

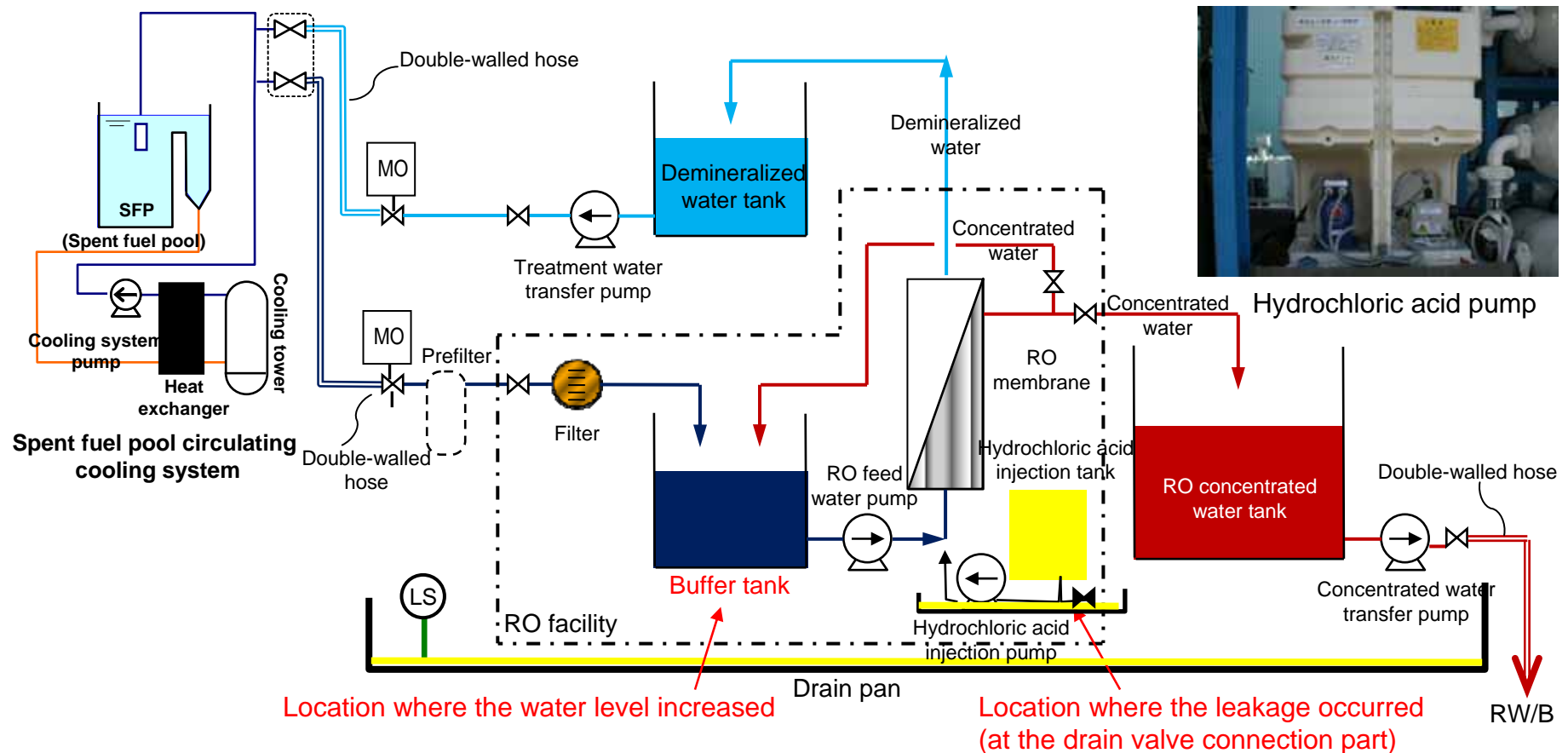
# Investigation Results of Suspension of Unit 3 Spent Fuel Pool Desalination System (Mobile RO) and Hydrochloric Acid Leakage at Fukushima Daiichi Nuclear Power Station

## Incident overview

October 4, 2012: Mobile RO was stopped due to an alarm indicating the buffer tank water level being too high.

