Revision

Current Handling of the No. 3 Underground Reservoir

（As of 6:00pm, April 7, 2013）

April 7, 2013

Tokyo Electric Power Company

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1. Confirmed Event Details

- No reduction in the water level inside the No. 3 underground reservoir has been seen.
- Analysis results of the water from inside the leak detection hole on the southwest side show a chlorine concentration of 380ppm, and all beta radiation to be on the order of 1.0×10^{3}Bq/cm^{3}
- Analysis results of the water from inside the leak detection hole on the northeast side show a chlorine concentration of less than 1ppm, and all beta radiation to be on the order of 1.0×10^{-1}Bq/cm^{3}
- Water levels inside the No. 3 leak detection hole are approximately 80cm from the bottom on the southwest side and approximately 45cm from the bottom on the northeast side. Water level inside the tank is approximately 5m.

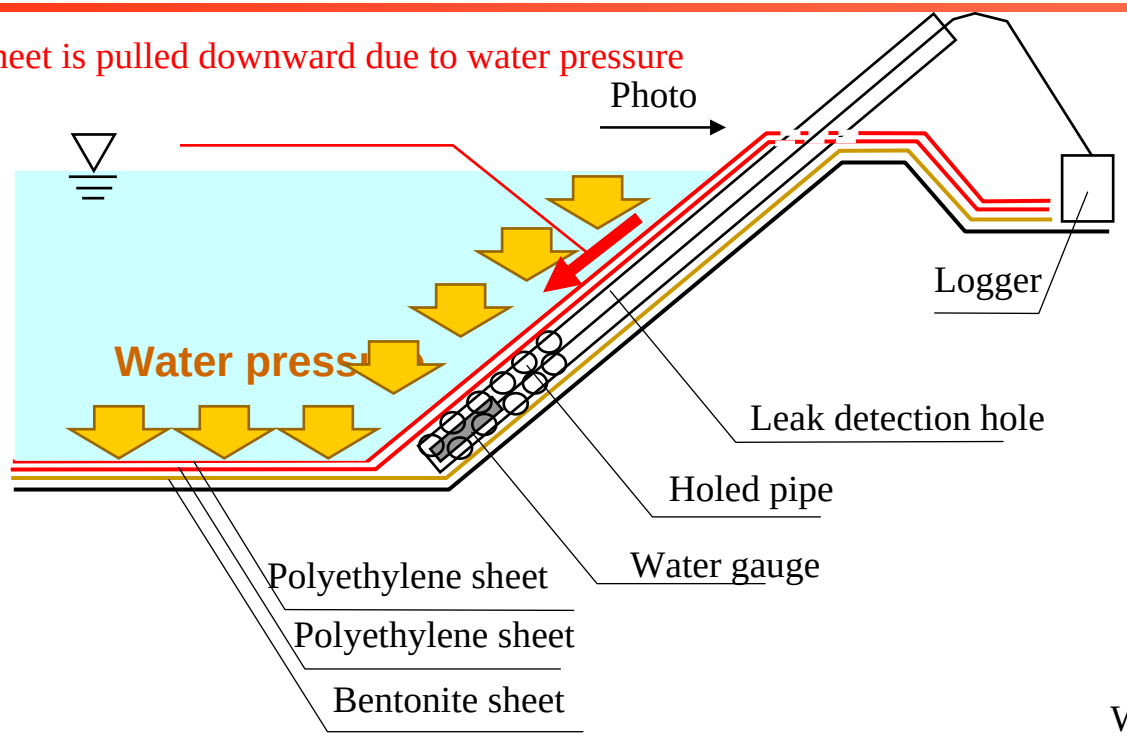
2. Possible Leak Causes and Predicted Leak Locations

- The water shielding sheet has a double layer construction, so there are nonconformities with both layers. The two most likely nonconformities with the water shielding sheet are as follows.
  (【Reference】 Please refer to the Cause Analysis Chart)
  - Manual weld nonconformity (insufficient weld, reduction in tensile strength due to insufficient weld)
  - Sheet puncture cause by protruding object
- If there was a leak in the bottom of the underground reservoir water pressure would act on the leak thereby causing the water level inside the leak detection hole to quickly rise, however this is not the case.
- No large leaks have been found in the No. 3 underground reservoir
- It is easy for large amounts of pressure to be put on the sheet

- The underground reservoir has manual welds and is subject to large tensile forces, so areas penetrated by different types of materials (leak detection hole penetration) are difficult to construct and may have lost durability.

