

# Investigation Results of the Water Leakage from the Second Cesium Absorption Apparatus (SARRY) Vent Line

< Reference >  
November 22, 2012  
Tokyo Electric Power Company

## 1. Outline

(1) Incident occurrence in chronological order

- At around 8:00 AM on November 20, 2012, a TEPCO employee on patrol in the water treatment facility found the water leakage from the second cesium absorption apparatus (SARRY) vent hole located at approx. 5m above the ground on the east exterior wall of the Miscellaneous Solid Waste Volume Reduction Treatment Building (High Temperature Incinerator Building).

- At 8:26 AM, the second cesium absorption apparatus (SARRY) was stopped and the leakage was confirmed to have stopped at around 10:10 AM.

- Sandbags to prevent leakage expansion were installed at around 10:10 AM.

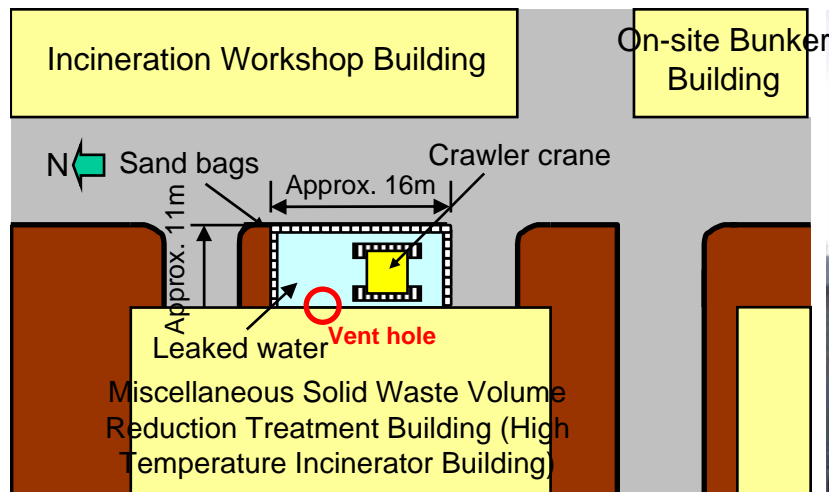
(2) Leakage condition

Amount of the leaked water: Approx. 176L (16mx11mx1mm)

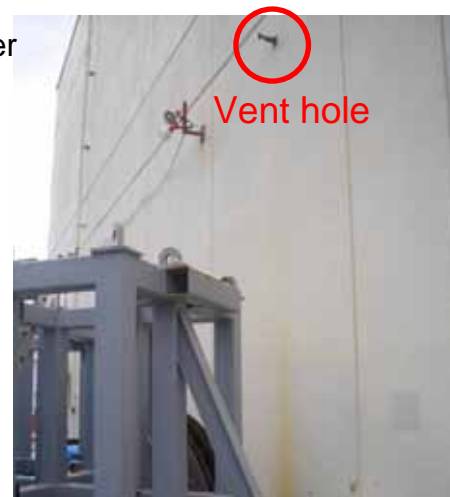
\* Since the leaked water had reached the concrete foundation (25cm higher than the adjacent ground) of the crawler crane used for replacing cesium absorption towers and its foundation wall surface, the water may have been absorbed into the ground.

Radioactivity density analysis results of the leaked water

Cesium 134:  $3.7 \times 10^2 \text{Bq/cm}^3$ , Cesium 137:  $6.5 \times 10^2 \text{Bq/cm}^3$ , Cobalt 60:  $3.5 \times 10^0 \text{Bq/cm}^3$ , Manganese 54:  $1.9 \times 10^0 \text{Bq/cm}^3$



