

IAEA Review of Safety Related Aspects of Handling ALPS-Treated Water at TEPCO's Fukushima Daiichi Nuclear Power Station

**Report 1: First Review Mission to Japan after the
Start of ALPS Treated Water Discharge (October 2023)**



IAEA

International Atomic Energy Agency

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EXECUTIVE SUMMARY

In April 2021, the Government of Japan released its Basic Policy on Handling of ALPS Treated Water at the Tokyo Electric Power Company Holdings' (TEPCO) Fukushima Daiichi Nuclear Power Station (FDNPS). The approach outlined in the Basic Policy is to conduct a series of controlled discharges of ALPS treated water into the sea over many years. Following the announcement of this policy, the Government of Japan requested that the IAEA conduct a detail review of the safety related aspects of handling ALPS treated water stored at FDNPS, applying the relevant international safety standards. The objective of the IAEA is to carry out this safety review, before, during and after discharges of treated water from ALPS.

The IAEA review before the discharge was completed with the publication of the IAEA's Comprehensive Report on the Safety Review of the ALPS-Treated Water at the Fukushima Daiichi Nuclear Power Station (IAEA's Comprehensive Report) that was released on 4 July 2023 [2]. That report summarizes and concludes the work carried out by the IAEA for two years before the discharge of ALPS treated water begins. It also comprises the technical topics and activities to be revisited and corroborated by the IAEA at various times during the ALPS-treated water discharges to assess the consistency of the water discharges activities with relevant international safety standards.

On September 2023, the IAEA and the Government of Japan signed a Memorandum of Cooperation that describes the IAEA basic framework for the safety review during the ALPS treated water discharges, as well as the monitoring and assessment activities carried out by the IAEA.

This report covers the IAEA first review mission since the start of ALPS treated water discharges from the FDNPS. It was conducted from 24 to 27 October 2023 to follow up on the findings from the IAEA's Comprehensive Report on the Safety Review. The review team, coordinated and led by a senior IAEA official, included 16 members, comprised of experts from the IAEA Secretariat and international experts who are designated members of the Task Force.

The scope of the review mission covered the main technical topics covered by the IAEA as part of its safety review before the start of discharges. These topics are noted below but are summarized in greater detail in the IAEA's Comprehensive Report. Additionally, as part of the mission's activities, the Task Force reviewed the status of the IAEA's independent corroboration of Japan's source and environmental monitoring programmes, and the onsite sampling and analysis activities conducted by IAEA experts at the FDNPS.

- Regulatory Control and Authorization
- Safety Related Aspects of Systems and Processes for Controlling Discharges
- Characterization of the Source
- Radiological Environmental Impact Assessment
- Source and Environmental Monitoring
- Involvement of Interested Parties
- Occupational Radiation Protection

During the mission the Task Force received updates on the progress made by NRA, TEPCO, METI, and other stakeholders in commencing and maintaining the discharges of ALPS treated water pursuant to the approved implementation plan and national regulations and laws. The Task Force had access to all relevant technical and regulatory experts and was provided with opportunities to inquire about specific issues. Additionally, the Task Force visited the FDNPS to personally see the equipment and facilities for the discharge of ALPS treated water.

The IAEA Task Force also discussed the details and activities carried out by IAEA staff since the discharge including the continuous presence at the site, independent measurements, discussions with TEPCO/METI and IAEA walkdowns through the ALPS facilities. The Task Force also noted the

comprehensive approach of the IAEA sampling, independent analysis and data corroboration activities proposed related to the source and environmental monitoring programme conducted by Japan.

Based on the activities conducted by the Task Force during the mission, the IAEA noted several major conclusions:

- In its reviews and observations, the Task Force did not identify anything that is inconsistent with the requirements in the relevant international safety standards. Therefore, the IAEA can reaffirm the fundamental conclusions of its safety review as outlined in the 4 July 2023 Comprehensive Report.
- A robust regulatory infrastructure is in place to provide operational safety oversight of the discharge of ALPS treated water, and the Task Force was able to witness first-hand the onsite presence of the NRA and their activities in this regard.
- Based on its observations at the FDNPS, the Task Force confirmed that the equipment and facilities are installed and operated in a manner that is consistent with the Implementation Plan and the relevant international safety standards.
- The Task Force reiterated the finding from the IAEA's Comprehensive Report that optimization of protection of the discharge of ALPS treated water needs to be considered moving forward as part of the overall decommissioning of the FDNPS site. However, the Task Force fully recognized that the discharges are in the early stages and that further time and operational experience are required before progress can be made on this issue.

