NRA presentation

- B Major principles and safety objectives

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2nd IAEA Regulatory Review Mission on ALPS Treated Water Handling
16-17 January 2023

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1. Regulatory perspectives on ALPS treated water discharge

After the accident:

- The NRA regulates the TEPCO Fukushima Daiichi NPS as *Specified Nuclear Facility,* with the recognition that it is ***in an existing exposure situation.***

  (NRA's regulatory requirements)

  - ✓ Reactor Regulation Act
  - ✓ Ordinance and Notification for 1F, Notification to Establish Dose Limits
  - ✓ Specific Regulatory Requirements on the Implementation Plan, *including the criteria that the additional effective dose at the site boundaries should be less than 1 mSv/y.*

For the ALPS treated water discharge to be conducted in a controlled manner:

- The NRA decided to review it ***as a planned exposure situation*** in addition to the regulation above.

  (NRA's regulatory requirements)

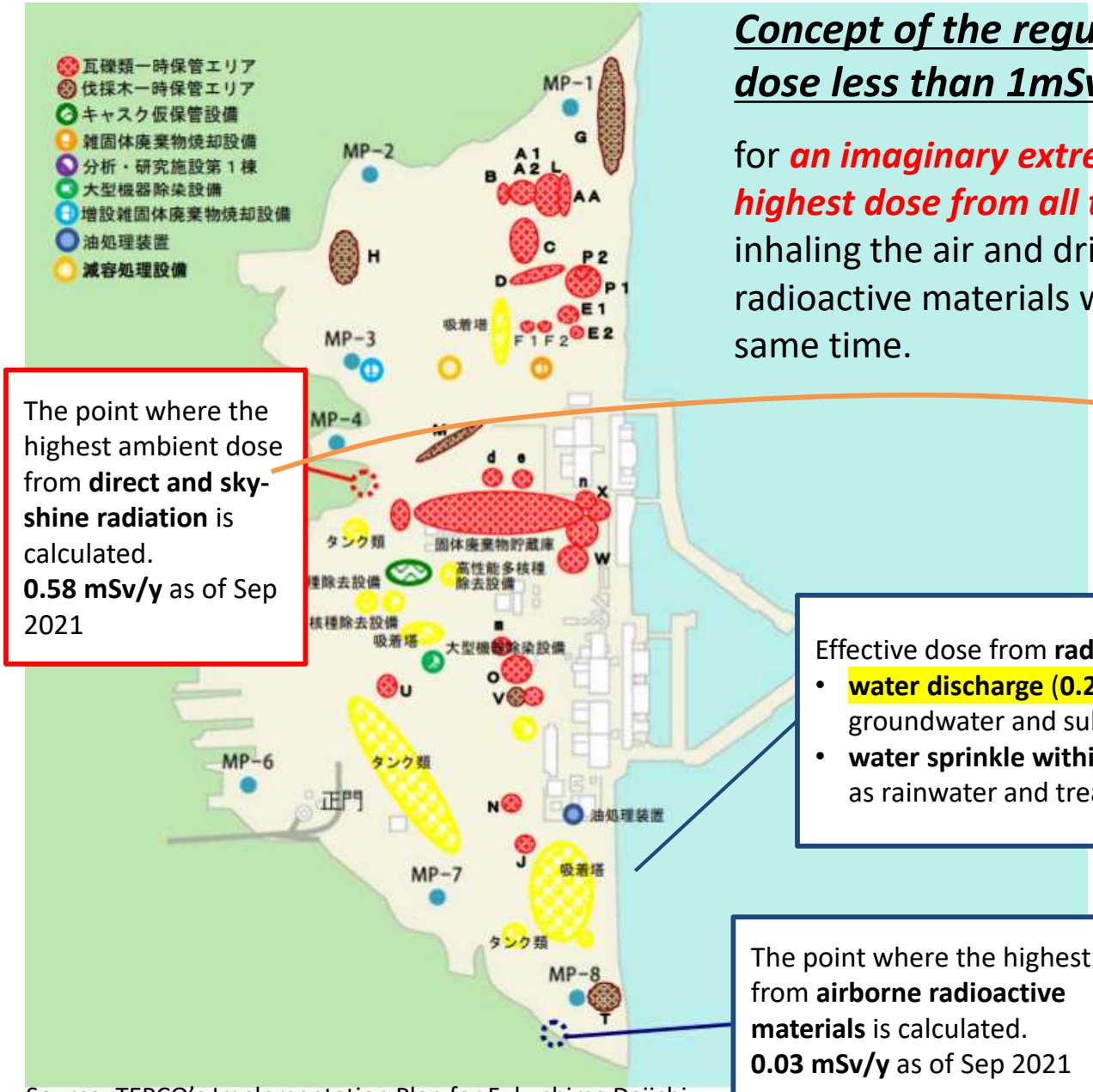
  - ✓ The methodology for the assessment to be in accordance with the relevant IAEA Safety Standards
  - ✓ *Dose constraint for a normal operation: 50μSv/y*
  - ✓ Does criterion for potential exposures: 5mSv/y
  - ✓ Dose criterion for flora and fauna: the lowest values of the Derived Consideration Reference Levels

