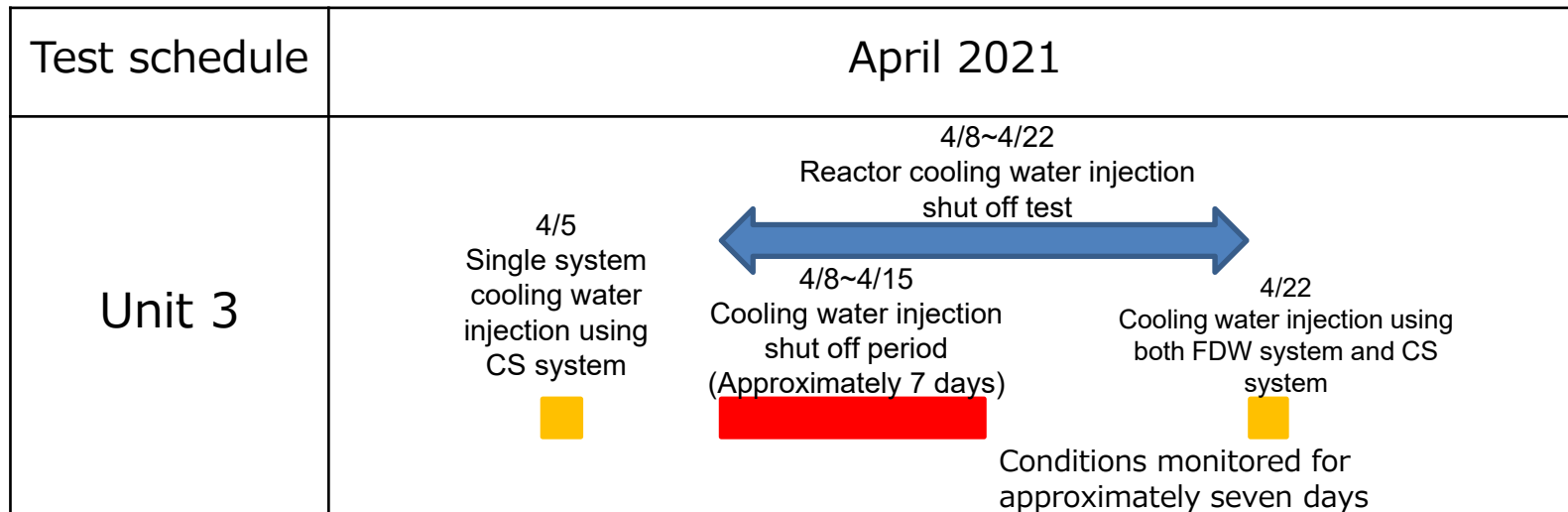


Fukushima Daiichi Nuclear Power Station Unit 3 reactor cooling water injection shut off test

- The water level inside the Unit 3 primary containment vessel (PCV) remains stable and fuel debris is being kept cool. Since we have seen no significant increase in parameters, such as temperature or dust discharge amounts, the Unit 3 reactor cooling water injection shut off test will be implemented according to the schedule shown below as planned in continuation from FY2019.
- In light of the decrease in PCV water levels, during this test we shall examine how far PCV water level will drop when reactor cooling water injection is shut off, and how that water level changes and drops in order to expand our knowledge as we prepare for fuel debris retrieval in the future. Furthermore, we will monitor temperature increases caused by the temporary shut off of reactor cooling water injection to see if they fall within expected ranges.
 - Test period: April 8~April 22, 2021 (cooling water injection shut off ~ examination of changes after the recommencement of cooling water injection)
 - Cooling water injection shutoff period: April 8~April 15, 2021 (approximately seven days)
 - (During the previous test cooling water injection was shut off for approximately two days (FY2019))
 - (Prior to the test, we will switch over to single system cooling water injection using the core spray (CS) system on April 5)
- Plant parameter monitoring has been enhanced since the water levels in the Units 1 and 3 PCVs dropped. Since no abnormalities in plant parameters have been seen, work that was suspended due to this event will be gradually recommenced. Since the water level in the Unit 3 PCV remains stable, we will return to normal monitoring on April 2 *.
 - (*The frequency of some major plant parameter monitoring shall be changed from once every hour→Once every six hours)
 - (Monitoring of Unit 2, which was enhanced as a precaution, will also be returned to normal procedures. Enhanced monitoring of Unit 1 will continue since the amount of cooling water injection continues to be adjusted in accordance with PCV water level.)
- During the cooling water injection shut off tests, Unit 3 plant monitoring will be enhanced just like during previous tests.

