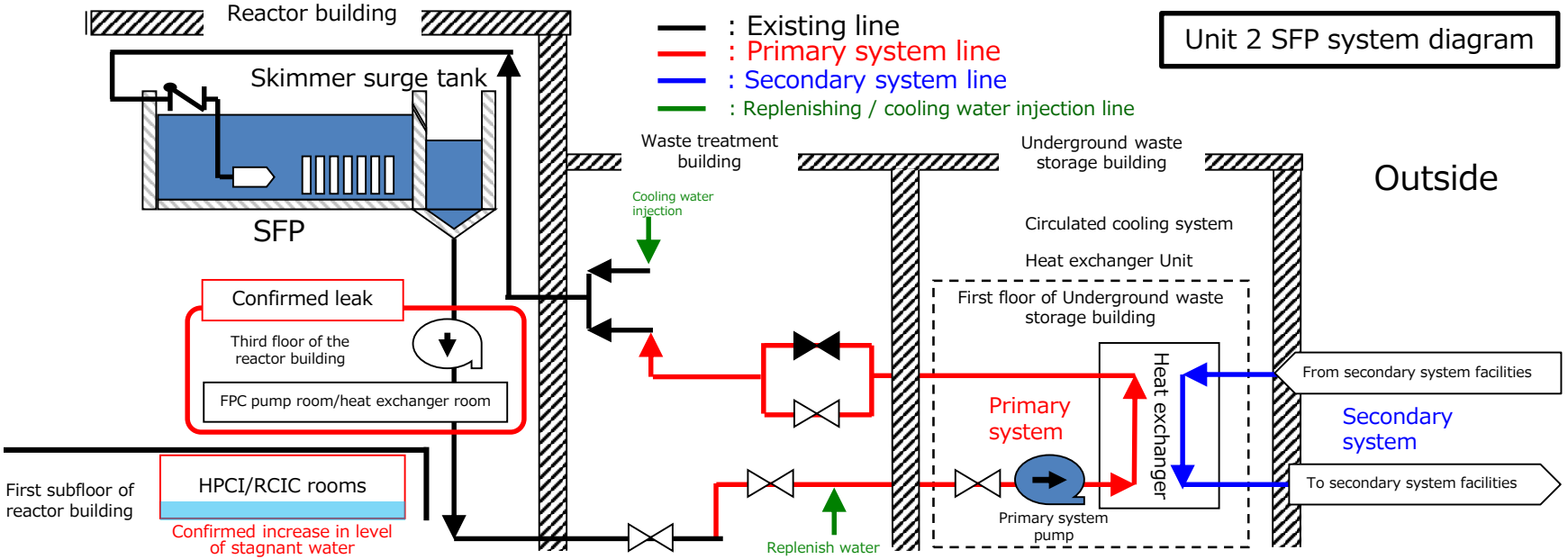
Fukushima Daiichi Nuclear Power Station Unit 2
Spent Fuel Pool Skimmer Surge Tank Water Level Decrease

