NRA presentation

C-1 Regulatory process

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1. Authorization process
2. Establishment of authorization for discharge
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1. Authorization process

Review on the first application of the Implementation Plan on ***installation of ALPS treat water discharge facility (approved)***

Approval given to

- Installation of facility
- Discharge Limit (Tritium)
- Operational Limits and Conditions

TEPCO started the construction of ALPS treated water discharge facility

Review on the second application of the IP on operational measures including the ***selection scheme of source term and the revised REIA***

Pre-service inspection

-On measurement and confirmation facility (K4 tanks)

Pre-service inspection

-On the other facilities

Operational safety inspection

-On quality management of analysis

Toward the start of discharge, TEPCO starts analysis of the selected nuclides of water stored in K4 tanks.

TEPCO starts operation of discharge

2. Establishment of authorization for discharge

The NRA ***approved*** the Implementation Plan including the following contents in July 2022:

- ***Installation of facility***

  > ***Review Results Document*** Chapter 1 Examination based on the Reactor Regulation Act

  Item 5 in this presentation

- ***Discharge Limit (Tritium)***

  > Chapter 1. 1-8. 3. Operation and control of the dilution/discharge facility

  Presentation B

- ***Operational Limits and Conditions***

  > Chapter 1.1-8. 3. Operation and control of the dilution/discharge facility

  Presentation B

- ***REIA (methodology and assessment results)***

  > Chapter 2. 2-1 Radiological Impact Assessment of discharge

  > Regarding the source term, knowing TEPCO's revisit of the source term, the NRA stated "even if there exists any other radionuclide than ALPS removal target 62 radionuclides and carbon14, the impact to humans is considered small because of low-energy radiation, and thus *the impact of the revisit of the source term to the assessment would be small*".

  Presentation C-2

3. Periodic regulatory review of the authorization

- Periodic review of the authorization of discharge will be conducted in the process for optimization for the whole site, typically once a year.

Presentation B

- The Implementation Plan is a legally binding document. If any safety-significant component is to be changed, TEPCO should apply for an amendment of the IP.

4. Inspection and enforcement

The NRA verifies TEPCO's compliance with the regulatory requirements and the approved operational limits and conditions:

Presentation B

✓ By inspections

Pre-service inspection Presentation C-1

Operational safety inspection: before discharge start Presentation D-1

Periodic facility inspection

✓ By independent monitoring

Operational safety inspection: during operation of discharge

To check whether ALPS treated water discharge operation meets the operating limits and conditions described in the Implementation Plan.

1. ***At the receiving process at K4 tanks***
2. ***At measurement/confirmation process at K4 tanks***
3. ***Before discharging operation***
4. ***During discharging operation***

Operational safety inspection: during operation of discharge

1. *At the receiving process at K4 tanks*

- ✓ Check whether the tank group receiving ALSP treated water is isolated from the other tank groups

2. *At measurement/confirmation process at K4 tanks*

- ✓ Check whether time for circulation and agitation is set enough to circulate water 2 circuits
- ✓ Check whether operational status of circulation pumps and agitators is monitored
- ✓ Check whether nuclides are analyzed under the established QMS
- ✓ Check whether the responsible person judges that the sum of the ratios of the radionuclides other than tritium is less than 1
- ✓ Check whether the tank concentration is confirmed less than 1E+6 Bq/L