This mission report documents observations from the Task Force and reflects the discussions between the Task Force and the Government of Japan. This report was agreed by the IAEA Task Force and has been published by the IAEA on its public website.

BACKGROUND

In April 2021, Japan announced its Basic Policy and soon after, the Japanese authorities requested assistance from the IAEA to monitor and review those plans and activities relating to the discharge of the treated water to ensure they will be implemented in a safe and transparent way, and they will be consistent with the IAEA's international safety standards. The IAEA, in line with its statutory responsibility, accepted the request made by Japan.

In July 2021, the IAEA and the Government of Japan signed the Terms of Reference for IAEA Assistance to Japan on Review of Safety Aspects of ALPS Treated Water at Tokyo Electric Power Company Holdings, Inc. (TEPCO) Fukushima Daiichi Nuclear Power Station (FDNPS). These terms of reference set out the broad framework that the IAEA will use to implement its review. Such a request to the IAEA, and its acceptance by the IAEA, is in accordance with the IAEA function described in Article III.A.6 of the IAEA Statute.

In September 2021, the IAEA sent a team to Tokyo, for meetings and discussions to finalize the agreement on the scope, key milestones and approximate timeline for the Agency's review. The team also travelled to the FDNPS to discuss technical details with experts at the site and to identify key activities and locations of interest for the Agency's review.

To implement the IAEA's review in a fully transparent and inclusive manner, the IAEA Director General established a Task Force. The Task Force operates under the authority of the IAEA and is chaired by a senior IAEA official. The Task Force includes experts from the IAEA Secretariat alongside internationally recognized independent experts with extensive experience from a wide range of technical specialties from Argentina, Australia, Canada, China, France, the Marshall Islands, the Republic of Korea, the Russian Federation, the United Kingdom, the United States and Viet Nam. These independent experts provide advice to the IAEA and serve on the Task Force in their individual professional capacity to help ensure the IAEA's review is comprehensive, benefits from the best international expertise and includes a diverse range of technical viewpoints.

The IAEA primarily conducted its review through the analysis of documentation provided by TEPCO, NRA, and METI; and holding review missions to further clarify questions and to ask for additional materials. The IAEA also conducted onsite visits to FDNPS periodically throughout 2021, 2022, and 2023. Five review missions to Japan were carried out between February 2022 and June 2023 and these and the corresponding technical reports are detailed in Annex 1. The reports issued after the first four review missions serve as progress reports and final conclusions are only presented for the first time in the comprehensive report which was published on 4 July 2023.

At the start of the review, the Government of Japan and TEPCO provided background materials with information pertaining to the proposed discharge of ALPS treated water. Subsequently, additional materials were provided upon request by the Task Force, or when ready for submission by TEPCO to the relevant Japanese authorities (e.g., NRA). This information was reviewed by the Task Force members and formed the basis for the review missions with relevant authorities and, ultimately, the Comprehensive Report. The purpose of the review missions is to review the reference materials submitted by the Government of Japan or TEPCO, seek clarification on technical issues, request additional information and observe on-site activities, as appropriate.

On September 18, 2023, the IAEA and Government of Japan signed a Memorandum of Cooperation that outlines the basic framework for the IAEA's ongoing safety review of the ALPS treated water discharges at FDNPS, as well as the associated monitoring and assessment activities conducted by the IAEA.

The IAEA's review is organized into the following three major components to ensure all key safety elements are adequately addressed:

- **Assessment of Protection and Safety** – This component is focused on reviewing technical aspects of the Implementation Plan, radiological environmental impact assessment (REIA), and other supporting materials prepared by TEPCO as part of their submission for regulatory approval of the discharge of ALPS treated water. This component primarily involves TEPCO

and the Ministry of Economy, Trade, and Industry (METI) and looks at the expected actions to be performed by TEPCO throughout the process, as defined in the relevant IAEA international safety standards.

