Attachment

Improvement of the environment within the Reactor Building of Unit 1

May 4, 2011

Tokyo Electric Power Company

東京電力 TEPCO

Purpose

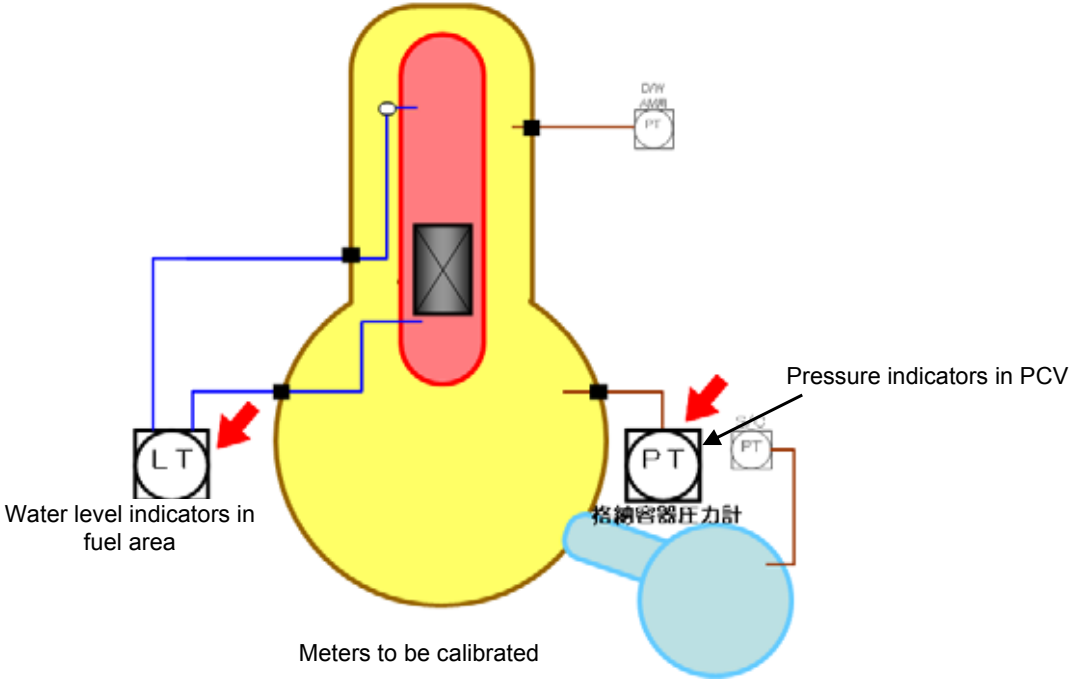
Improvement of the environment in the Reactor Building (R/B) to the level where persons are capable of entering and conducting the following works.

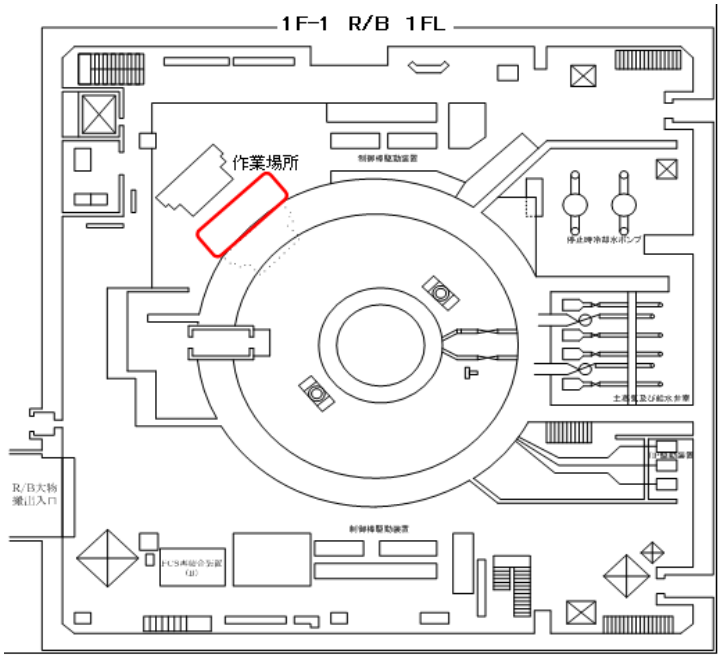
- Calibration and installation of meters in order to submerge the upper part of fuel rods
- Installation of alternative reactor cooling facilities
- Connection alteration of piping used for nitrogen gas injection to the Primary Containment Vessel (PCV)

Calibration and installation of measures in order to submerge the upper part of fuel rods

We can now observe the water level of the reactor and PCV (estimating from pressure of PCV and Suppression Chamber) after power restoration of measurement instruments. However, due to high temperature and humidity in PCV, the meters indicate some errors.

- We will calibrate water level indicators in the reactor aiming to restore monitoring function of the reactor water level.
- We will calibrate pressure indicators in PCV aiming to improve reliability of monitoring water level in PCV.

