

Status of cores at Units 2 and 3 in Fukushima Daiichi Nuclear Power Station

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Tokyo Electric Power Company



東京電力

Results of Analysis

Temperature at the bottom of Reactor Pressure Vessel (RPV) at each of Units 1 to 3 is generally within 100 to 170 , and all of those plants are stably cooled.

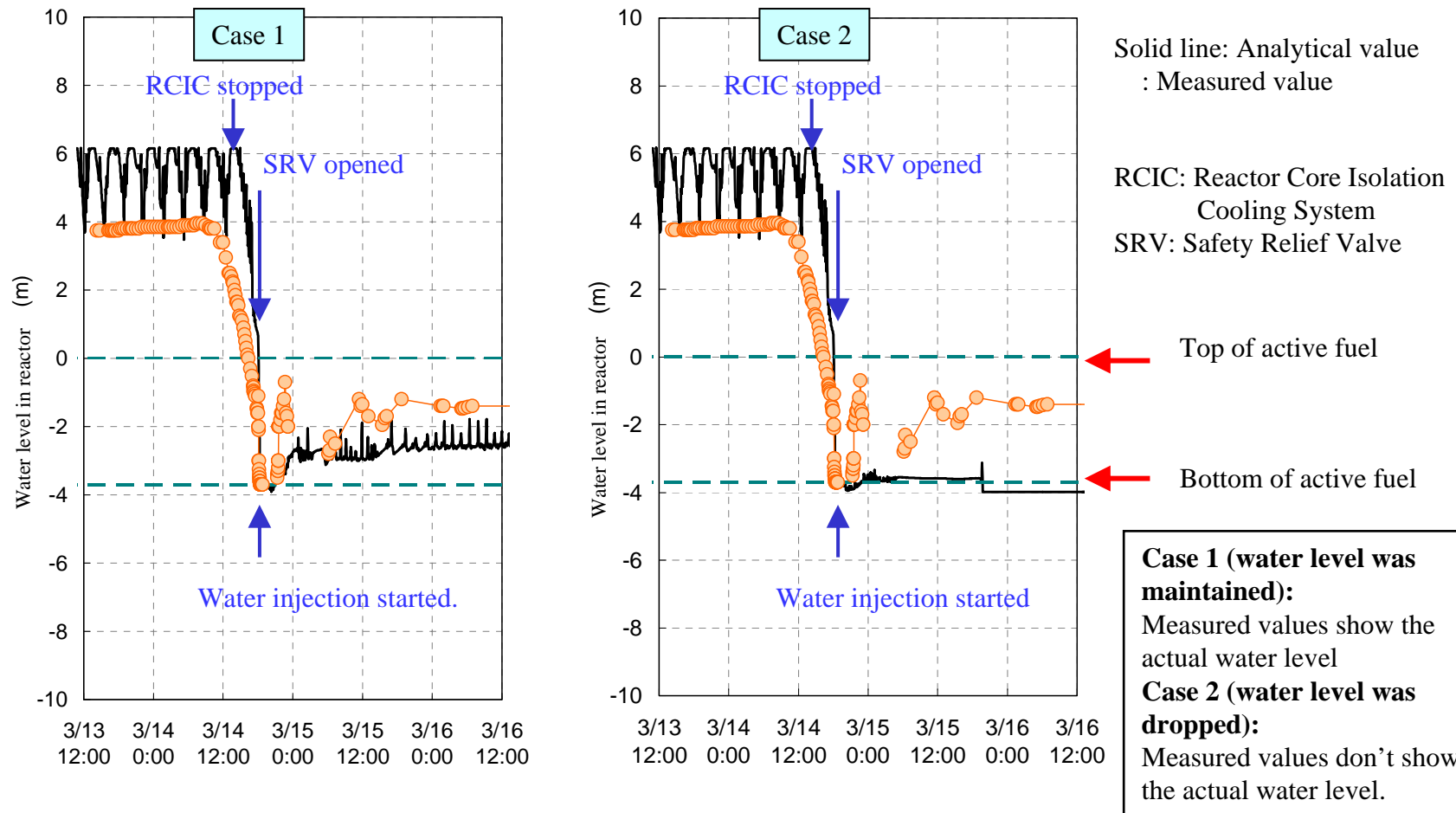
Seeing that cooling by water injection is continued, we don't think it will develop into the serious situation that leads to a large-scale emission of radioactive materials.

