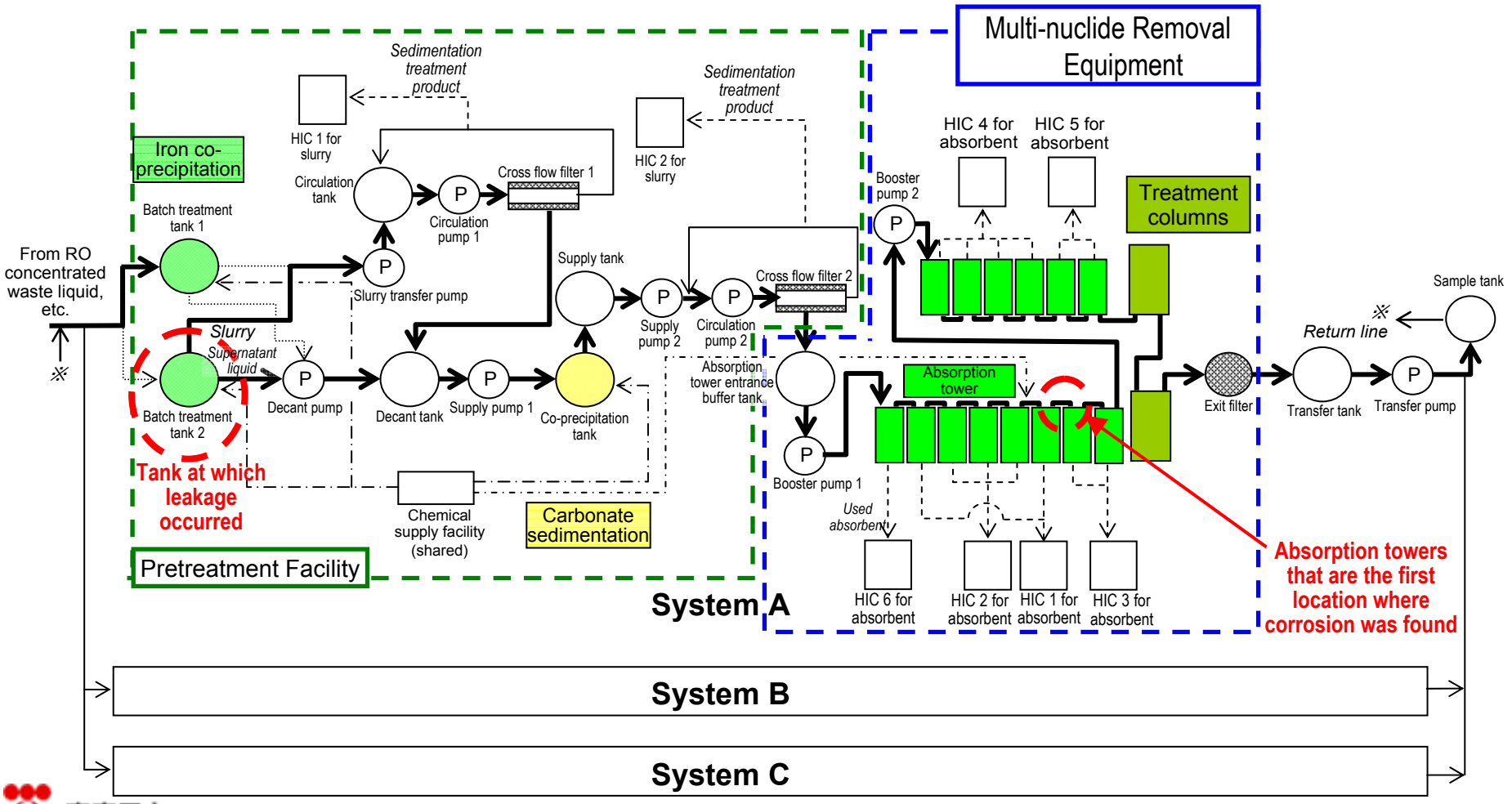
<Reference>
September 25, 2013
Tokyo Electric Power Company

Cause and Preventive Actions Following Leakage from a Batch Treatment Tank of Multi-nuclide Removal Equipment