Test schedule (tentative)



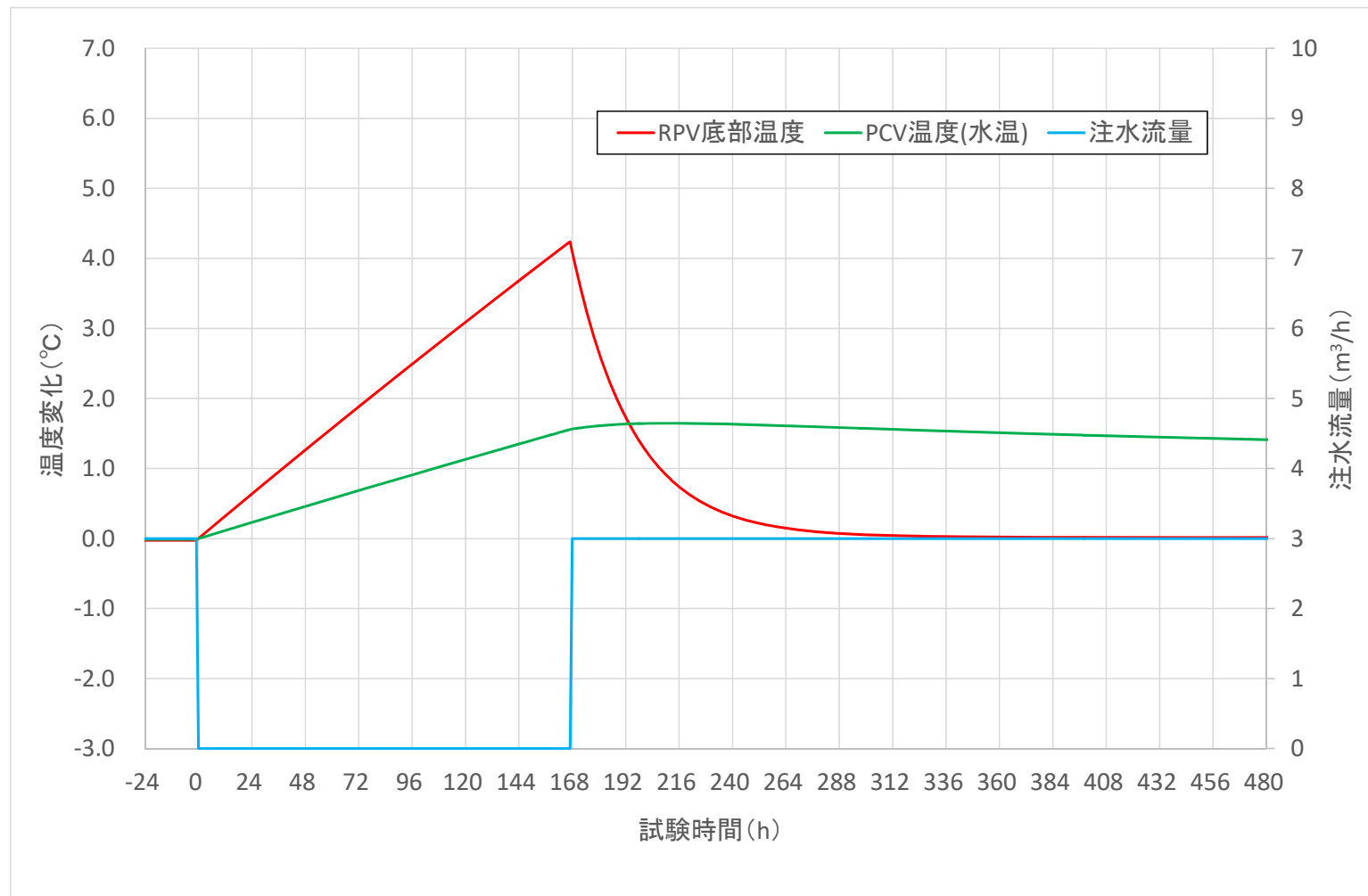
- The Unit 3 test will begin on April 8 (cooling water injection shutoff: 4/8~4/15)
 - Pre-test preparations: April 5: Switch over to single system cooling water injection using the core spray (CS) system. To compare results with the previous test (FY2019), only the CS system will be used for reactor cooling water injection during this test as well)
 - (CS system 1.5m³/h→3.0m³/h, FDW (feed water) system :1.5m³/h→0.0m³/h)
 - Cooling water injection shut off *1 : 4/8 CS system (3.0m³/h→0.0m³/h)
 - Cooling water injection recommenced *2 : 4/15 CS system(0.0m³/h→3.0m³/h)
 - Systems restored to normal after test concludes: 4/22 Switch back to using both the FDW system/CS system for cooling water injection
 - (CS system 3.0m³/h→1.5m³/h, FDW system:0.0m³/h→1.5m³/h)