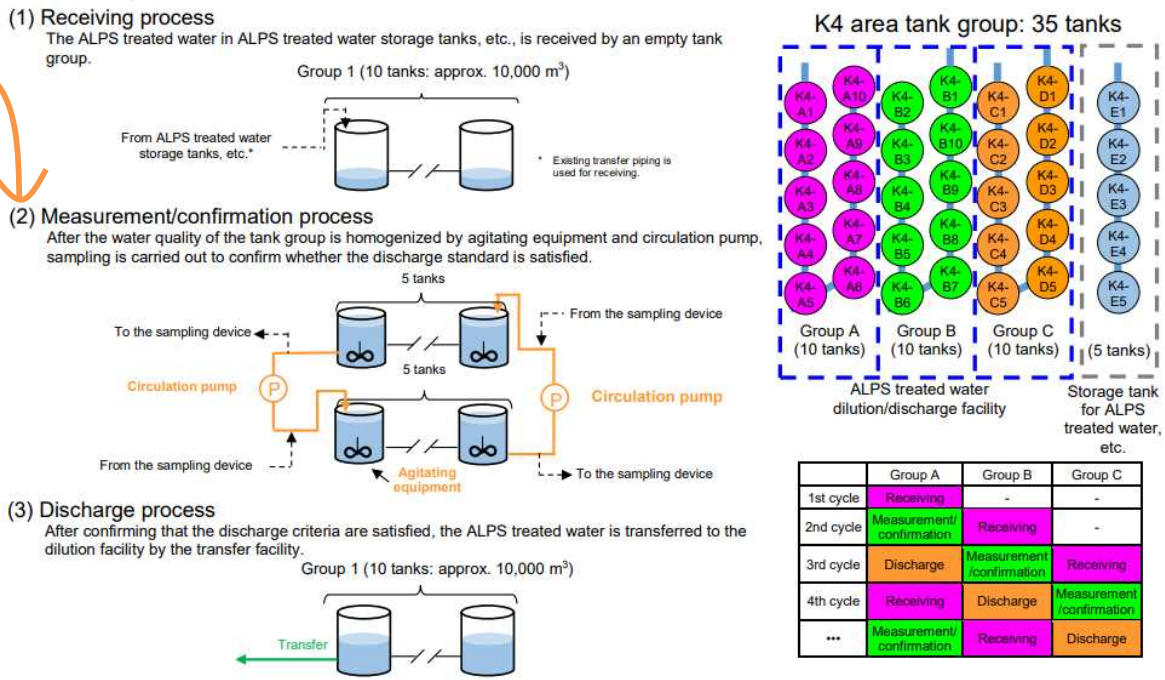


Figure 5-3-3 Schematic diagram of measurement/confirmation facilities

Operational safety inspection: during operation of discharge

3. *Before discharging operation*

- ✓ Check whether relevant equipment, e.g., ALPS treated water flow rate control valve, is set to ensure the dilution ratio of 100 times or more
- ✓ Check whether the discharging of tritium is within 22 tera Bq/year, this discharge is reflected to the annual discharging plan
- ✓ Check, during the initial stage of discharge operation, the concentration of tritium at the vertical shaft correspond to the calculated value using the concentration before dilution