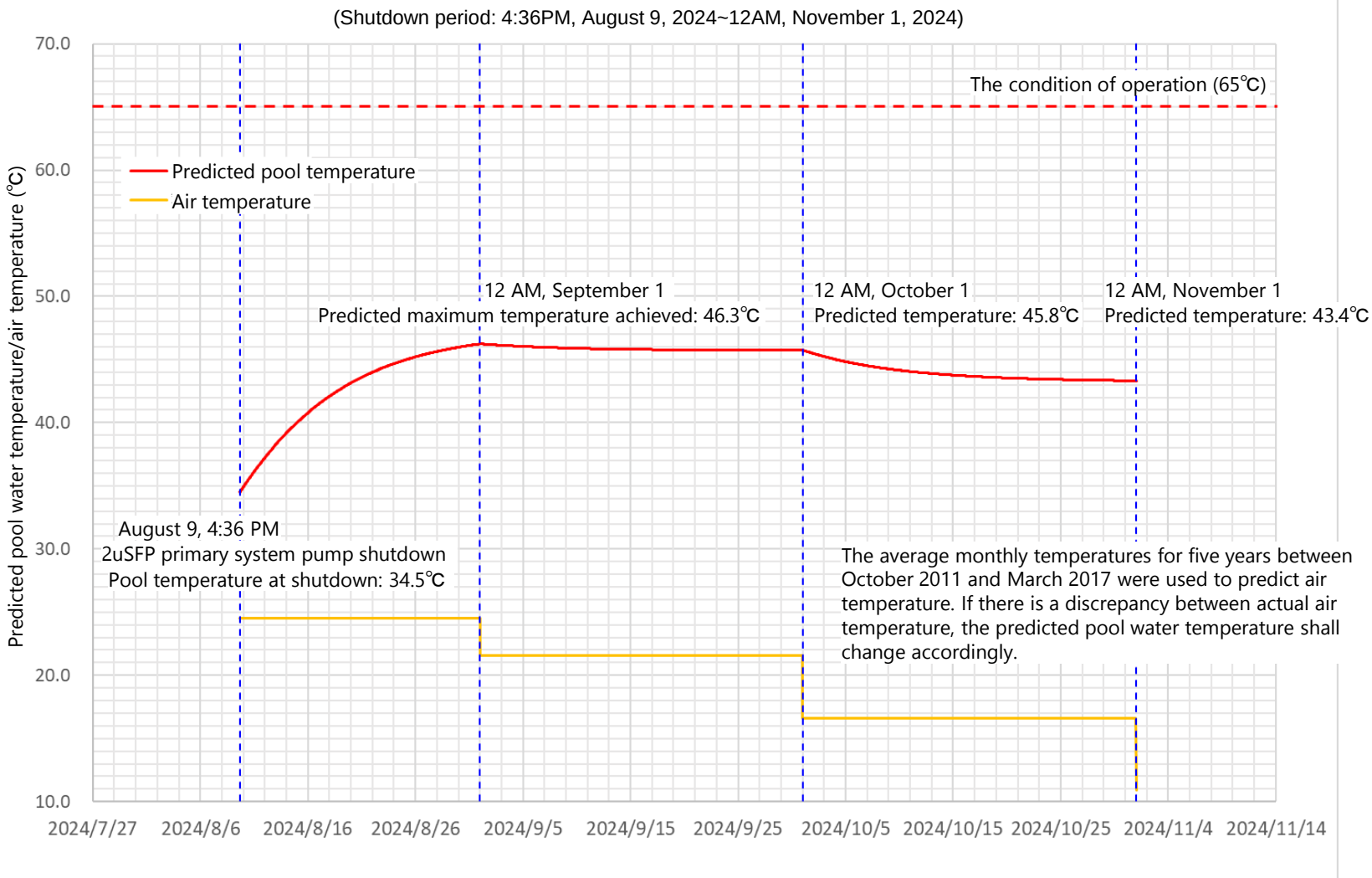
＜Reference document＞
August 13, 2024
Tokyo Electric Power Company Holdings, Inc.
Fukushima Daiichi Decontamination & Decommissioning Engineering Company

- At 1:05 PM on August 9, a TEPCO employee confirmed that the water level of the Unit 2 spent fuel pool (hereinafter referred to as, "SFP") skimmer surge tank (tank used to confirm that the spent fuel pool is full of water) had decreased. At this time, the employee confirmed that the water level of the Unit 2 SFP had not decreased, and thereafter confirmed that the water level of stagnant water in the high pressure cooling water injection system (hereinafter referred to as, "HPCI") room on the first subfloor of the Unit 2 reactor building had increased.
- In order to investigate the cause of the skimmer surge tank water level decrease, at 4:36 PM on the same day the primary pump for the SFP cooling system was intentionally shut down.
- We have evaluated that with cooling shut off, the temperature of the Unit 2 SFP water should initially rise approximately 0.06°C/hour and reach a maximum temperature of approximately 46°C, thereby confirmed staying below the limited condition of operation of 65°C.
- Thereafter, a remotely operated robot (SPOT) was used to perform an investigation of the third floor of the Unit 2 reactor building and it was found that water was leaking from the FPC (existing fuel pool coolant cleansing system) pump room/heat exchanger room. Furthermore, the leaking water was flowing into the floor drain via the floor sump pit in the reactor core isolation cooling system room (hereinafter referred to as, "RCIC room," which neighbors the HPCI room). At current time the leak has not spread to other areas.
- At 6:52 AM on August 10, we confirmed that the level of stagnant water in the HPCI room had stopped rising and therefore determined that the leak had stopped. Furthermore, we have confirmed that the level of stagnant water is lower than the subdrains in the vicinity of the building and that the leaked water has been contained within the building.
- We will continue to monitor the Unit 2 SFP water level and its temperature and remain on standby so that we can implement SFP circulation cooling whenever necessary as we deliberate further investigations and countermeasures.