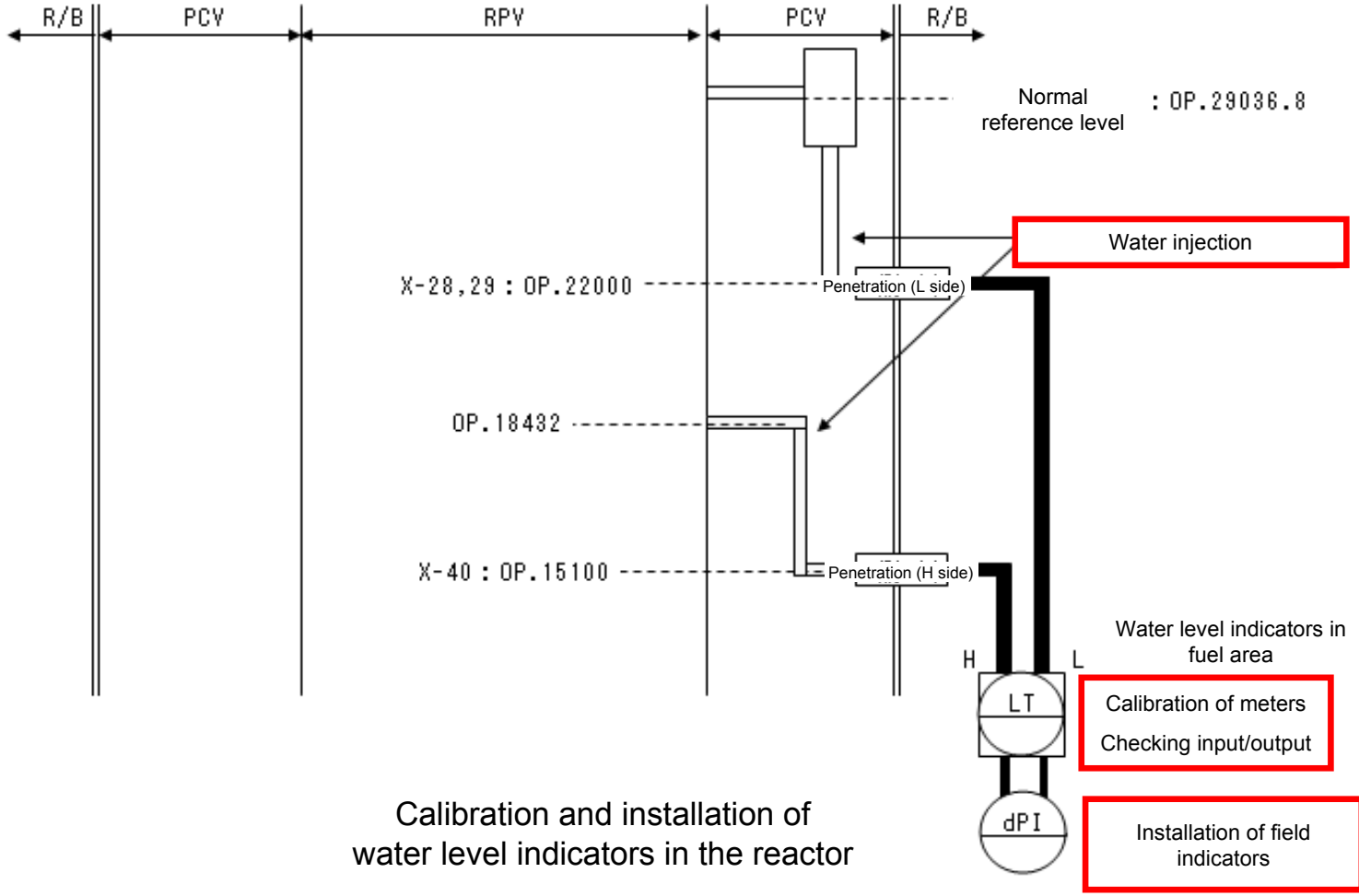




Work objects and the location of work

Calibration and Installation of water level indicators in the reactor

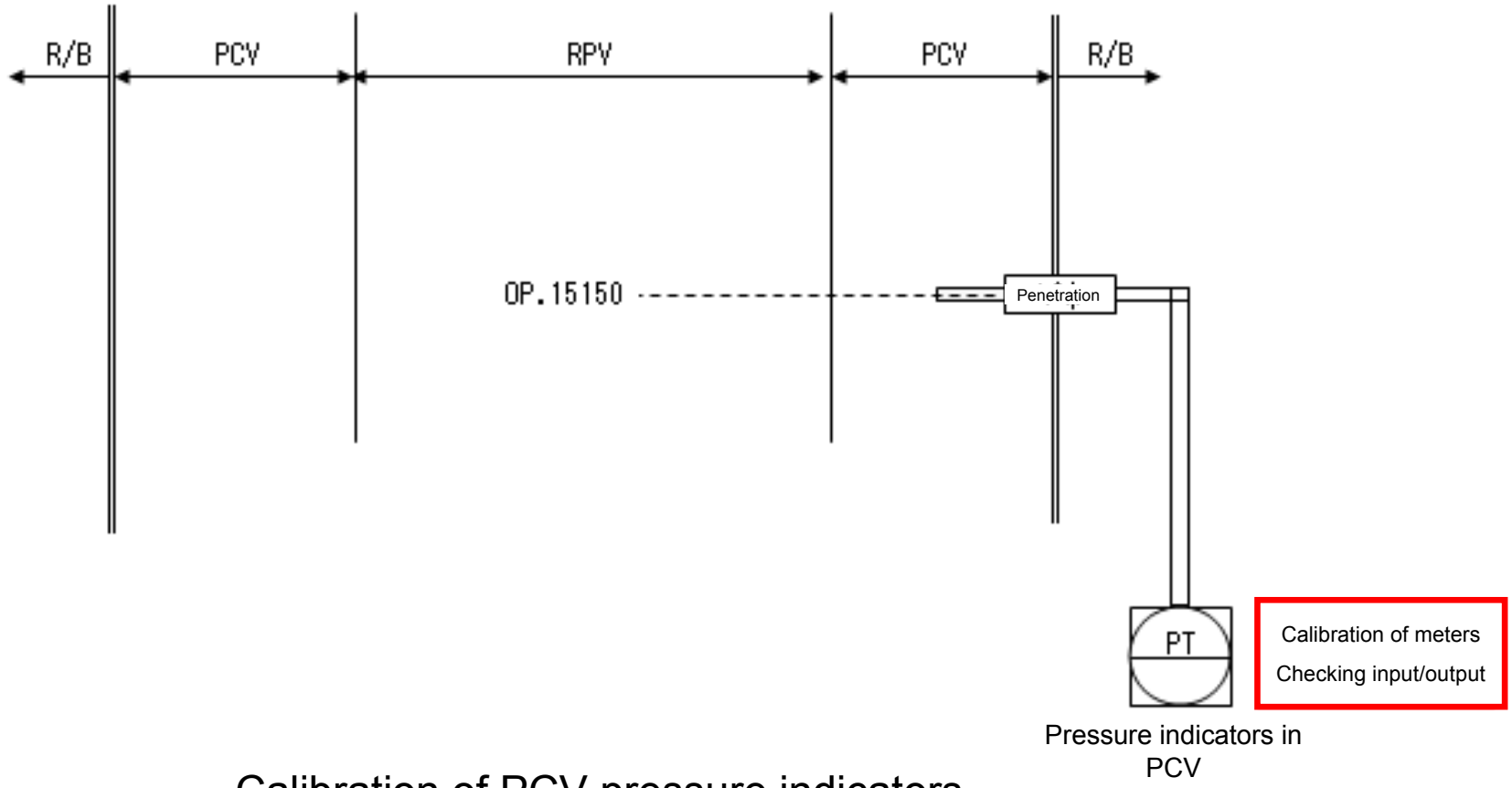
- We will inject the water to the detecting pipe of water level indicators in fuel area and calibrate meters.
- We will bifurcate the detecting pipe at the test plug of water level indicators and install differential pressure indicators.
- The work above will restore the function to monitor the water level in the reactor, which will further enable to confirm that the water level in the reactor is above the fuel range.



