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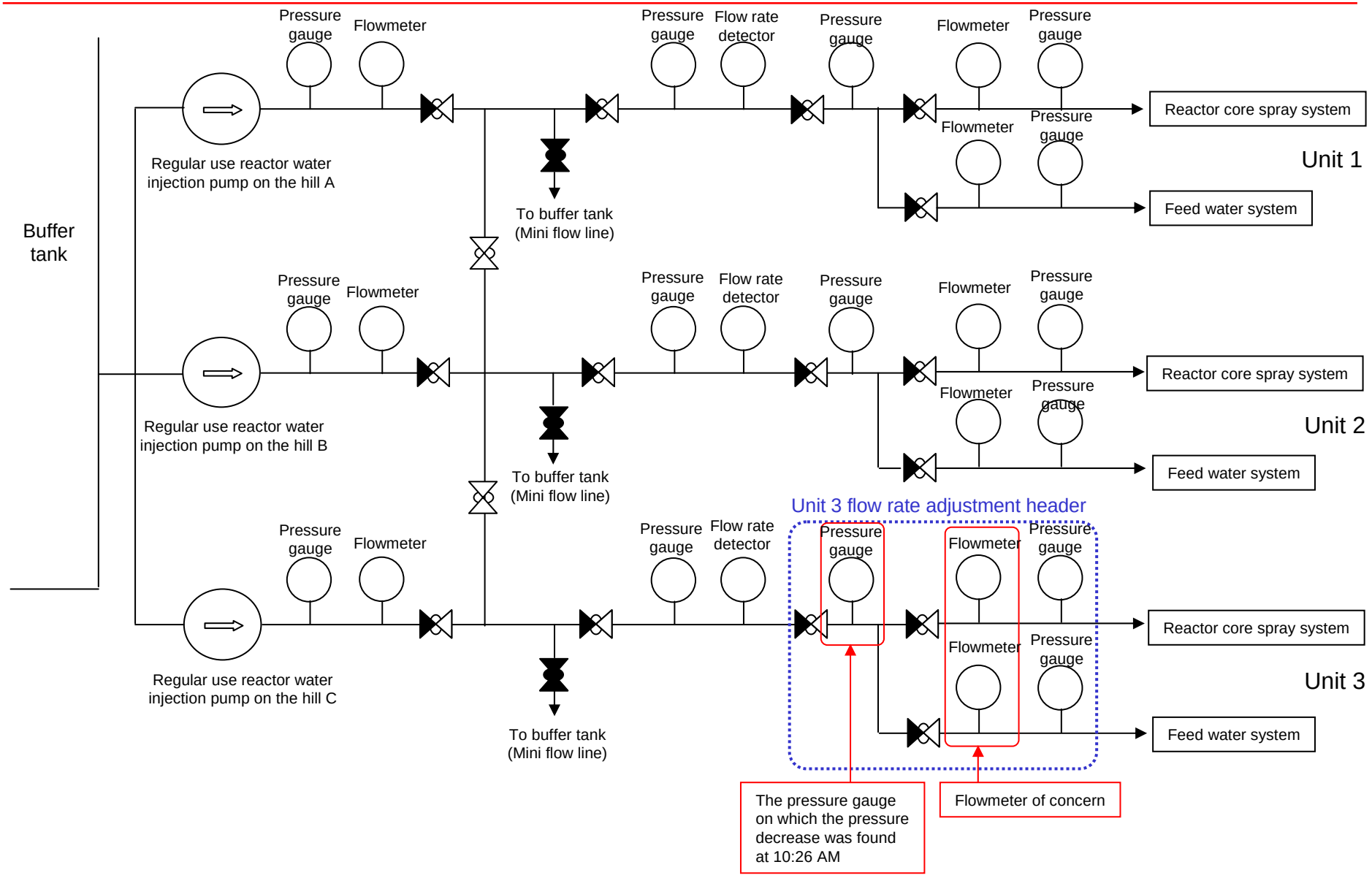
Increase in the Reactor Injection Water Amount at Unit 3 of Fukushima Daiichi Nuclear Power Station

November 27, 2012
Tokyo Electric Power Company

1. Outline of the incident

- Unit 3 reactor injection water amount was found to have increased from 5.8m^3/h (as of 10:00 AM) to 7.0m^3/h at 11:00 AM on November 26 during a regular plant data check.
- As the flow rate increase in any given 24 hours exceeded 1.0m^3/h, it was judged that the condition did not fulfill the “operational requirements” (hereafter LCO) stipulated by Article 138 of the technical specification for the nuclear reactor facility.
- At 11:10 AM on the same day, the reactor injection water flow rate was set back to 6.0m^3/h. No abnormality was found with the plant condition and monitoring post data.
- Upon checking the related plant data to identify the cause of the increase in the reactor injection water flow rate, it was found that the reactor injection water pressure was found to have decreased from 0.73MPa to 0.48MPa at 10:26 AM on November 26.
- At about the same time, it was confirmed that a worker was removing heat insulating material near the flow rate adjustment valve to prepare for replacing the reactor injection water flowmeter.

2. Reactor Water Injection System



3. Incident in Chronological Order (November 26)

[Confirmation of deviation from LCO]

11:00 AM

Increase in the reactor injection water amount was confirmed (from 5.8 to 7.0m^3/h) and the condition was judged to be a deviation from LCO.

11:05 - 11:10 AM

Adjusted the reactor injection water amount to 6.0m^3/h (originally set value). (Feed water system: Decreased from 4.0 to 2.0m^3/h, Reactor core spray system: Increased from 3.0 to 4.0m^3/h)

11:10 AM

No significant change in monitoring post was confirmed.

11:27 AM

Xenon 135 density in the PCV gas control system was confirmed to be less than the detection limit (3.4×10^{-1}Bq/cm^3).