TEPCO 東京電力

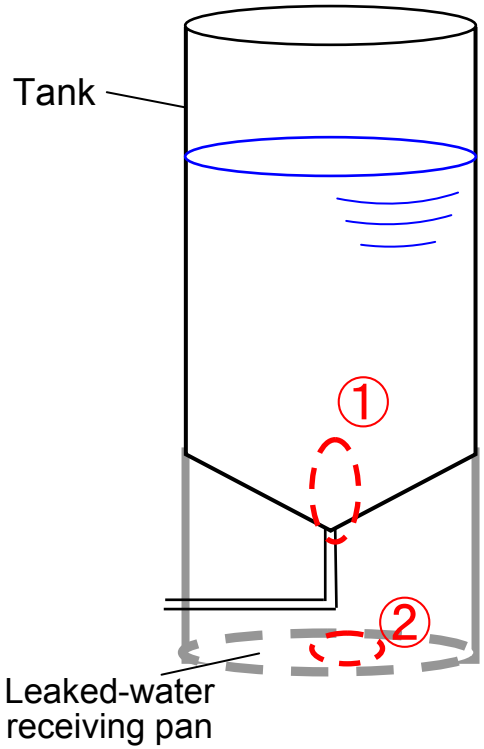
Locations of Leakage and Corrosion

- On June 15, leakage from the lower side of the batch treatment tank 2A was found.
- In a horizontally deployed investigation conducted later, corrosion was found in some locations including the absorption tower 6A

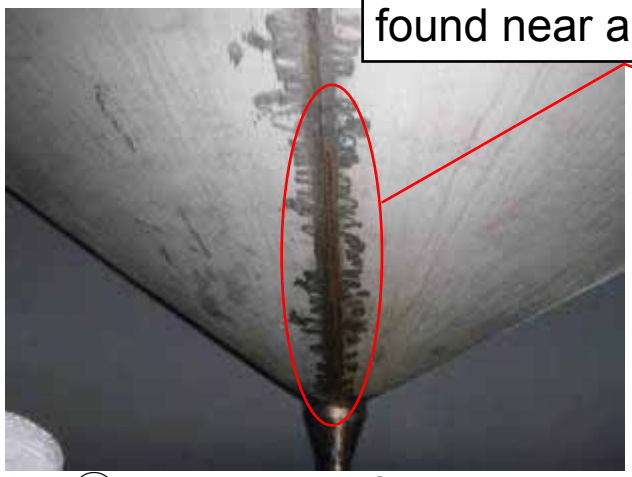


Results of Leakage from the Batch Treatment Tank 2A

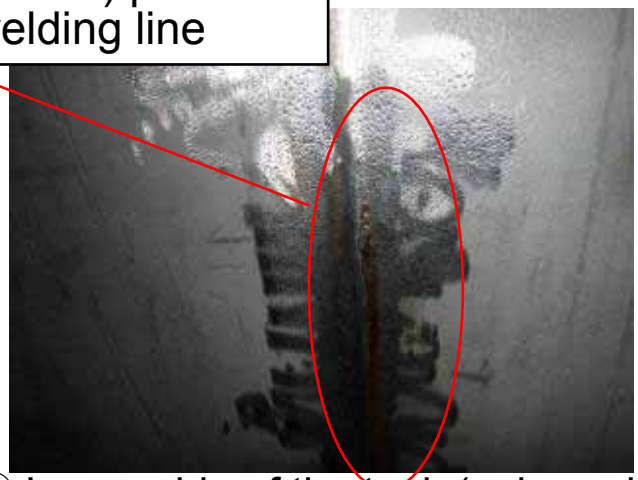
Schematic view of the batch treatment tank



A discolored (brown) part was found near a welding line



① Lower side of the tank



① Lower side of the tank (enlarged)

Discolored water drop traces were found

② Leaked-water receiving pan

Not being large-scale leakage, this was found during a patrol as small-scale leakage (a few water drop traces) on the floor of a receiving pan placed under the tank.

Causes of Leakage and Corrosion

- Leakage from the lower side of the batch treatment tank 2A

  Unexpectedly damaging corrosion was caused by a combination of complex factors such as **formation of a crevice environment** due to accumulation and adhesion of generated iron precipitation on the internal surface of the tank, and **development of a corrosive environment** due to injection of chemicals (mainly, hypochlorous acid). A through-hole was made at a corroded part, causing the leakage.