Calibration and installation of water level indicators in the reactor

Calibration of PCV pressure indicators

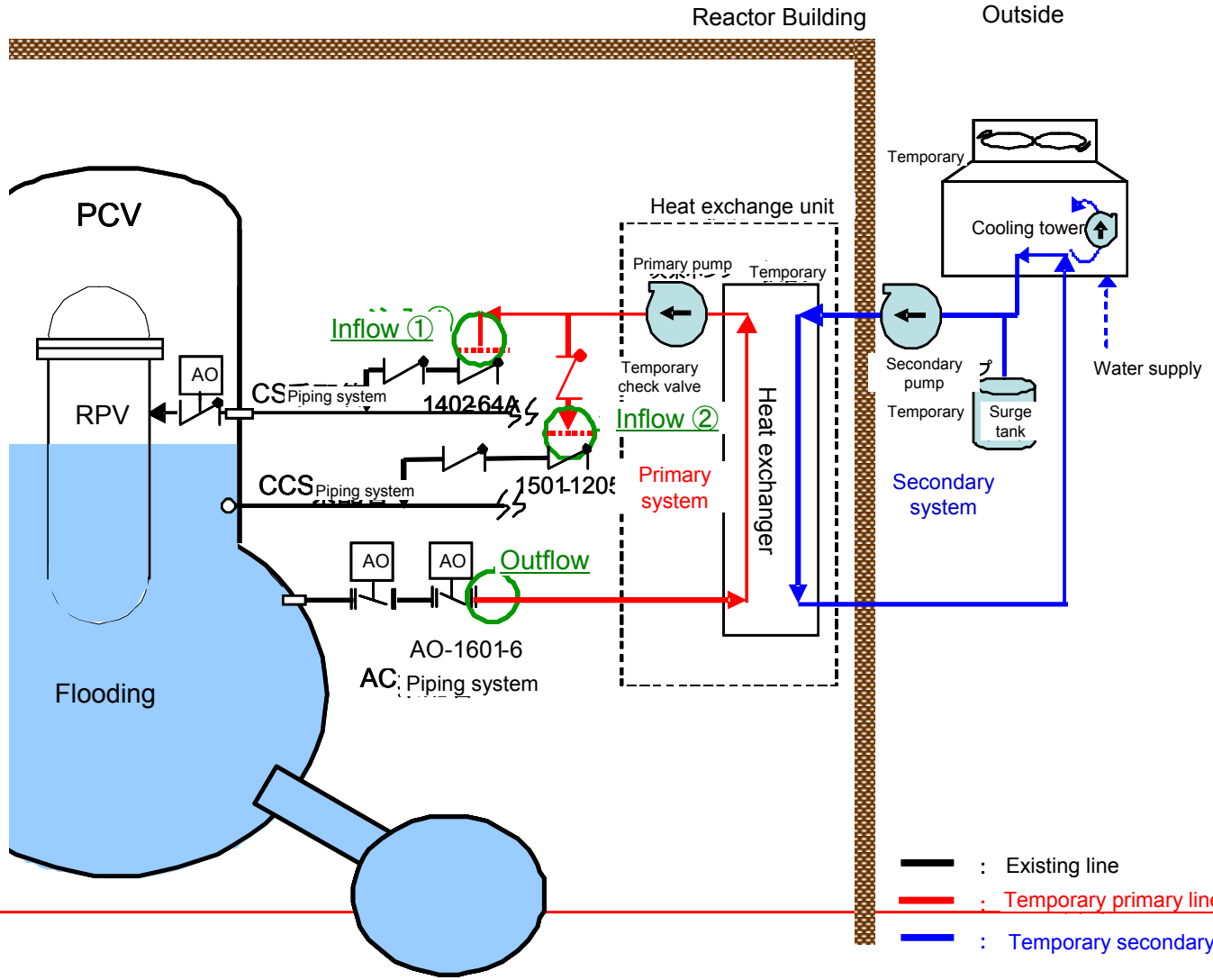
- We will calibrate PCV pressure indicators.
- This work will improve the accuracy of monitoring of PVC water level, which will decrease the risk of flooding PCV vent lines.