- **Regulatory Activities and Processes** – This component is focused on assessing whether the Nuclear Regulation Authority’s (NRA) review and approval process is conducted in accordance with the relevant IAEA international safety standards. This component primarily involves NRA as the independent regulatory body responsible for nuclear safety within Japan; it is focussed only on the regulatory aspects relevant for NRA’s review of the discharge of ALPS treated water from the Fukushima Daiichi Nuclear Power Station.
- **Independent Sampling, Data Corroboration and Analysis** – This component includes all activities associated with the IAEA’s independent sampling and analysis that is and will be performed to corroborate the data from TEPCO and the Government of Japan associated with the discharge of ALPS treated water. Samples are analysed by IAEA laboratories as well as independent third-party laboratories. Additionally, this component also includes the corroboration of occupational exposure.

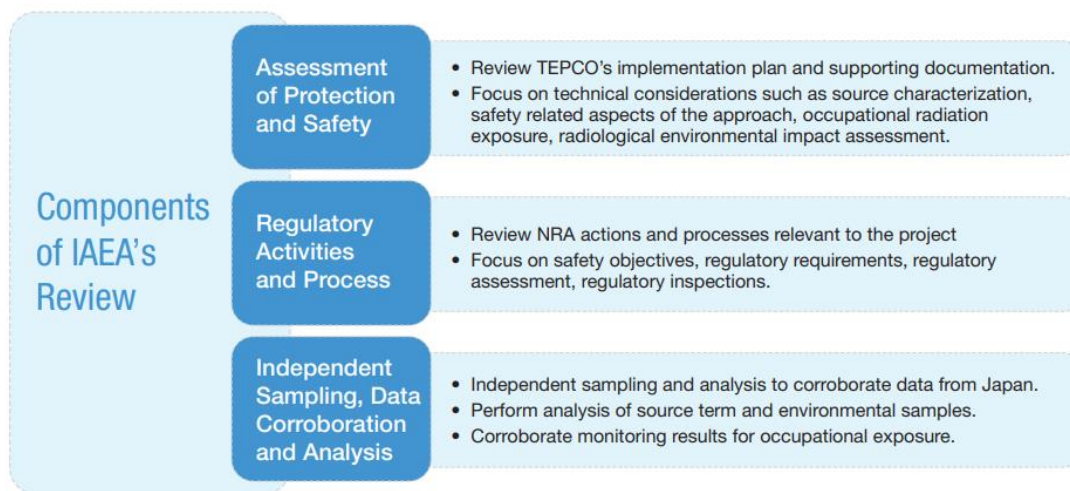


Figure 1: Components of the IAEA Review

Additional information on the IAEA’s review, as well as background information, documents, reports, and other publications can be found online at the dedicated website for the IAEA’s Fukushima ALPS review [3].

MISSION ACTIVITIES IN OCTOBER 2023

Discussions with NRA

On the first day of the mission, the Task Force met with NRA officials to receive an update on the regulatory aspects since right before the start of the discharges in August 2023. The NRA started by providing an overview of the final steps in the regulatory process, prior to the start of operation of the discharges on 24 August 2023. The final elements of TEPCO's Implementation Plan were approved by the NRA Commission on 10 May 2023 and NRA's pre-service inspections of the ALPS discharge facility were completed in June 2023 and certified by NRA on 7 July 2023.

During the mission the Task Force inquired about the frequency of NRA's review of the Implementation Plan. NRA stated that oversight of the Implementation Plan is a continuous process. There is an oversight committee established for the site decommissioning work comprising NRA and external experts that meet regularly (e.g. 6 times in 2023). If TEPCO identifies that changes to the Implementation Plan are needed, TEPCO will inform NRA and make an application to change it. NRA is also able to direct that changes be made to the Implementation Plan by TEPCO when they deem it necessary.

For the start of the first discharge of ALPS treated water, NRA resident inspectors carried out a stepwise inspection process and procedures to check whether the operation was done according to the approved procedures established under the approved Implementation Plan for each of the steps:

- Operation of the transfer and dilution facilities;
- Dilution of the ALPS treated water;
- Sampling of the water to be discharged (after dilution); and
- Discharging the ALPS treated water to the sea.