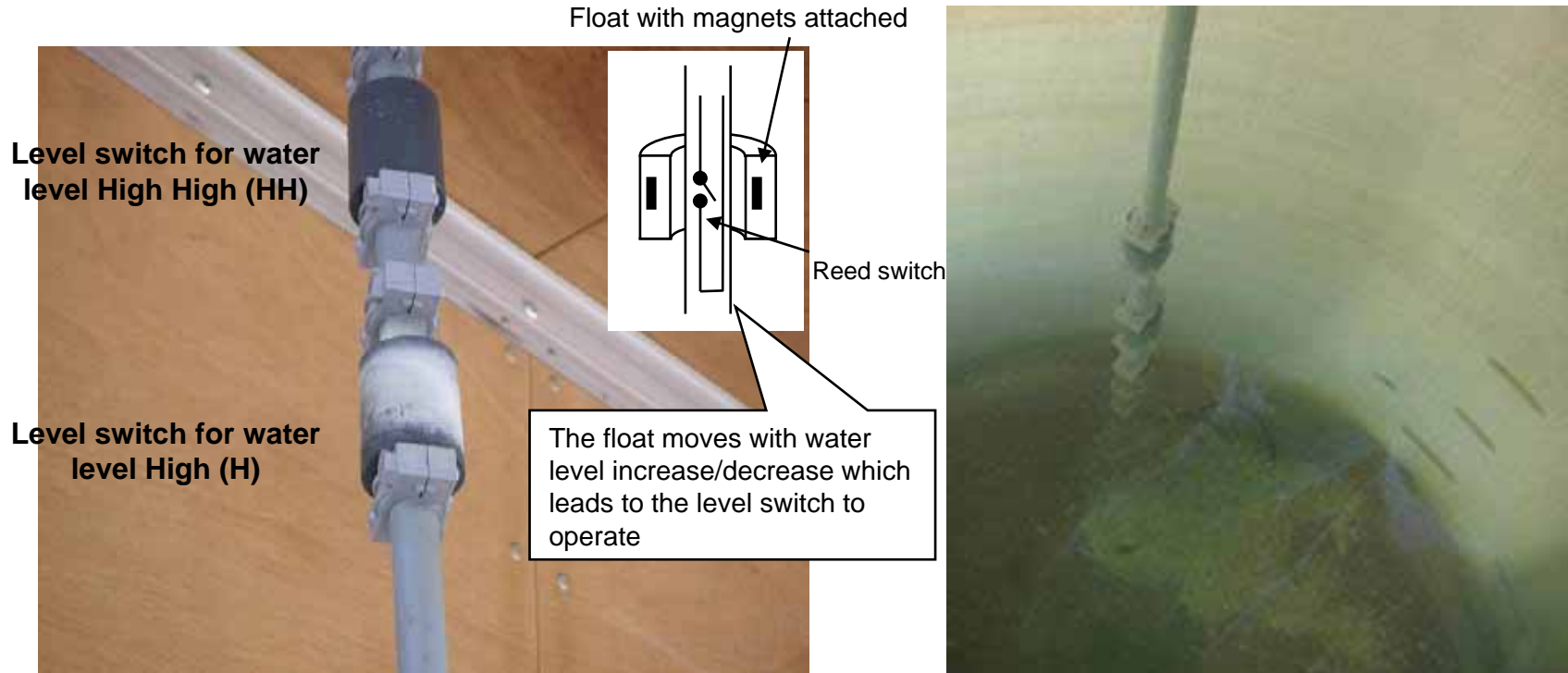
October 23, 2012: Control operation of the hydrochloric acid injection system was started.

October 24, 2012: Leakage from 25% hydrochloric acid tank was found at the system which had been suspended since the control operation of the hydrochloric acid injection system was started on the previous day.



\*Buffer tank: Tank in the desalination system (mobile RO) which temporarily stores water to be transferred to the RO membrane

# Investigation of the cause of buffer tank water level increase



## Assumed cause

Normally the water level is controlled below (H) level switch. However, the float got stuck due to the scale attached on (H) level switch and the level switch did not operate properly. As a result, the water level increased up to (HH) level switch causing the alarm to go off and the system to be stopped.

## Recurrence prevention

- Acid cleaning will be performed on the level switches in buffer tank, etc. to facilitate them to operate properly.
- Prevent scale generation by hydrochloric acid injection (utilizing the existing hydrochloric acid injection line)

\*Level switch: Sensor which detects and controls water level

\*Scale: Calcium carbonate which originates from the calcium dissolved in the spent fuel pool water

# Investigation of the cause of hydrochloric acid leakage

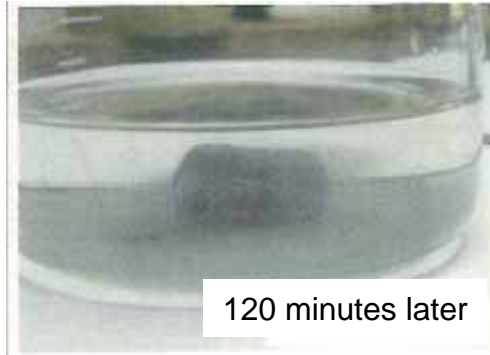
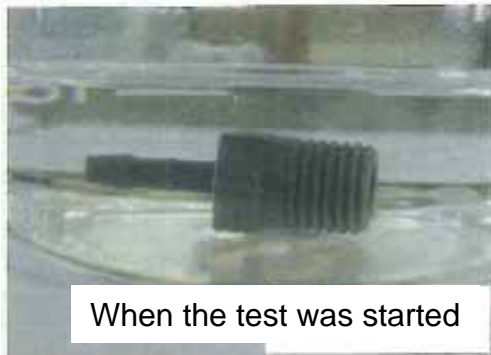


- As a result of drainage line appearance inspection,
- The drain valve has come off the drain hose.
  - The part connecting the drain valve and drain hose (nipple) was missing.
  - The nipple on the downstream side of the valve was also damaged.

Drainage line connection area assumed to be the leakage location

As a result of a durability test performed on the nipple connecting the drain valve and drainage line hose (made of polyamide resin), the sample was completely dissolved after 16 hours of being soaked in hydrochloric acid.

Durability test: Drain hose nipple soaked in hydrochloric acid (25% HCl)



16 hours later:  
Completely dissolved

## Investigation of the cause of hydrochloric acid leakage

### Assumed cause

Hydrochloric acid injection had been performed at the system for scale removal on the day before the leakage occurred. However, the nipple connecting the drain valve and the hose of the hydrochloric acid tank was dissolved into 25% hydrochloric acid used for scale removal as the nipple was made of polyamide resin. It was the first time that hydrochloric acid was used in the hydrochloric acid injection system as water was usually used during trial operation for performance confirmation.

### Recurrence prevention

- Closed the drainage line hose with a stopper and installed a polyvinyl chloride nipple which is acid-resistant.
- Operated the hydrochloric acid injection system using hydrochloric acid and found no other areas affected.

### Future schedule

As preparation for trial operation has been completed, the system will be started on November 28 and operation check will be performed for the entire system. If no problem is found as a result, the system will be put in service.