Calibration of PCV pressure indicators

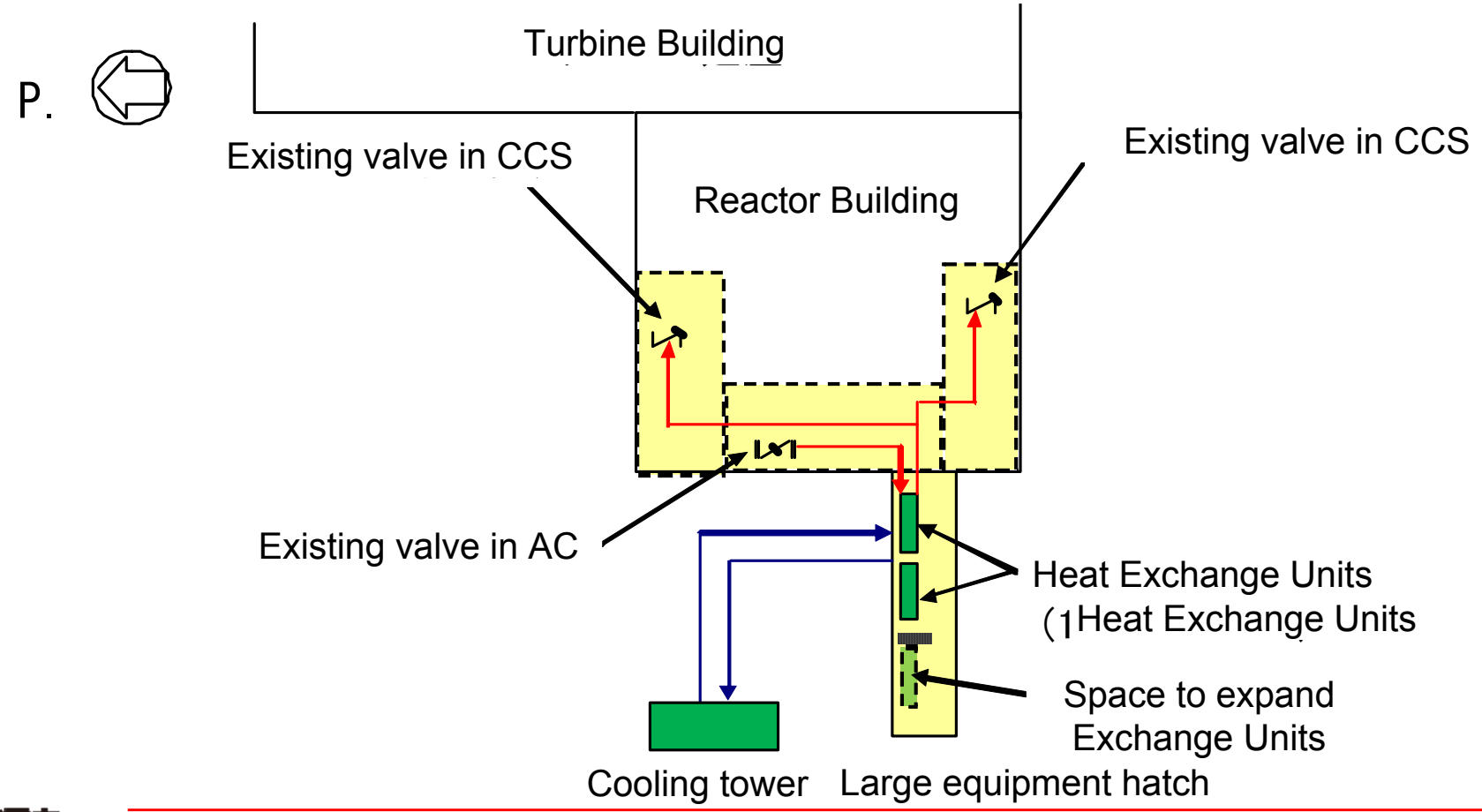
An overview of alternative reactor cooling facilities

■ For the purpose of securing reactor cooling function, we will partly combine existing systems to utilize alternative cooling facilities, which enables circulation cooling of reactor coolant. With this, reactors will reach cold shutdown at an early stage.



