Leakage from the Desalination System (RO3) at Fukushima Daiichi Nuclear Power Station

<Reference>
June 21, 2013
Tokyo Electric Power Company

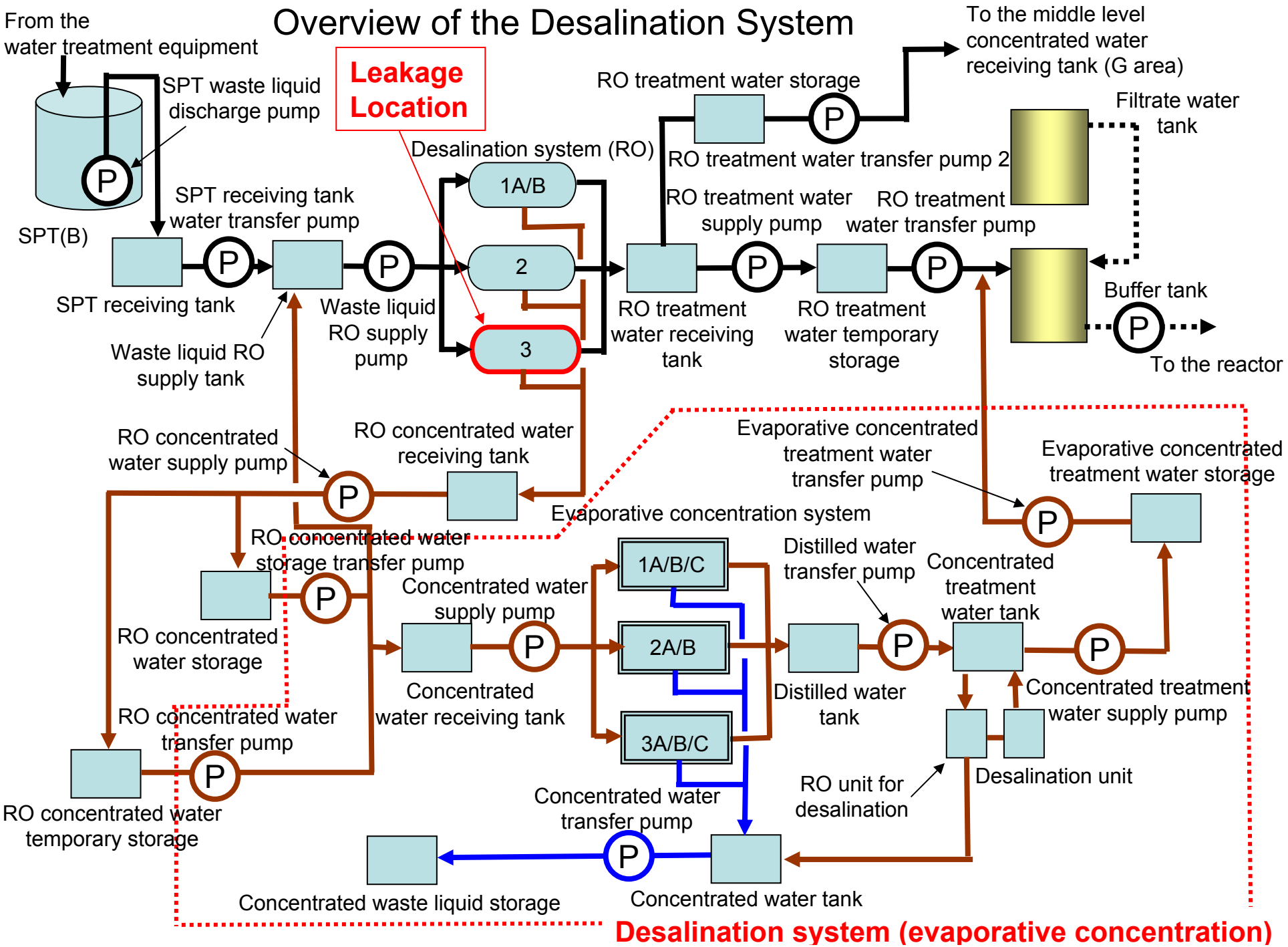
- Date and Time: Around 2:58 AM on June 21, 2013
- Location: In the temporary warehouse of the desalination system (RO3)
- Outline

1. At 2:58 AM, a cooperative company worker found a leak detector of the desalination system operating.
2. At 3:03 AM, a cooperative company worker suspended the desalination system (RO3) and closed the exit valve of the ultra filter raw water pump.
3. At 3:17 AM, stop of the leakage was confirmed at the site.
4. From around 4:00 AM to around 6:00 AM, an absorber was placed on the floor.
5. From around 10:30 AM to around 3:00 PM, collection of remained water was performed in order to secure workability at the site.
6. At around 1:10 PM, the exit valve was opened to identify the leakage location. We found that the leakage occurred through a cap section in the lower part of a flow meter at the ultra filter raw water pump outlet.
7. At around 3:00 PM, the flow meter was replaced to a new one.

