

Conditions at the Fukushima Daiichi Nuclear Power Station after the Earthquake of March 16 (Update)

< Reference document >
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Tokyo Electric Power Company Holdings, Inc.
Fukushima Daiichi Decontamination &
Decommissioning Engineering Company

【Earthquake data】

Date/Time: Around 11:36 PM, Thursday, March 16, 2022

Hypocenter: Off the coast of Fukushima Prefecture

Depth: Approx. 60km

Magnitude: 7.3

Seismic intensity in surrounding communities: Futaba Town: 6-strong; Oguma Town: 6-weak

Updated areas

Underlined parts on slides 2, 6-8

Graph on slides 9, 10

【 Plant status 】

◆ Seismometers

- Horizontal: 221.3 Gals (Unit 6)
 - Vertical: 202 Gals (Unit 6)
- (Category III)

◆ Observed tsunami height

• It is confirmed that earthquake data is collected with the seismometer installed on the first and fifth floors at Unit 3 reactor building and at 4 locations in the tank area. Earthquake data will be assessed later.

- Approx. 20cm (Time of observation: 1:33 AM, March 17)

◆ Facility status

- Reactor cooling water injection equipment (Units 1~3): No abnormalities
- Monitoring post indicators: No significant fluctuations
- Site border/on-site dust monitor indicators: No significant fluctuations
- On-site dosimeter indicators: No significant fluctuations
- Seawater radiation monitor indicators: No significant fluctuations
- On-site drainage channel monitor indicators (excluding the unloading wharf): No significant fluctuations
- On-site drainage channel monitor indicators (unloading wharf): increase from 60Bq/liter prior to the earthquake to 230Bq/liter. ("High" alarm setting: 1,500Bq/liter)⇒ Decreasing trend seen since around 1:30 AM March 17
- On-site continuous dust monitors : The following fluctuations were confirmed.
 - Unit 2 reactor building: Alarm sounded at 12:09 AM, March 17, and a maximum value of 5.3×10^{-3} Bq/cm³ was indicated at around 1 AM ("High" alarm setting: 1×10^{-3} Bq/cm³)
 - Unit 1/2 west side slope: 1.47×10^{-5} Bq/cm³ (No Alarm; "High" alarm setting: 5×10^{-5} Bq/cm³)
 - Unit 1 ocean side (2.5m foundation): 1.11×10^{-5} Bq/cm³ (No Alarm; "High" alarm setting: 5×10^{-5} Bq/cm³)
 - Unit 3 ocean side (2.5m foundation): 1.55×10^{-5} Bq/cm³ (No Alarm; "High" alarm setting: 5×10^{-5} Bq/cm³)

⇒ Decreasing trend was confirmed after 1:00AM on March 17 in all of the above. The high alarm at Unit 2 reactor building was cleared at 4:39Am on March 17

Sequence of events (1/7)

◆ March 16

11:34 PM Automatic shutdown of the Unit 5 spent fuel pool cooling pump (※ Shutdown at around 11:34 PM in conjunction with earthquake).

⇒ Operation recommenced at 4:08 AM on March 17

11:36 PM Fire alarm in main administration building activates.

11:37 PM Pump that supplies refrigerant for the land-side impermeable wall automatically shuts down after detecting a current surge.

11:50 PM Three fire detectors on the second floor of the Unit 5 turbine building activate.

⇒ 12:05 AM, March 17: Futaba Fire Department notified (General-use phone line)

12:23 AM, March 17: Tomioka Fire Department arrives

1:22 AM, March 17: Fire Department personnel confirm that there is no fire or smoke

2:07 AM, March 17 Tomioka Fire Department determine that fire alarms were false alarms

11:52 PM Nuclear alert issued (EAL earthquake)

11:59 PM Drop in the water level of the Unit 2 SFP skimmer surge tank. Unit 2 spent fuel pool cooling equipment manually shut down. Isolation valve closed. Drop in water level halted.

⇒ After that it was evaluated that limiting condition for operation of 65°C would not be reached.