2. Dose assessment methodology

Objective	*To be used for optimization for the whole site as existing exposure situation*	*To be used for optimization for discharge as planned exposure situation*
Background	The same methodology as applied to the normal nuclear facilities in Japan	IAEA Safety Standards
Criteria	***less than 1 mSv/y at the site boundary***	***Dose constraint: 50μSv/y***
Target for assessment	for ***an imaginary extreme situation assuming constant exposure to the highest dose from all the pathways***, i.e., the highest ambient dose, inhaling the air and drinking water (about 2 liters per day) containing radioactive materials with the highest concentration for discharge at the same time.	for ***the representative person*** to be identified by using the typical data after obtaining the data such as the habit data of the population living in the region
Assumptions made for assessment	Extreme situation to ensure that any person would not be exposed beyond this assessment	Conservative but realistic

Those two different assessments and results are ***incomparable*** as the methodologies and assumptions are totally different .

2. Dose assessment methodology



Concept of the regulatory requirement: additional effective dose less than 1mSv/y

for ***an imaginary extreme situation assuming constant exposure to the highest dose from all the pathways***, i.e., the highest ambient dose, inhaling the air and drinking water (about 2 liters per day) containing radioactive materials with the highest concentration for discharge at the same time.

The point where the highest ambient dose from **direct and sky-shine radiation** is calculated.
0.58 mSv/y as of Sep 2021

an imaginary extreme situation assuming constant exposure to the highest dose from all the pathways

Effective dose from **radioactive liquid waste** is **the sum of:**

- **water discharge** (**0.22mSv/y**; discharged water such as bypassed groundwater and subdrain treated water) and
- **water sprinkle within the site** (**0.075mSv/y**; sprinkled water such as rainwater and treated Unit 5/6 stagnant water).

The point where the highest dose from **airborne radioactive materials** is calculated.
0.03 mSv/y as of Sep 2021

Source: TEPCO's Implementation Plan for Fukushima Daiichi
https://www.tepco.co.jp/decommission/information/implementation/pdf/3_2_2.pdf

3. Optimization

NRA's requirements for optimization

Optimization for the whole site as an existing exposure situation:

The NRA requires that TEPCO should reduce overall risks at 1F and move decommissioning forward by optimizing decommissioning activities within the criteria of additional effective dose less than 1mSv/y.

The Regulatory Requirements

I. Measures to be taken with regard to the overall process and risk assessment

– Overall risks of the Specified Nuclear Facility shall be reduced and optimized through the assessment of each process and stage (of decommissioning)

If optimization for the whole site informs that the way and amount of discharge should be changed, that should be considered as a relevant factor in optimization for discharge in the range of dose constraint.

Optimization for ALPS treated water discharge as a planned exposure situation:

The NRA requires that the way and amount of discharge should be optimized below the dose constraint taking into account relevant factors.

3. Optimization

Optimization using the two different criteria

At the review on the Implementation Plan for ALPS treated water discharge facility, the NRA confirmed:

	Dose assessment at the site boundaries	***Dose assessment for the representative person***
Objective	To be used for optimization for ***the whole site***	To be used for optimization for ***discharge***
Criteria	***less than 1 mSv/y at the site boundary***	***Dose constraint: 50μSv/y***
Assessment result	• 0.035mSv/year • the effective dose due to radioactive liquid waste remains to be 0.22 mSv/y, therefore at the site boundary continue to be less than 1 mSv/year	• approximately 10^{-2} to 10^{-1} μSv/year, which is considerably small compared to 50 μSv/year.
Optimization	• ***ALPS treated water discharge in the applied way and amount*** contributes to ***reduction and optimization of risks of Specified Nuclear Facility as a whole*** by securing areas to install new facilities necessary to move decommissioning forward.	• TEPCO has decided that the annual amount of tritium to be discharged is controlled at a level lower than 22 tera Bq after ***optimization below the dose constraint***. • TEPCO plans to periodically revisit the annual amount of tritium to be discharged taking into account factors to be considered in the optimization process.

3. Optimization

Citation from ***the NRA Review Results Documents published in July 2022***

Optimization for the whole site

Chapter 1 Examination based on the Reactor Regulation Act
1-1 Overall process and risk assessment of Specified Nuclear Facility

In this examination, *the NRA confirms whether or not ALPS treated water discharge contributes to reduction and optimization of risks of Specified Nuclear Facility as a whole.*

In the Application, TEPCO states that ALPS treated water discharge is newly introduced to reduce the amount of water stored at site after processed by systems such as ALPS and thus the Discharge Facility is to be installed toward the start of discharge in around spring 2023.
TEPCO also states that, *in order to reduce the amount of water stored at site after processed by systems such as ALPS, the Discharge Facility is to be designed and operated so that more amount of ALPS treated water than the contaminated water being generated can be discharged*. As a result, tanks currently storing ALPS treated water (hereinafter referred to as "storage tanks") can be dismantled and removed, and areas for installing new facilities such as fuel debris storage facility can be secured; therefore, the Discharge Facility contributes to reduction and optimization of risks of the entire Specified Nuclear Facility in the future.