Area affected by the leakage



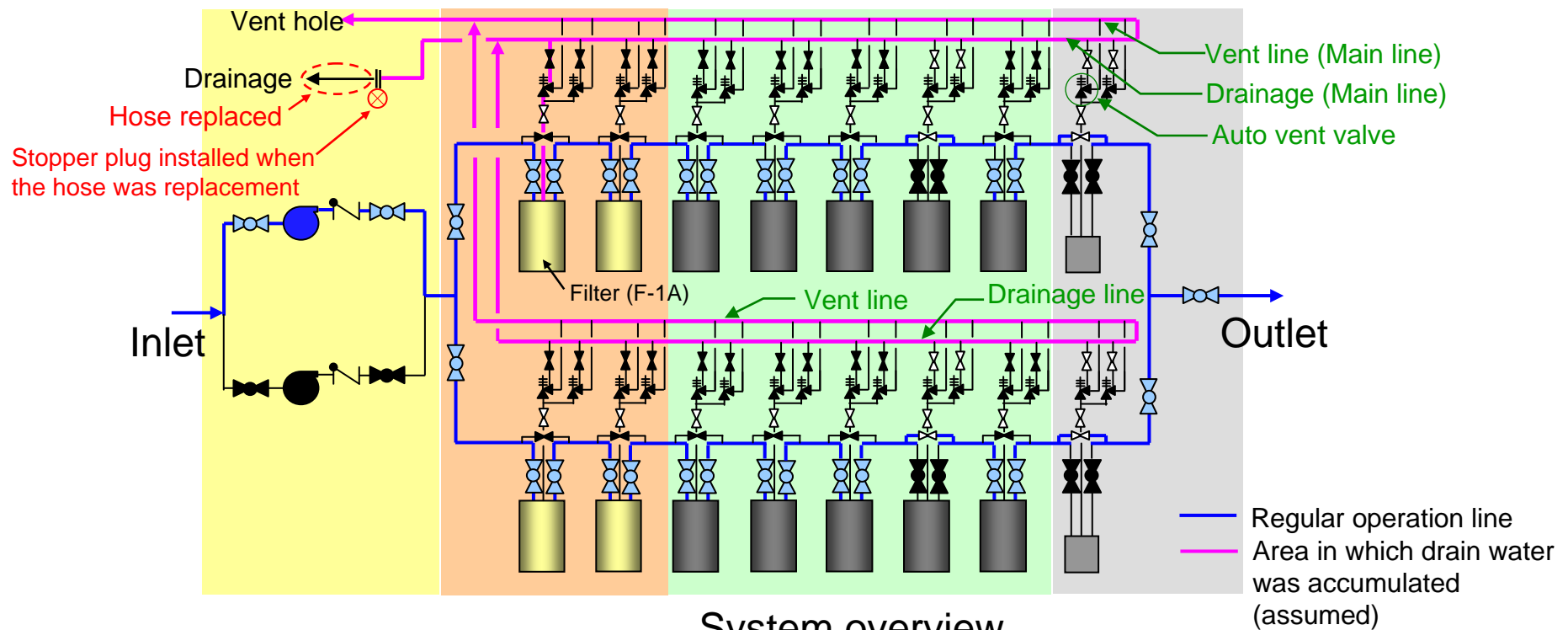
Leakage location



Leakage condition

## 2. Assumed cause

- Pressure hose replacement was done for reliability improvement starting from November 16.
- Though there was no significant leakage when the hose was removed on November 16, a stopper plug was temporarily installed on the drainage line to prevent work area contamination in the case of water leakage as the system was in operation.
- With the stopper plug installed for hose replacement, the drain water from the auto vent valves was accumulated in the drainage and vent lines (main lines) which led to the water leakage from the vent hole to the outside.



System overview

(When the drain water from the filter (F-1A) auto vent valve leaks from the vent hole)