3. Scenario where the area near the leak detection hole penetration is damaged

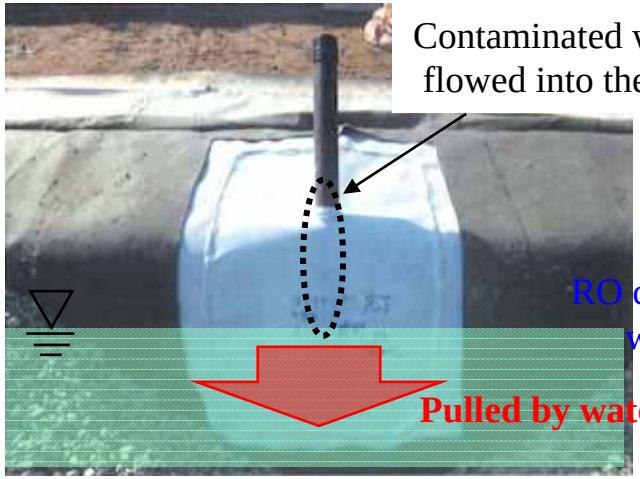
Sheet is pulled downward due to water pressure



Weld between leak detection hole and sheet

Weld stretches and breaks

Contaminated water may have flowed into the detection hole



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4. Estimating the amount of leakage

- The amount of water inside the southwest side leak detection hole is approximately 17 liters, assuming that the leak is confined to the leak detection hole and area sandwiched between the polyethylene sheet and the bentonite sheet.
- The all beta concentration of this contaminated water is 2.2×10^3Bq/cm^3, but the concentration of the accumulated RO concentrate wateris approximately from 1.0×10^4 to 1.0×10^5Bq/cm^3, so the amount of leaked RO concentrate wateris estimated to be approximately 0.3~3 liters.

Current amount of water estimated from water level in detection hole:

Detection hole and surrounding cross-sectional area x detection hole water level =0.216 x 0.8m (detection hole water level) 17 liters

Estimated leak amount using dilution ratio:

Detection hole water level x concentration ÷ RO concentration of concentrated water approx. 0.3~3 liters

5. Current proposed countermeasures

- Emergency countermeasures are being put in place due to the possibility of a leak from the top of the underground reservoir.
- As soon as temporary pumps can be installed, water will be transferred from the No. 3 underground reservoir and the current water level of approximately 95% reduced to approximately 80% (water level reduction of approximately 1m)
- For levels of the No. 1 and No. 6 underground reservoirs will be restricted to 80%.
- We continue to take water samples from the leak detection hole in the No. 3 underground reservoir ← If the new leaks have been stopped then the results will either not change or they will lower.
- In the days to come we will ascertain, analyze, and correct the causes of the leaks, including the No. 2 underground reservoir.
- Work to transfer water from the No. 2 underground reservoir continues (approximately 5 days)