⇒ Operation recommenced at 7:38 AM

◆ March 17

12:09 AM "High" alarm sounds for continuous dust monitors in the Unit 2 reactor building

12:12 AM Drop in the water level of the Unit 2 SFP skimmer surge tank. Unit 2 spent fuel pool cooling equipment manually shut down. Isolation valve closed. Drop in water level halted.

⇒ Limiting condition for operation of 65°C has not reached

⇒ Operation recommenced at 7:38 AM

12:18 AM Water treatment equipment shut down

⇒ No abnormalities with parameters

1 AM It is confirmed that there are no abnormalities with the contaminated water tank water level indicator.

Around 1 AM Decreasing trend was seen with readings from continuous dust monitors installed in the unit 2 reactor building.

1:05 AM It is confirmed that the water levels in the common pools for Unit 1-4, Unit 5 and Unit 6 have not dropped.

1:19 AM TEPCO employees begin patrols of tank areas on high ground. (class III rounds began)

Sequence of events (2/7)

◆ March 17

2:20 AM Puddles assumed to be caused by sloshing of the Unit 6 spent fuel pool found.

2:35 AM Puddles assumed to be caused by sloshing of the Unit 5 spent fuel pool found .

2:45 AM Drop in the water level (55mm/hour) of the Unit 6 turbine auxiliary cooling system (pure water) surge tank.

2:45 AM Leak the thickness of approximately two pencils was found from the bolt that secures the bottom of the existing desalination equipment ultra filter cleaning water tank. Tank isolated. It has been confirmed that the leak has been contained by the dikes.

⇒ Scope of leak: Approx. 6m x 6m x Depth 1mm. The water that leaked is desalinated freshwater

2:48 AM A small leak of approximately one drop every several minutes found from the hydraulic pump for the filtrated pure water device sludge device. Amount of leak: 50cm x 50cm x 1mm. It has been confirmed that this dripping oil has been stopped by closing a valve.

2:50 AM High ground patrols found that some paint on the dikes of the J5 tank and G6 tank areas has peeled back

⇒ No leaks were found in the aforementioned tank areas.

3 AM Displacement of the strontium-removed water tank (H8-A3) found.

⇒ No leaks were found from the connecting pipes, and no decreases was seen in the water level of the tank.

4:10 AM A leak approximately three pencils in width was found coming from the notch tank that stores rainwater on the west side of water filtration facilities.

Around 4:20 AM Puddles assumed to be caused by sloshing of operation auxiliary common facilities (common pool building) were found.

Around 4:30 AM Leakage of the desalination system (RO-2) sodium sulfite tank was found from the sloshing, and it was confirmed that leakage is contained within the weir. The leakage area was approx. 1m×1m×1mm.

4:31 AM Readings on some water level gauges in ALPS treated water, etc. tanks deviate from the measurable scale of the gauges.

⇒ It is confirmed that there are no abnormalities, such as leaks.

4:55 AM It is confirmed that the air-conditioning isolation valve in Unit 5 reactor building air-conditioning equipment completely closed and the equipment has automatically shut down.

⇒ No significant fluctuations seen in monitor readings.

Sequence of events (3/7)

◆ March 17

5 AM Leak of filtered water and crack found in treated water tank for additionally installed equipment to drain raw water, pure water and sludge that is currently being built.

⇒ This equipment is currently in trial operation and there were no leaks of radioactive substances

5:13 AM Displacement of high-performance ALPS sample tank (A, C) and additionally installed ALPS sampling tank (A, C) found.

⇒ It is confirmed that there are no leaks.

5:48 AM Unit 1 primary containment vessel pressure temporarily increases and then decreases.

⇒ 10:30 PM, March 16 (prior to earthquake): 0.13 kPa

11:37 PM, March 16 (after earthquake): 0.28 kPa

5:37 AM, March 17 (thereafter): 0.00 kPa

5:59 AM It is confirmed that there are no significant fluctuations with the readings of continuous dust monitors in the Unit 1 reactor building.