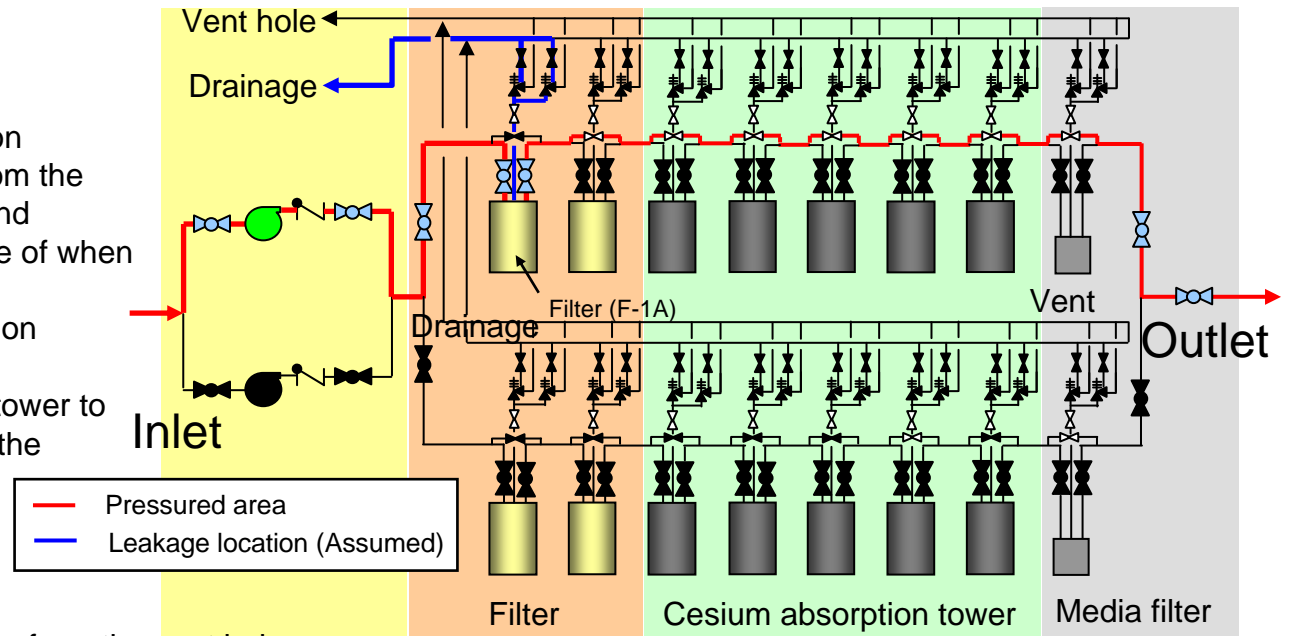
### 3. Site investigation results

#### (1) Outline

[Investigation 1] Reproducibility confirmation  
Confirmed the amount of water leakage from the drainage line under the system structure and pressure conditions (1MPa) similar to those of when the leakage occurred.

[Investigation 2: Reference] Leakage location confirmation

Pressure was applied on each absorption tower to confirm the amount of water leakage from the drainage line.



#### (2) Investigation results

[Investigation 1]

A system: 300 [mL/min], no water discharge from the vent hole

B system: 110 [mL/min], no water discharge from the vent hole

Daily water discharge amount is assumed to be approx. 590L.

[Investigation 2: Reference\*1]

See the table on the right.

System structure when leakage from each absorption tower was tested (Example of "Investigation 2" F-1A)

#### (3) Evaluation based on the site investigation results

Water which is assumed to come from the auto vent valves was found to be discharged from all the absorption towers. However, if the amount is equivalent to the flow in open channel\*3

(approx. 38,000mL/min) or less, the water discharge does not affect the drainage function. As a result of site investigation, the water discharge amount was found to be substantially lower than the above mentioned amount. Therefore there is no problem with the drainage function.

\*1 As pressure of 1MPa was applied on each absorption tower, the leakage amount is larger than that of during regular operation (investigation 1).

\*2 Media filter is isolated from the system during regular operation and is not planned to be used in the future.

\*3 Condition where the upper part of the inside of the drainage line is not filled with water (the inside of the pipe not entirely filled with water)

Absorption tower	A system leakage amount (approx.) (mL/min)	B system leakage amount (approx.) (mL/min)
Filter 1	20	180
Filter 2	20	126
Cesium absorption tower 1	20	72
Cesium absorption tower 2	80	45
Cesium absorption tower 3	30	36
Cesium absorption tower 4	20	30
Cesium absorption tower 5	120	26
Media filter*2	N/A	N/A

#### **4. Countermeasures**

(1) As a result of site investigation, no abnormality in which water leaks from the vent hole was detected unless the drainage line is closed. For recurrence prevention, relevant workers are reminded not to close the drainage line and a sign “Do not close” will be installed at site.

(2) In response to the incident, safety management measures will be considered. The deliverables will be shared across relevant departments by the end of FY 2012.

#### **5. Additional measures to be implemented in response to the leakage**

(1) Cleaning the vent line

- Clean the vent main line (before the second cesium absorption apparatus (SARRY) is restarted)
- Measure the radioactive materials discharged from the vent hole (Dust sampling to be performed when the system is suspended next time for filter backwash)

(2) Enhanced patrol (Patrol to be done twice a day (instead of once a day) and check for leakage from the vent hole)

(3) Radiation exposure mitigation when working at the leakage location

- Remove the soil at high radiation locations near the concrete (to be completed by the next absorption apparatus replacement)
- Shield the concrete surface (around the end of November)

(4) Further measures (to be considered)

- Paint the concrete surface
- Install the drainage line in a way to prevent leaked water from directly dripping on the concrete surface
- Install equipment which allows to monitor the water discharged from the drainage line.