Additionally, the NRA explained that they had stationed inspectors at the control room; ALPS treated water transfer pumps; ALPS treated water flow meters; sea water transfer pumps; and vertical shaft (including sampling from the upper-stream vertical shaft). During the operation of the discharge, NRA inspectors conduct regular safety inspections of the management of the discharge operation, quality assurance of the analysis of activity concentrations in the discharged water, project management of the operation, and the status of any unusual events and corrective actions taken due to problems such as equipment failure or leakages.

The NRA explained the independent source monitoring that it is undertaking to complement the operational safety inspections and more broadly, the regulatory oversight of the discharge activities. A summary of the radionuclides included in NRA's independent source monitoring is shown in Table 1.

Table 1: Independent source monitoring by NRA

NRA Independent Source Monitoring	Frequency	Radionuclides
Before the start of discharge	-	Co-60, Sr-90, Ru-106, Sb-125, I-129, Cs-134, Cs-137 H-3, C-14, Tc-99 Cl-36, Fe-55, Se-79
After the start of discharge	Once a year (for year 1 (2023) – the 2nd batch of discharge)	C-14, I-129 (major contributors in the REIA) Co-60, Ru-106, Sb-125, Cs-134, Cs-137 (major gamma-emitting radionuclides)

Before the start of discharges of ALPS treated water, the independent source monitoring confirmed that TEPCO's analysis for the first batch of ALPS treated water discharge was valid. The radionuclides assessed by NRA before the start of discharge are given in Table 1.

After beginning to discharge ALPS treated water, independent verification analyses will be undertaken by NRA or its contractor once a year but also, in the first year of discharges (2023), for the second batch of discharge (see Table 1).

The Task Force noted that not all 30 radionuclides in TEPCO's source term are included in NRA's independent source monitoring and, that in the case of future independent verification, ^3H will not be assessed (as shown in Table 1). The NRA explained that this had been decided on the basis that ^3H at the levels typically present in ALPS treated water is easy to measure and that this radionuclide does not contribute significantly to radiation exposures. The Task Force was satisfied that this approach was justified.

The NRA provided an overview of the marine environmental monitoring that is being undertaken close to the FDNPS as part of the Comprehensive Radiation Monitoring Plan (CRMP) to specifically address the discharges of ALPS treated water. The NRA, Ministry of Environment (MOE), the Fukushima Prefecture (FP) government and TEPCO are also monitoring tritium in seawater while the Fisheries Agency of Japan (FAJ) is monitoring fishery products. The NRA explained that for seawater a dual approach is being taken which balances the need to publish results frequently and soon after sampling, thus keeping the public informed, with the longer times required for low level analyses of tritium. MOE, FP and TEPCO perform "quick" results whereby samples are analysed with a target detection limits for tritium of 10 Bq/L. The results of more sensitive analyses – with target detection limits of 0.1 – 0.4 Bq/L – are performed by the NRA and, again, MOE, FP, and TEPCO. The NRA is undertaking seawater monitoring for tritium on a monthly basis at four points within three kilometres of the FDNPS site.

The NRA mentioned the importance of the IAEA's ongoing verification of Japan's marine monitoring data. This includes both the corroboration of ALPS-specific monitoring and the ongoing project "Marine Monitoring: Confidence Building and Data Quality Assurance" that more generally addresses the quality of data from marine monitoring undertaken in Japan following the accident at FDNPS. The NRA stated that these IAEA activities were vital for improving the credibility and transparency of this monitoring data both in Japan and internationally.

The Task Force inquired how the monitoring results are being used to confirm the conclusions of the Radiological Environmental Impact Assessment (REIA) and whether the REIA needs updating. It was discussed that the activity concentrations in fish are below the detection limits of 10Bq/kg and are consistent with both the assessment results and with the activity concentrations before the discharges started. NRA stated that at the current time, none of the results from the CRMP, including activity concentrations in fish, indicated that a review of the REIA is needed. TEPCO is obliged to review the monitoring data and assess if an update to the REIA is required, and NRA will monitor this but has not set a fixed frequency.