The NRA confirmed that risks of Specified Nuclear Facility will be reduced and optimized as a whole by securing areas to install new facilities necessary to move decommissioning forward.

3. Optimization

Citation from ***the NRA Review Results Documents published in July 2022***

Optimization for discharge

Chapter 2 Review in light of the Government Policy
2-1 Radiological Impact Assessment of discharge
(6) Comparison of estimated doses with dose constraint

Referring to paragraph 5.38 to 5.42 of GSG-10 on comparison of estimated doses with dose constraints, the NRA confirmed the following:

- As a result of the above assessment, the estimated dose to the representative person is approximately 10^{-2} to 10^{-1} μSv/year, which is considerably small compared to 50 μSv/year, the criterion which the NRA Commission approved on 16 February 2022.
- *With the above result in mind, recognizing that, in the process of deciding the Government Policy, consideration was given to factors for optimization of protection and safety associated with ALPS treated water discharge such as the planning of the entire decommissioning, the effect of decay, the risk of accidental discharge during storage, occupational exposure, and societal impacts, TEPCO has decided that the annual amount of tritium to be discharged is controlled at a level lower than 22 tera Bq.*
- TEPCO plans to periodically revisit the annual amount of tritium to be discharged within the range of the dose constraint taking into account factors to be considered in the optimization process.

Process for optimization for the whole site

- The NRA developed a document ***"Measures for Mid-term Risk Reduction for decommissioning TEPCO's Fukushima Daiichi NPS"*** in February 2015.
- The NRA revises it in accordance with the progress of the decommissioning work, typically once a year. The current version is as of March 2022.
- The purpose is to ***set mid-term targets*** *for decommissioning* of 1F in order to reduce overall risks and move decommissioning forward.
- In the process of setting targets, the draft document is discussed at ***the Oversight and Review Meeting for 1F, which involves external experts and local stakeholders in addition to NRA Commissioners, NRA staff and TEPCO***, and decommissioning activities are to be optimized.

The 104th Oversight and Review Meeting for 1F
Dec 19, 2022

Process for optimization for the whole site

- After setting the document, the NRA requires TEPCO to achieve those targets and oversee the progress at the Oversight and Review Meeting.

- In the future revision process, which also involve discussion at the Oversight and Review Meeting, the NRA will see ***whether ALPS treated water discharge in the approved way and amount continues to contribute to the progress of decommissioning***. If it hampers the progress, e.g., radioactive waste cannot be stored in a safe manner because of land occupation by water tanks, the NRA might require TEPCO to reconsider the discharge amount below the range of the dose constraint.

March 9, 2022
Nuclear Regulation Authority Japan

Measures for Mid-term Risk Reduction at TEPCO's Fukushima Daiichi NPS（Main Goals）

Area / Fiscal Year	Liquid Radioactive Material	Spent Fuel	Solid Radioactive Material	Countermeasures for External Events	Important Areas to Progress Decommissioning
2022	Approach toward stopping water injection to reactor Approach to decrease the water level in suppression chamber of Unit 1 and 3 Determine the treatment method of untreated water in tanks	Start fuel removal from Unit 6 Provide shielding in Unit 2 reactor building operating floor and suppress dust scattering (to be completed in FY2023)	Start Laboratory-1 operations Install volume reduction treatment facility Develop an analytical plan (including facility and human resources) Investigate inside Unit 1 primary containment vessel Retrieve fuel debris from Unit 2 experimentally and investigate inside PCV and analyze debris Start installation of crane for large waste storage facility (Cs adsorption vessel) Start installation of ALPS slurry (*HIC) stabilization facility	Widen the faced area around buildings (for temporary rainwater control) (to be completed in FY2023) Install seismograph in Units 1 and 2	Remove high-dose standby gas treatment system pipes in lower exhaust stack at Units 1 and 2 Consider impact of contamination beneath shield plugs on decommissioning processes Continuously Improve workplace environment Reinforce quality management system in decommissioning Reduction of exposure under high-dose environment
2023	Start treatment of untreated water in tanks Treat and halve the amount of stagnant water in reactor building		Start removal of Zeolite etc. in process main building, etc. Start removing sludge from decontamination facility Start operation of 10 solid waste storage facilities (First half of 2023FY) Take safety measures for stepwise expansion of retrieval of fuel debris inside Unit 2 Install large waste storage facility (CS absorption vessel)		Take measures to suppress dust scattering from buildings, etc. Start the ALPS treated water discharge into the sea
2024		Install Unit 1 reactor building cover Start fuel removal from Unit 5	Install ALPS slurry(HIC) stabilization facility	Establish method for evaluating building structure integrity	
Further Goals 2025 ～ 2033	Dry up Process Main Building, etc. Treat all stagnant water in reactor building	Expand dry storage cask area to install additional dry casks Fuel removal from Unit 1 and 2 Fuel removal from spent fuel pool of all units	Install analytical facility "Laboratory-2" and other fuel debris analytical facility Dissolve outside storage of rubbles Store retrieved fuel debris in stable state Control waste in safer and more stable state Install comprehensive analysis facility	Seal outer wall of buildings (groundwater control)	

