

April 2, 2018

Kyushu Electric Power Company Inc.

Genkai Nuclear Power Station Unit 3:

Checking status of the small steam leak from the air vent pipe of the deaerator

Kyushu Electric Power Company confirmed a small steam leak from the air vent pipe of the secondary system of Genkai Nuclear Power Plant Unit 3, which is PWR type and rated electric output 1.18 million, around 19 o'clock on March 30. Genkai Nuclear Power Plant Unit 3 was under periodical inspection, resumed power generation on March 25 this year, and adjusted operation with 75% electricity output at that time.

Since the small steam leak was confirmed, it was decided that the load would be dropped from the electric output of 75% to stop power generation as soon as it becomes ready and inspections will be conducted as a precaution.

There is no radiation influence on the environment by this event.

(as already reported on March 30)

[New information as of April 2]

The examination of the air vent pipe revealed there was a dent in the surface of the pipe and also a penetrating hole in the dent. In addition, there were observed inside the heat insulator discoloration and adhered substance like rust. Since the affected pipe is located outside the building, it is assumed that rainfall had come through a gap in the exterior panel, wetted the insulator and caused the surface of the pipe to partly erode until it got penetrated.

As countermeasures, rainproof treatment shall be strengthened along with replacing the affected pipe, exterior panel and insulator. Likewise, reinforcement of waterproofing and replacement of the pipe, exterior panel and insulator will be implemented in terms of other fifteen air vent pipes than the affected pipe.

Attachment:

Genkai Nuclear Power Station Unit 3: Checking status of the small steam leak from the air vent pipe of the deaerator

(Attachment)

April 2, 2018

Kyushu Electric Power Company Inc.

(As of 10:00am)

Genkai Nuclear Power Station Unit 3

Checking status of the small steam leak from the air vent pipe of the deaerator

1. Date and time of the event

Around 19:00, March 30, 2018

2. Place of the event

Genkai Nuclear Power Station Unit 3

3. How the problem was detected and handled

Genkai Unit 3 restarted power generation on March 25, 2018. It was in the controlled operation with 75% output when the small steam was detected around 19:00, March 30, from the air vent pipe of the deaerator in the secondary system.

Therefore the power was decreased so that the generator got off the grid, which made possible inspection of the air vent pipe of the deaerator.

No radioactive impact to the environment due to this even is confirmed.

(See appendices for details)

(Event history)

March 25	14:29	Synchronizing to the Grid
March 26	00:35	35% output
March 27	17:00	50% output
March 30	19:00	75% output
March 30	around 19:00	Small steam leak was detected
March 31	01:00	Start decreasing output
March 31	06:02	Generator off the grid
March 31	09:00	Start preparation for self-inspection
April 1	14:20	Start of self-inspection

4. Check results

Since a small steam leak was found from the 5th air ventilation pipe (hereinafter referred to as "the affected pipe") of the 3B deaerator, check of all the air ventilation pipes (total of 16 in each of the 3 A and 3 B deaerator) was carried out as follows.

(1) Check of insulation material of air ventilation pipes (including exterior plate)

a. Exterior plate

Condition check on the exterior panels of all the air ventilation pipes of the 3A and 3B deaerators was carried out.

The results are as follows.

[The affected pipe]

Significant rust was observed on a part of the lower surface of the exterior panel of the pipe.

[Other air ventilation pipes]

No significant rust was found on the exterior board of the other air ventilation pipe.

b. Thermal insulation material

Condition check on thermal insulation materials of all ventilation pipes of 3A and 3B deaerator was carried out. The results are as follows.

[The affected pipe]

Adhered substances such as discoloration and rust were found in the heat insulation material, which contacts the pipe partly.

[Other air ventilation pipes]

No adhered matter such as discoloration or rust was found for the heat insulation material of the air ventilation pipe other than the affected pipe.

(Appendix – 4, 5)

(2) Check of air ventilation pipes

a. Observation check

Condition check on all ventilation pipes of deaerators 3A and 3B was carried out. The results are as follows.

[The affected pipe]

A clear indent was found in the horizontally running part of the affected pipe. The indent was on the upper side of the pipe and one penetrating hole (length approx. 13 mm × width approx. 6 mm) was found in it.

The pipe in the vicinity of the penetrating hole was indented in the direction

from the outside to the inside of the pipe.

No clear indent was found in other areas of the affected pipe.

[Other air ventilation pipes]

No clear indent was found in the air ventilation pipes other than the affected pipe.

b. Inner check

After detaching the affected pipe, a fiber scope was inserted inside and check of inner surface of the pipe was carried out. As a result, the penetrating hole was found on the upper side of the pipe running horizontally.

The inner check revealed there was no clear denting in the direction from the inside to the outside of the pipe.

(Appendix – 4, 6)

5. Estimated cause

The affected pipe is located at the top of a deaerator installed outdoors.

Therefore, seams are filled by caulking or the like so that rainwater does not enter inside the exterior panel.