Test plan precautions (limited conditions of operation)

- *1 Clause 32.1 will apply because limited conditions of operation (Clause 18) will be deliberately deviated from as the amount of cooling water required for reactor cooling is not maintained.
- *2 Clause 32.1 of the implementation plan shall apply because the limited conditions of operation (Clause 18) pertaining to the amount of increase of cooling water injection during an arbitrary 24 hour period of 1.5 m³/hour will be deviated from.

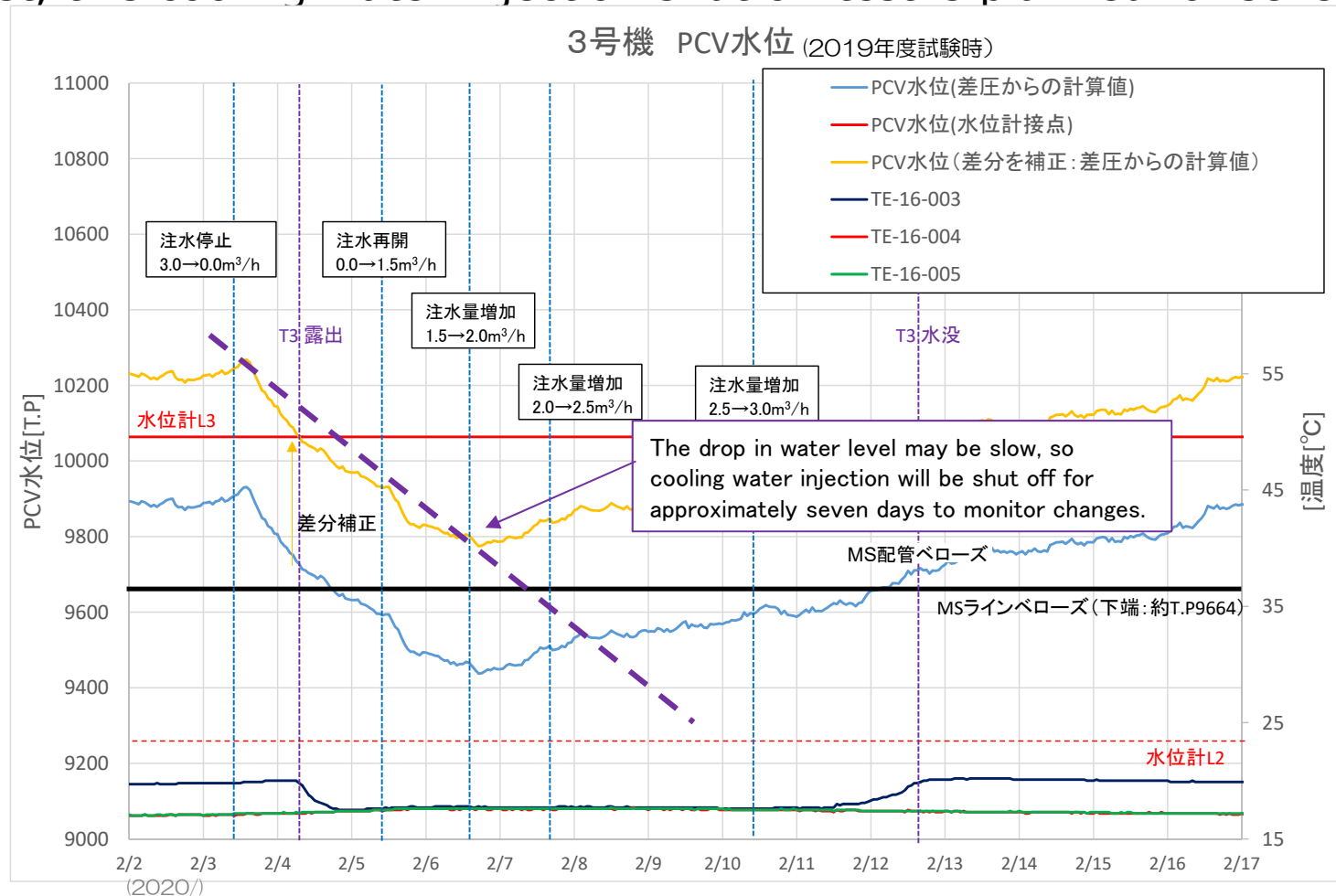
(Reference) Assessments of temperature increases during the shut off of cooling water injection at Unit 3