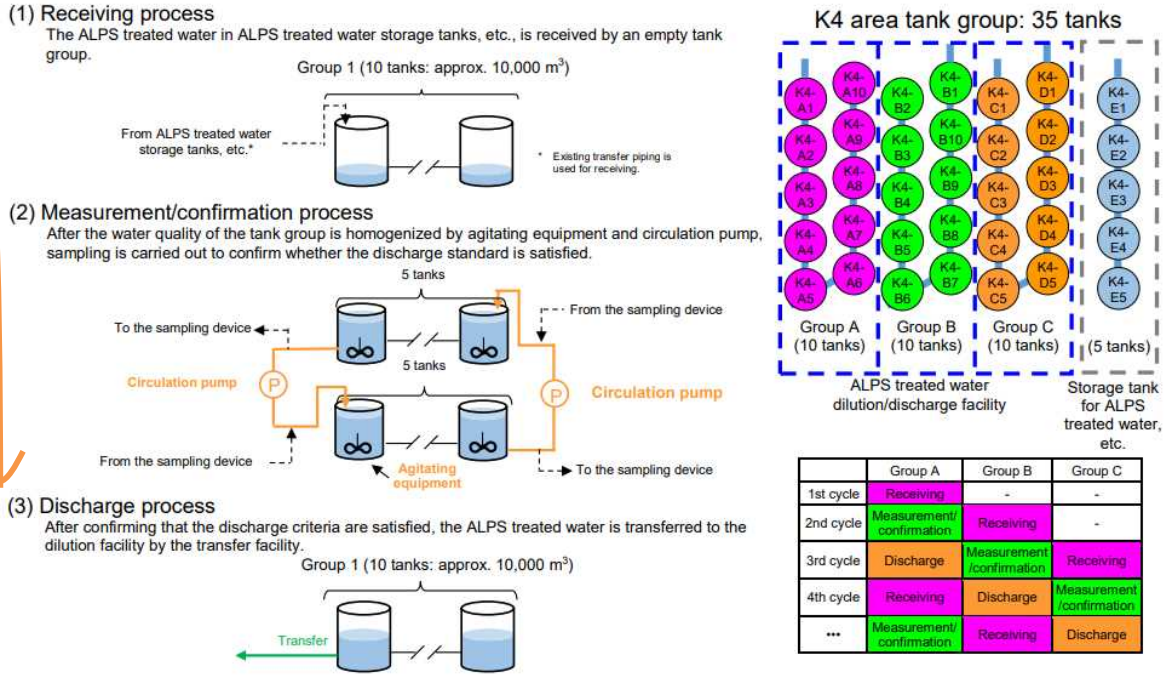


Figure 5-3-3 Schematic diagram of measurement/confirmation facilities

Operational safety inspection: during operation of discharge

4. During discharging operation

- ✓ Check whether the flow rates of ALPS treated water and sea water are monitored to ensure the set dilution rate is maintained
- ✓ Check whether operation is conducted according to the annual discharge plan
- ✓ Check whether the monitoring and controlling system such as flow rate monitors keep its redundancy or diversity.
- ✓ Check whether TEPCO suspends the operation in case of unusual occurrences manually or automatically, and report to the relevant organizations including the NRA (according to the Nuclear Emergency Act Article 25)

5. Examination based on the Reactor Regulation Act

Structure of the draft review results document

Introduction

Chapter 1 Examination based on the Reactor Regulation Act

1-1 Overall process and risk assessment of Specified Nuclear Facility
1-2 Treatment, storage and management of radioactive liquid waste
1-3 Treatment, storage and management of radioactive solid waste
1-4 Management of workers' radiation exposure
1-5 Radiation protection in the area surrounding the site by restricting release of radioactive materials
1-6 Emergency measures
1-7 Design considerations
1-8 Measures taken for operational safety
1-9 Safety assessment of facility design
1-10 Enhancing public acceptance on the implementation of the Plan
1-11 Examination results

Chapter 2 Review in light of the Government Policy

2-1 Radiological Impact Assessment of discharge

5. Examination based on the Reactor Regulation Act

●***"Chapter 1 Examination based on the Reactor Regulation Act"*** provides the results of the examination whether or not the Application fulfills the requirements relevant to the installation and operation of the Discharge Facility stipulated in the "Items required for measures which should be taken at Tokyo Electric Power Co., Inc.'s FDNPS in line with the Designation as the Specified Nuclear Facility" (decided by the NRA Commission on November 7, 2012, hereinafter referred to as the "Regulatory Requirements").

●***"Chapter 2 Review in light of the Government Policy"*** provides the results of the review whether or not the Application is in line with the descriptions in the Government Policy relevant to the design and operation of the Discharge Facility as well as the radiological impact by discharge.

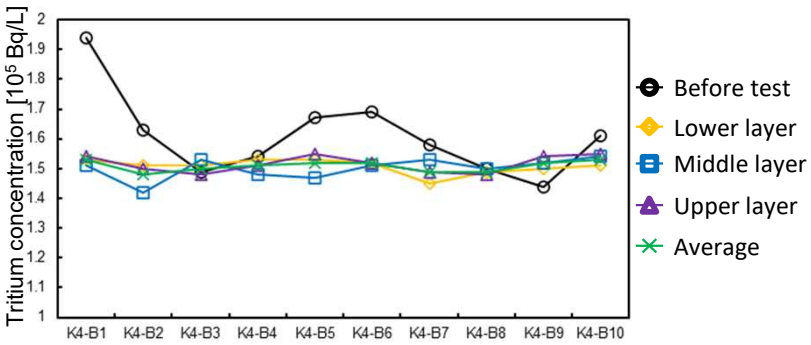
5. Examination based on the Reactor Regulation Act