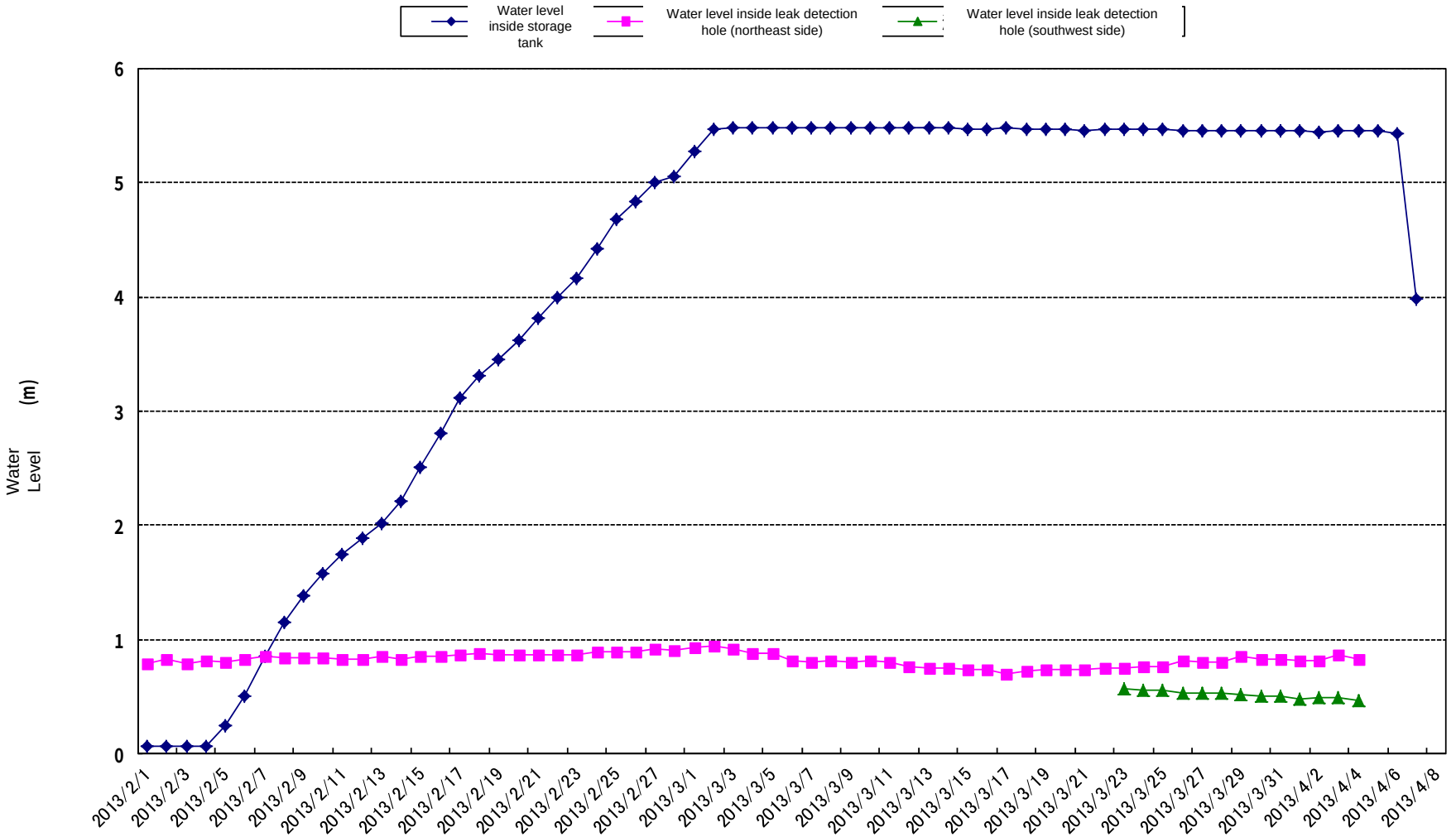
[Reference] Cause Analysis Chart

- The probability of damage to the double layer of water shielding sheet is a multiple of individual nonconformities

	Possible nonconformities	Individual nonconformity probability	Water shielding sheet (second layer) nonconformity event			
			Pin hole in sheet	Insufficient weld (auto)	Insufficient weld (manual)	Protrusion
Water shielding sheet (first layer) nonconformity event	Pin hole in sheet ※1	Low	Low	Low	Medium	Medium
	Insufficient weld (auto)※2	Low	Low	Low	Medium	Medium
	Insufficient weld (manual)※3	Medium	Medium	Medium	Medium~High	Medium~High
	Sheet damage caused by protruding object※4	Medium	Medium	Medium	Medium~High	Medium~High

[Individual nonconformity mindset]