- PCV temperature should rise approximately 2°C when cooling water injection is shut off for seven days.
 - * Based on the results from the FY2019 test, the temperature at the bottom of the RPV should increase approximately the same amount as PCV temperature.



(Reference) Assessments of water level decreases during the shut off of cooling water injection at Unit 3

- As PCV water level decreases due to cooling water injection shut off, we will watch to see if water level drops below the height of the main steam pipe bellows where it has been confirmed that there is a leak.
- In light of the decreases in PCV water levels seen during the FY2019 test, this cooling water injection shut off test is planned for seven days.



(Reference) Monitored parameters and assessment criteria

- (1) Cooling status monitoring (during cooling water injection shut off and the recommencement of cooling water injection)
- Monitoring will be enhanced during cooling water injection shut off and for 24 hours after the recommencement of cooling water injection. If there are no abnormalities with cooling status, monitoring will be performed at regular frequency after 24 hours has passed since the recommencement of cooling water injection.

Monitored parameters	Monitoring frequency			Assessment criteria
	During cooling water injection shut off	During the 24 hours after the recommencement of cooling water injection	After 24 hours have passed ^{※1} (Regular monitoring frequency)	
Temperature at the bottom of the RPV	Hourly	Hourly	Hourly	Temperature increase of less than 15° C ^{※2}
Temperature inside the PCV	Hourly	Hourly	Once every 6 hours	Temperature increase of less than 15° C ^{※2}
Amount of cooling water injected into the reactor	Hourly	Hourly	Hourly	(The required amount of injected cooling water must be maintained)
Containment vessel gas monitoring system dust monitors	Hourly	Once every 6 hours	Once every 6 hours	No continuation of significant increases

- ※1 Enhanced monitoring will be continued if there is a temperature increase of 10° C or more even after 24 hours have passed since the recommencement of cooling water injection.
 ※2 Cooling water injection flow will be increased if there is an increase in temperature of 15° C or more (recommencement of regular cooling water injection)