Countermeasures for Risks which would have an effect on the human and the environment

Countermeasures for Risks which effect on offsite is relatively small, but still need attention

4. Discharge limits

4. Discharge limits

The purpose of establish discharge limits is to control the exposure of the public. For this purpose, the NRA judged in the review of the Implementation Plan that ***setting the discharge limit for tritium is good enough*** due to the following reasons:

- Tritium, which cannot be removed by ALPS, is the dominant nuclide in ALPS treated water in terms of concentration and therefore a robust indicator and suitable to be controlled.

- By setting both ***(1) the discharge limit of Tritium*** and ***(2) the operational limits and conditions (including the concentration of the other nuclides)***, the discharge amount of the other nuclides are controlled in certain ranges.

- The assessed doses in the ranges of the other nuclides are still considerably small compared to the dose constraint 50μSv/y.

- Therefore, there is no need to set discharge limits for the other nuclides.

(1) Discharge limit of Tritium (22 tera Bq)

- This limit leads ***the volume of ALPS treated water*** to be discharged, depending on the concentration of tritium.

  22 tera Bq/y / the concentration of tritium (Bq/L) = ALPS treated water volume (L/y)

(2) Operational limits and conditions

- The operational condition caps ***the concentration of the other nuclides*** to be discharged.

By ***the volume of ALPS treated water*** and ***the concentration of the other nuclides***, the discharge amount of the other nuclides are controlled in the certain ranges.

4. Discharge limits

(1) Discharge limit of Tritium (22 tera Bq)

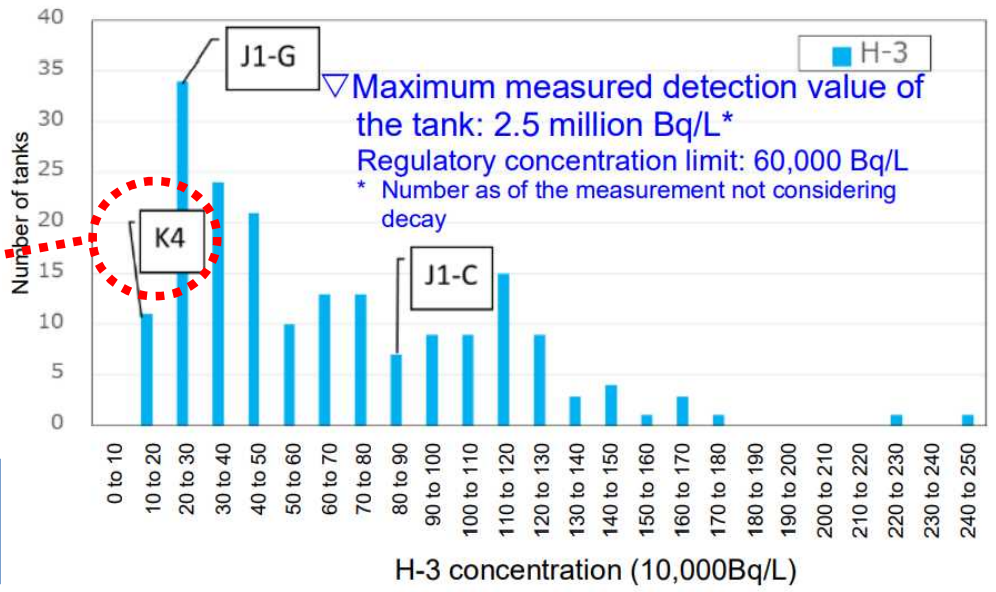
- This limit leads ***the volume of ALPS treated water*** to be discharged, depending on the concentration of tritium

- 22 tera Bq/y / the concentration of tritium (Bq/L) = ALPS treated water volume (L/y)

- ***Lower the concentration of tritium*** is, ***more ALPS treated water*** is discharged.

- K4 tritium concentration is in the lowest band, and therefore the ALPS treated water volume is maximum.

