Increase of the temperature indicator of the upper bottom head of the Reactor Pressure Vessel (RPV) of Unit 2

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Tokyo Electric Power Company

1. Overview

- On Feb. 2, the temperature indicator of the RPV upper bottom head (0°) started to rise.
- On Feb. 3, we changed the balance of water injection flow (decreasing 2m3/h of the water injection through the core spray system and increasing 2m3/h of the injection through the reactor feed water system). On Feb. 5 and 6, we separately increased 1m3/h of the water through the reactor feed water system.
- On Feb. 7, the temperature rising slowed down and we increase 3m3/h of water through the core spray system in order to decrease the temperature indicator surely.
- Since Feb. 7, we monitored the temperature, but on Feb. 11 the temperature indicator rose again and therefore we increased 1m3/h of water through the reactor feed water system.
- However the indicators kept increasing and therefore we further increased 3m3/h of the water through the core spray system, up to 9.9m3/h on Feb. 12
- Other temperature indicators installed in the RPV and PCV or the temperature indicator of the upper part of RPV support skirt junction, which is around the upper bottom head of RPV, tend to decrease.

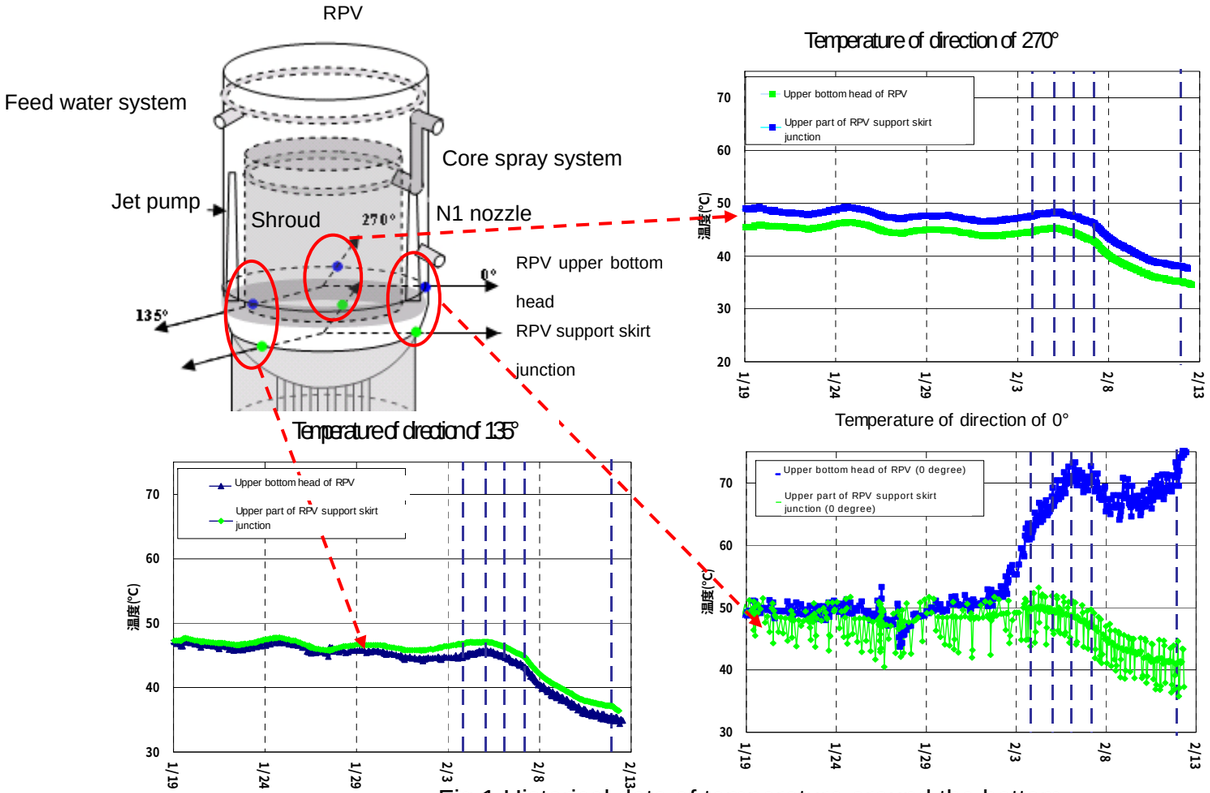

Fig.1 Historical data of temperature around the bottom of RPV

2. Status of RPV cooling

Although the temperature indicator for the upper bottom head of RPV (0°) increased, considering the following points such as historical data of temperature indicators for other parts affected by increase of injected water and so forth, overall, we judge that the reactors are cooled properly.