1-2 Treatment, storage and management of radioactive liquid waste

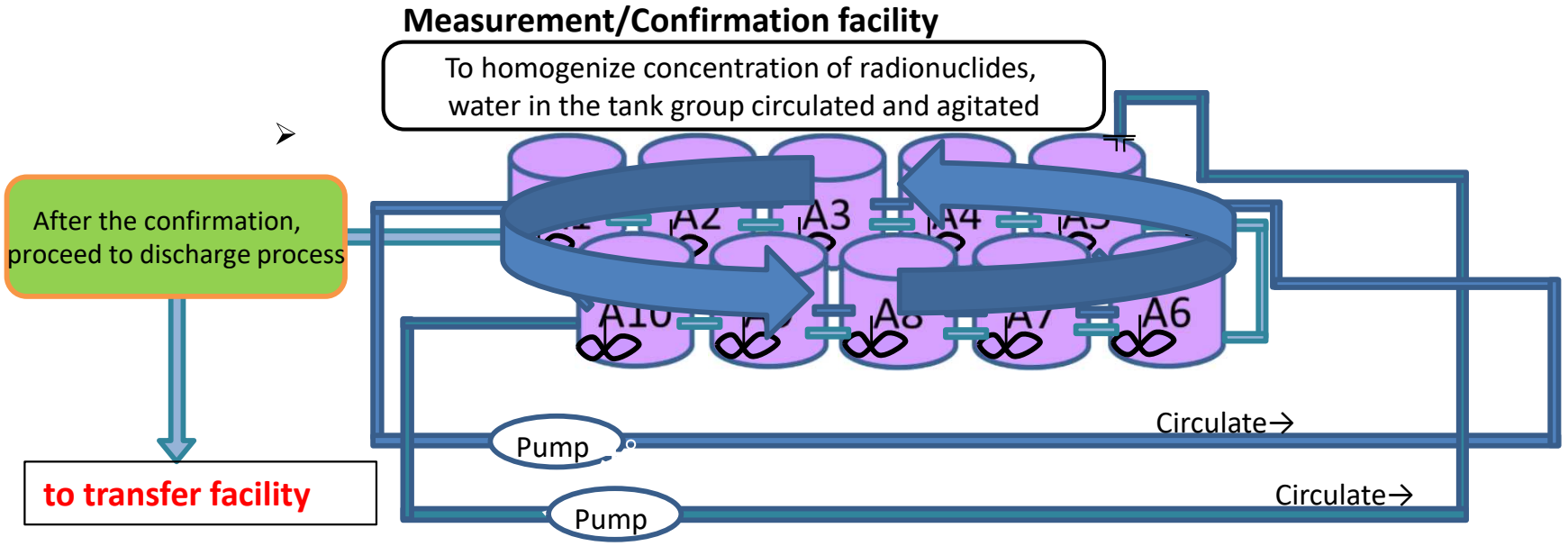
2.Homogenization and analyses of concentrations of radionuclides in ALPS treated water

【NRA examination result】

- Homogeneity of the concentrations of radionuclides is achieved by the circulation and agitation of ALPS treated water in the tank group for a sufficient time.
- A step to the discharge process is taken after the determination of tritium concentration required for setting the flow rate of ALPS treated water and the confirmation that the sum of the ratios of the other radionuclides to each concentration limit in the Notification is less than 1.