※1：A full-scale spark test inspection is underway, but it is unlikely that there are product defects.
※2：A full-scale pressurization inspection is underway and the probability of insufficient welds is unlikely since they are done automatically
※3：A full-scale negative pressure inspection is underway and there is medium possibility of a nonconformity with welds since they are done manually.
※4：There is a medium possibility that the sheet was damaged by stones, or protective concrete poured on the bottom . The sheet also has built-in penetrations.

underground reservoir No. 2 water level



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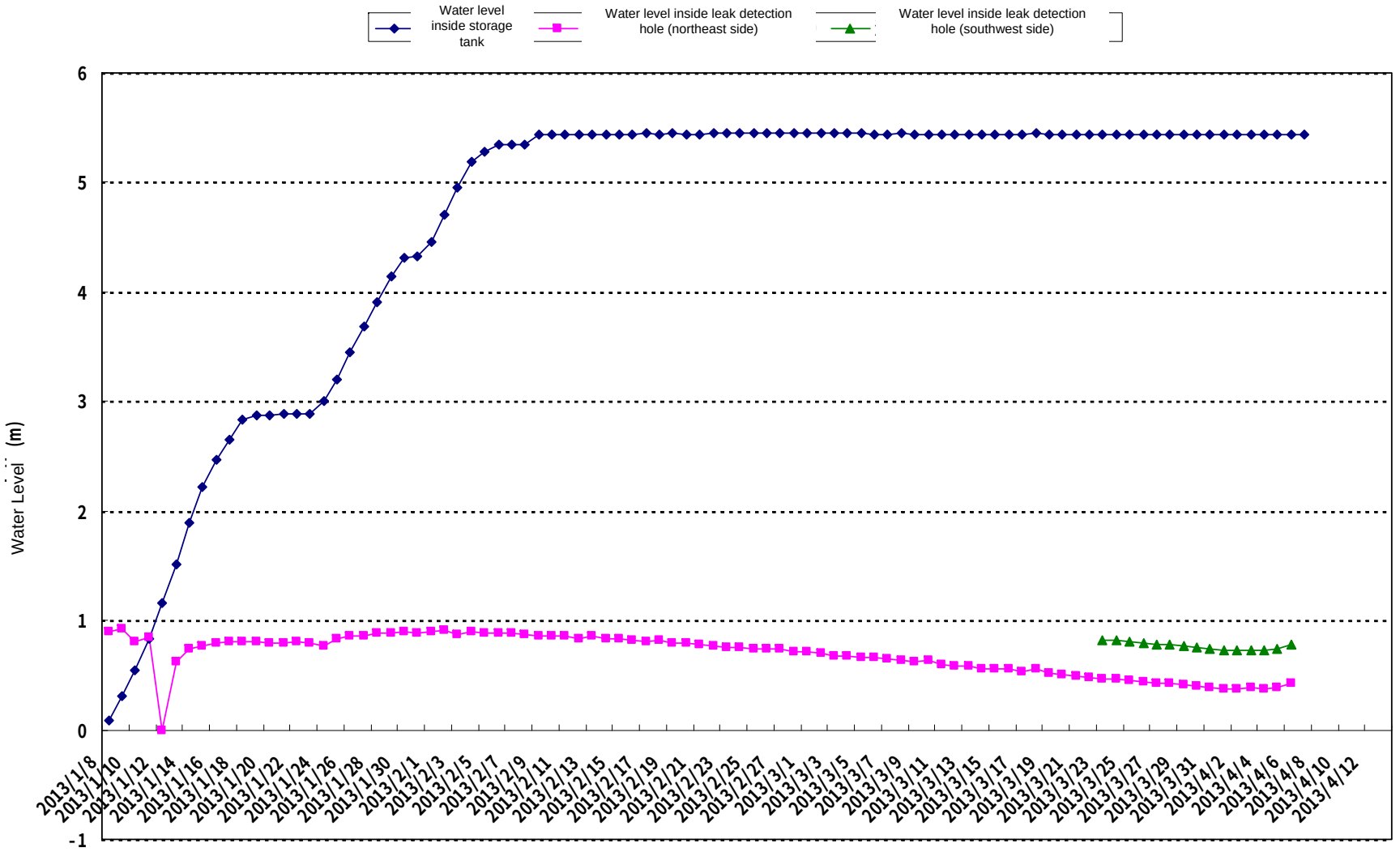
underground reservoir No. 3 water level