① There is only one point where the temperature rose and the indicators including those for nearby areas show decreasing tendency (Fig.1)

② The temperature indicators around the RPV and in the PCV show decreasing tendency and therefore we could assume the whole facility is overall cooled (Fig.2).

③ Considering the relation between the PLR entry pressure and the water amount through the reactor feed water system, there is presumed to be some water around the point and it should be cooling (Figs. 3 and 4).

④ As a result of sampling of gas in the PCV, we have confirmed that there has not occurred any criticality (Xe-135 was below detection limit) and that there is no increase of radiation (Cs-134 and 137) (Table 1).

3. Further responses

So far we have tried to confirm the actual condition and the mechanism of temperature increase and considered the way of cooling and implementing countermeasures.

However, most of the results obtained from the above indicate that the temperature indicator malfunctions rather than the temperature actually rose (e.g. Fig. 5).

Considering this situation, overall, we judge that the reactors remain cold shutdown but we will take measures shown as below.

- Monitoring the temperature indicators of the RPV and the PCV including the indicator at stake.
- Investigating the causes for the indicator rising without excluding the possibility of the actual temperature rising.

Parameters concerning the temperature of Unit 2 at 1F

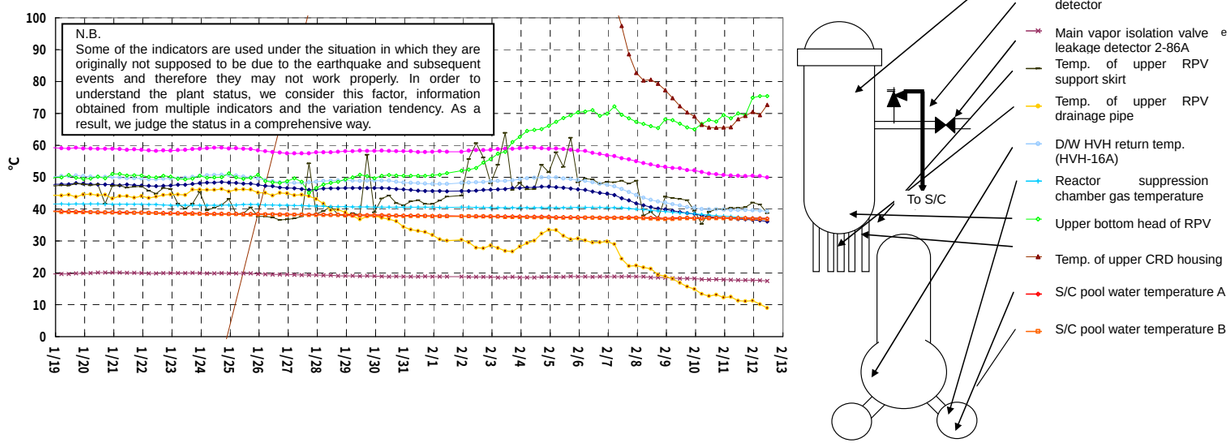

Fig.2 Historical data of temperature of RPV and PCV

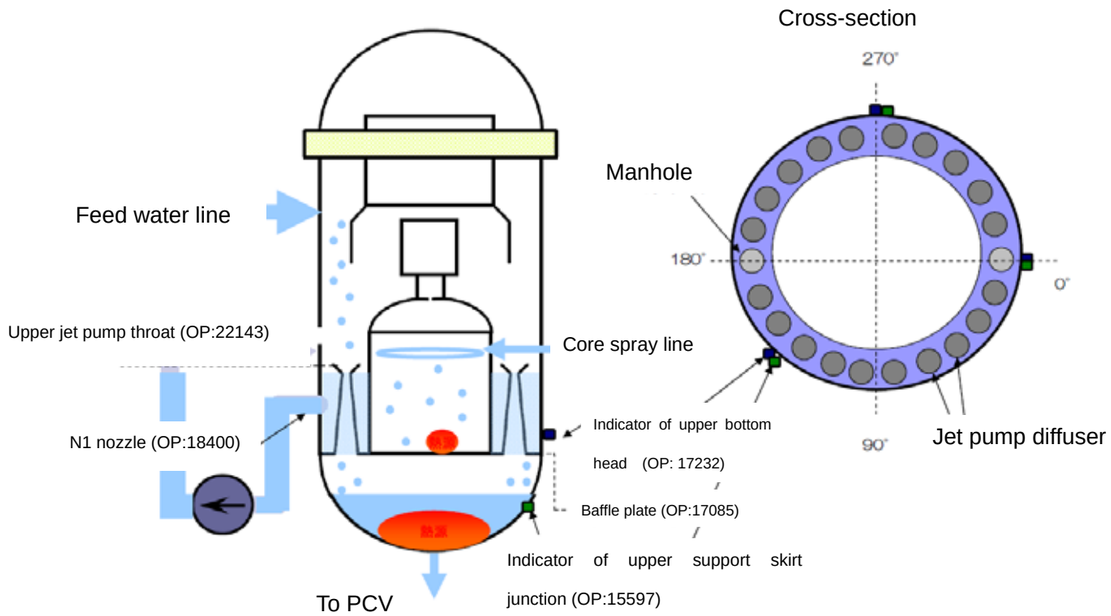

Fig.3 Cross-section diagram of Reactor Pressure Vessel and reactor feed water system

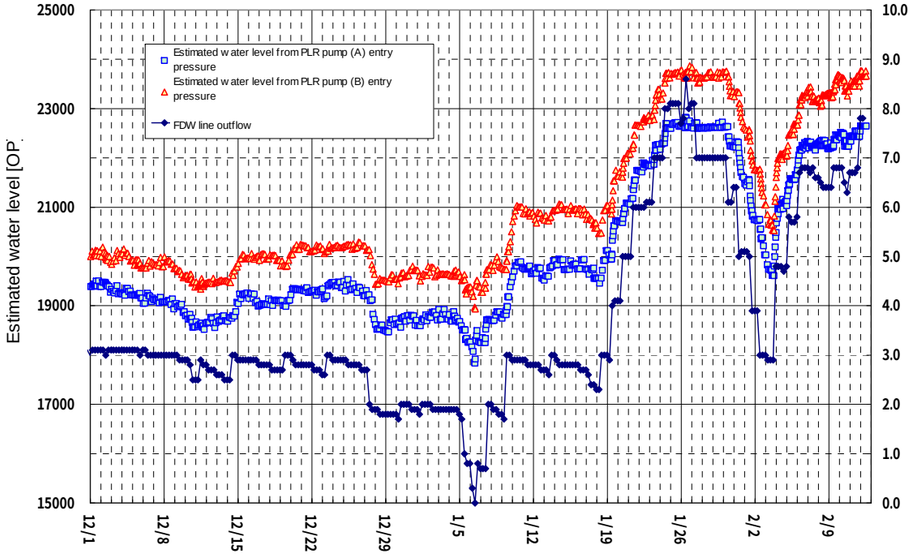

Fig.4 Estimated water level and the water amount of the reactor feed water system in the annulus part

Table 1 Sampling result of gas in the Primary Containment Vessel (vial container) (Unit2) (Bq/cm^3)