Tritium concentration distribution in the tank after the demonstration test



Excerpted and edited from the TEPCO's explanation material（28th April 2022）

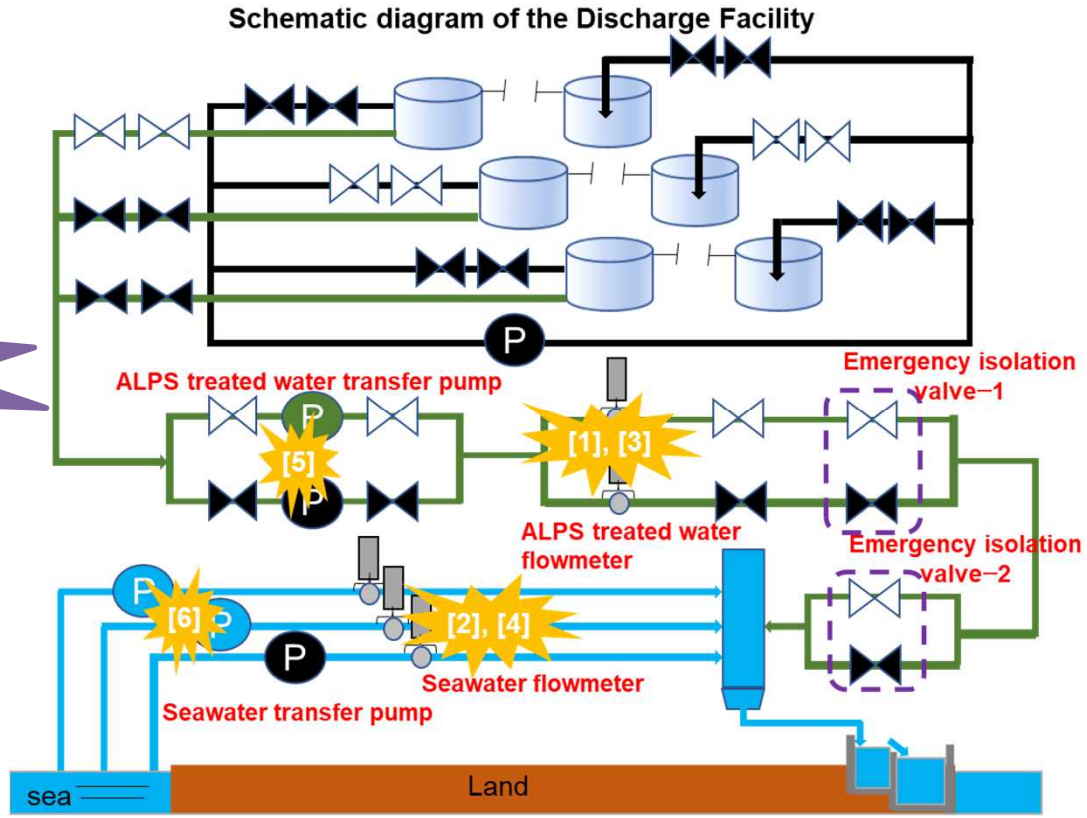
1-7-6 Design considerations for operability
【NRA confirmation result】

- The dilution/discharge facility is designed that the emergency isolation valves with interlocks can suspend ALPS treated water discharge without expecting operator's action.

Interlock to "close" emergency isolation valve includes:

[1] Failure of ALPS treated water flowmeter
[2] Failure of seawater flowmeter
[3] High ALPS treated water flow rate
[4] Low seawater flow rate
[5] Trip of ALPS treated water transfer pump
[6] Trip of seawater transfer pump