6:25 AM Exhaust radiation monitor sample pump in the operation auxiliary common facility (common pool building) shuts down.

6:25 AM Water leak found from the downstream side of the Unit 6 turbine auxiliary cooling system seawater pump (A) cooling water inlet valve.

6:29 AM unit 6 turbine auxiliary cooling system seawater pump switched from (A) to (B), and (A) isolated. It is confirmed that the drop in water level in the turbine auxiliary cooling system surge tank has stopped. Pure water is used for coolant and there was no leak of radioactive substances.

6:29 AM It was confirmed that beam-like steel frame had fallen inside the Unit 4 reactor building cover building

7:38 AM Operation of Unit 2 spent fuel pool cooling equipment recommences.

⇒ Field checks implemented to confirm that there are no abnormalities with operation

Confirmed by 8:00 AM 1 reactor building first floor continuous dust monitor reading is 5.7×10^{-4} Bq/cm³ and rising. Unit 2 reactor building first floor continuous dust monitors shows decreasing trend. Other building monitors either shown no significant fluctuation or decreasing trends.

Sequence of events (4/7)

◆ March 17

The following was confirmed by 8:00 a.m.

- It was confirmed that there is no leakage from the accumulated water transfer system, cesium adsorption system, desalination system, Multi-nuclide removal equipment, subdrain purification system, land-side impervious wall system and ground water bypass system.
- It was confirmed that rounds had completed for Units 1-3 CST reactor injection system, common FPC system, spent fuel pool secondary system and power supply system.
- It was confirmed that there is no leakage or other abnormalities at Units 5 and 6 reactor building, turbine building, radwaste building and miscellaneous solid waste incinerator building.

The following was confirmed by 9:00 a.m.

- It was confirmed that six containers stored in temporary storage area "a" had toppled over and its contents had come out. Five of the toppled containers stored used protective clothing, and one container stored scrap iron. Dose of the contents was confirmed to be at the same level as the background.
- Cracks were found on some parts of the on-site road (asphalt). This did not obstruct passage.
- Waterproof coating was found to be peeling from the subdrain collection tank No.1. Tank functions were not affected.
- Tank water gauge indication failure was found on 38 units. 27 of the units were restored with initialization work. The remaining 11 units are planned to be restored using spare parts.
- Water puddle was found on the stair landing (between fourth floor and fifth floor) at Unit 5 reactor building. It was confirmed that water had stopped dripping.

The following was confirmed by 10:00 a.m.

- It was confirmed that tanks had moved from its position in multiple tank areas and that waterproof coating was peeling inside the weir. Continuously check detailed base numbers. The tank foundation is not fixed and designed to shift its position with seismic shakes.

Sequence of events (5/7)

◆ March 17

The following was confirmed by 10:00 a.m.

- The increased indicated values on the continuous dust monitors at Unit 1 reactor building were confirmed to have dropped to the level before the increase.
- Regarding increase on the shallow draft quay PSF monitor, it was judged that the monitor detector itself had been contaminated since there was no difference between the gross β value of the main stream of the drainage channel and the monitor collection water tank according to sampling results.
- Radioactive liquid leakage alarm went off at Unit 5 reactor building. The field will be checked later.

The following was confirmed by 11:00 a.m.

- Regarding the leakage detector alarm that went off at Unit 5 reactor building, the field was checked and it was found that leakage of a size of about four pencils was flowing into the room from pipe penetrations of the residual heat removal seawater system.
- At six tanks in F area, a drop of water was dripping every 2 seconds from the flange. The dropped water had accumulated in the weir.
- It was confirmed that water is continuously dripping from the receiving pipe of the rainwater mobile receiving tank (A).
- It was confirmed that a drop of water was dripping every minute near the rainwater treatment facility RO membrane unit (A) A-1 inlet pipe. The dropped water had accumulated in the weir. Said facility is currently stopped, and it is planned to cover the area later.
- Restoration procedures for the accumulated water transfer system will start as soon as it is ready.

The following was confirmed by 0:00 p.m.