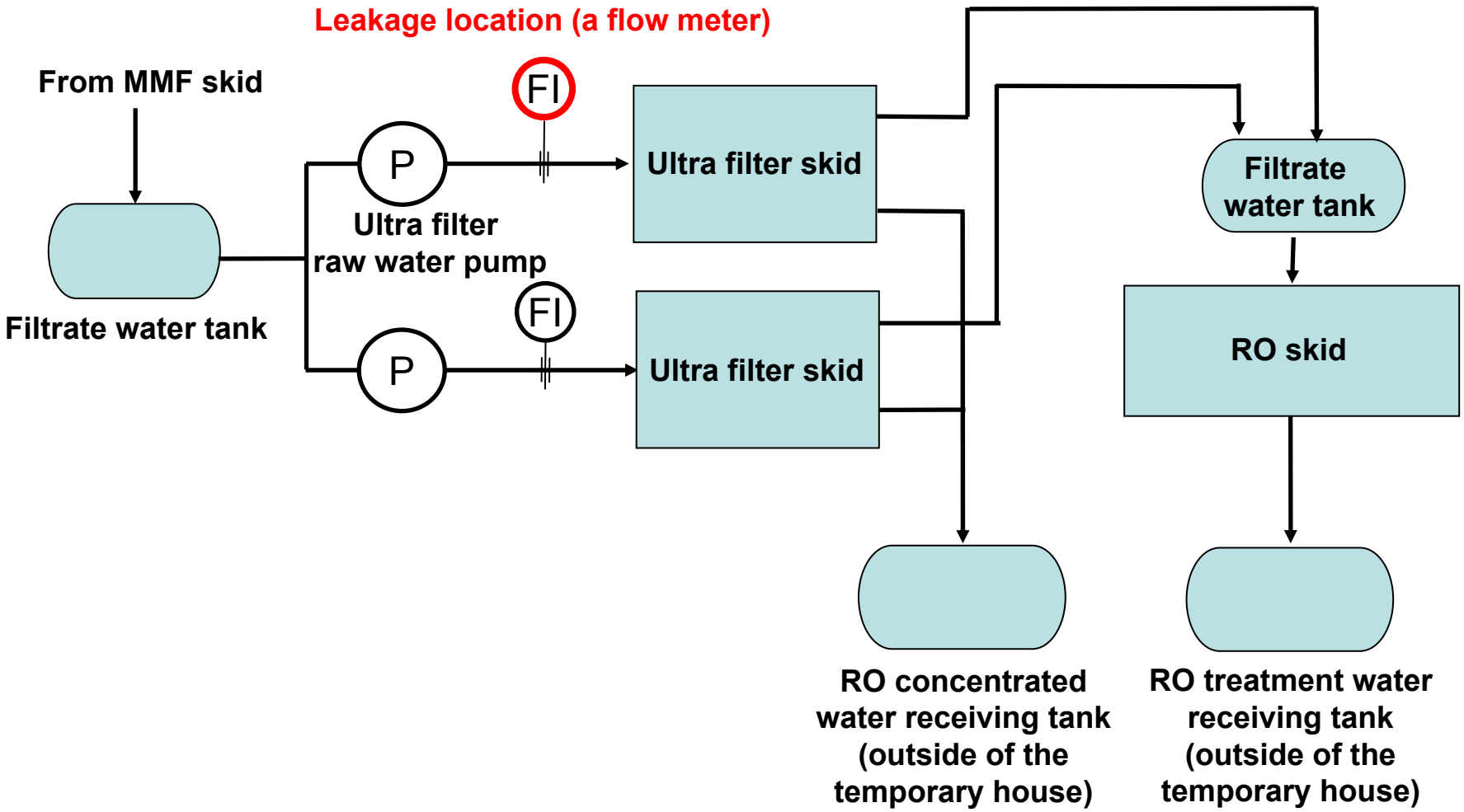
- Estimated leakage amount: Approx. 250 liters
- Nuclide analysis results