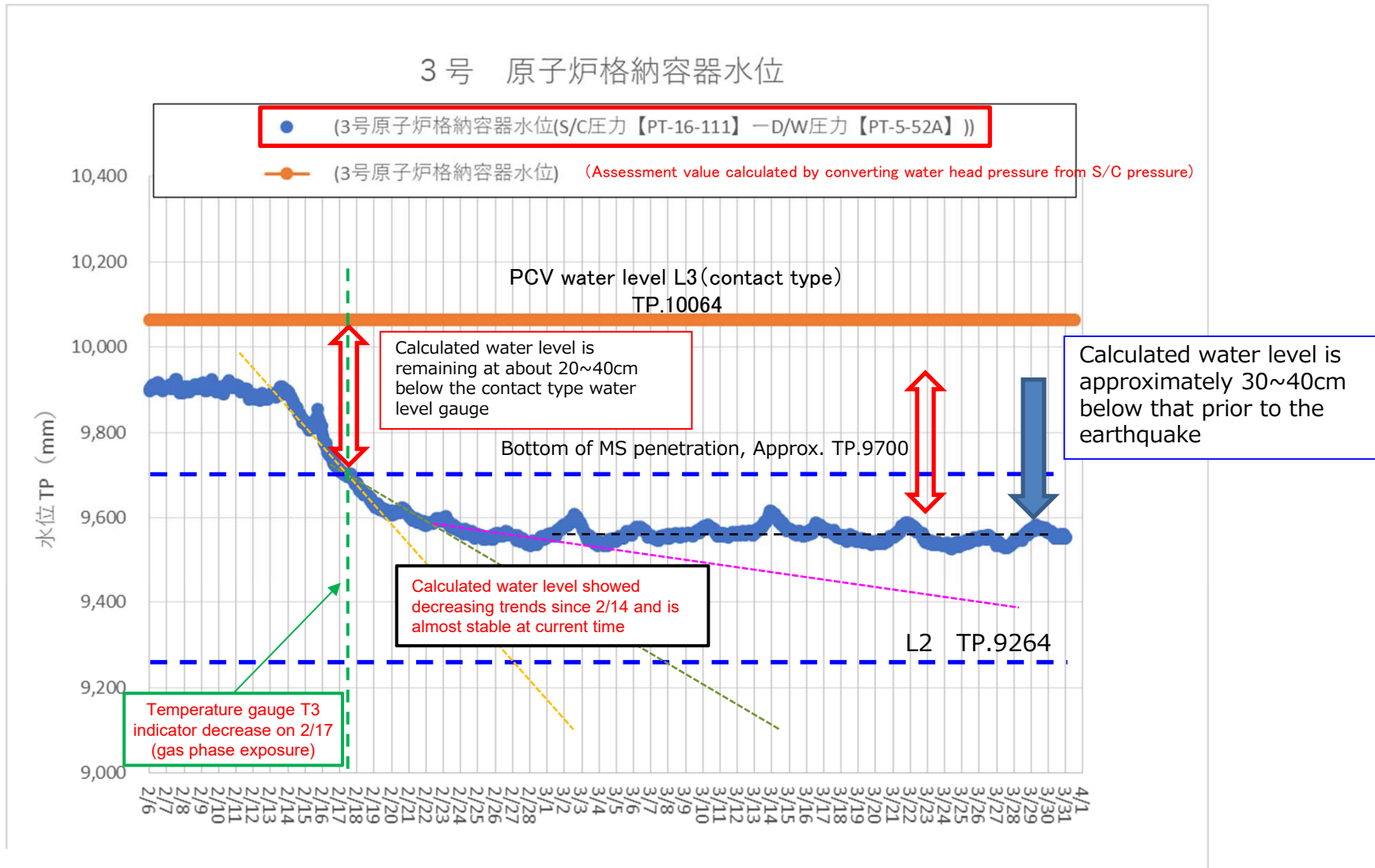
- (2) Subcriticality monitoring (during the recommencement of cooling water injection)
- We will standby ready to inject boric acid quickly during the 24 hours after the recommencement of cooling water injection

Monitored parameters	Monitoring frequency		Assessment criteria
	24 hours after the recommencement of cooling water injection	After 24 hours have passed (Regular monitoring frequency)	
Containment vessel gas management system Xe-135 concentration	Hourly	Hourly	Must be below detectable limits ^{※3}