The Task Force noted that different organizations were participating in the CRMP and were publishing the results on their respective websites. There are many different types of analysis and measurements being conducted by different organizations. Some analyses are rapid and conducted daily which are less sensitive but provide results quickly; other measurements are slower but are also more sensitive with lower limits of detection. The Task Force highlighted that a comprehensive website containing all the monitoring and analysis results would be beneficial for the public and help to streamline the access and consumption of relevant data by the public. The NRA stated that this is already under construction.

As part of the meeting with NRA, the Task Force also inquired about the longer-term follow-up items that were going to be addressed after the start of discharges. The recommendations from the Task Force related to NRA setting discharge limits for radionuclides other than tritium and the requirement on TEPCO to review the optimization of protection for the discharge of ALPS treated water based on operational experience and associated monitoring following the start of the discharge, will be reviewed by the NRA once enough operation experiences have been accumulated. The Task Force acknowledged

that, as this mission was occurring only two months after the start of discharges, little operational experience and other data was available to further consider these long-term follow-up items.

Visit to FDNPS

During the mission the Task Force travelled to the Fukushima region to meet with TEPCO and METI and to visit the FDNPS. While at the site the Task Force was provided with an overview of the technical status of the ALPS treated water discharges and was able to visit each step of the discharge process. This included:

- Confirmation/measurement tanks (K4 tank area);
- ALPS treated water transfer building including the transfer pumps, sampling station, and radiation detectors;
- Electrical room which includes flow control valves and an emergency isolation valve;
- Seawater pumps and header piping, radiation detectors installed near the seaside pumps and the vertical shaft, and the vertical shaft leading to the discharge tunnel; and
- Control room located in the seismic isolation building.

During the visit to FDNPS the Task Force was also provided an overview of the sampling and analysis that takes place before and during each batch of ALPS treated water to be discharged. This included observing the sampling ports used to sample from the measurement/confirmation tanks, as well as the sampling points used to sample treated, diluted water prior to and during the discharge process. The IAEA also provided an overview of their work at the site under the terms described in the Memorandum of Cooperation signed in July 2023 and the Task Force visited the IAEA's Fukushima Daiichi NPS site office located at FDNPS.

Discussions with TEPCO and METI

Following the site visit to FDNPS, the Task Force met with officials and experts from TEPCO and METI. TEPCO provided an overview of the plan for the discharge of ALPS treated water for the Japanese 2023 Fiscal Year (FY)¹. All the ALPS treated water currently stored in the measurement and confirmation tanks (K4A, K4B, and K4C tanks) will be discharged in three separate batches. Additionally, the K4B tank group will be refilled over the winter and ready for discharge in 2024 prior to the end of the Japanese 2023 FY. The total amount of tritium to be discharged in these first four batches is estimated at around five TBq. The details of these batches are given in Table 2.

¹ The 2023 FY for Japan is from 1 April 2023 through 31 March 2024.

Table 2: Discharge Plan for FY 2023

	Discharge Number			
	1	2	3	4
Tank Group	K4B	K4C	K4A	K4B
Treated Water Volume (m³)	~7800	~7800	~7800	~7800
Secondary Treatment	Not required	Not required	Not required	Not required
Discharge Start	24 August 2023	5 October 2023	2 November 2023	TBD
Discharge End	11 September 2023	23 October 2023	20 November 2023	TBD
Notes				Refilled from K4E and K3A

TEPCO provided to the Task Force a detailed description of the analyses of radionuclides undertaken in each batch of ALPS treated water in the measurement/confirmation tanks prior to discharge. Activity concentrations of tritium measured in the vertical shaft daily during the discharge of the first and second batches were also presented. These results showed that the tritium activity concentrations in the discharged ALPS treated water for the first and second batches were far below the Basic Policy limit of 1,500 Bq/L and the operational limit (700 Bq/L) and also consistent with the expected values based on the target discharge concentration for each batch. TEPCO also demonstrated with data that the sampling conducted in the vicinity around FDNPS has shown that the tritium concentration in seawater is well below the operational limit (discharge suspension level is 700 Bq/L) set for activity concentrations of tritium in seawater at the 10 locations within three kilometres of the power station.