Interim analyses show that in Unit 1 pellets were melted down to the bottom of RPV rather soon after tsunami attacked (already announced on May 15).

Since we compiled data on plants at the time of the earthquake this time, we analyzed Units 2 and 3 in addition to Unit1*.

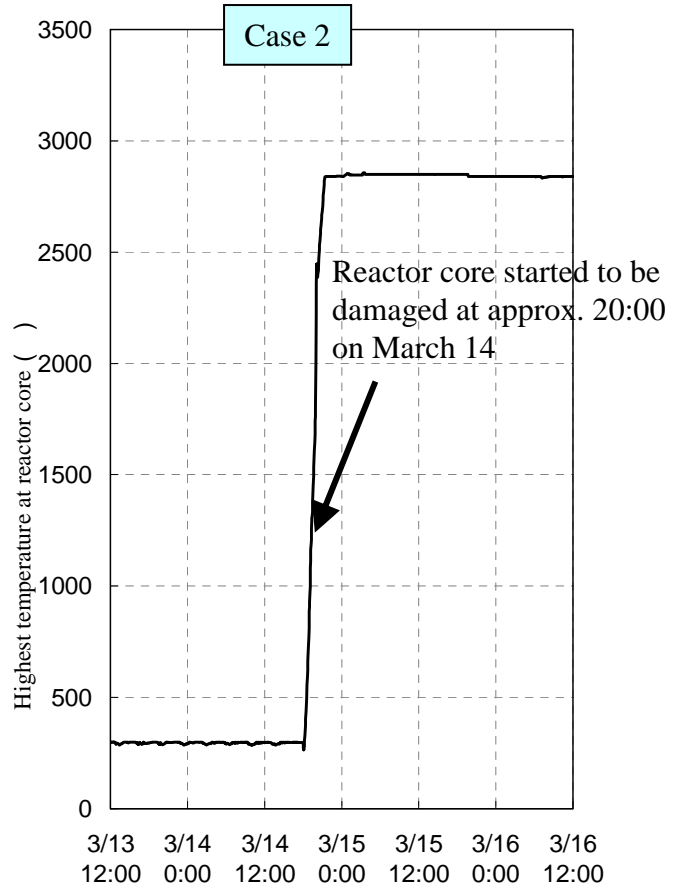
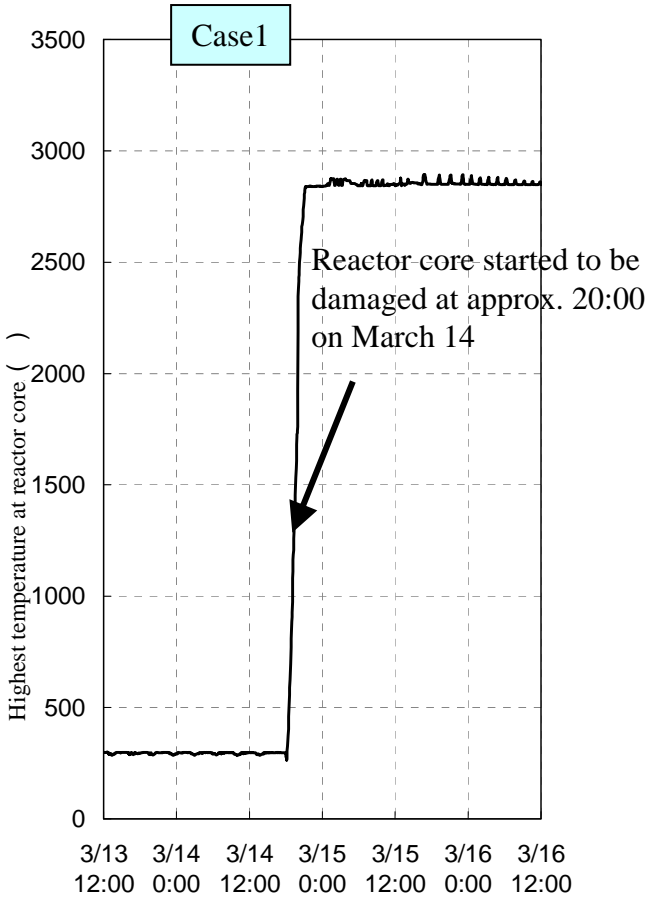
*: Analysis results of Unit 1 were the same as those of interim analyses.