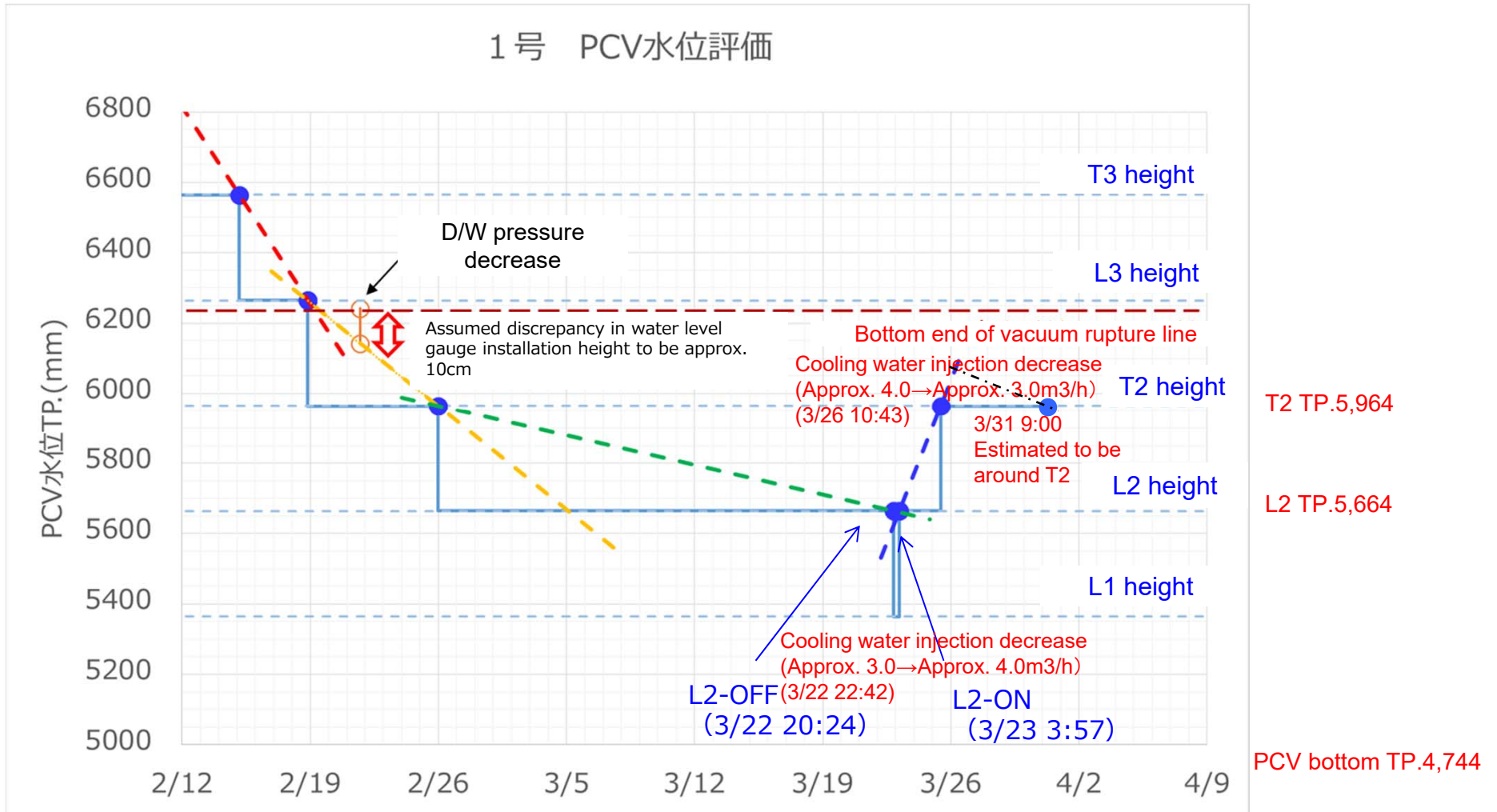
- ※3 Normal values of Xe-135 are below detectable limits at Unit 3 .
 Boric acid will be immediately injected to maintain subcriticality if there is a significant increase of Xe-135, or if Xe-135 is detected, in both systems simultaneously, even if the margin of 1Bq/ cm³, which is the limited condition of operation, is maintained. (If these conditions are seen in only one system, a decision will be made in consideration of the possibility of instrument malfunction)