TEPCO also provided details of the operating records that showed the expected operation of the discharge facility with the ALPS treated water transfer flow and seawater transfer flow, and hence dilution rate remaining constant over the duration of the discharge.

TEPCO summarised the results of facility inspections that were undertaken in the measurement/confirmation facility, transfer facility, dilution facility, discharge facility and seawater intake facility, where no abnormalities have been observed.

The Task Force discussed the issue of homogenization and inquired how TEPCO was ensuring that homogenization was ensured. During discussions it was highlighted that the measurements taken during the first two batches of discharges show consistent levels of tritium at the treated water transfer pump outlet, thus indicating that homogeneity is being maintained in the tanks. The Task Force suggested that TEPCO consider repeating the homogeneity test on some frequency and TEPCO noted that they will consider this should anything about the system change that would require further validation of the homogenization.

The results of the sea area monitoring during the first and second batches of discharges were shared with the Task Force. These included the results of tritium activity concentrations in seawater sampled in the vicinity of the discharge outlet within three kilometres and 10 kilometres of the FDNPS since the start of the discharge on 24th August 2023.

Quick tritium measurements of seawater collected from 10 specific locations within three kilometres of the site and four locations within 10 kilometres of the site indicate that the concentrations are below the discharge suspension and investigation levels (see Table 3 below). While most measurement results indicate tritium levels below the detection limit of 10 Bq/L, a small number of activity concentrations slightly elevated– in the range 10 – 22 Bq/L – have been observed at the monitoring locations closest to the release point since the discharges started in August. This is to be expected. A more complete

picture will emerge as the dataset of the results of more sensitive tritium analyses of seawater samples grows.

Weekly measurements of tritium in seawater at the same locations were also presented to the Task Force. These have a lower target detection limits (0.1 - 0.4 Bq/L) but take about two weeks to analyse. They also confirm that activity concentrations in seawater are low and are not distinguishable from tritium activity concentrations measured in seawater historically around Japan.

Table 3: Criteria used by TEPCO for analysis results for quick tritium measurements

Location	Discharge Suspension Level (Bq/L)	Investigation Level (Bq/L)	Detection Limit (Bq/L)
Within 3km of the site (10 locations)	700	350	~10
Within a 10km square in front of the site (4 locations)	30	20	~10

**Note – Historical range for seawater across Japan ranges from around 0.043 Bq/L to 20 Bq/L*

Regarding occupational exposure, TEPCO provided an overall assessment of radiation monitoring (individual and workplace), dose assessment methodology and recording of occupational exposure for workers including contractors of ALPS discharge equipment and facilities. These arrangements were conducted under the supervision of a qualified Radiation Protection Officer. Such arrangements were reviewed by the Task force and evaluated in Report 1: Review Mission to TEPCO and METI (February 2022).

A dedicated department of TEPCO workers (called Program 6 or PG-6) is responsible for the design and construction of ALPS treated water discharge facilities. TEPCO highlighted that the total number of workers varies (due to involvement of different contractors) depending on the planned work but several workers are under routine control and monitoring for ALPS related activities. Work planning is essential with necessary details on work type, planned dose, actual dose with proper monitoring arrangements and are recorded on a daily basis.

Depending on the work characteristics, whole body, extremity and eye dosimeters are used (all are Radiophotoluminescence, RPL dosimeters for gamma, beta and neutron exposure) and recorded. Although the typical discharge duration is around 17 days, passive dosimeters are used for a month and assessed. Internal dosimetry with in-vivo techniques is conducted every three months. Records are checked with baseline records, stored in Personal Dose Control System of TEPCO (for both TEPCO employees and contractor workers) and relevant occupational exposure data is transferred to the system of Radiation Dose Registration Center for Workers, as they were evaluated in Report 4: Review Mission to TEPCO and METI (November 2022).

CONCLUSIONS AND OUTCOMES

During the mission, the Task Force received the full cooperation from counterparts in TEPCO, METI and NRA and noted their commitment to providing the Task Force with comprehensive information related to the discharge of the first two batches of ALPS treated water. During the week the Task Force did not identify anything that is inconsistent with the requirements in the relevant international safety standards. Therefore, the IAEA is able to reaffirm the fundamental conclusions of its safety review as outlined in the 4 July 2023 Comprehensive Report. As part of its discussions and inquiries during the mission, the Task Force identified several conclusions and outcomes that are summarized below.