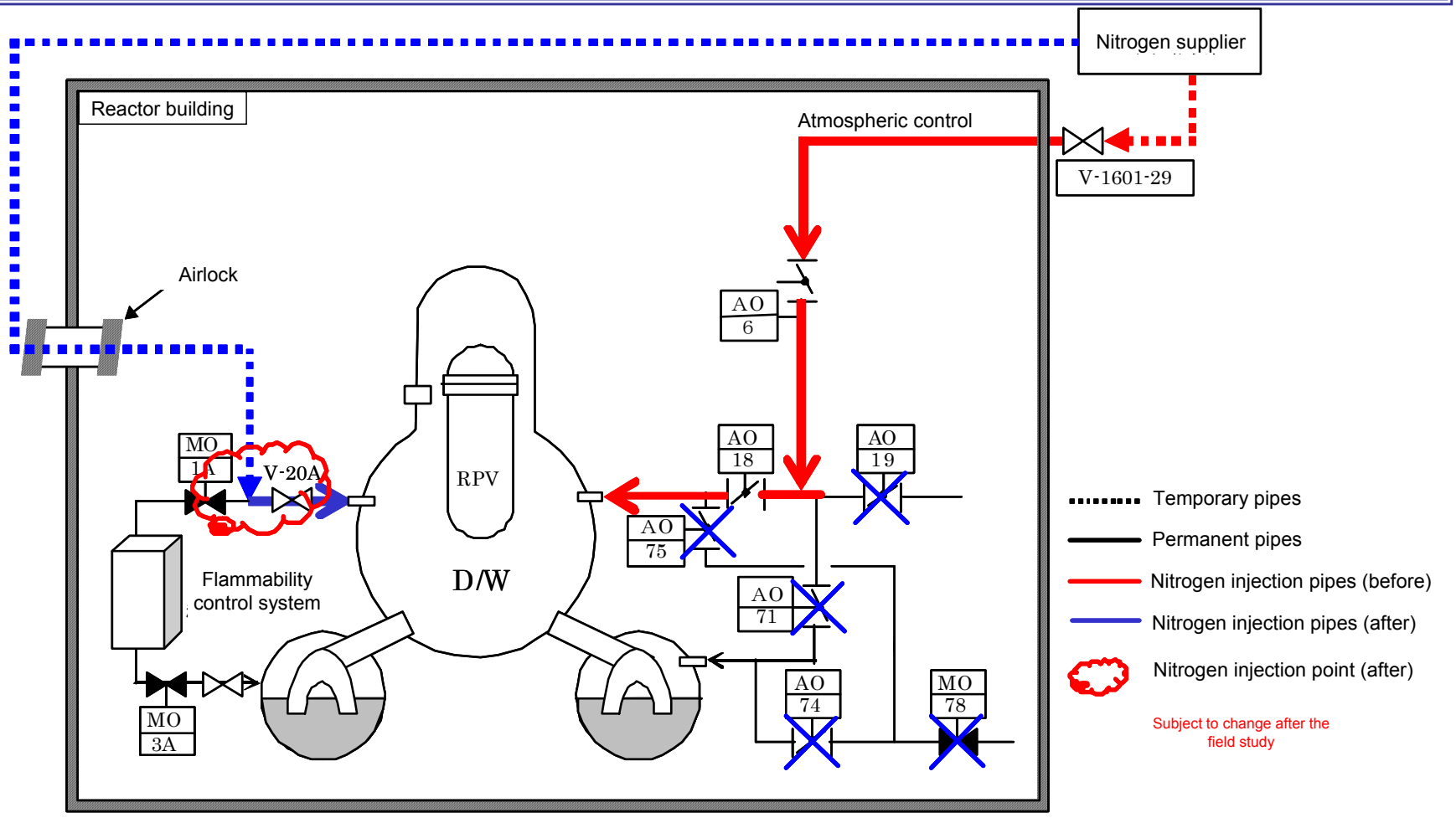
Overview of alternative reactor cooling facilities layout

- Heat exchange units will be installed in the large equipment hatch on 1FL of Unit 1, considering the space, airborne radiation, and necessary length of pipes to connect to the existing system.
- Secondary system (such as pumps and the cooling tower) will be installed outside, since it needs to be air-cooled.

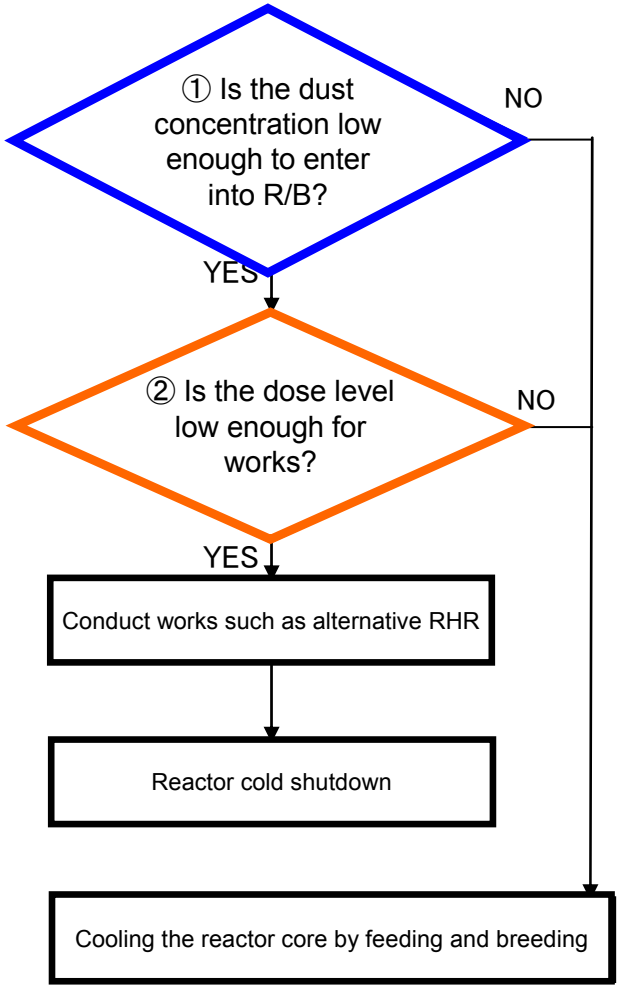


Connection alteration of piping used for nitrogen gas injection to PCV

- Air supply line in AC system, which is currently used to inject nitrogen gas into PCV through, will be used to feed reactor coolant in alternative reactor cooling system. Thus, nitrogen gas injection needs to be conducted through another line. The work this time includes the change in the nitrogen injection point.