- The water puddle found on the stair landing at Unit 5 reactor building was checked in the field, and it was found that water puddles exist on the third floor, fourth floor and stair landing between the fourth floor and fifth floor. The water puddle is speculated to have been formed by leaked water from the spent fuel pool flowing into the air conditioning duct near the water surface and dripping from the joint. Currently, water has stopped dripping and has been wiped.

Sequence of events (6/7)

◆ March 17

The following was confirmed by 0:00 p.m.

- A water puddle was found at the bottom of the root of connection tube between H2 area tank C3-D3 tank. Currently, water is not dripping from the root and is contained in the weir.
- It has been confirmed that the following leakages have stopped:
 - Leakage of filtered water from the processing water tank of the raw water filtered water pure water sludge expansion drainage system
 - Leakage of desalinated processing water from the ultra filter cleaning water tank of the existing desalination system
- Regarding tank water gauge indication failure, one unit was restored, counting to 28 out of 38 units having completed restoration. The remaining 10 units are planned to be restored using spare parts.

The following was confirmed by 1:30 p.m.

- Class III rounds were completed (0:35 p.m.). Measures will be implemented for water leaks and other defects found in the rounds. The status of field equipment will continue to be closely observed in regular rounds.
- All accumulated water transfer pumps of the accumulated water transfer system were started up, and it was confirmed that that integrity is ensured after startup.
- At six tanks in F tank area, areas where water was dripping were covered. (11 areas)

The following was confirmed by 2:30 p.m.

- During regular operator rounds, it was found that water was flowing in from the following pipe penetrations on the first floor of Unit 3 radwaste building. Water that flowed in is contained in the weir.
 - Inlet pipe penetration of spent fuel pool equipment primary system filter demineralizer (B) (size of one pencil)
 - Outlet pipe penetration of same system (5-6 drops every second)

Sequence of events (7 / 7)

◆ March 17

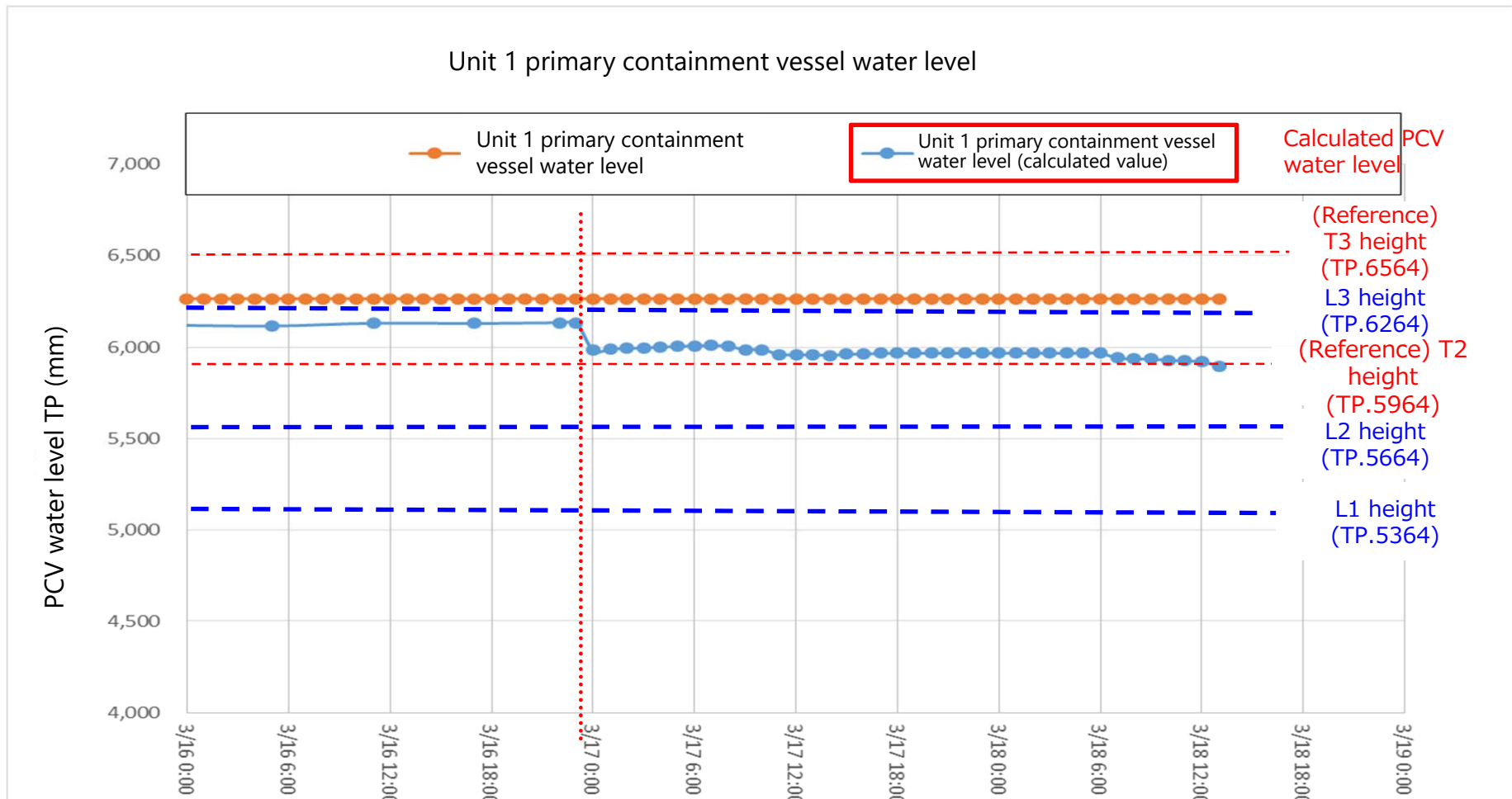
The following was confirmed by 2:30 p.m.