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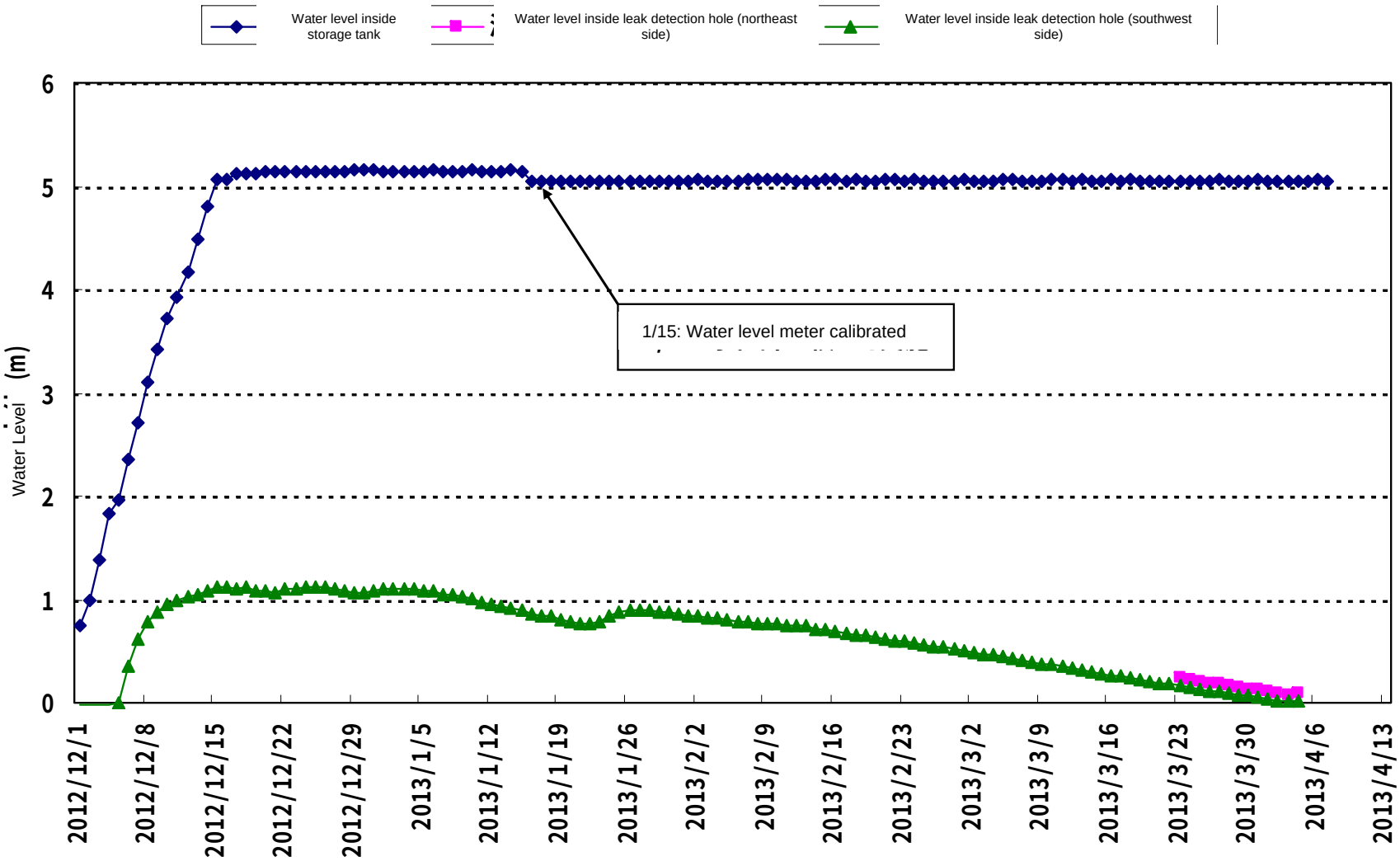
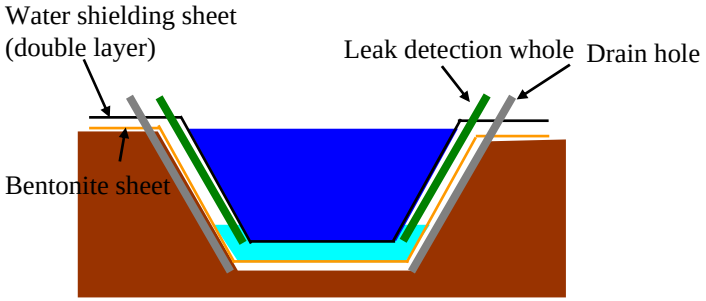
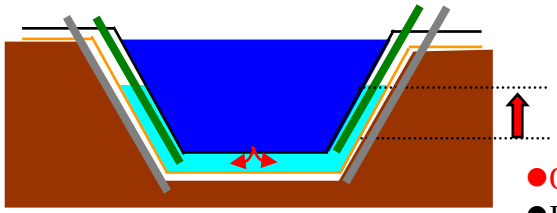
underground reservoir No. 4 water level