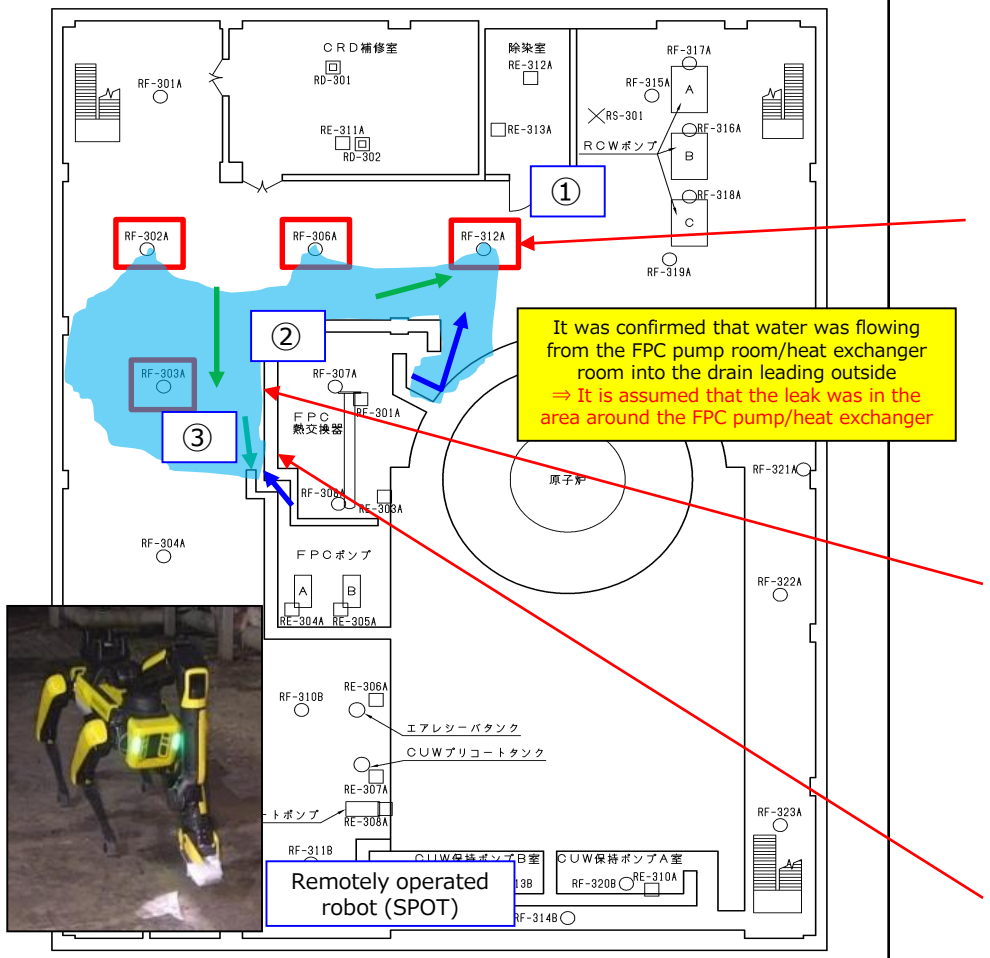
Unit 2 SFP temperature increase prediction

■ An evaluation of the Unit 2 SFP pool water temperature increase during cooling shutdown has confirmed that the limited condition of operation of 65°C will not be reached. Furthermore, the temperature of the Unit 2 SFP water should initially rise approximately 0.06°C/hour and reach a maximum temperature of approximately 46°C.