- The water puddle at the root of the C3-D3 tank connection tube in the H2 area weir was analyzed and determined to be rainwater.
- Water that spilled over due to the Unit 5 spent fuel pool shaking was wiped.
- Fuel pool water that spilled over due to the fuel pool shaking was wiped on the operation floor of Unit 6 reactor building.
- Inspection results for equipment in the port are as follows:
 - Cracks were found on facings in the Units 1-4 revetment area and Unit 5&6 revetment area
 - Mega-float north-side revetment blocks were found to be shifted
 - Abnormalities have not been found for other revetment equipment
- Regarding containers where damage was found before the earthquake in temporary storage area (f), it was found that the damage expanded due to this earthquake. The containers contain used protective clothing, and it was confirmed that the dose of the contents was at the same level as the background.
- It was found that a part of the roof was damaged in the temporary storage area (N)

Situation after the earthquake

Water level inside the Unit 1 primary containment vessel

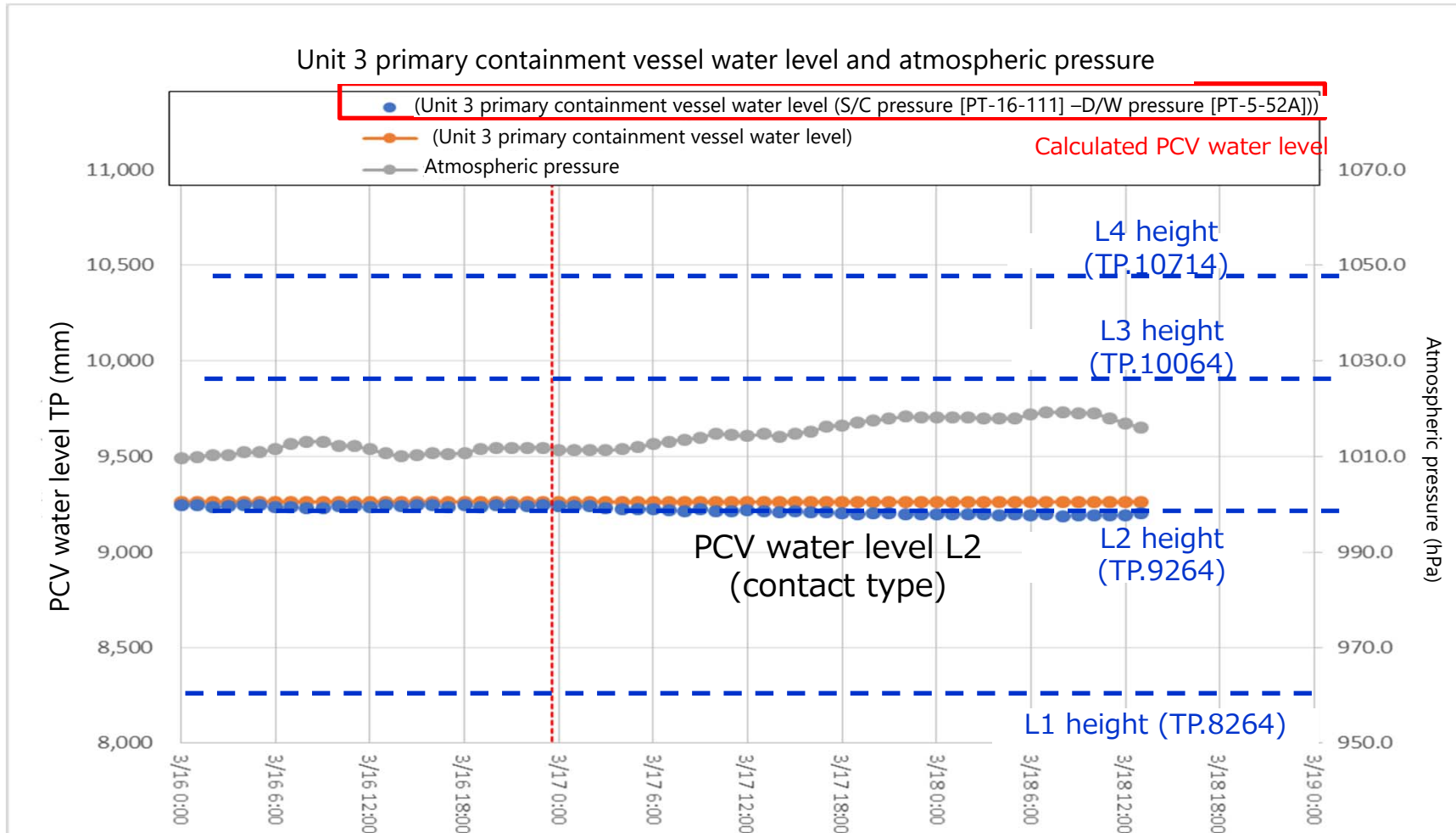
- Although the water level inside the Unit 1 primary containment vessel had temporarily decreased as follows, no significant changes have been confirmed. Fluctuations in the water level will continue to be closely observed.
- The current water level is close to the position of water gauge L3 (T.P.+6,264mm).
(Primary containment vessel bottom is T.P.+4,744mm)



Situation after the earthquake

Water level inside the Unit 3 primary containment vessel

- No significant changes have been confirmed regarding the water level inside the Unit 3 primary containment vessel, as follows.
 - The current water level is close to the position of water gauge L2 (T.P.+9,264mm).
- (Primary containment vessel bottom is T.P.+4,044mm)



Situation after the earthquake

Falling of steel auxiliary member inside the Unit 4 reactor building cover building

Occurrence (confirmed time): Around 6:29 a.m. on March 17

Description: TEPCO employees found a steel auxiliary member used for exterior wall installation had fallen. It is speculated that the member had fallen due to bolts at the joint rupturing. No significant corrosion was found on the bolts.



Specifications of the beam-like steel frame
Length approx. 5.6m width approx. 25cm height approx. 10cm,
thickness approx. 10-13mm, weight approx. 200kg



Bolts at the joint ruptured



Situation after the earthquake

State of containers