Water level in Unit 2 (analysis results)



- After RCIC stopped at approx. 1:25 on March 14, the water level in RPV dropped. In case 1, by water injection, the water level maintained the same as measured (approx. -3m from top of active fuel).
- In case 2, after drawdown, although water was injected, the water level kept below the bottom of active fuel.

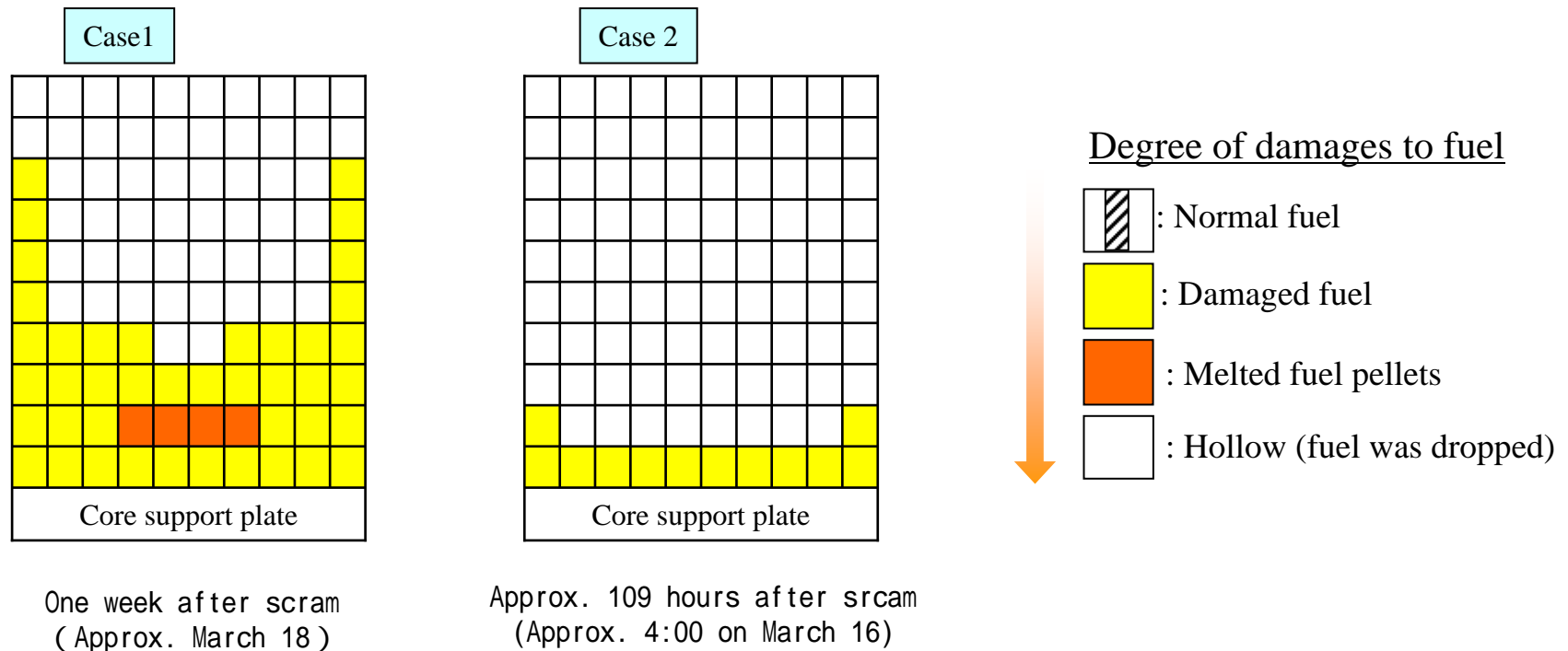
Highest temperature at reactor core in Unit 2 (analysis results)