- (3) Other monitored parameter trends
- Temperature at the top of the reactor pressure vessel, containment vessel pressure, and containment vessel water levels

(Reference) Unit 3 PCV water level

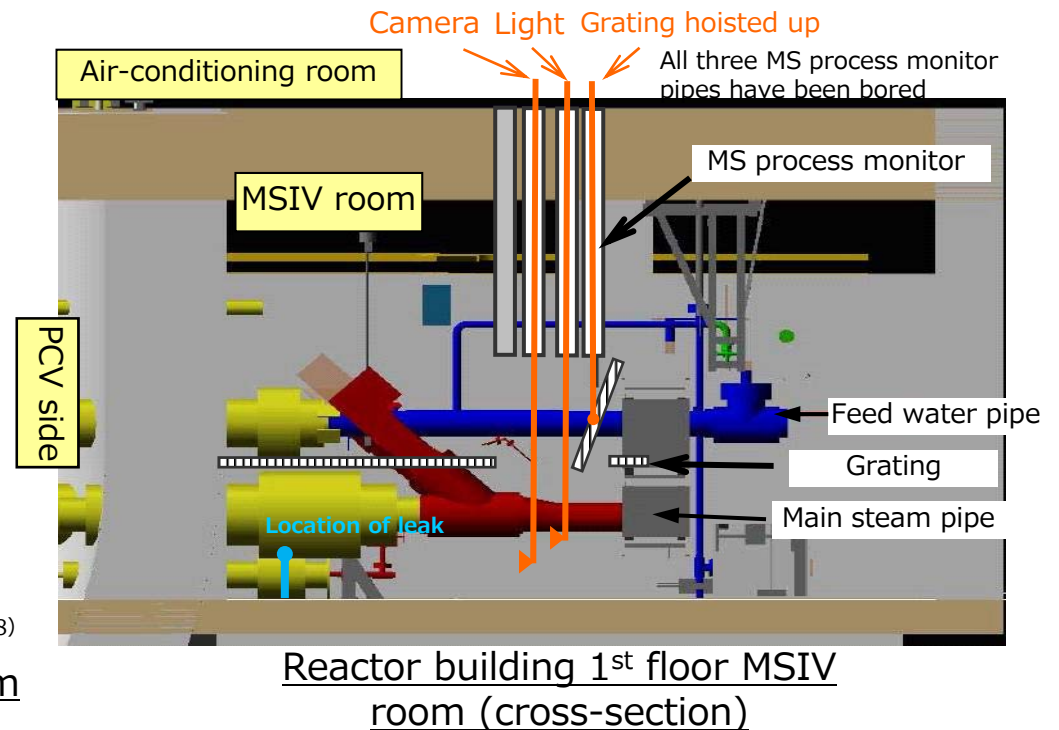
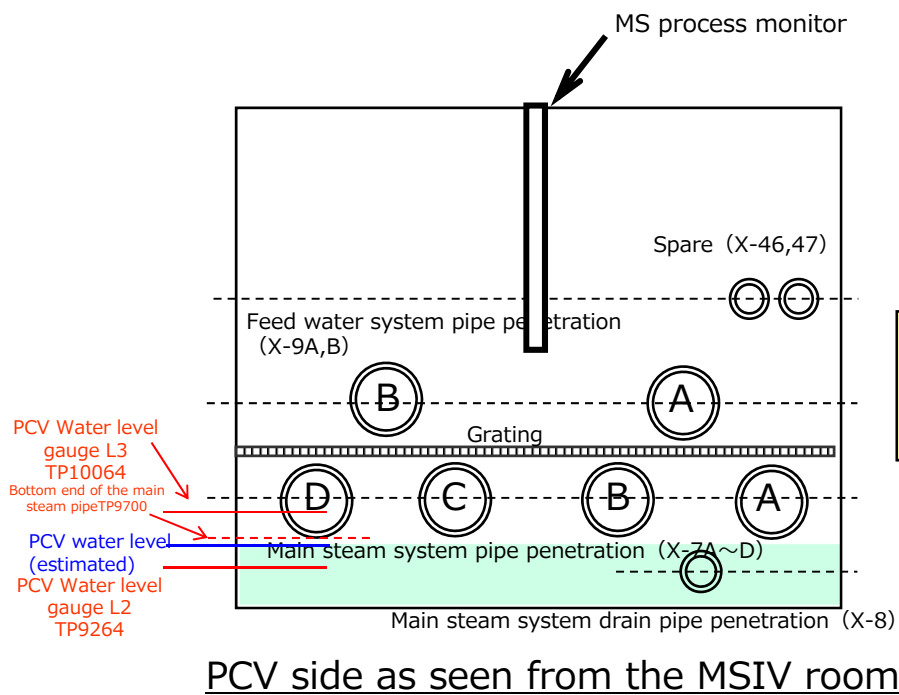