Results of a field investigation using a remotely operated robot (SPOT) (around 10 PM on August 9)

Scope of leak on the floor of the third floor of the Unit 2 reactor building



: Scope of confirmed leak

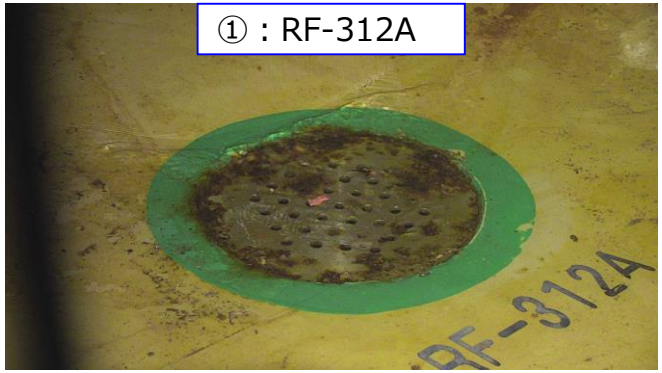
: Drain into which water was flowing

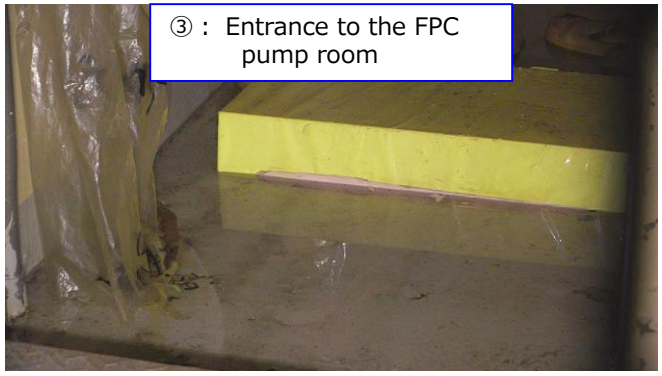
: Direction of photograph

: Direction of leak

※ Obstructions prevented investigation of the inside of the FPC pump room/heat exchanger room

Photographs taken from the site





Investigating the cause and making repairs

■ Since the temperature of the Unit 2 SFP pool water cannot be measured (temperature assessments are being conducted) and a field investigation has found that there is a leak of water from the FPC pump room/heat exchanger room, we will implement the following measures going forward.

< Installation of water temperature gauge/water level gauge >

In order to enhance monitoring during shutdown of the Unit 2 SFP cooling system, a water temperature gauge and water level gauge (straight scale) will be installed on the south side of the SFP.

The aforementioned water temperature gauge and water level gauge will be monitored using the camera that is already installed on the fifth floor of the reactor building.

< Taking field dose measurements with the remotely operated robot >

As part of preparations (investigation) for identifying the source of the leak a remotely operated robot (SPOT) will be used to measure dose rates inside the FPC pump room/heat exchanger room and examine conditions inside the room.