  Cs134: 5.7 x 10^{-1}Bq/cm^3, Cs137: 1.7 x 10^{0}Bq/cm^3

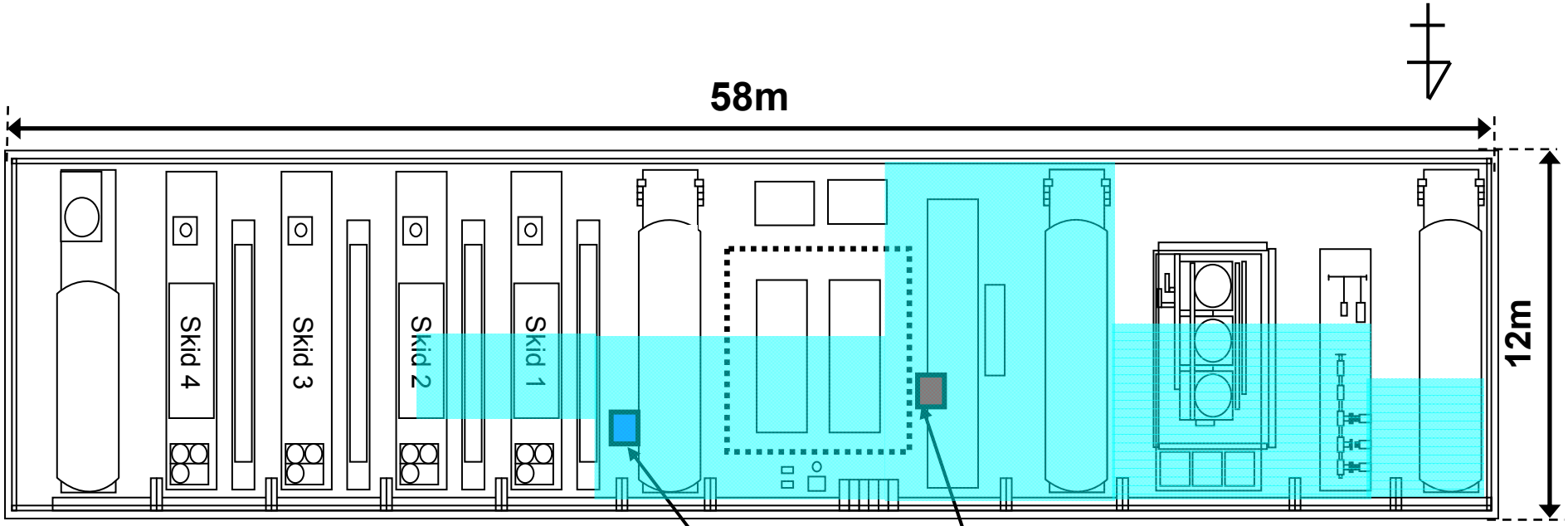
  All β : 2.6 × 10^{4}Bq/cm^3
- Estimated cause: The cap section in the lower part of the flow meter was removed when the ultra filter was cleaned on June 20. The cause of the leakage is estimated to be cracks occurred at the neck part of the cap because the cap was tightened too much after the cleaning.
- Countermeasure: The flow meter will be replaced to a new one if it is found to be contaminated.


Overview of the Desalination System
From the water treatment equipment
SPT waste liquid discharge pump
Leakage Location
To the middle level concentrated water receiving tank (G area)
RO treatment water storage
Filtrate water tank
Desalination system (RO)
RO treatment water transfer pump 2
1A/B
SPT receiving tank water transfer pump
RO treatment water supply pump
RO treatment water transfer pump
SPT(B)
2
3
SPT receiving tank
Waste liquid RO supply pump
RO treatment water receiving tank
RO treatment water temporary storage
Buffer tank
Waste liquid RO supply tank
To the reactor
RO concentrated water supply pump
RO concentrated water receiving tank
Evaporative concentrated treatment water transfer pump
Evaporative concentrated treatment water storage
Evaporative concentration system
RO concentrated water storage transfer pump
1A/B/C
Distilled water transfer pump
Concentrated treatment water tank
Concentrated water supply pump
2A/B
RO concentrated water storage
Distilled water tank
Concentrated water receiving tank
Concentrated treatment water supply pump
3A/B/C
RO concentrated water transfer pump
RO unit for desalination
Desalination unit
Concentrated water transfer pump
RO concentrated water temporary storage
Concentrated waste liquid storage
Concentrated water tank
Desalination system (evaporative concentration)

Overview of the Desalination System (RO3)



Leakage Situation in the Temporary Warehouse of the Desalination System (RO3)