Scenarios to improve the environment in R/B



① Dust Concentration

Observed on April 17

[Current]

I−131	Cs−134	Cs−137
0.32	0.092	0.076

(Bq/cm3)

[Target] The level where persons with full-face masks can enter

I-131	Cs-134	Cs-137
Not exceeding 0.01	Not exceeding 0.03	Not exceeding 0.03

(Bq/cm3)

[Method]

Exhausters

② Dose level

[Current] Approx. 10 mSv/h (average in the building)

[Target] The level where works can be conducted

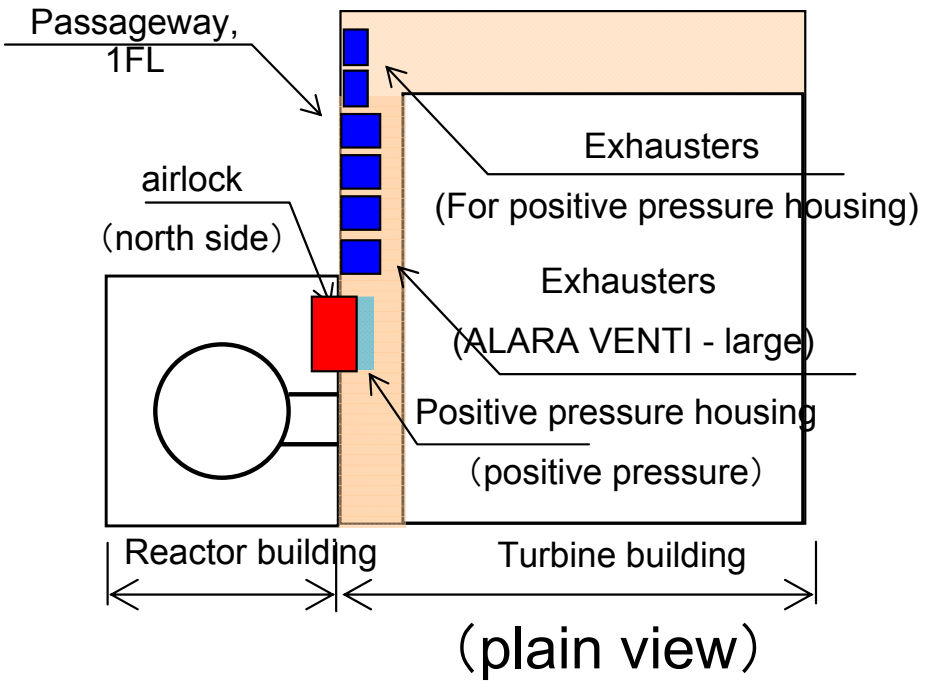
Not exceeding 1 mSv/h

[Method] Either of or the combination of the followings;

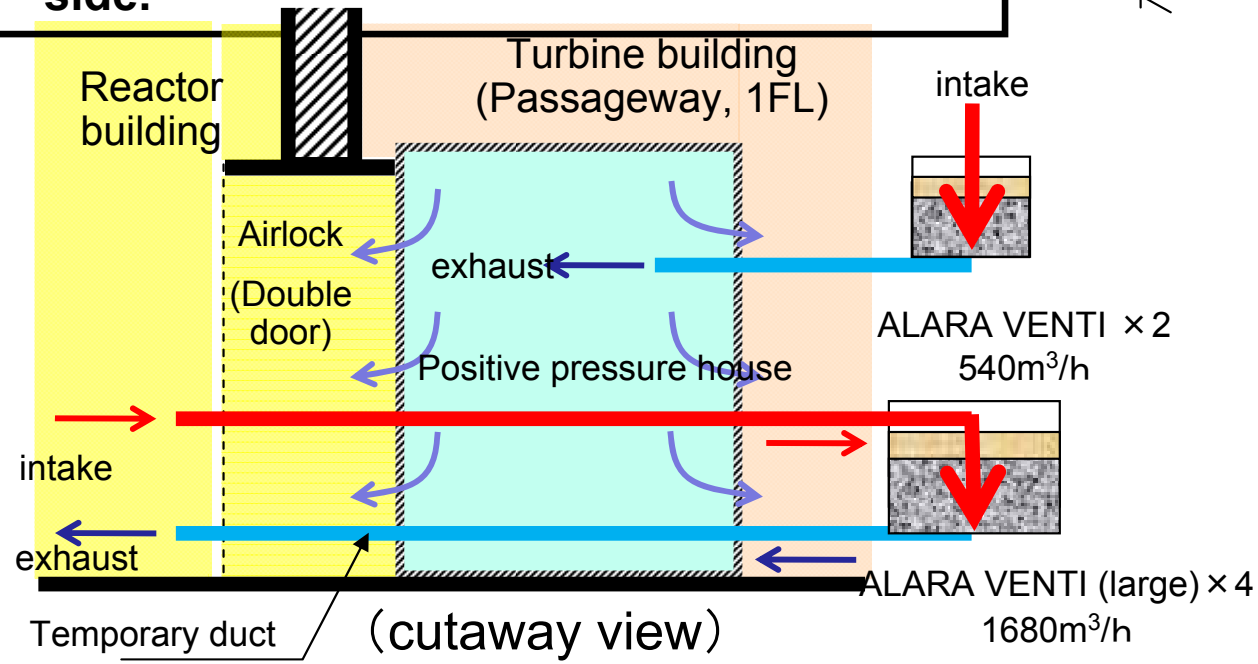
1. Decontamination
2. Shielding
3. Removal of rubble

Ventilation by the Exhausters

- **We will place exhausters (ALARA VENTI) at the passageway of the 1st floor of the turbine building.**
- **We will place positive pressure houses in front of the north side airlock, reactor building**
- **We will continue ventilation of the reactor building keeping the reactor building pressurized from the turbine building side.**