< Leak investigation >

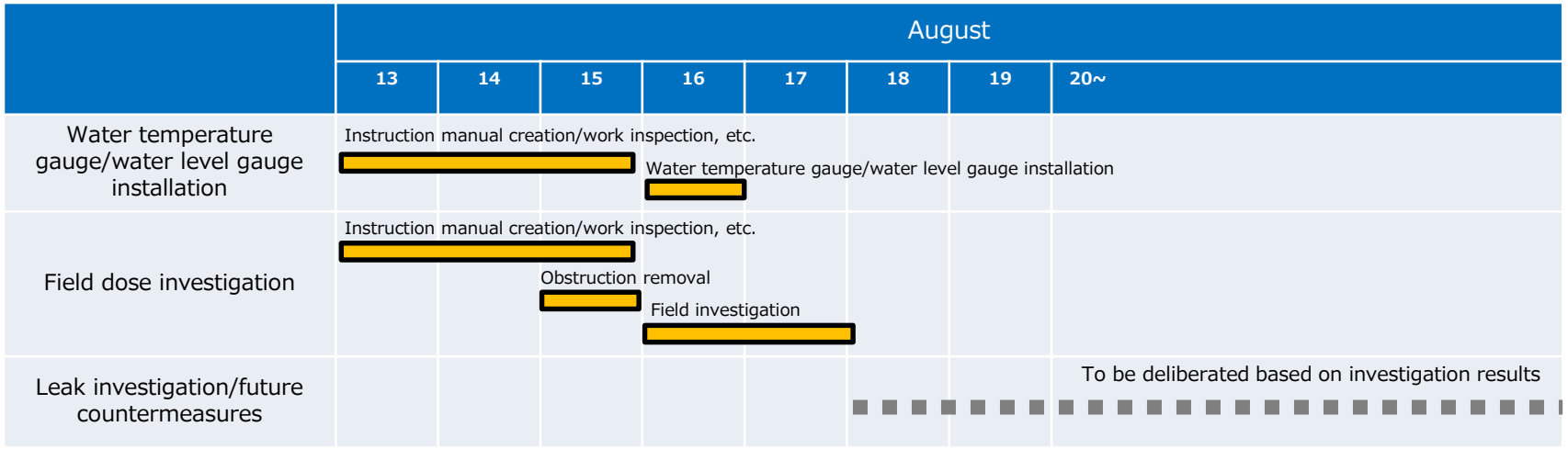
Based on field dose investigation results, we will formulate an investigation plan that utilizes the remotely operated robot (SPOT). In particular, we shall inject filtered water into the skimmer surge tank and examine water leaking from the equipment in the FPC pump room/heat exchanger room.

< Future countermeasures >

Based on the results of the aforementioned investigations, we shall deliberate countermeasures for the future. Since the work will be done in a high-dose environment, safety shall be prioritized.

① Examine methods for repairing the leak

② If repairing the leak is difficult due to the high-dose environment, an alternate cooling method will be examined（To be deliberated simultaneously with ①）



Circulated cooling of the Unit 2 SFP going forward

【 Current conditions 】

＜ Pool water level monitoring method ＞

- This event consisted of a decrease in the water level of the Unit 2 SFP skimmer surge tank and had no impact on the water level of the SFP that contains spent fuel. The SFP continues to hold a sufficient amount of water.
- A camera is being used to monitor the SFP and we have confirmed that water levels are near the overflow level. (Checked approximately once every hour)

＜ Pool water temperature management method ＞

- Our assessment of SFP temperature, which considers current outside air temperatures, shows that the maximum temperature of SFP is around 46°C even without being cooled, which is far below the limited condition of operation of 65°C.
- In addition to this temperature assessment, we will install a new pool water temperature gauge in order to check actual measurements.
- Although circulation cooling using the SFP cooling system primary pump is possible at this time, the amount of stagnant water will only increase if the leak is not repaired. Therefore, we must balance cooling with steps to prevent the amount of stagnant water from increasing.

【 Basic approach to circulated cooling of the SFP going forward 】

- We will continue to monitor the Unit 2 SFP water level and temperature and remain on standby so that we can implement SFP circulation cooling whenever necessary.
- Since our assessment of the Unit 2 SFP temperature shows a significant margin below the limited condition of operation at 65°C, the SFP cooling system primary pump shall be used to restart circulation cooling and suppress temperature increases if it is determined that there will be an impact on the operating floor environment or equipment, or if there is a temperature increase beyond what is predicted.