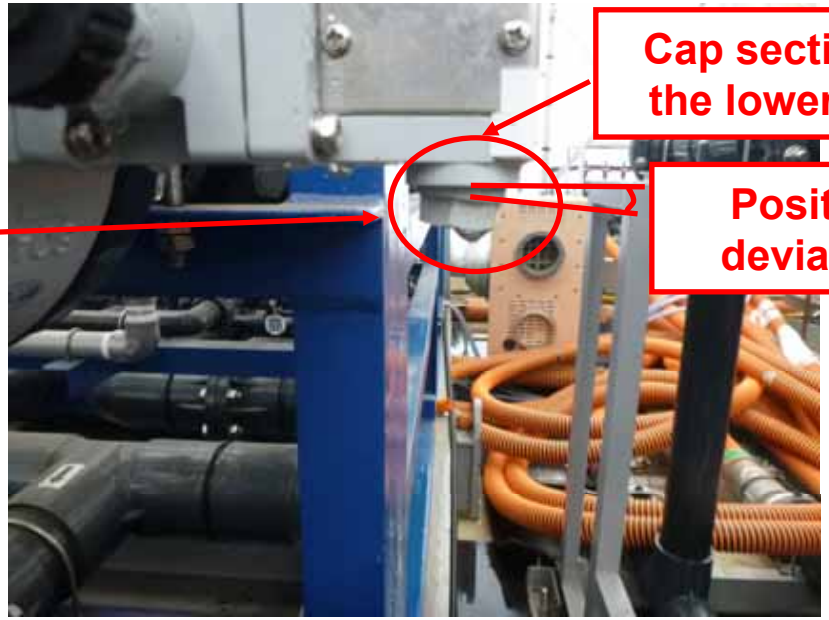


: leaked area (250m^2)

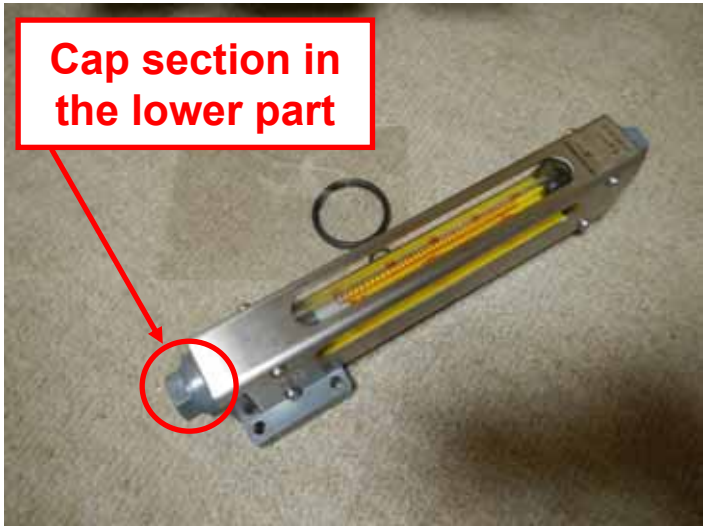
Estimated leakage amount: 250 liters
(≒250m^2 x depth 1mm)

Leakage Location of the Flow Meter (Cap Section in the Lower Part)

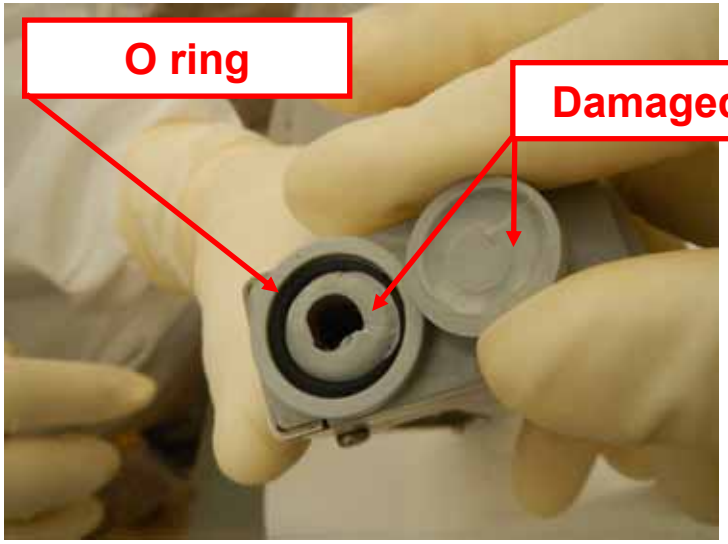
Identifying work of the leakage location



Before the identifying work of the leakage location



New flow meter



After the cap section in the lower part of the flow meter was removed (neck part of the cap was damaged)

Estimated Leakage Mechanism

The cap section in the lower part of the flow meter was removed when the ultra filter was cleaned on June 20. The cause of the leakage is estimated to be cracks occurred at the neck part of the cap because the cap was tightened too much after the cleaning.

（No leakage was found at a leakage check utilizing pump operating pressure after the restoration work. Sealing performance of the flow meter is estimated to be maintained by the O rings at that moment.)