Confirming the situation of the exterior panel and pipe, it is considered that rainwater intruded from the gap of the exterior board, the heat insulation material absorbed water and became a wet state, causing the erosion of external parts, which progressed and became penetrating hole.

6. Counter measure

Replacement of the affected pipe, insulation material and exterior plate in which the penetrating hole was found will be conducted.

In addition, with respect to 15 air ventilation pipes other than the affected pipe, the heat insulation material and the exterior board will be replaced with new ones. At the same time, all the air ventilation pipes will be replaced as precaution.

Appendices

1. System diagram (omitted)
2. Schematic of the deaerator (omitted)
3. Specification of the deaerator
4. Photographed locations of the heat insulator (incl. the exterior panel) and the air vent pipe
5. Visuals of the heat insulator (incl. the exterior panel) and pipes
6. Visuals of the air vent pipe

Deaerator Main Spec

1.Main Spec

Main Item		
Name	Deaerator	Water Storage Tank
Type	Horizontal Spray Tray	Horizontal Cylindrical Tray
Number	2	1
Maximum Pressure	1.37MPa	1.37MPa
Maximum Temperature	200℃	200℃
Volume of Water		—
Storage Capacity (NWL)	—	600m ³
Bore Size	3,000mm	4,700mm
Shell Thickness	23mm	34mm
Head Thickness	25mm	36mm
Full Length	19,980mm	43,570mm

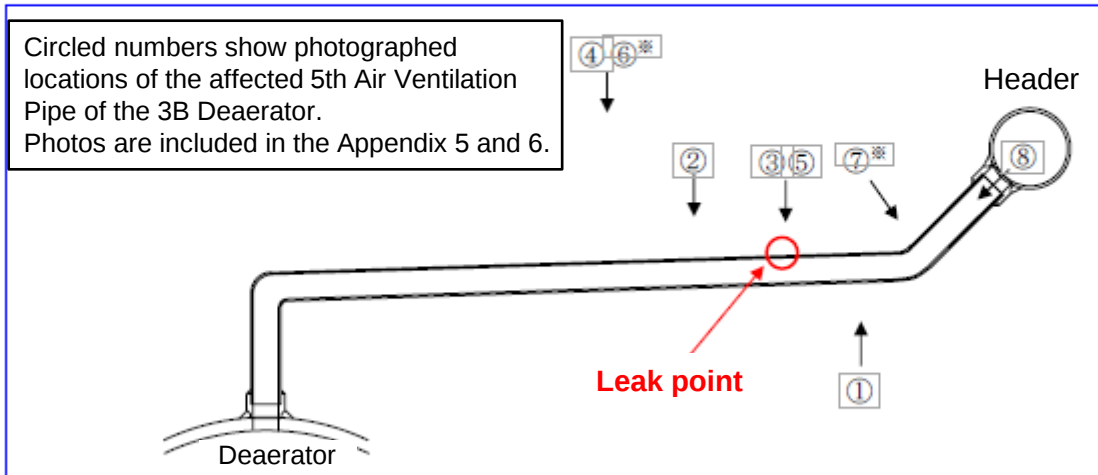
Main Material		
Name	Deaerator	Water Storage Tank
Shell	SB46	SB46
Head	SB46	SB46
Tray	SUS304	—

2.Ventilation Pipe Spec

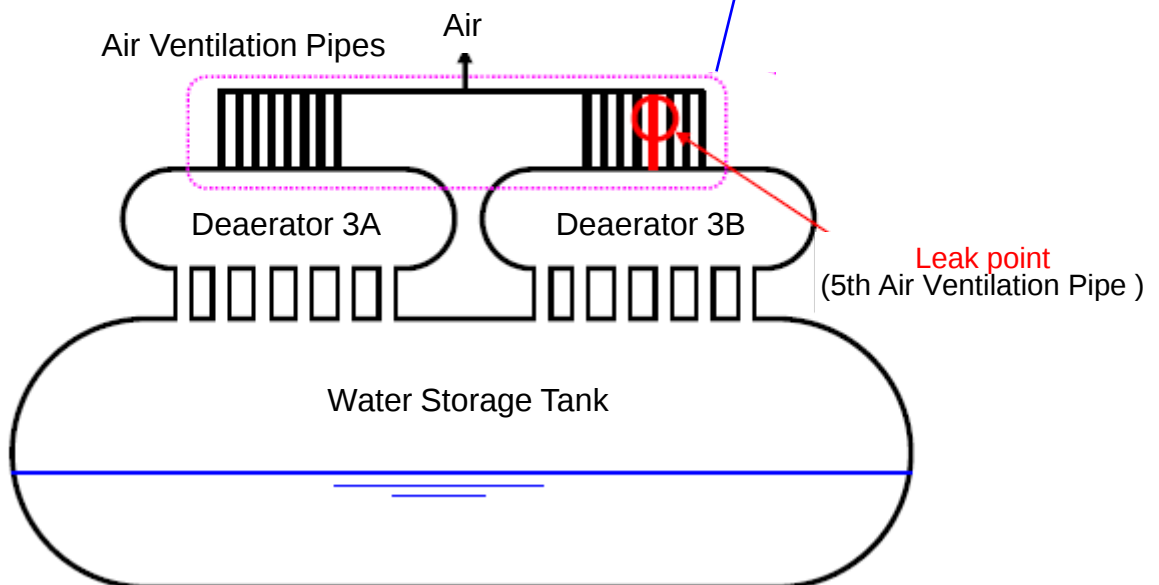
Name	Deaerator Air Ventilation Pipe
Outer Size	50A
Thickness	3.9mm
Material	STPG38