- The Task Force noted the robust regulatory infrastructure in place to provide operational safety oversight of the discharge of ALPS treated water and was able to witness first-hand the onsite presence of the NRA and their activities in this regard.
- Based on its observations at FDNPS, the Task Force confirmed that the equipment and facilities are installed and operated in a manner that is consistent with the Implementation Plan and the relevant international safety standards.
- The Task Force stressed that the environmental monitoring programmes in place are very important for the international community. The Task Force also noted the importance of the IAEA's corroboration, highlighting that its purpose is to provide transparency and further confidence in the accuracy and reliability of the data reported by TEPCO and the Government of Japan.
- The Task Force noted that to facilitate a comprehensive review and systematic analysis of the environmental monitoring data being gathered under the CRMP and by TEPCO, a collection of all the monitoring data into a single website and in an easily accessible format would be extremely useful. This will enable any variations and trends in the activity concentrations in the environment and comparisons between locations, radionuclides and environmental media to be compared. It will also enable any anomalies and trends in activity concentrations to be identified. While not directly required by relevant international safety standards, this ease of access to important data and results would help to support the involvement of interested parties in the process.
- The IAEA Safety Standards require that a review of the REIA is undertaken on a periodic basis to be defined by the relevant national authorities. Measurement information on the radionuclide composition and the discharges of ALPS treated water and activity concentrations in the environment can be an important input into this and can be used to update and verify the assumptions made in the REIA and the models used. In particular, the Task Force expressed interest as to whether any accumulation of radionuclides discharged is observed in marine sediments. However, the Task Force acknowledged that any robust verification is likely to be limited as it is expected that most of the radionuclides discharged will not be detectable in the environment due to the very low quantities discharged and further dilution in the sea.
- The Task Force noted that TEPCO is already undertaking a comparison of the results of the marine dispersion model used in the REIA with measured activity concentrations in seawater.
- The Task Force reiterated the finding from the IAEA's Comprehensive Report that optimization of protection for the discharge of ALPS treated water needs to be considered moving forward as part of the overall decommissioning of the FDNPS site and that care should be taken not to imply that dilution is performed for the purposes of radiation protection and safety. However, the Task Force fully recognized that the discharges are in the early stages and that further time and operational experience is required before progress can be made on this issue.
- The Task Force reemphasized that assessment of the ALPS treated water discharge facility on a periodic basis is essential, and should continue as currently implemented, for the sustainability of measures on occupational radiation protection (including occupational exposure data for external and internal exposures of TEPCO workers and contractors /sub-contractors) in the

relevant areas and during normal operation, as noted in the IAEA Comprehensive Report (July 2023).

- The Task Force reemphasized the unique working characteristics of ALPS and activities that could potentially incur relatively higher doses as noted in Report 1: Review Mission to TEPCO and METI (February 2022). TEPCO is encouraged to maintain a consistent approach to assessing and recording occupational exposures for such situations.

The Task Force will continue to review the activities of TEPCO and NRA to assess whether they are consistent with the relevant international safety standards. During this October mission the Task Force discussed its next steps and highlighted a desire to continue conducting routine review missions to Japan. The next review mission is anticipated to take place in the Spring of 2024. Outside of the routine review missions, the Task Force may conduct additional ad hoc missions or technical reviews depending on the operational situation of the discharge of ALPS treated water or if key technical documents such as the Implementation Plan or REIA were to change significantly.