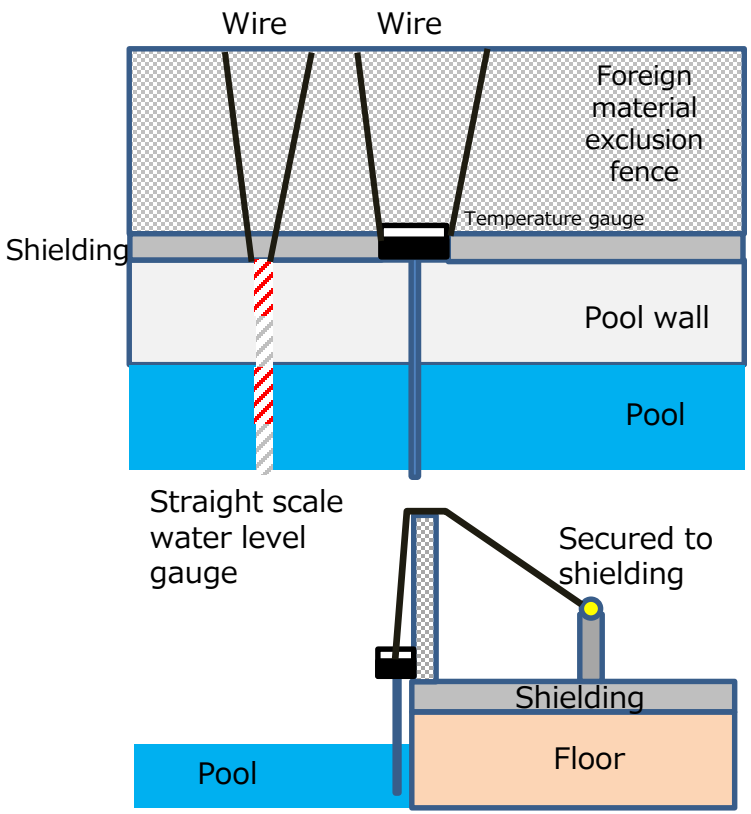
＜ Reference ＞

During 24 hours of the continuous circulation cooling mentioned earlier, it is estimated that a total of 70m³/day is needed (amount needed to fill the skimmer surge tank is approximately 30m³, and the amount of leakage during operation is approximately 40m³/day (leak amount considered to be approximately 1.8m³/hour)). Furthermore, past records have shown that 24 hours of continuous operation would bring the temperature down by approximately 5°C.

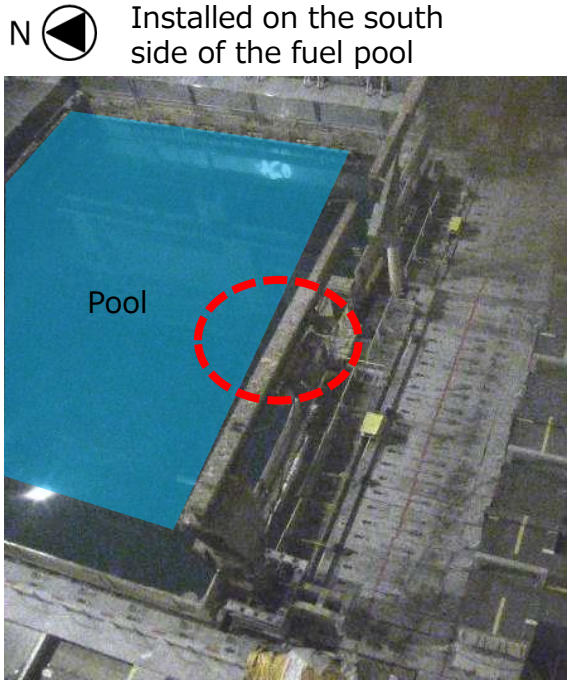
<Reference> Installing a water temperature gauge and water level gauge at the Unit 2 SFP

■ The temperature of the Unit 2 SFP water was normally measured right before the cooling system primary pump. However, in order to enhance Unit 2 SFP monitoring while the cooling system is shut down, from August 16, we will install a water temperature gauge and a water level gauge at the Unit 2 SFP. The aforementioned water temperature gauge and water level gauge will be monitored using the camera that is already installed on the fifth floor of the reactor building.