The blank cell contains commercially confidential information which cannot be disclosed

Photographed locations of the heat insulator (incl. the exterior panel) and the air vent pipe



※Photos of ⑥ and ⑦ were taken at 3rd Air Ventilation Pipe of 3A Deaerator for comparison with an undamaged pipe



Visuals of the heat insulator (incl. the exterior panel) and pipes

- Near the Leak Point (5th Air Ventilation Pipe of the Deaerator 3B)



Photo ①

Visuals of the heat insulator (incl. the exterior panel) and pipes

- Outside Observation Condition of Thermal Insulation Material (5th Air Ventilation Pipe of the Deaerator 3B)



Photo ②

- Inside Observation Condition of Thermal Insulation Material (5th Air Ventilation Pipe of the Deaerator 3B)



Photo ③

Visuals of the air vent pipe (Outside)

- o Leak Pipe(5th Air Ventilation Pipe of the Deaerator 3B)



Photo ④

- o Leak Point (5th Air Ventilation Pipe of the Deaerator 3B)



Photo ⑤

Visuals of the air vent pipe (Outside)

- o Other Leak-Free Pipe (3rd Air Ventilation Pipe of the Deaerator 3A)

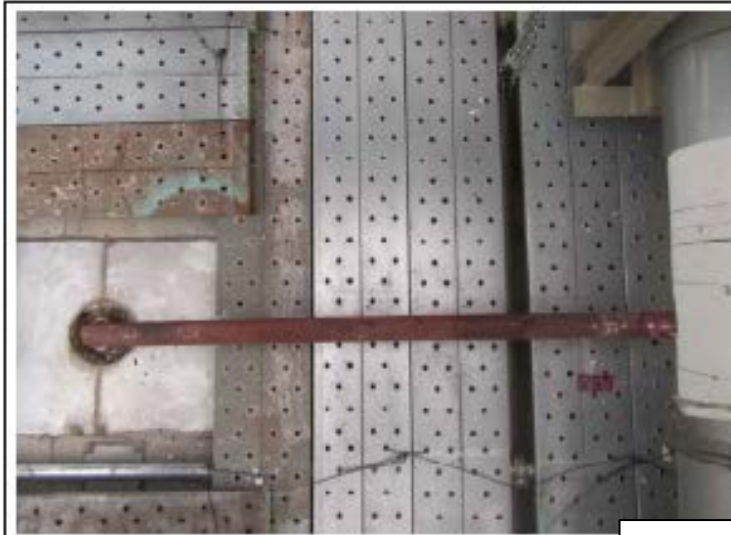


Photo ⑥



Photo ⑦

Visuals of the air vent pipe (Inside)

- Inside Observation Condition of Leak Pipe
(5th Air Ventilation Pipe of the Deaerator 3B)

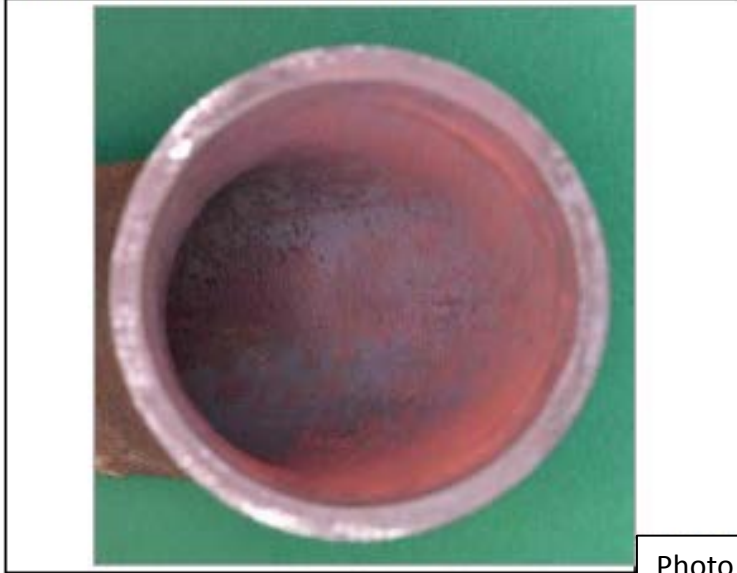


Photo ⑧