- Corrosion in the absorption tower 6 and further downstream locations

  While **silver impregnated activated carbon** with which the absorption tower 6 is filled is considered to **contribute to occurrence and development of corrosion**, corrosion was found in locations downstream of the absorption tower 6 that are not in the alkaline environment.

- Corrosion near the batch treatment tank and at flange parts of the absorption tower 6 and further downstream locations

  Around each of the flange parts where corrosion was found, fluid becomes **stagnant** due to the shape of the flange part, and **flows slowly, which is favorable for local corrosion to occur**. This is considered as another factor contributing to development of corrosion.

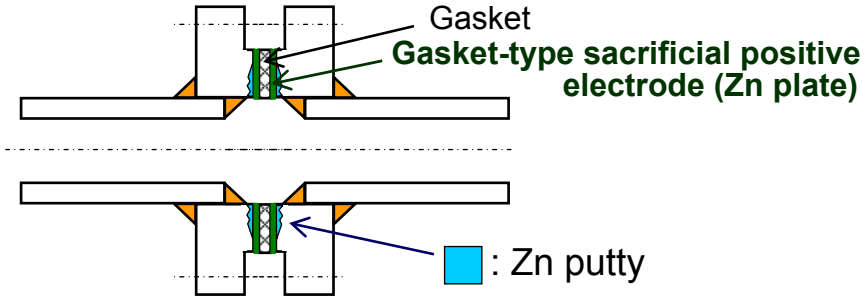
Recurrence Prevention Measures on Batch Treatment Tanks and Horizontal Deployment

- Recurrence prevention measures on batch treatment tanks

  After the damaged parts were repaired, **rubber lining (chloroprene rubber) was provided** on the internal surfaces of the tanks.

- Measures taken within the horizontal deployment range

  Gasket-type sacrificial positive electrodes, etc., were provided to flanges that have the risk of suffering crevice corrosion. Additionally, for higher reliability, we are considering future **replacement with lining pipes**.



Batch treatment tank 1C
(after rubber lining was provided)

Gasket-type sacrificial positive electrode

Preventive Actions for Starting a Hot Test for the System C in Response to the Occurrence of Corrosion in Absorption Towers