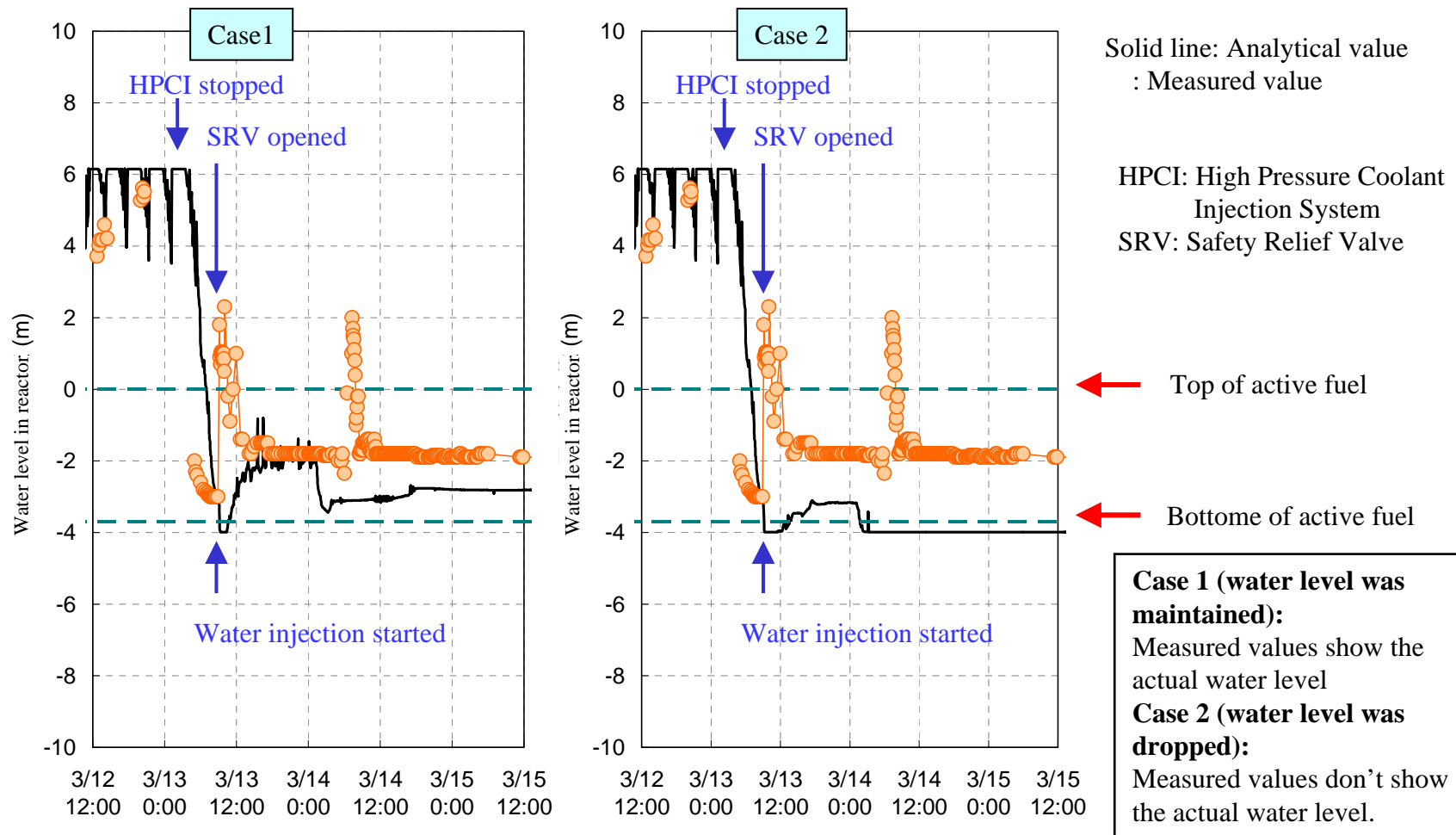
· After the drawdown, temperature at reactor core rose and it starts to be damaged in both cases.

Status of reactor core in Unit 2 (analysis results)

- In case 1, fuel is maintained in the fuel area.
- In case 2, large part of fuel drops down to the bottom of RPV in approx. 101 hours after scram (approx. 8:00 pm on March 15)
- Analysis results of Case 2 show RPV gets damaged. However, in even in this scenario we think the damage is limited judging from temperature around RPV etc.