Event organization based on location of leak

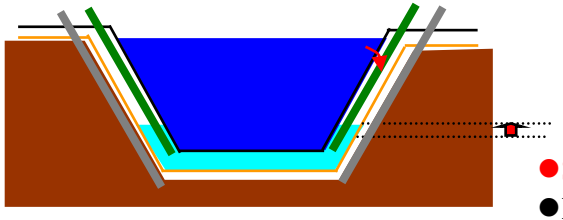


Normal State



Leak from the bottom

- Quick rise in water level
- Increase in leak detection whole water concentration
- Increase in drain hole water concentration



Leak from the top

- Slow rise in water level
- Increase in leak detection whole water concentration
- Increase in drain hole water concentration

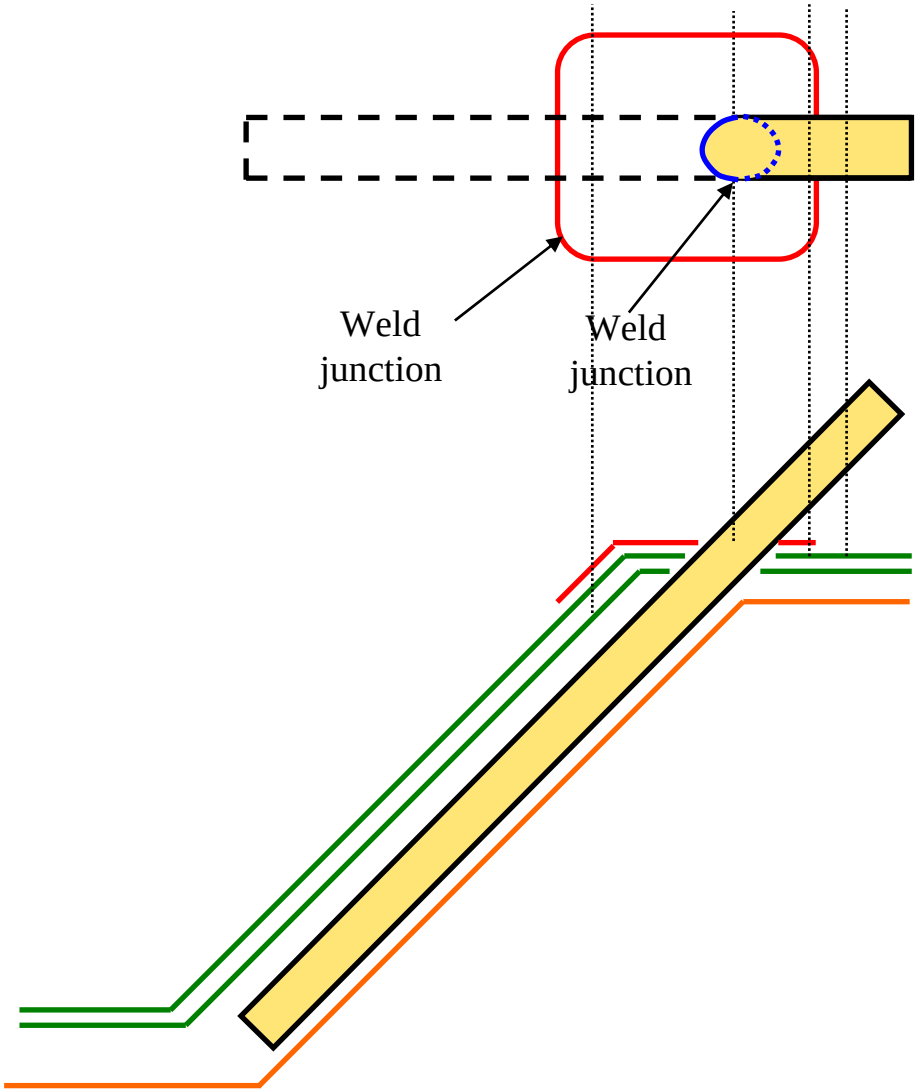
< No.2 underground reservoir >

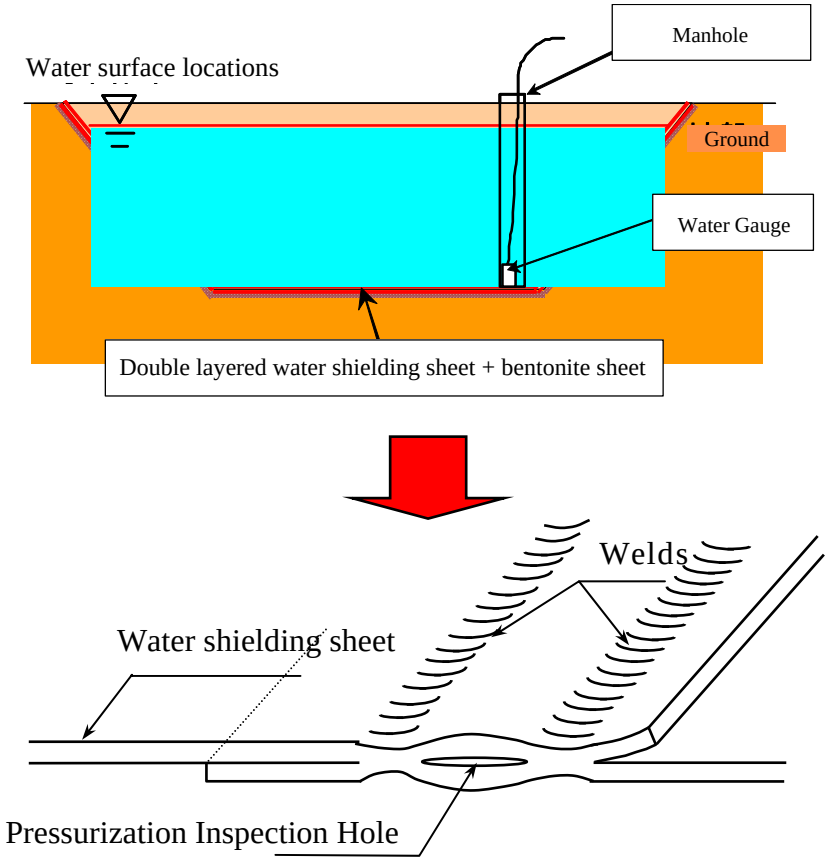
Water level changes in the storage tank and section holes have been slow. Water concentrations in the detection hole and drain hole on the northeast side show rises in saline and all beta radiation thereby suggesting a leak from the top.

< No.3 underground reservoir >

There have been no changes in the water levels of the storage tank and the detection holes, rather only an increase in the concentration of water in the detection hole thereby suggesting a leak from the top.