(Reference) Unit 1 PCV water level



Monitoring conditions inside the main steam isolation valve (MSIV) room during the Unit 3 cooling water injection shut off test

- In conjunction with the Unit 3 reactor cooling water injection shut off test cameras* will be lowered from the main steam pipe process radiation monitor pipe (MS process monitor) that runs from the air conditioner room above the MSIV room to the MSIV room to see if there any significant changes from the previous inspection (May 2014) to conditions inside the room or to pipes where leaks have been found. (* Two types of cameras (a camera with a telescopic lens, and a wide-angle camera) will be used)
- The cameras will be inserted twice, once prior to cooling water injection shut off, and once during shut off.



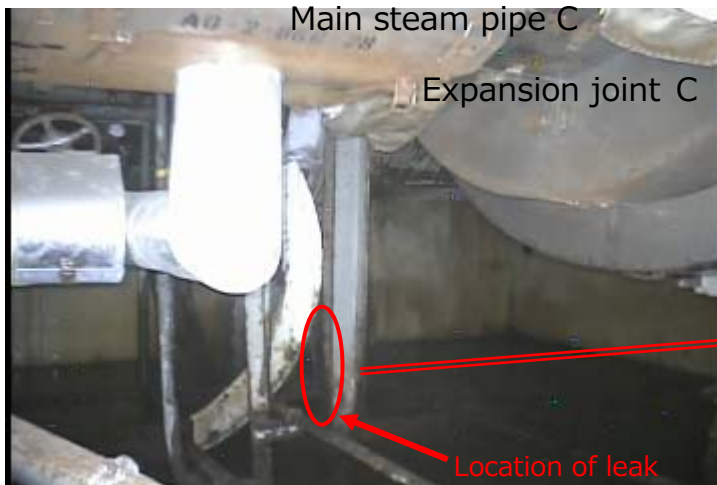
MSIV room internal condition monitoring schedule (tentative)

	March			April																						
	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
Reactor cooling water injection shut off test			Single system reactor cooling water injection (CS system)																							
MSIV external valve room condition investigation			Camera inspection/adjustment, grating removal																							

(Reference) Results from past investigations

(Investigation under grating, May 15, 2014)

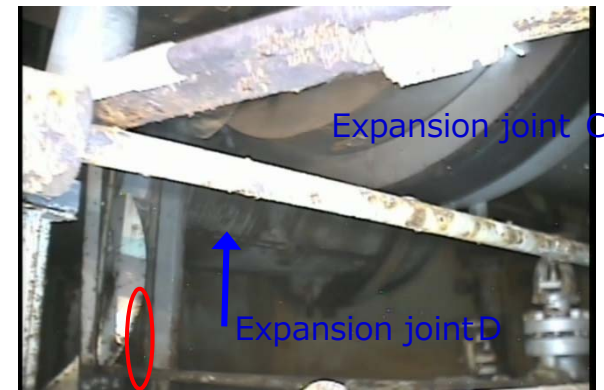
- A leak was found from around the main steam pipe D expansion joint
- The size of the leak was estimated to be about the diameter of 2~4 pencils.
- No leaks were found from other pipes



Main steam pipe D (Behind main steam pipe C)



Enlarged view of leak location



Main steam pipe D