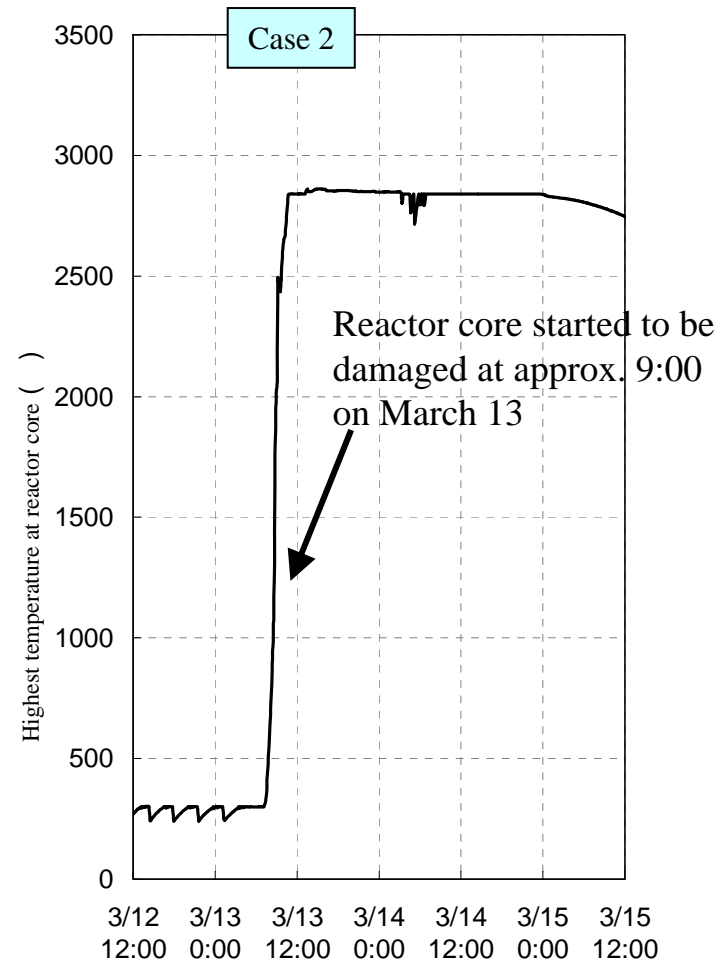
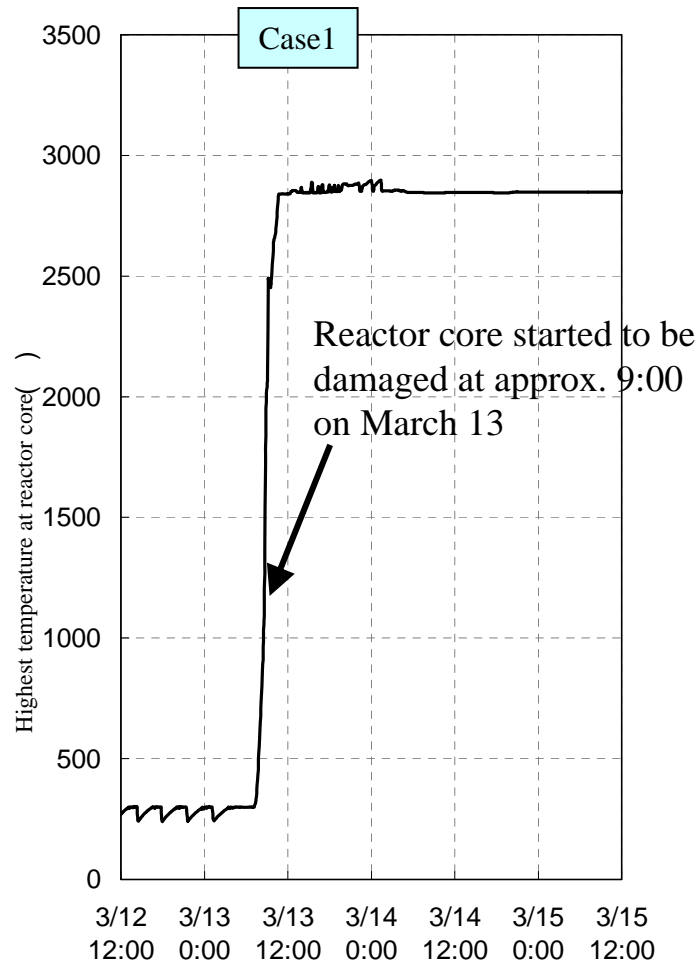