K4 tritium concentration	ALPS treated water volume is maximum.
1.4E+5 Bq/L	1.57E+8 L

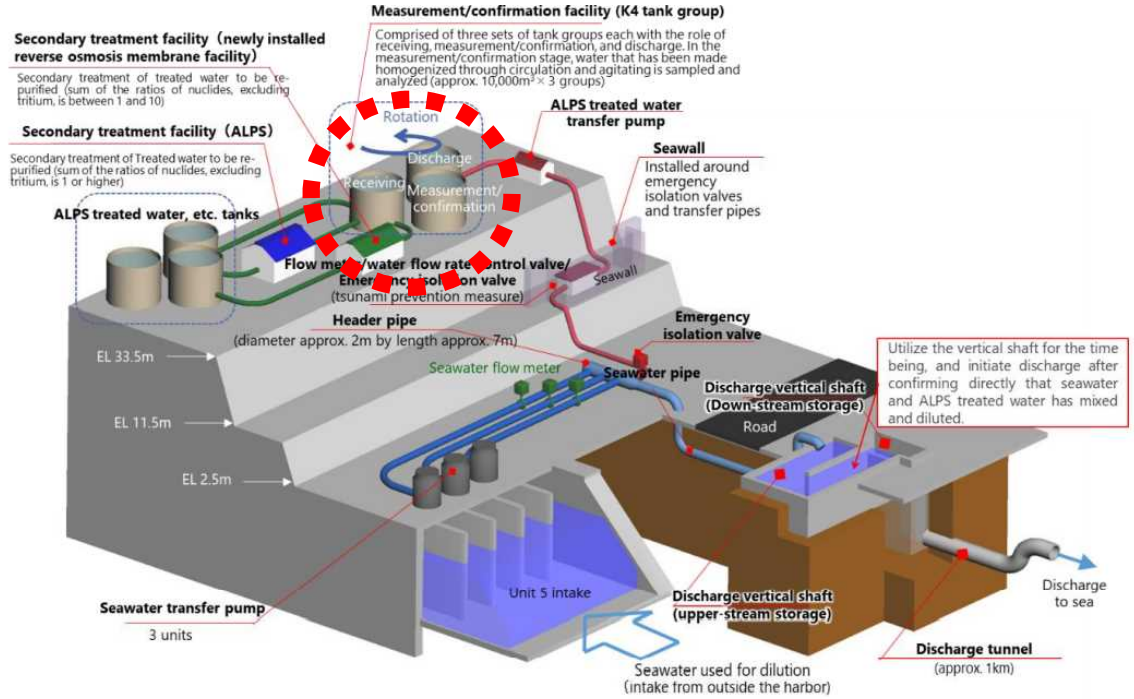


Source: TEPCO's REIA (April 2022)

(2) Operational limits and conditions

- The operational condition caps ***the concentration of the other nuclides*** to be discharged.

- For each batch transferred to the K4 confirmation/measurement tanks before discharge, TEPCO confirms by analysis that ***the sum of the ratios of the radionuclides other than tritium*** to each concentration limit stipulated in the regulation is **less than 1**.



Source: TEPCO's REIA (April 2022)

Figure 5-3-2 Overview of facilities for discharging into the sea and related facilities

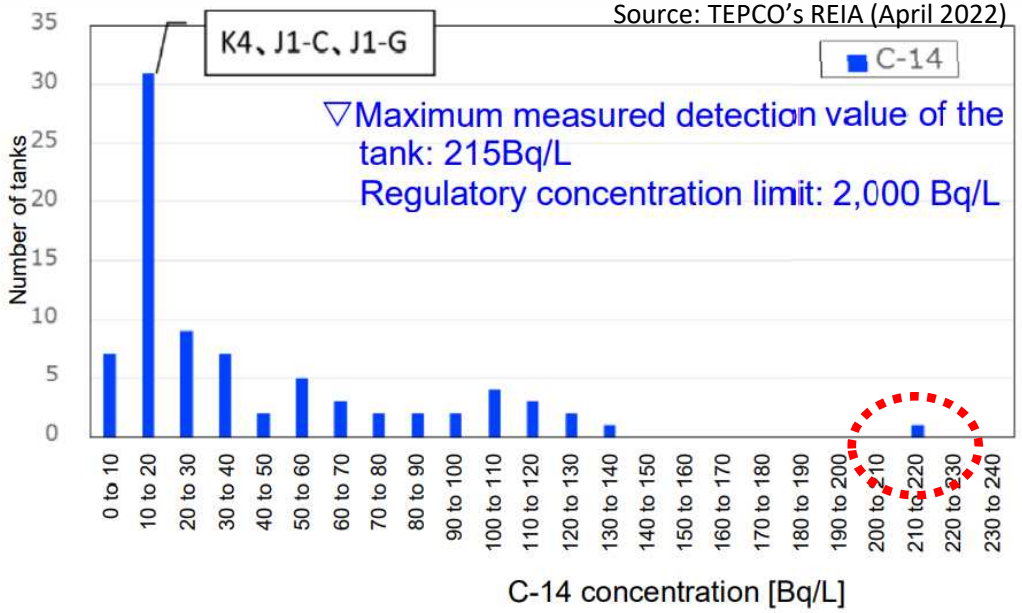
4. Discharge limits

C-14

The highest concentration of C-14 in tanks: 215Bq/L (within the operational condition)

To see ***the maximum discharge amount of C-14***, the highest concentration and maximum ALPS treated water volume can be multiplied.