Parts with the potential to leak



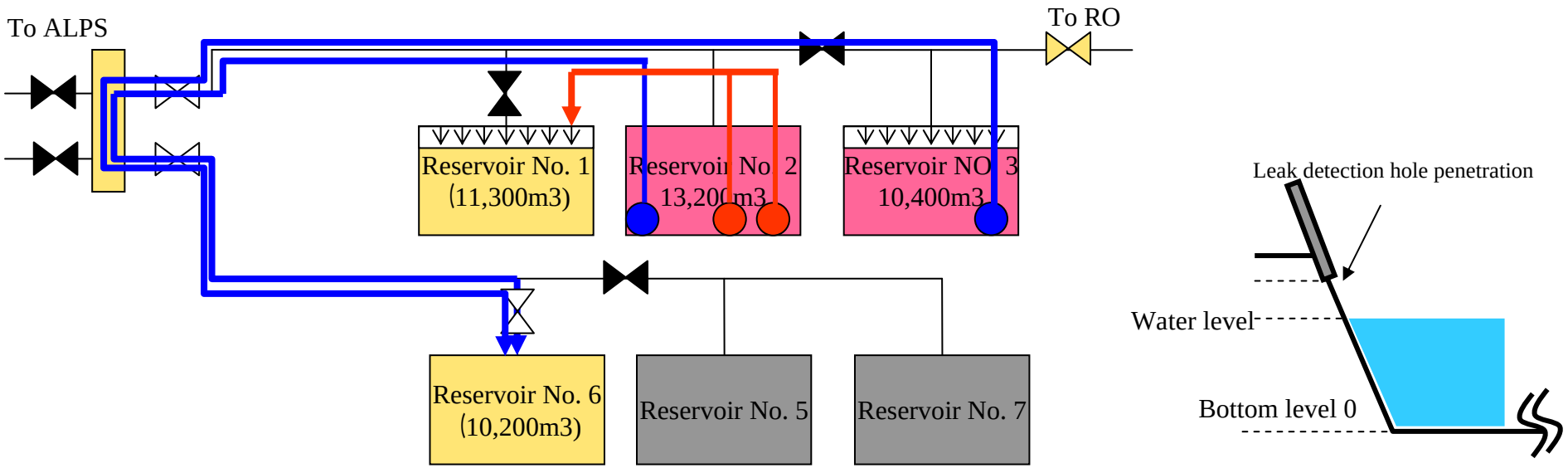


Leak detection hole welds

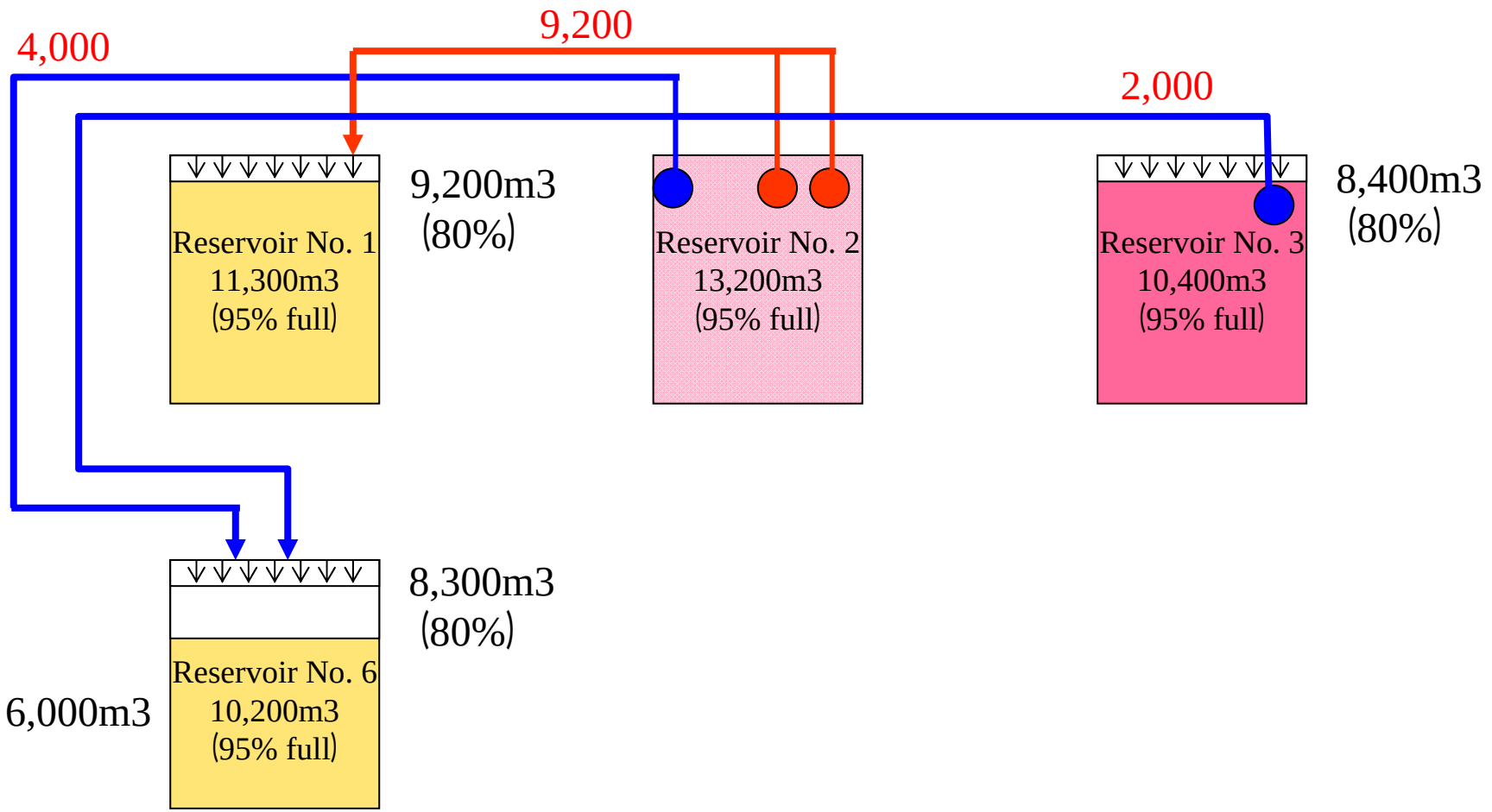
Water shielding sheet welds

Level reductions in underground reservoir No. 3

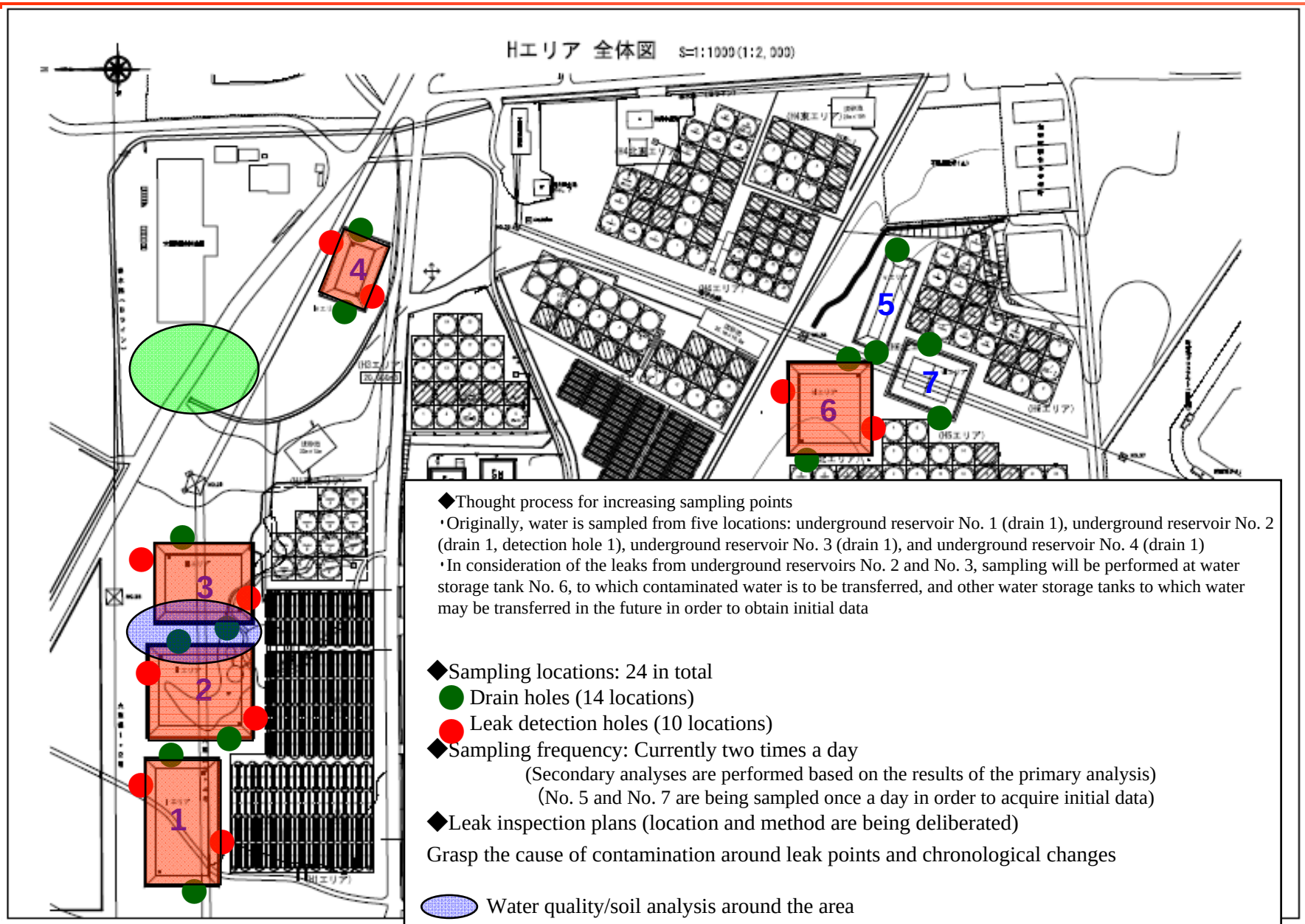
- It is possible that there is a leak from the top of the tank
- The permanent pump will be used to transfer approximately 2,000m3 of water from reservoir No. 3 to reservoir No. 6 and reduce the water level of reservoir No. 3 to 80% (height 4,576, penetration hole height 5,720)
- Reservoir No. 2 transfer work will continue at the same time (approximately 5 days)
- The water level of reservoir No. 1 will also be restricted to 80% (height 4,368, penetration hole height 5,460)



Transfer Flow Balance



underground reservoirs sampling plan



◆Thought process for increasing sampling points

・Originally, water is sampled from five locations: underground reservoir No. 1 (drain 1), underground reservoir No. 2 (drain 1, detection hole 1), underground reservoir No. 3 (drain 1), and underground reservoir No. 4 (drain 1)

・In consideration of the leaks from underground reservoirs No. 2 and No. 3, sampling will be performed at water storage tank No. 6, to which contaminated water is to be transferred, and other water storage tanks to which water may be transferred in the future in order to obtain initial data

◆Sampling locations: 24 in total

- Drain holes (14 locations)
- Leak detection holes (10 locations)

◆Sampling frequency: Currently two times a day

(Secondary analyses are performed based on the results of the primary analysis)

(No. 5 and No. 7 are being sampled once a day in order to acquire initial data)

◆Leak inspection plans (location and method are being deliberated)

Grasp the cause of contamination around leak points and chronological changes

- Water quality/soil analysis around the area
- Water quality/soil analysis downstream from leak location

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