

○○ : Fire engine
R/B: Reactor building
T/B: Turbine building

1F: Fukushima Daiichi Nuclear Power Plant
2F: Fukushima Daiiini Nuclear Power Plant
KK: Kashiwazaki Kariwa Nuclear Power Plant
SD: Self-Defense Forces
PF: Public Fire Station
(1) Status after Tsunami (Mar 11 around 15:40)

- Water storage tank #4
  - Water supply inlet
    - Reverse cleaning valve pit
      - No seawater
  - R/B
  - T/B
- Water storage tank #3
  - Water supply inlet
    - Reverse cleaning valve pit
      - Seawater exist
  - R/B
  - T/B
- Water storage tank #2
  - Water supply inlet
    - Reverse cleaning valve pit
      - No seawater
  - R/B
  - T/B
- Water storage tank #1
  - Water supply inlet
    - Reverse cleaning valve pit
      - No seawater
  - R/B
  - T/B

Outline

- Status of 3 fire engines deployed at the power plant:
  - One fire engine deployed in the fire engine house on a hill was usable.
  - One fire engine deployed near the safeguard headquarters on the Units 1-4 side was broken down due to tsunami.
  - One fire engine deployed on the Units 5/6 side was not usable because the passage to the Units 5/6 side was interrupted due to road damage and debris carried by tsunami, and there was information that the fire engine was swept up by tsunami.
(2) Start of freshwater injection to Unit 1 (Mar 12 around 4:00)

Outline

• Around 3:30 TEPCO employees and partner companies went to the site and found the Unit 1 power supply inlet. Around 4:00 the water (about 1300L) stored in the fire engine was injected.
• During the attempt to use the water stored in the broken down fire engine, around 4:20 the staff returned to the seismic isolated building by fire engine due to increased radiation dose.
(3) Restart of freshwater injection to Unit 1
(Mar 12 around 5:46)

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<th>#4</th>
<th>#3</th>
<th>#2</th>
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<td>T/B</td>
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Reverse cleaning valve pit

Water storage tank

Self-Defense Forces and partner companies went to the site by fire engine and restarted the water injection at 5:46.
(4) Start of continuous injection, and arrival of support fire engines (Mar 12 in the morning)

- Continuous water injection line from the water storage tank to the water supply inlet was installed to inject water.
- KK arrived at the site around 10:30, and the fire engine of Self-Defense Forces arrived before noon. Water was supplied from water storage tanks around the site to the water storage tanks to the Unit 1 side.
- In addition, 1 chemical fire engine shared by 1F and 2F was moved from 2F. (The fire engine was not used actually because of its old model.)
(5) Hydrogen explosion at Unit 1
(Mar 12 15:36)

After the explosion, all workers evacuated to the seismic isolated building.
The hose prepared for seawater injection was damaged and not usable due to the impact of explosion.
A water injection line was installed by connecting 3 fire engines in series and using the Unit 3 reverse cleaning valve pit as water source, to start seawater injection to Unit 1 at 19:04.
(7) Start of freshwater injection to Unit 3  
(Mar 13 9:25)

Outline

* Collected the fire engine on the Unit 5/6 side around 6:00. 1 KK standby fire engine at 2F arrived at 1F around 6:30.
* As for Unit 1, a seawater injection line was installed using seawater of the Unit 3 reverse cleaning valve pit as water source, which was later changed to freshwater injection line using water storage tanks as water source, to start water injection at 9:25.
(8) Start of seawater injection to Unit 3  
(Mar 13 13:12)

Outline

- The line was changed to using the Unit 3 reverse cleaning valve pit as water source, to start seawater injection to Unit 3 at 13:12.
The lineup was formed to prepare for seawater injection to Unit 2.
At 1:10, water injection was stopped due to seawater shortage in the Unit 3 reverse cleaning valve pit.
At 3:20, seawater became available by adjusting the pumping location of the hose, and water injection to Unit 3 was restarted.
On Mar 14, 2 fire engines from public fire stations arrived early morning, and at 5:03, 4 fire engines arrived from TEPCO’s thermal power plants. Water supply line from the shallow draft quay was formed, and the fire engines were started at 9:05. Seawater was continuously supplied to the reverse cleaning valve pit.
(12) Hydrogen explosion at Unit 3
(Mar 14 11:01)

- After the explosion, all workers evacuated to the seismic isolated building.
- The fire engines around the site were broken down due to the impact of explosion, and water injection was stopped.
(13) Restart of water injection to Unit 3 / start of seawater injection to Unit 2
(Mar 14 around 15:30/19:54)

Outline

*A seawater injection line was installed from shallow draft quay to Units 2 and 3, and the fire engines were started around 15:30. Water injection to Unit 3 was restarted, and prepare Unit 2 to the status being injected with water after pressure decrease of the reactor. Seawater injection was started at 19:54.*
(14) Restart of water injection to Unit 1
(Mar 14 around 20:00)

Outline

- Around 20:00, restart of water injection to Unit 1 was confirmed.
Additional Information
Impassable because the tanks carried by tsunami blocked the way.

Impassable due to road damage and debris carried by tsunami.

Breakdown due to tsunami.

Shallow draft quay.
[Fire Engine Class]
1F (Fukushima Daiichi Nuclear Power Plant): A2 Class
SD (Self-Defense Forces): A2 Class
KK (Kashiwazaki Kariwa Nuclear Power Plant): A2 Class
Minami Yokohama Thermal Power Plant: A1 Class
Chiba Thermal Power Plant: A1 Class
Sodegaura Thermal Power Plant: A1 Class

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<th>[A1 Class Design Specification]</th>
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<th>Specified discharge rate</th>
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<tr>
<td>High pressure discharge</td>
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Vertical Section

Flood height
Units 1-4: O.P. + from 11.5 to 15.5 m
Units 5-6: O.P. + from 13 to 14.5 m

*1 Ground height of Units 5 and 6 is O.P. + 13 m

*2 Unit 6 has EDGs in the reactor bldg. and another bldg

Fukushima Nuclear Accident Analysis Report (Interim Report) which was released on Dec. 2, 2011