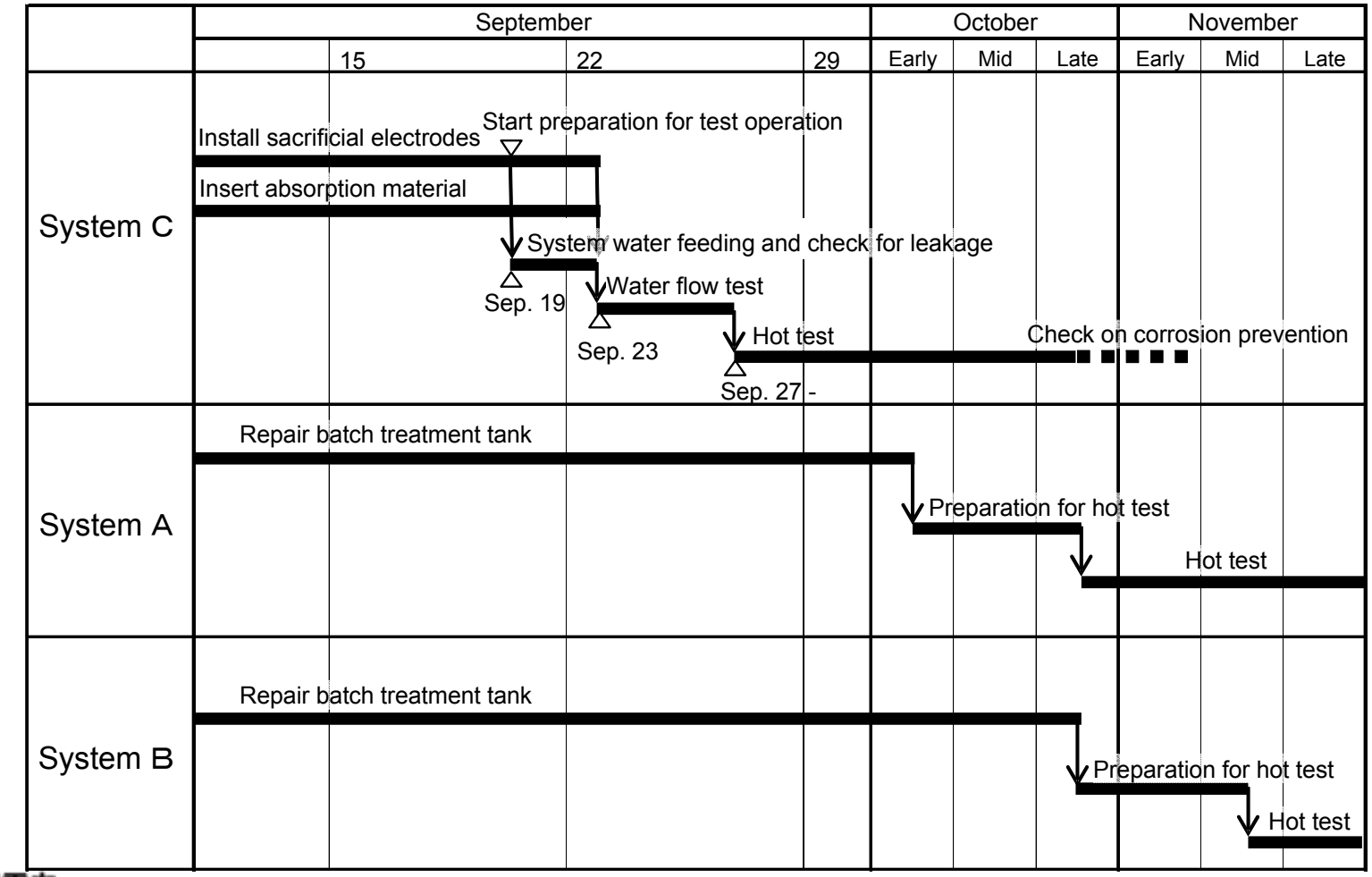
- **Stop injection of hypochlorous acid**
- **Bypass the silver impregnated activated carbon tower** in a neutral region where a corrosion potential is increased.
- Consider **restructuring of absorption towers** in order to **secure the absorption capability** expected from silver impregnated activated carbon, which is to be bypassed.
- After the start of the hot test, **regularly inspect** locations corresponding to those in the system A where relatively severe corrosion was found, so that **the corrosion suppression effects of the respective corrosion prevention measures**, in addition to the removal capability, will be checked **for extension of our knowledge**.

We will take the above actions in order to **reduce as early as possible the risk of leakage from the RO concentrated water storage tank**, and **will start a hot test for the system C on September 27**.

Further, we **will restart hot tests for the systems A and B** as soon as we are ready.