11:30 AM

No significant change in monitoring post was confirmed.

11:40 AM

No abnormality such as a leakage near the injection line between the regular use reactor water injection pump and the building entrance.

9:35 PM

Recovery to the state which fulfills LCO

[Heat insulating material removal to prepare for flowmeter replacement (at Unit 3)]

10:22 AM: Work started

10:28 AM: Work completed

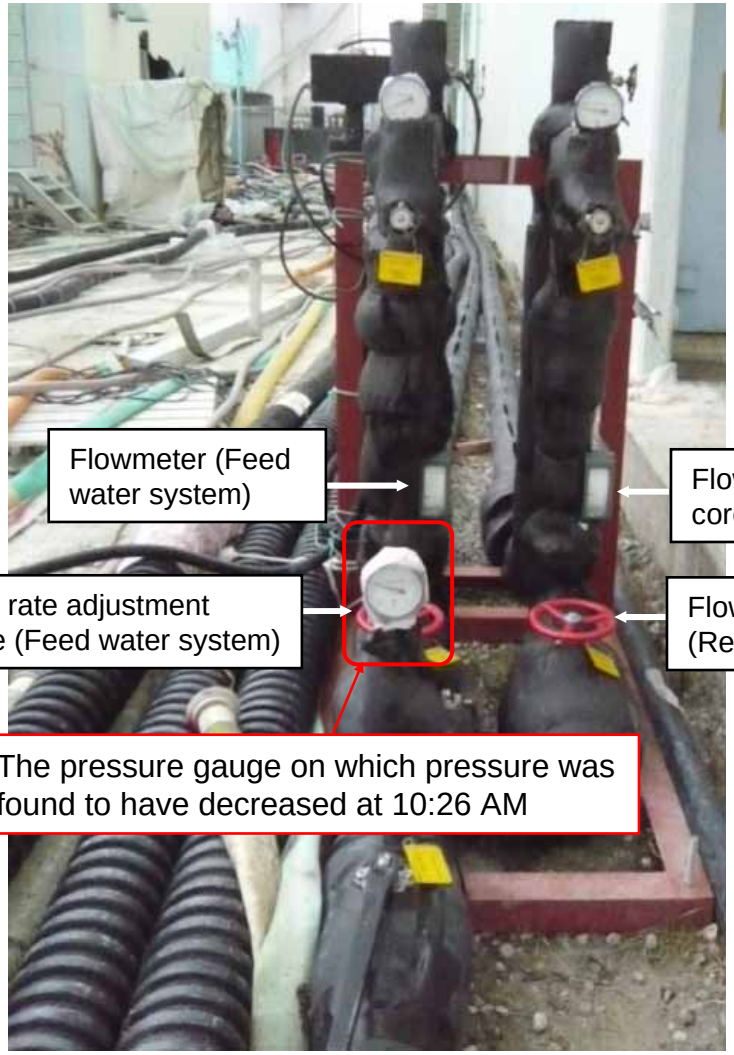
4. Assumed Cause

- The opening amount of the flow rate adjustment valve was found to be larger after the incident occurred.
- Although the heat insulating material removal was being carried out with a careful attention to the flow rate fluctuation (such as cutting the heat insulating material before removing), a worker unintentionally touched the flow rate adjustment valve while removing the heat insulating material

for the following reasons, causing the flow rate to increase.

1. The flowmeter and the flow rate adjustment valve of concern are located closely to each other.
2. Heat insulating material removal was performed in a poor working environment (on the Eflex on the side of the flow rate adjustment valve).

5. Status of Unit 3 Flow Rate Adjustment Valve



Unit 3 flow rate adjustment header (Before the heat insulating material removal: Photo taken on February 2012)

The opening amount of Unit 3 reactor injection water flow rate adjustment valves and reactor injection water flow rates

	November 21, 2012 (When installed)		November 24, 2012 (Flow rate adjusted)		November 26, 2012 (Flow rate recovered)	
	Opening amount (cm)	Injection amount (m^3/h)	Opening amount (cm)	Injection amount (m^3/h)	Opening amount (cm)	Injection amount (m^3/h)
FWS*	10.1	1.9 (As of 4:00 PM)	10.1→10.7	1.7→2.0	14.1 →9.7	4.0→2.0
RCSS**	32.2	3.9 (As of 4:00 PM)	32.2→33.2	3.8→4.0	32.0 →33.3	3.0→4.0

*FWS: Feed water system
**RCSS: Reactor core spray system

⇔ Not in operation

⇔ Not in operation

6. Unit 3 Plant Data Trend

Unit 3 plant data trend (November 26, 2012)

	Feed water system (m^3/h)	Reactor core spray system (m^3/h)	RPV bottom head temperature (℃)	Skirt junction upper temperature (℃)	RPV bottom head upper temperature (℃)	PCV air conditioner return air temperature (℃)	PCV air conditioner supply air temperature (℃)	PCV radioactivity density A system (Bq/cm^3)	PCV radioactivity density B system (Bq/cm^3)
10:00	1.8	4.0	40.9	40.9	30.6	39.1	37.2	ND	ND
11:00	4.0	3.0	41.0	40.9	30.6	39.2	37.3	ND	ND
12:00	2.0	4.0	40.9	40.9	30.6	39.3	37.4	ND	ND
13:00	2.0	4.0	41.0	40.9	30.7	39.3	37.5	ND	ND
14:00	2.0	4.0	41.0	40.9	30.8	39.3	37.6	ND	ND

※11:00 The incident judged to be a deviation from LCO (flow rate increase during any given 24 hours exceeded 1.0m^3/h)

ND: Less than the detection limit (3.4×10^{-1}Bq/cm^3)