Water level in Unit 3 (analysis results)



- After HPCI stopped at approx. 2:42 on March 13, the water level in RPV dropped. In case 1, by water injection, the water level maintained the same as measured (approx. -3m from top of active fuel).
- In case 2, after drawdown, although water was injected, the water level kept below the bottom of active fuel.

Highest temperature at reactor core in Unit 3 (analysis results)

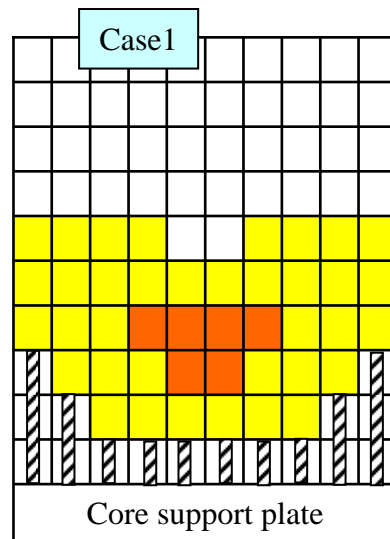


· After the drawdown, temperature at reactor core rose and it starts to be damaged in both cases.

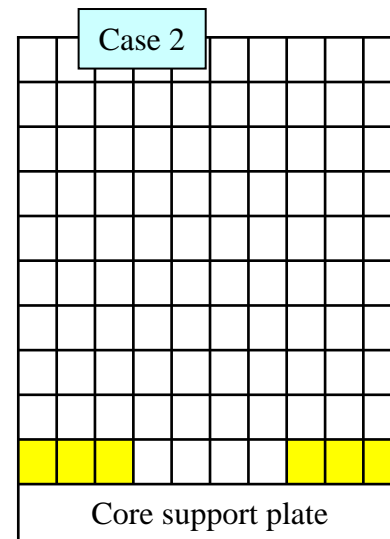
Status of reactor core in Unit 3 (analysis results)

In case 1, fuel is maintained in the fuel area.

- In case 2, large part of fuel drops down to the bottom of RPV in approx. 60 hours after scram (approx. 3:00 on March 14)
- Analysis results of Case 2 show RPV gets damaged. However, in even in this scenario we think the damage is limited judging from temperature around RPV etc.

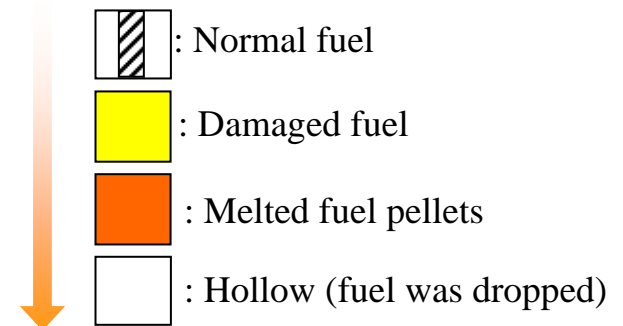


One week after scram
(Approx. March 18)



Approx. 96 hours after scram
(Approx. 3:00 pm on March 15)