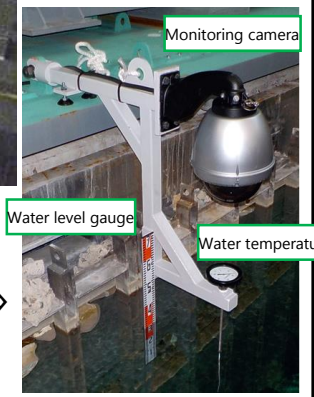
Concept diagram



Installation location

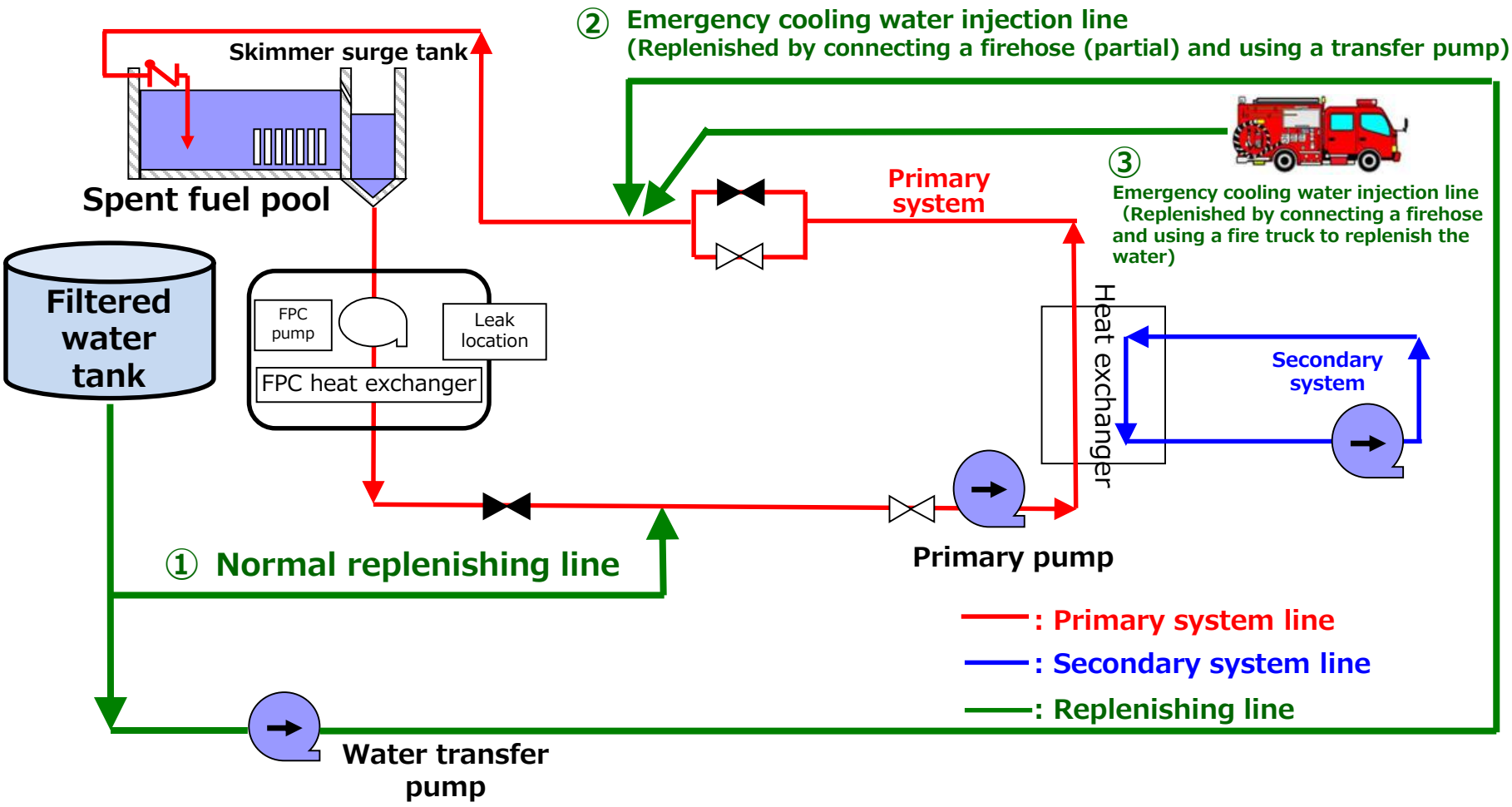


Reference: Photo of Unit 3 SFP monitoring equipment ⇒



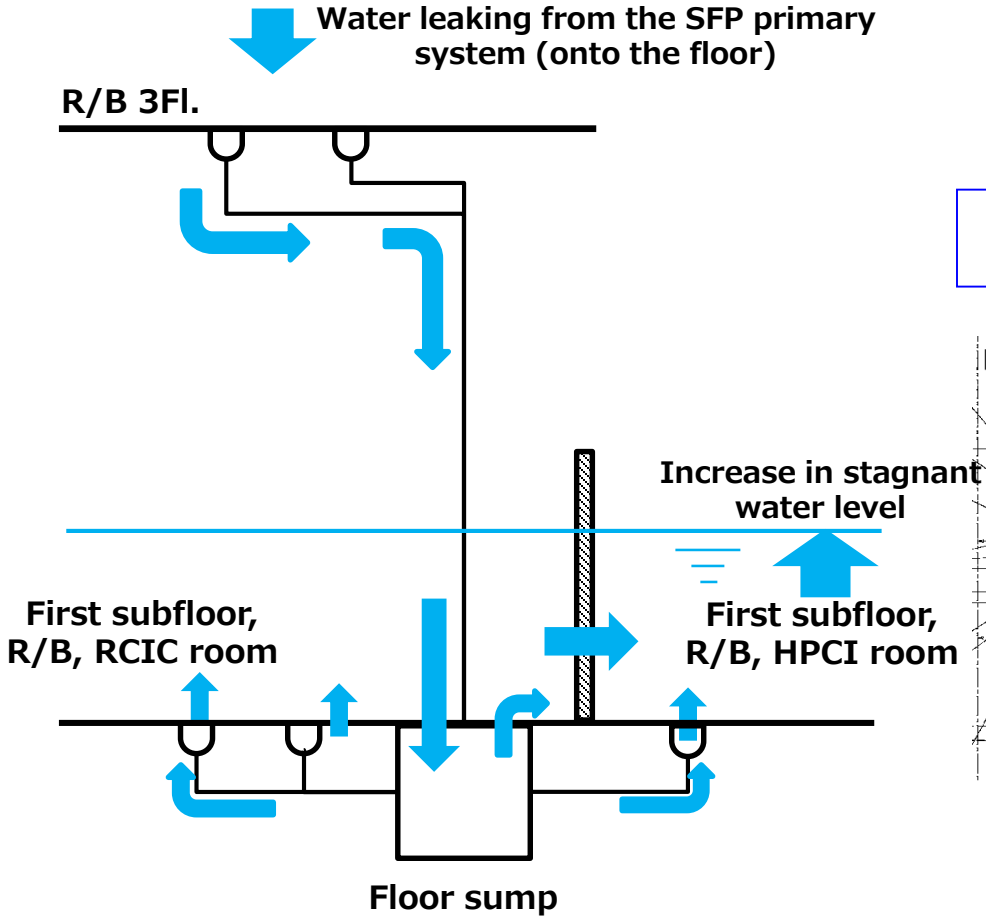
<Reference> Method for replenishing the Unit 2 SFP

■ Even if the water level of the Unit 2 SFP decreases due to natural evaporation, the following method would be used to replenish it with filtered water thereby making it possible to maintain the water level of the SFP.
- Normally used skimmer surge tank replenishing line (① in the figure below) ※The pool can be replenished whether the primary pump is in operation or not
- Replenishing line from emergency cooling water injection lines (②,③ in the figure below)



<Reference> Stagnant water conditions on the first subfloor of the Unit 2 reactor building

- In conjunction with a decrease in the Unit 2 skimmer surge tank water level, we confirmed that there is a leak of water from the FPC pump room/heat exchanger room on the third floor of the Unit 2 reactor building.
- Since leaking water was flowing into the floor drain via the floor sump pit in the RCIC room, we assume that the level of stagnant water on the first subfloor of the Unit 2 reactor building (HPCI/RCIC) is increasing.
- The leaked water will be transferred to the process main building along with other stagnant water and purified with water treatment equipment.



The RCIC room and the HPCI room on the first subfloor of the Unit 2 reactor building are connected