Source: TEPCO's REIA (April 2022)



Dose assessment of K-4 tank

H-3 concentration	C-14 concentration	ALPS treated water volume is maximum.	C-14 discharge amount	Assessed dose from C-14
1.4E+5 Bq/L	15 Bq/L	1.57E+8 L	2.4E+9 Bq	0.007 μSv/y

Dose assessment of maximum discharge amount of C-14

H-3 concentration	C-14 concentration	ALPS treated water volume is maximum.	Maximum C-14 discharge amount	Assessed dose from C-14
1.4E+5 Bq/L	215 Bq/L	1.57E+8 L	3.4E+10 Bq	0.101 μSv/y

Compared to 50 μSv/y, smaller by 2 order of magnitude

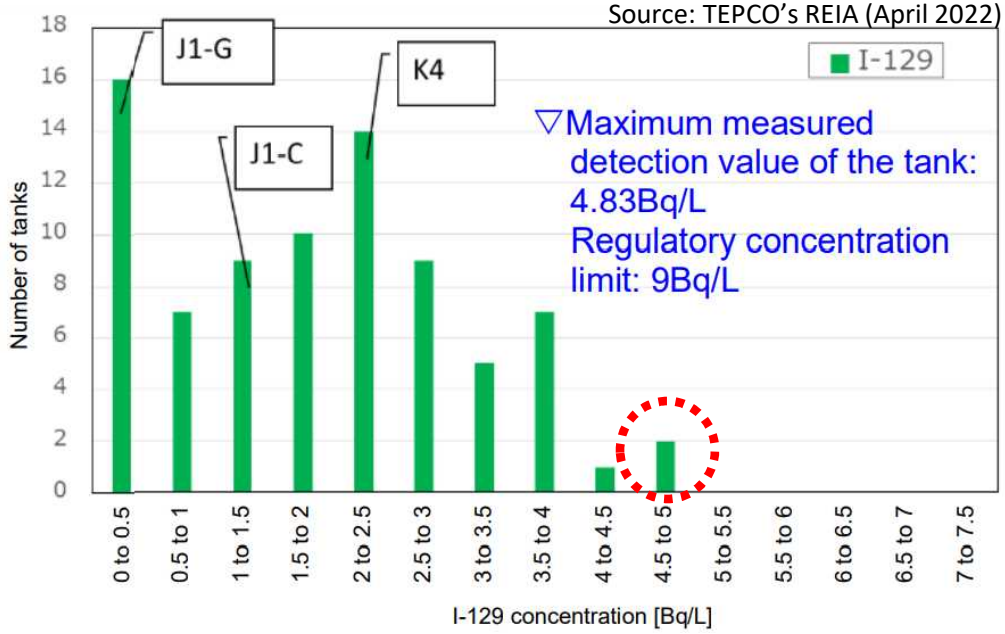
4. Discharge limits

I-129

The highest concentration of I-129 in tanks: 4.83Bq/L (within the operational condition)

To see ***the maximum discharge amount of I-129***, the highest concentration and maximum ALPS treated water volume can be multiplied.

Source: TEPCO's REIA (April 2022)



Dose assessment of K-4 tank

H-3 concentration	I-129 concentration	ALPS treated water volume is maximum.	I-129 discharge amount	Assessed dose from I-129
1.4E+5 Bq/L	2.1 Bq/L	1.57E+8 L	3.3E+8 Bq	0.018 μSv/y

Dose assessment of maximum discharge amount of I-129

H-3 concentration	I-129 concentration	ALPS treated water volume is maximum.	Maximum I-129 discharge amount	Assessed dose from I-129
1.4E+5 Bq/L	4.83 Bq/L	1.57E+8 L	7.6E+8 Bq	0.041 μSv/y

Compared to 50 μSv/y, smaller by 3 order of magnitude

4. Discharge limits

- Looking at the maximum discharge amount of C-14 and I-129, which are the dominant nuclides for assessment*, and the possible highest doses by them, the NRA confirmed that the assessed doses are still controlled considerably below the dose constraint 50 μSv/y, and therefore ***setting the discharge limit for tritium is good enough to control the exposure of the public***.

*I-129 & C-14 account for about 50% - 80% of the total dose.

- There are different parameters to set the maximum discharge amount of C-14 and I-129, such as equipment maximum flow rate for discharge (500 m^3/day) and the concentration limit of each nuclide, and TEPCO used those parameters to calculate the maximum discharge amount of C-14 and I-129 with extreme assumptions.