Degree of damages to fuel

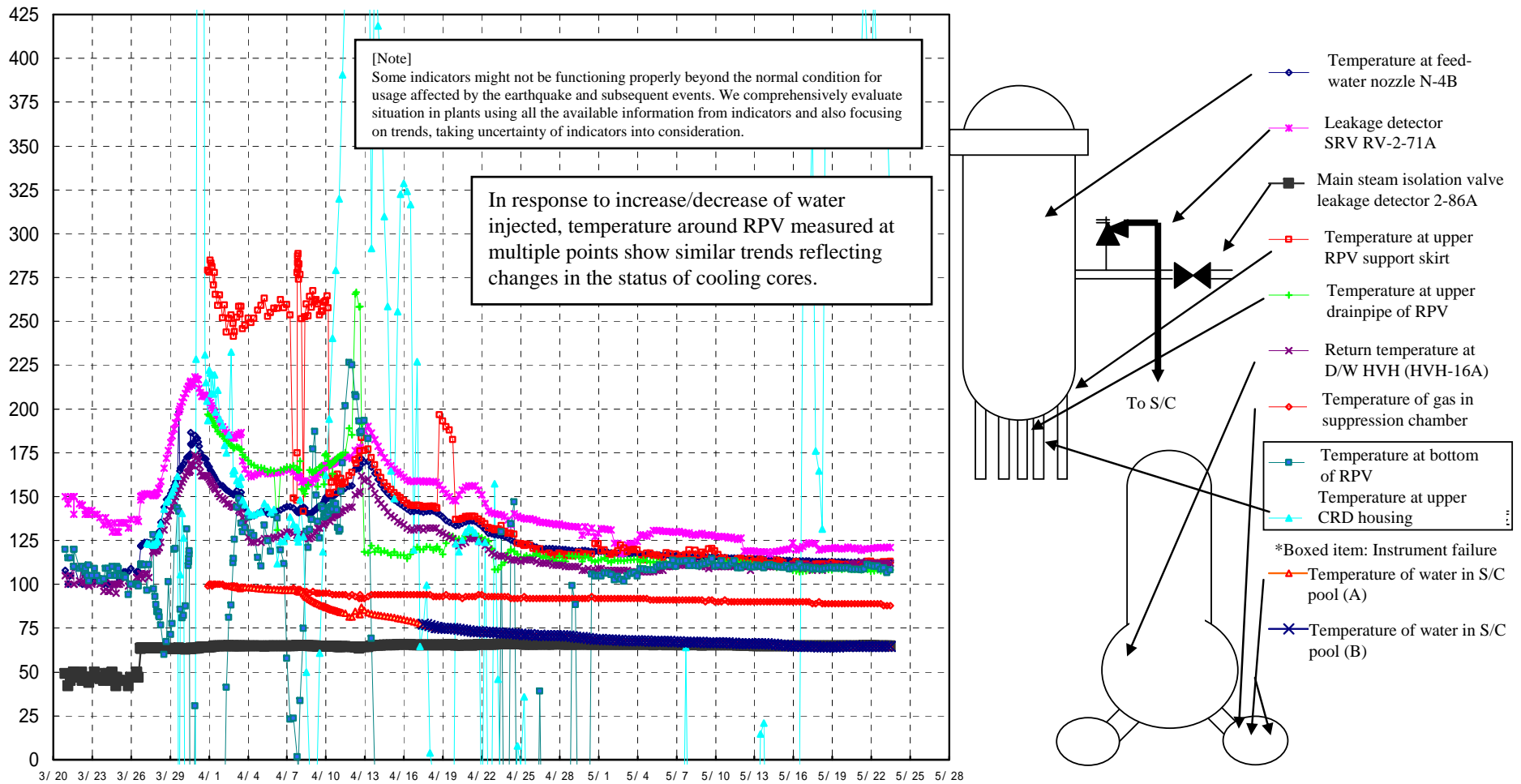


Estimation based on measured temperatures around each Unit

- Judging from overall trends at each point temperature is measured, we estimate that cores are cooled sufficiently now.
 - Temperature around RPV is measured by indicators placed at multiple points. Functioning indicators generally show similar trends or temperatures.
 - In response to increase/decrease of water injected, temperature around RPV measured at multiple points show similar trends reflecting changes in the status of cooling cores.

