

Topic 1: ALPS treated water

External Advisors (e-mail)

21 August 2021

Nuclear Regulation Authority Commission



1. NRA's Concern

External Advisors,

NRA would greatly appreciate it if you could provide some advice or thoughts on the stakeholder communication on handling of ALPS treated water, described from the next slide.

NRA's concern is:

- One of the most fundamental elements to build a trust is sharing and disclosing related information to concerned stakeholders. Then we are able to interact proactively with the stakeholders in the communication which leads to mutual understanding, and finally build a trust. With regard to Discharge of ALPS Treated Water, the NRA will disclose all decision making processes as well as related information and materials, and also will answer to questions and explain on anxieties of neighboring countries. As a regulator, to gain understanding and build a good relationship with neighboring countries about the implementation of ALPS Treated Water Discharge, besides disclosing and explaining regulator's decision making processes and scientific understandings on this matter, what should the NRA consider and implement other than the action plan shown on page 7 and 8?



2. Discharge of ALPS Treated Water

- The Basic Policy on handling of ALPS (multi-nuclides removal equipment) treated water at TEPCO Fukushima Daiichi NPS, which indicates a disposal method of ALPS treated water, was announced at the 5th Inter-Ministerial Council for Contaminated Water, Treated Water and Decommissioning Issues on 13 April 2021.
- “Discharge of ALPS treated water into the sea ” has been selected based on achieving certain and consistent compliance with the regulatory requirements set forth based on the ICRP recommendations that are widely referred to in the radiation protection standards in each country, and considering the successful precedence in Japan, as well as in consideration of secure and sound monitoring and others.
- TEPCO will conduct the discharge of ALPS treated water into the sea subject to the approval from the NRA to the implementation plan and other details. Examination meeting of the NRA will be made open to the public.

Conformity Review of Implementation Plan

- Design of discharge system (structure, strength, etc.)
- Dilution method
- Nuclide concentration measurement/evaluation method and system before, during and after purification treatment
- Monitoring method for nuclide concentration, etc. when discharging treated water



2. Discharge of ALPS Treated Water

- Considering relevant international law and international practice, measures will be taken to assess the potential impact on the marine environment.
- The Government of Japan and TEPCO will strengthen and expand radiation monitoring of the relevant sea area.
- Based on the coordination in the inter-agency Monitoring Coordination Meeting, NRA will prepare for the sea area monitoring and will start the monitoring before the discharge of ALPS treated water into the sea.
- The Government of Japan is communicating with the IAEA to coordinate review mission on handling of ALPS treated water and also review on the Sea Area Monitoring, in order to enhance the objectivity and transparency of Sea Area Monitoring.

3. Requirement of Effective Dose at Boundary of FDNPS

Requirement: Effective dose (due to rubbles and contaminated liquid, etc. generated after the accident, which are stored in the Facility) along the site boundaries shall be less than 1 mSv/year.

- In order to evaluate radioactive substances with different requirements collectively, the ratio of the actual radiation concentration (a_i) to the legally required concentration (A_i) is calculated for each radioactive substance, and **sum of the ratio of legally required concentration** is used for evaluation. (For the legally required concentration of typical nuclides, see attached.)
- In order to meet the requirement, sum of the ratio of legally required concentration must be less than 1 (which is equivalent to 1mSv*)
 - *The legally required concentration is set as the concentration that will result in exposure to 1 mSv in one year if continue to drink approx. 2 Litters of liquid of that concentration every day.

$$\text{Sum of the ratio of legally required concentration} = \sum \frac{a_i}{A_i} < 1.0$$

Status of effective dose at boundary

- Effective dose along the site boundary is below 1 mSv/year since 2015. Most recent value is 0.92 mSv/year as of March 2021, and the detail is shown in the table.

Status of effective dose at boundary	Amount per year as of March 2021
Gaseous discharge	0.03 mSv
On-site water spraying	0.075 mSv
Liquid discharge (Other than ALPS treated water)	0.22 mSv
Direct ray from each on-site facilities and Skyshine	0.59 mSv
Total	0.92 mSv

4. Concentration and Amount of ALPS Treated Water



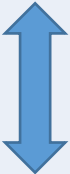
Status of ALPS treated water stored in TEPCO Fukushima Daiichi NPS premises (As of April 1, 2021)

- Amount of liquid stored in tanks: approx. 1.25 million m³
 - Average tritium concentration: approx. 620,000 Bq/L
 - Total tritium: approximately 780 trillion Bq (converted to pure tritium water: approx. 15 grams)

	Liquid Stored in Tanks	
Radioactive Substances	Tritium	Nuclides other than Tritium
Stage 1	Liquid stored in tanks will be purified and treated for radioactive substances other than tritium as many times as necessary until the concentration of radioactive substances other than tritium falls below the legally required concentration for safety before discharge.	
Stage 2	<p>Liquid undergone Stage 1 will be diluted by more than 100 times with seawater.</p> <p>Tritium which is difficult to removed will be diluted with enough seawater to concentrations far below the legally required concentration of 60,000 Bq/L to the current operational target value of 1,500 Bq/L for the tritium concentration in drainage of underground water bypass and subdrain.</p> <p>The annual tritium release rate will be less than 22 trillion Bq per year which was the discharged management target value for Fukushima Daiichi NPS before the accident, over the period of 30 to 40 years required for decommissioning.</p>	<p>The concentration of nuclides other than tritium at this point will be far below the legally required concentration.</p>




5. Major Events and Action Plan

Year	Major Event	Implementation Plan of Fukushima Daiichi NPS	International Review on Regulatory Aspects*
2021			
13 April	Basic Policy on handling the ALPS treated water		
14 April	NRA Commission Meeting	Status check before application (TEPCO 's application preparation status, application time, etc.)	Preparation and coordination for International Review
Summer (TBD)	Application of Implementation Plan to be submitted by TEPCO (expected)	NRA's Review Meeting a. Overview of application b. Review policy	
Winter (TBD)	NRA Commission Meeting Approval for Implementation Plan Start of construction	 NRA's Review period of approx. 3 months	International Review (prior to the approval of the Implementation Plan, documentation review)



5. Major Events and Action Plan

Year	Major Event	Proposed Activity	
2021			
30 Nov - 1 Dec	13 th Top Regulators' Meeting on Nuclear Safety	Discussion with regulators from China and South Korea regarding the implementation plan for ALPS treated water discharge	
Year	Major Event	Implementation Plan of Fukushima Daiichi NPS	International Review on Regulatory Aspects*
2022	Completion of construction Trial operation	Confirmation of nuclide analysis system, etc. Pre-service Inspection Confirmation of nuclide analysis results	 International Review (at the time of preparatory discharge phase, on-site review)
2023	Discharge of ALPS treated water		

* International Review is planned to be conducted by regulators from International Nuclear Regulators' Association and also by IAEA which convenes a group of designated and internationally recognized experts of member countries including Japan's neighboring states.