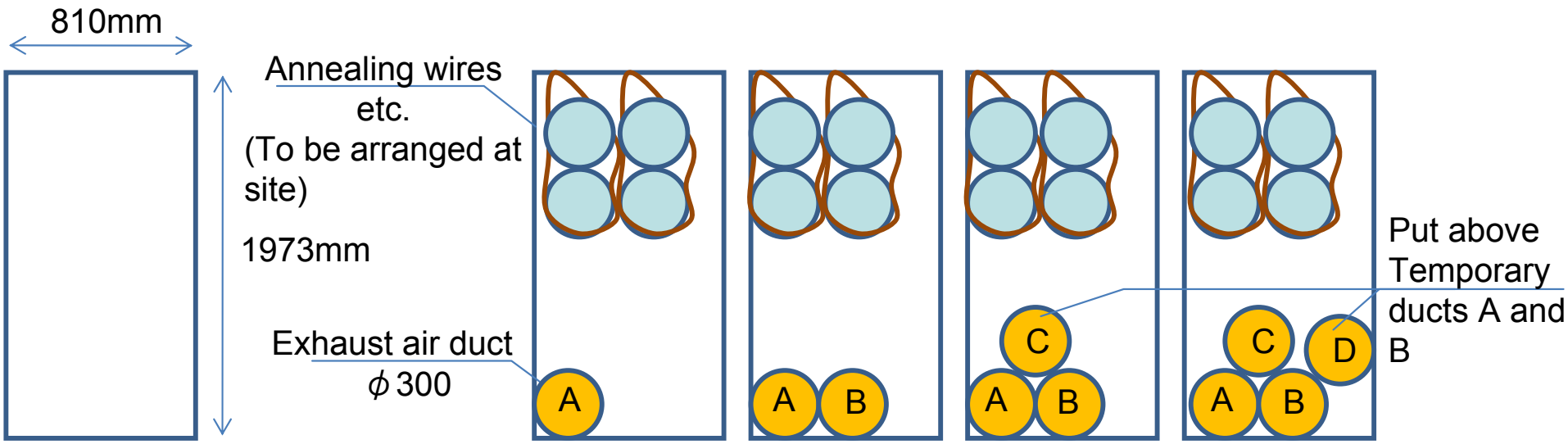


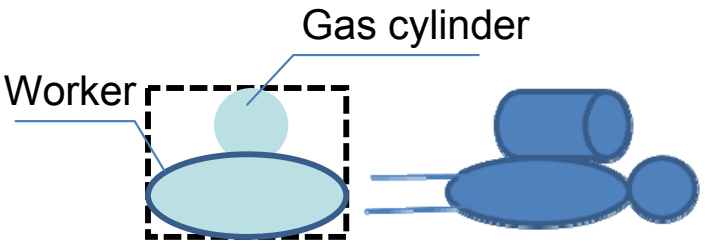
(plain view)



(cutaway view)