Nuclides (half-life)	PCV gas management facilities (vial container (entry side))					
	2012/01/11	2012/01/18	2012/01/25	2012/02/01	2012/02/06	2012/02/12
I-131 (Approx.8days)	N.D. ($<1.3\times10^{-1}$)	N.D. ($<1.5\times10^{-1}$)	N.D. ($<1.5\times10^{-1}$)	N.D. ($<1.3\times10^{-1}$)	N.D. ($<1.3\times10^{-1}$)	N.D. ($<1.3\times10^{-1}$)
Cs-134 (Approx.2 years)	5.1×10^{-1}	6.0×10^{-1}	6.7×10^{-1}	3.5×10^{-1}	N.D. ($<3.3\times10^{-1}$)	N.D. ($<3.1\times10^{-1}$)
Cs-137 (Approx.30 years)	5.6×10^{-1}	7.1×10^{-1}	6.0×10^{-1}	7.4×10^{-1}	5.4×10^{-1}	N.D. ($<3.7\times10^{-1}$)
Kr-85 (Approx.11years)	1.8×10^{2}	4.1×10^{1}	N.D. ($<2.7\times10^{1}$)	N.D. ($<2.5\times10^{1}$)	N.D. ($<2.6\times10^{1}$)	N.D. ($<2.6\times10^{1}$)
Xe-131m (Approx.12 days)	N.D. ($<3.6\times10^{0}$)	N.D. ($<3.6\times10^{0}$)	N.D. ($<3.6\times10^{0}$)	N.D. ($<3.0\times10^{0}$)	N.D. ($<2.9\times10^{0}$)	N.D. ($<3.0\times10^{0}$)
Xe-133 (Approx.5 days)	N.D. ($<2.6\times10^{-1}$)	N.D. ($<2.7\times10^{-1}$)	N.D. ($<2.5\times10^{-1}$)	N.D. ($<2.5\times10^{-1}$)	N.D. ($<2.5\times10^{-1}$)	N.D. ($<2.4\times10^{-1}$)
Xe-135 (Approx.9hours)	N.D. ($<1.1\times10^{-1}$)	N.D. ($<1.1\times10^{-1}$)	N.D. ($<1.1\times10^{-1}$)	N.D. ($<9.5\times10^{-2}$)	N.D. ($<1.0\times10^{-1}$)	N.D. ($<9.5\times10^{-2}$)

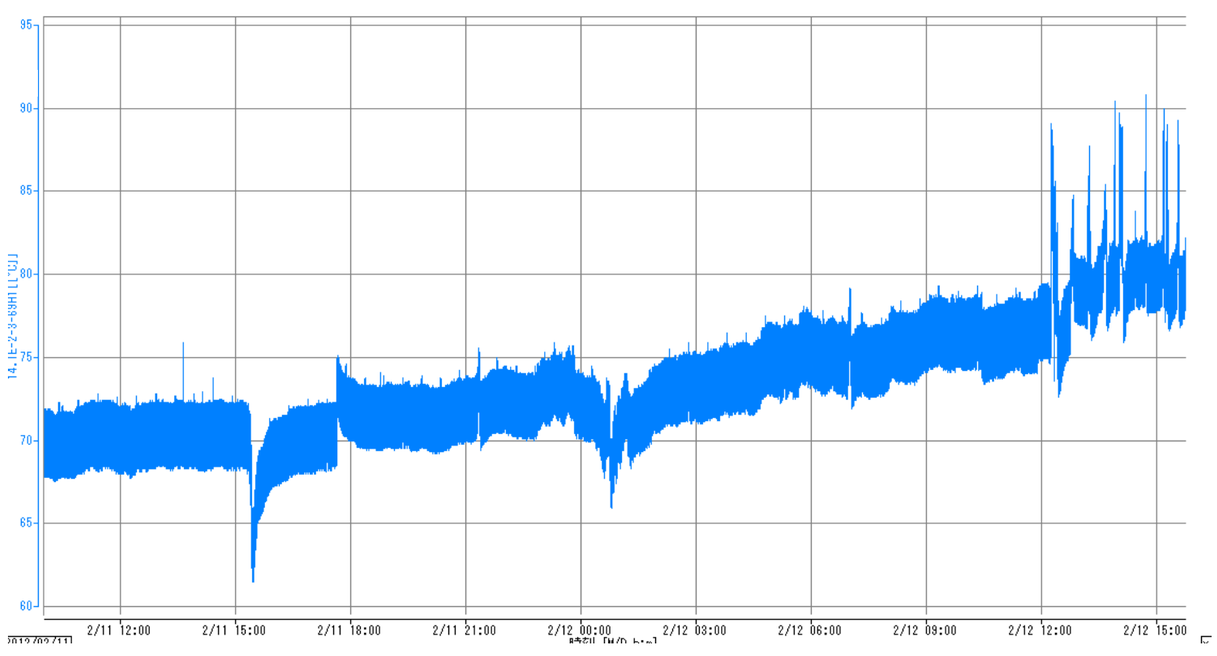

Fig.5 Example of the fluctuation of the temperature indicator for the upper bottom head of RPV (0°) (one-second sampling)