Unusual occurrence



5. Examination based on the Reactor Regulation Act

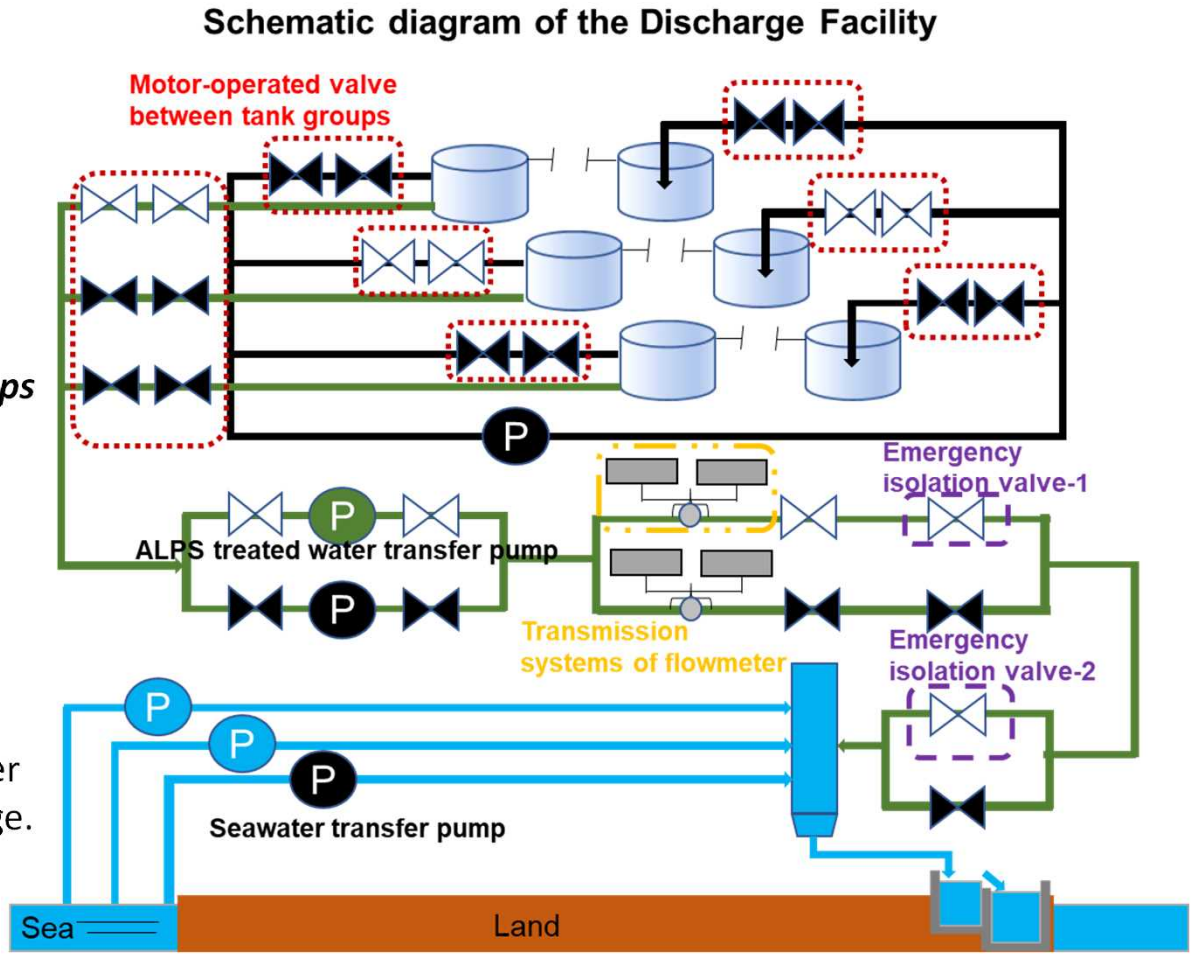
1-7-7 Design considerations for reliability 【NRA confirmation result】

- The following components are designed with redundancy or diversity considering the operating principles of each requested function, in order to ensure sufficiently high reliability.

- ***Valves used as the boundary of the tank groups*** are multiplexed in series in order to prevent water mixing between the tank groups.

- ***The differential pressure transmitter and its transmission line of ALPS treated water flowmeter*** are multiplexed in order to confirm whether dilution of ALPS treated water into seawater is performed within the set range.

- ***Motorized emergency isolation valve-1 and air-actuated emergency isolation valve-2*** are installed.



1-11 Examination results

Considering the confirmation in Chapter 1, the NRA concludes that the Application satisfies the relevant items of the Regulatory Requirements and thus is sufficient for preventing disasters to be caused by nuclear fuel materials, materials contaminated by nuclear fuel materials or nuclear reactors.

Thank you for your attention.