NRA Maximum C-14 discharge amount	TEPCO's Maximum C-14 discharge amount	NRA Maximum I-129 discharge amount	TEPCO's Maximum I-129 discharge amount
3.4E+10 Bq	3.7E+11 Bq	7.6E+8 Bq	1.6E+9 Bq

- Even though the NRA's amount is more realistic using the actual concentration in tanks, the difference is one order of magnitude, and still controlled below the dose constraint 50 μSv/y. The NRA's conclusion is not changed.

5. Operational limits and conditions

5. Operational limits and conditions

Legal framework of regulation on 1F

(NRA's regulatory requirements)

- ✓ Reactor Regulation Act
- ✓ Ordinance and Notification for 1F, Notification to Establish Dose Limits
- ✓ Specific Regulatory Requirements on the Implementation Plan : *not prescriptive and how to fulfill the Requirements depends on TEPCO's plan*

Implementation Plan (IP)
to cover following items: Overall process and risk assessment, Design and SSCs, **Operational Safety**, Physical Protection, Removal of fuel debris and decommissioning, Public Acceptance, Inspection

- ✓ In response to the Specific Regulatory Requirements, **TEPCO** shall establish and submit the IP.
- ✓ The **NRA** reviews whether the submitted IP meets the Regulatory Requirements.
- ✓ Once the IP is approved, ***it becomes a legally binding document and TEPCO shall conform to it***.
- ✓ The **NRA** conduct inspections (both pre-service/periodic facility inspection and operational safety inspection) to check whether TEPCO conform to the IP for installation and operation.

Including operational limits and conditions

5. Operational limits and conditions

Requirements for operational safety in the Specific Regulatory Requirements

III. Items concerning measures taken for operational safety of the Specified Nuclear Facility

By taking appropriate measures such as operation management, maintenance management, radiation control, radioactive waste management, emergency measures, on-site and off-site environmental radiation monitoring, *"II. Items concerning measures to be taken for design and facilities" shall be ensured to be appropriately and reliably implemented*, as well as workers' and on-site/off-site safety shall be ensured; particularly, with regard to emergency measures during accident or disaster, systems for communication with relevant organizations and medical care system in emergency shall be prepared in addition to responses to emergency; and education and training shall be appropriately conducted for employees and workers including those of contracted and subcontracted companies to maintain and improve their skills and capabilities.

The NRA reviewed the TEPCO's operational limits and conditions for ALPS treated water discharge and concluded that they fulfil the above requirements.

Approved Operational Limits and Conditions for ALPS treated water discharge

Operational Conditions includes:

1. *Circulation and agitation time* to ensure homogeneity before analysis to confirm the sum of the ratios of the radionuclides other than tritium to each concentration limit stipulated in the regulation is less than 1.
2. *Flow rate of ALPS treated water* to make the dilution rate 100 times or more
3. *Limit on tritium concentration* in ALPS treated water to be discharged in order to ensure 1,500 Bq/L
4. Annual discharge plan to fulfil *the discharge limit on tritium*

Operational Limits includes:

- Suspension of discharge in case of usual occurrences including the case that unusual value is detected by sea monitoring

Approved Operational Limits and Conditions for ALPS treated water discharge

Citation from ***the NRA Review Results Documents published in July 2022***

Chapter 1 Examination based on the Reactor Regulation Act

3. Operation and control of the dilution/discharge facility

(1) Operational controls of the dilution/discharge facility

TEPCO states that in order to reduce the effective dose at the site boundary as low as reasonably achievable, the following operational controls are implemented for the dilution/discharge facility upon discharge (of ALPS treated water which fulfils the criteria that the sum of the ratios of the radionuclides other than tritium to each concentration limit stipulated in the regulation is less than 1).

1. *The circulation and agitation time in the measurement/confirmation facility is appropriately set based on the demonstration test so that the representativeness of samples can be ensured.* In order to reduce variations in tritium concentration within the tank group prior to circulation and agitation, ALPS treated water to be received in the measurement/confirmation facility as one batch is controlled not to have significantly different tritium concentration.

1. Circulation and agitation time

Approved Operational Limits and Conditions for ALPS treated water discharge

Citation from ***the NRA Review Results Documents published in July 2022***

Chapter 1 Examination based on the Reactor Regulation Act

3. Operation and control of the dilution/discharge facility

(1) Operational controls of the dilution/discharge facility

2. TEPCO states that, *in order to make the dilution ratio 100 times or more, based on the tritium concentration determined in the measurement/confirmation process, the flow rate of ALPS treated water is set and controlled within the planed maximum flow rate of 500 m^3 per day* (the minimum flow rate is more than the amount of contaminated water generation) by ALPS treated water transfer pumps, ALPS treated water flow rate control valves and ALPS treated water flow meters, and two or more seawater transfer pumps are operated at all times thereby ensuring the seawater volume required to dilute the flow rate of ALPS treated water.