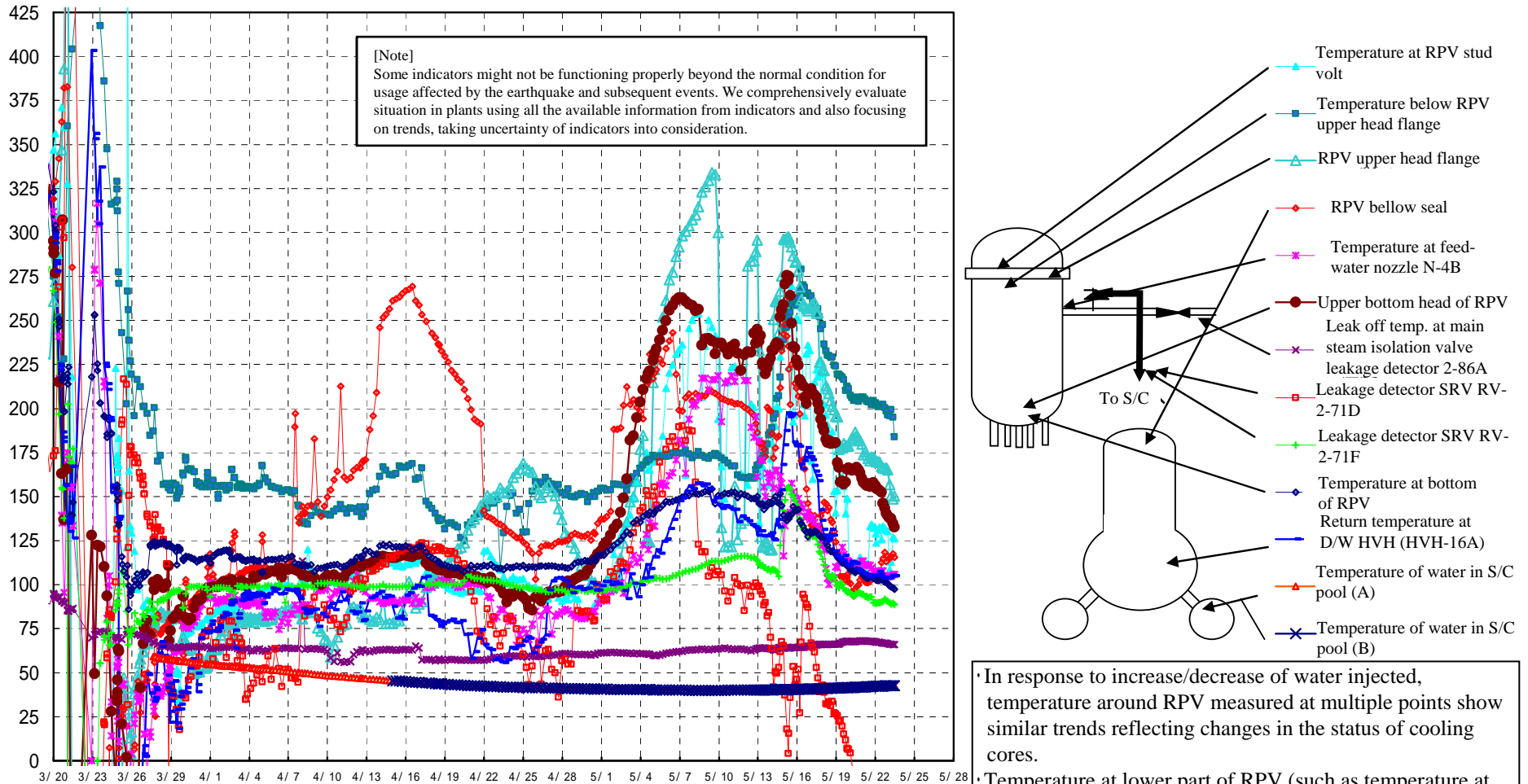
Measured temperature around RPV in Unit 2

Parameters (typical points) regarding temperature of Unit 2, Fukushima Daiichi NPS



Measured temperature around RPV in Unit 3

Parameters (typical points) regarding temperature of Unit 3, Fukushima Daiichi NPS



• In response to increase/decrease of water injected, temperature around RPV measured at multiple points show similar trends reflecting changes in the status of cooling cores.

• Temperature at lower part of RPV (such as temperature at the bottom of RPV), which is measurable, moves in almost the same manner as that measured at other points of RPV.

Summary of results

- Analysis results show that although the cores were partially melted, they remained within the fuel areas and RPVs were not damaged. However, if we assume water levels were lower, results indicate that RPVs were damaged.
- Seeing that measured temperature around RPV in each plant now shows the trends from which we can expect large part of fuel remains within RPV and that now we stably continue water injection which sufficiently cools reactors, we don't think it will develop into a worse situation.