The Installation (exhaust air duct) Manner

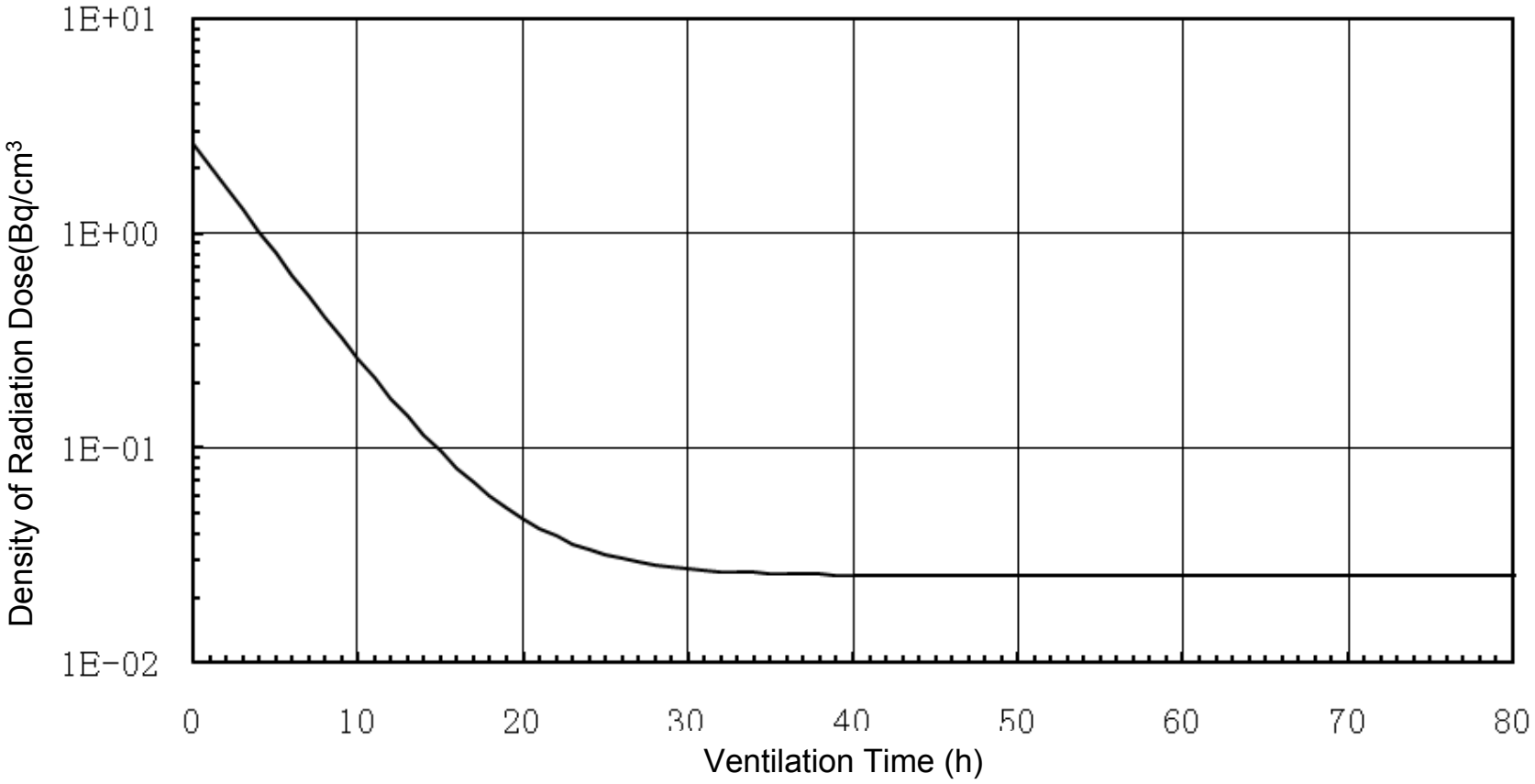




<Outline>
・Implement one by one (at the rate of one duct per approximately 5 minutes).
・Push the duct into **as far as possible**.
・Implement the work at the corridor.

The Iodine Removal Effect Using the Exhauster

■ With four Exhausters, it is expected based on our assessment that the density of I-131 would be reduced to around 2.6×10^{-2} (Bq/cm3) after the systems' operation over 30 hours.



Environmental Impact Assessment caused by opening the airlock to implement the work

【Evaluation】

【Density limit (average in 3 months)】
I-131：5.0E-06 、 Cs-134：2.0E-05 、 Cs-137：3.0E-05

■ The density at the site boundary

The density (Bq/cm^3) [average in 3 months] at the site boundary in case of using exhausters shown below:

I-131：4.6E-08、 Cs-134：2.0E-08 、 Cs-137：1.7E-08

（Data measured at the West Gate on April 29: I－ 131: 1.1E-04, Cs－ 134: 5.7E-05, Cs－ 137: 6.5E-05）

■ Estimate of radiation dose

Dose of internal exposure resulted from inhalation is dominant. The maximum radiation dose (mSv) is estimated as follows:

I-131:4.0E-03, Cs-134,137: 1.6E-03

- **The predictive value of effective dose is 5.6E-03mSv, which is sufficiently lower than the annual exposure dose limit of the general public 1mSv.**
- **The predictive value at the monitoring post is approximately 1.8E-02 μ Sv/h, which is not in the level to affect the current value (several tens μ Sv/h※).**

※Normal value: 3 × 10^{-2} μ Sv/h

Monitoring of Radiation Dose when opening the airlock to implement the work

Monitoring of Radiation Dose

- Beside the fixed-point observation at the monitoring posts (8 spots), we select additional monitoring spots and decide observation time according to the wind direction, wind velocity, air stableness expected at the beginning of the ventilation. We will monitor the radiation dose at the expected leeward side 1km inside the site (1 spot) and 3 to 5km outside the site (approximately 5 spots).
- The discharge will continue approximately 1 hour. Therefore, the radiation dose rate will be observed continuously and the density of radioactive materials will be observed once each time before, after , and in the middle of the discharge.

Ventilation effect by opening the airlock (double-entry door)

Calculate the naturally-ventilated air amount inside the building when opening the airlock (double-entry door).

《Condition》

①Outside air temperature
15.1℃ (at Onahama, Average temperature in May)

②Open point of the external wall
One point at the Airlock

③Wind condition outside the building
No wind.

④ Wind condition inside the building
Air flow through the staircases opening

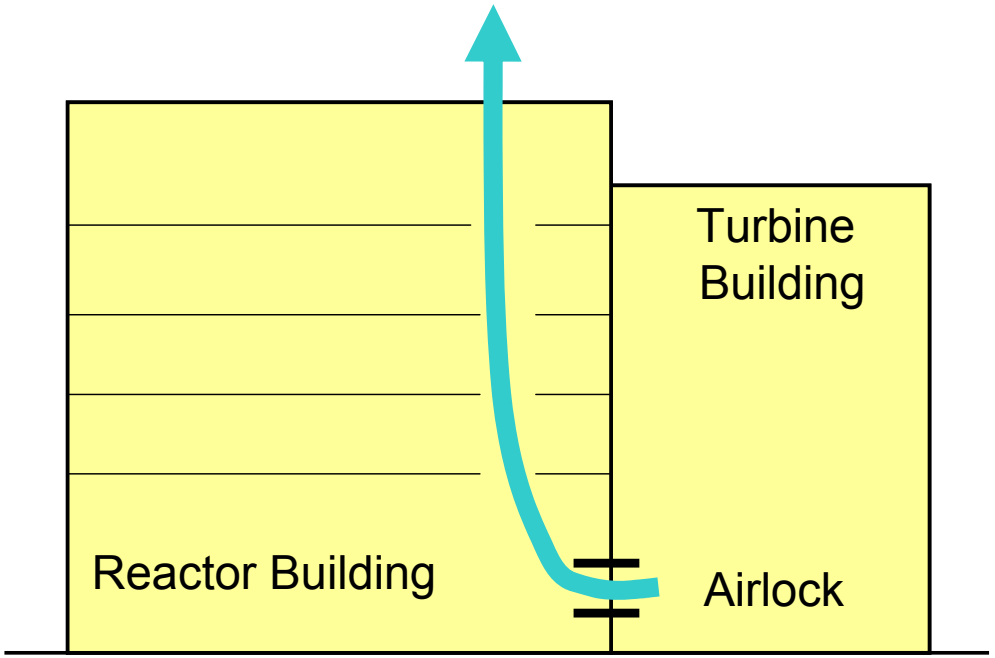
⑤Exhaust temperature from blow-out panel (air temperature inside the building): 27℃

《Result》

Approximately 22,000m3/h

※SGTS Rated Flow: 2,720m^3/h

< Illustrated overview >



Construction Schedule (Draft)