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ANNEX I. LIST OF REVIEW TEAM MEMBERS

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24 October 2023

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- Yoshie AOKI, Chief
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- Kai ONOYAMA, Specialist

NRA Fukushima Daiichi Regional Office

- Ryusuke KOBAYASHI, General Manager

Ministry of the Environment (MOE) - Marine Environment Division, Environmental Management Bureau

- Takenori KITAMURA, Senior Assistant for Radioactive Material Monitoring
- Daisuke ISHIKAWA, Section Chief

Fisheries Agency (FAJ) - Research and Technological Guidance Division, Resources Enhancement Promotion Department

- Yosuke NAKAYAMA, Deputy Director

TEPCO

- **Akira ONO**: Executive Vice President, President of Fukushima-Daiichi D&D Engineering Company (FDEC)
- **Junichi MATSUMOTO**: Chief Officer for ALPS Treated Water Management, FDEC

Ministry of Foreign Affairs (MOFA) Observers

Disarmament, Non-Proliferation and Science Department

- Mitsuko HAYASHI, Deputy Director-General

International Nuclear Cooperation Division

Disarmament, Non-Proliferation and Science Department

- Kentaro MINAMI, Director

25 October 2023

Ministry of Economy, Trade, and Industry (METI)

- Keiichi YUMOTO Director-General for Nuclear Accident Disaster Response
- Haruhiko URATA Assistant Director

TEPCO

- **Junichi MATSUMOTO**: Chief Officer for ALPS Treated Water Management, FDEC
- **Takahiro KIMOTO**: Deputy General Manager, D&D Communication Center, FDEC
- **Gaku SATO**: Deputy General Manager, Project Management Office, FDEC
- **Tadashi YAMANE**: Manager, Mechanical Equipment for Treated Water Installation Project Group, ALPS Treated Water Program Department, Fukushima Daiichi Nuclear Power Station (FDNPS), FDEC
- **Kenro FURUKAWAZONO**: Manager, Civil Equipment for Treated Water Installation Project Group, ALPS Treated Water Program Department, FDNPS, FDEC
- **Hiroaki SANESHIGE**: Manager, Planning Radioactive/Chemical Analysis & Evaluation for Treated Water Project Group, ALPS Treated Water Program Department, FDNPS, FDEC
- **Katsuhisa MATSUZAKI**: Team Leader, Mid and Long Term Planning Group, Project Management Office, FDEC

26 October 2023

Ministry of Economy, Trade, and Industry (METI)

- Keiichi YUMOTO Director-General for Nuclear Accident Disaster Response
- Yuki TANABE Director for international issues
- Norikazu WATANABE Director for international issues
- Atsushi WAKUI Deputy Director
- Takanori MANISHI Deputy Director
- Shino KUWA Deputy Director
- Chiaki IIZUKA Deputy Director
- Sachi MURAKAMI Assistant Director
- Haruhiko URATA Assistant Director

TEPCO

- **Junichi MATSUMOTO**: Chief Officer for ALPS Treated Water Management, FDEC
- **Gaku SATO**: Deputy General Manager, Project Management Office, FDEC
- **Tadashi YAMANE**: Manager, Mechanical Equipment for Treated Water Installation Project Group, ALPS Treated Water Program Department, FDNPS, FDEC
- **Kenro FURUKAWAZONO**: Manager, Civil Equipment for Treated Water Installation Project Group, ALPS Treated Water Program Department, FDNPS, FDEC
- **Masayoshi GOTO**: Team Leader, Planning Radioactive/Chemical Analysis & Evaluation for Treated Water Project Group, ALPS Treated Water Program Department, FDNPS, FDEC
- **Katsuhisa MATSUZAKI**: Team Leader, Mid and Long Term Planning Group, Project Management Office, FDEC

ANNEX III. MISSION AGENDA

Review Mission to Japan

24-27 October 2023

Tuesday 24 October 2023	
09:00 - 09:30	Opening session (at MOFA HQ)
09:30 - 10:00	Transit between MOFA and NRA
10:00 - 13:30	Internal Task Force meeting (at NRA HQ)
13:30 - 14:00	Lunch
14:00 - 17:00	Discussions with NRA (at NRA HQ)

Wednesday 25 October 2023	
08:00 - 11:00	Transit from Tokyo to FDNPS
11:00 - 12:00	Lunch at FDNPS
12:00 - 17:00	Task Force technical visit to FDNPS
17:00 - 17:30	Transit from FDNPS to hotel

Thursday 26 October 2023	
09:00 - 14:00	Discussions with METI and TEPCO (Fukushima region)
14:00 - 15:00	Lunch
15:00 - 19:00	Transit from Fukushima region to Tokyo

Friday 27 October 2023	
09:00 - 12:00	Internal Task Force meeting (at METI HQ)