   Furthermore, at the initial stage of discharge, a small amount of discharge will be carefully carried out with the aim of verifying that water is diluted as expected in the discharge vertical shaft (upstream shaft) and that the operation procedures are reliably followed.

2. Flow rate of ALPS treated water

Approved Operational Limits and Conditions for ALPS treated water discharge

Citation from ***the NRA Review Results Documents published in July 2022***

Chapter 1 Examination based on the Reactor Regulation Act

3. Operation and control of the dilution/discharge facility

(1) Operational controls of the dilution/discharge facility

3. *In order to achieve sufficient dilution so that the tritium concentration in discharged water becomes less than the operational limit 1,500 Bq/L, the tritium concentration of ALPS treated water to be discharged is limited to 1 million Bq/L.* Then the operational control value for tritium in discharged water is decided taking into count uncertainties associated with the entire process of discharge as well as the result of the numerical simulation of dilution.

4. *To ensure that the annual amount of tritium to be discharged falls within 22 tera Bq, the annual discharge plan for ALPS treated water is established for each fiscal year and discharge is conducted in accordance with the plan.*

3. Limit on tritium concentration
4. Discharge limit on tritium

Approved Operational Limits and Conditions for ALPS treated water discharge

Citation from ***the NRA Review Results Documents published in July 2022***

Chapter 1 Examination based on the Reactor Regulation Act

3. Operation and control of the dilution/discharge facility

(2) Responses to unusual occurrences: suspension of discharge

TEPCO states that ALPS treated water discharge will be suspended by the emergency valves automatically or manually in case of occurrence of an event that may lead to ALPS treated water discharge in a manner TEPCO does not intend, or in case that unusual value is detected by sea monitoring, in addition to normal operation and shutdown of the dilution/discharge facility.

In addition, for equipment required to prevent or immediately mitigate ALPS treated water discharge in an unintended manner, its maintenance plan is established to check and maintain the performance. If the performance of the equipment cannot be confirmed through inspection and it is determined that immediate recovery is difficult, ALPS treated water discharge will be suspended.

Suspension of discharge

Reporting requirements

1. Legal framework

For normal operation:

Reactor Regulation Act Article 67-1

Ordinance for Nuclear Power Plant Article 136-1

Based on the results of source monitoring

- ✓ *Annual discharge amount of nuclides included in liquid radioactive waste (to be reported once a year)*
- ✓ *Concentration of nuclides included in discharged liquid radioactive waste, average in three months and the highest (to be reported once 6 months)*

For anomalies:

Nuclear Emergency Act Article 25

- ✓ *Any anomalies beyond the approved operational limits and conditions, **including the case of an unusual value detected by sea monitoring***

2. At inspections

At operational safety inspection, NRA resident safety inspectors are entitled to check the operator's conformity to the Implementation Plan anytime, ***including the results of source monitoring***.

6. Enforcing the discharge authorization

6. Enforcing the discharge authorization

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

✓ By inspections

Pre-service inspection to see whether functions or performance described in the Implementation Plan are archived

Operational safety inspection to see whether operational safety measures are taken in accordance with the Implementation Plan on a day-to-day basis, specifically here whether ALPS treated water discharge operation meets the operating limits and conditions described in the Implementation Plan.

Periodic facility inspection to see whether the expected performance of the facility is maintained.

✓ By independent monitoring

Legal authority of the NRA

– when the NRA finds that the operational safety measures in compliance with the Implementation Plan are **NOT** taken, ***the NRA may order*** TEPCO to take measures necessary for operational safety, including ***suspension of discharge or alteration of the design of the Discharge Facility***. (Refer to the Reactor Regulation Act, Article 64-3-6.)

6. Enforcing the discharge authorization

Source: TEPCO's material on 19 Dec 2022

✓ By independent monitoring

Independent source monitoring

– The NRA/JAEA establishes an independent source monitoring programme.

– When significant discrepancy is confirmed between the measurement results of TEPCO and the NRA/JAEA, the NRA and TEPCO have technical discussions, and TEPCO should identify reasons and solutions. In parallel, the NRA requires TEPCO to take necessary measures, such as suspension of discharge or improvement of analysis, commensurate with the features and magnitude of the issue.

✓ By independent monitoring

Independent environmental monitoring

– The NRA establishes an independent environmental monitoring programme in the framework of the CRMP.

– TEPCO states that ALPS treated water discharge will be suspended by the emergency valves in case that an unusual value is detected by sea monitoring either by TEPCO itself and/or the other agencies involved in the CRMP such as the NRA.

– When an unusual value is detected by sea monitoring or significant discrepancy is confirmed between the measurement results of TEPCO and the NRA/MOE, the NRA closely watches considerations at the expert meeting under the CRMP, and, as necessary, the NRA checks TEPCO's conformity to the Implementation Plan and requires TEPCO to take necessary measures, such as suspension of discharge or improvement of analysis, commensurate with the features and magnitude of the issue.

Thank you for your attention.