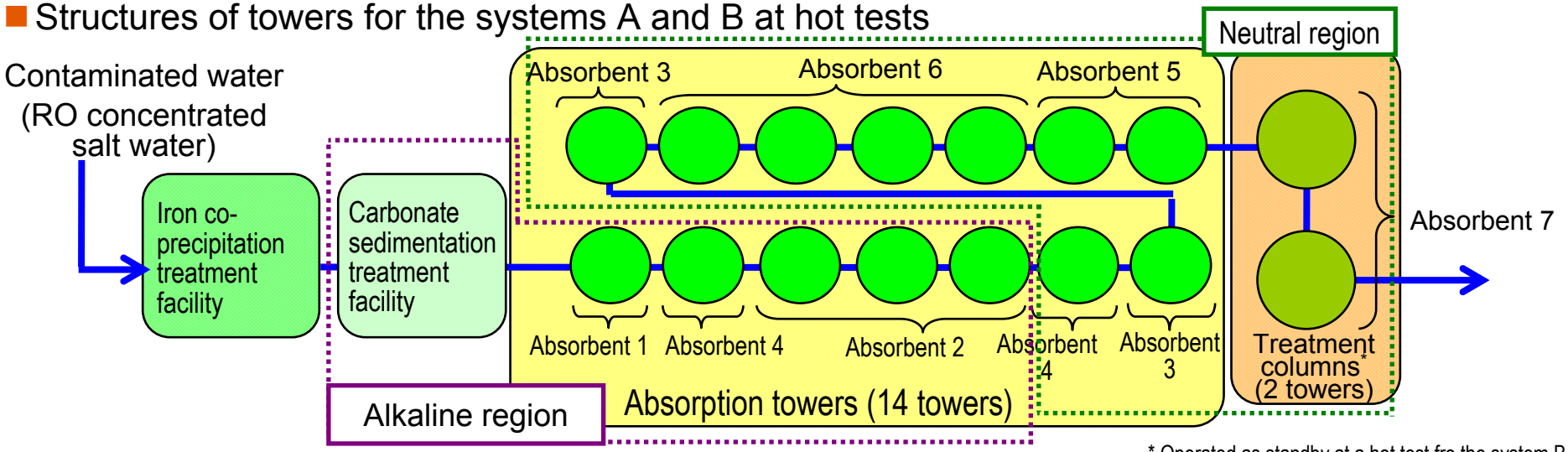
Schedule

- Corrosion prevention work (installation of sacrificial electrodes), absorbent insertion, and water feeding into the system (from Sep. 19) are conducted simultaneously. A water flow test (from Sep. 23) and then **a hot test (from Sep. 27)** are scheduled to follow.



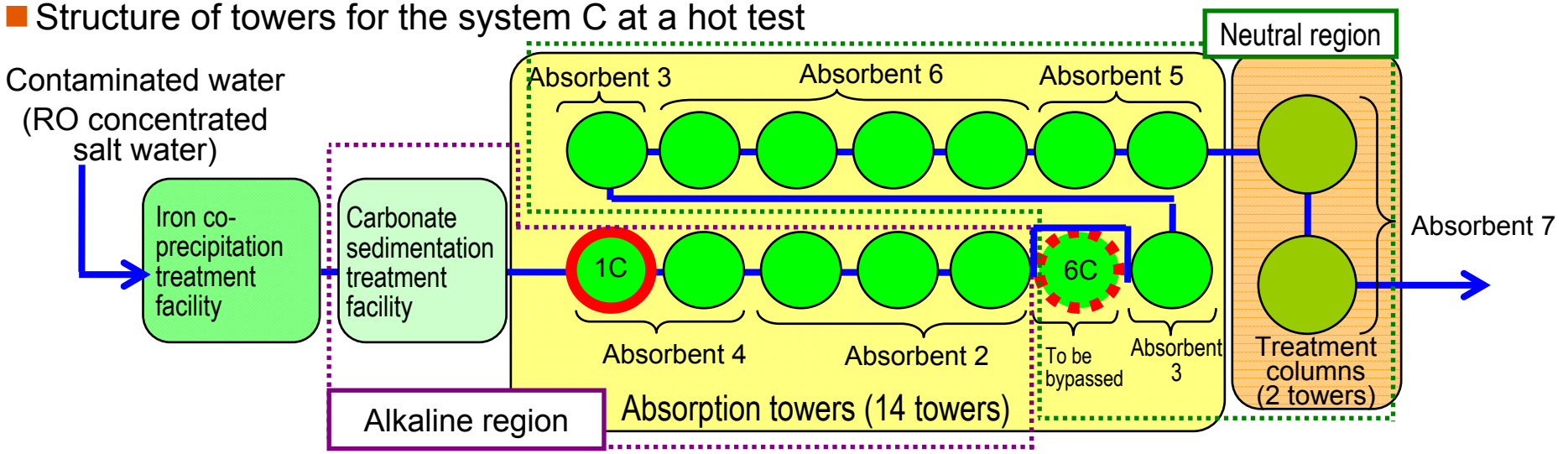
(Reference) Structures of Towers at the Start of a Hot Test for the System C

■ Structures of towers for the systems A and B at hot tests



* Operated as standby at a hot test fro the system B

■ Structure of towers for the system C at a hot test



Silver impregnated activated carbon (the absorption tower 6C) in the neutral region will be bypassed. In order to secure the absorption capability, silver impregnated activated carbon will be used in the absorption tower 1C.