NRA presentation

NRA's updates from the Comprehensive Mission

OTSUJI YAMAMOTO Ayako
Nuclear Regulation Authority JAPAN

24 October 2023

Contents

1. Regulatory process
2. Inspection
3. Independent monitoring
4. Actions from the January Mission

1. Regulatory process

NRA	TEPCO
Review of IP	Application of Implementation Plan (IP) (21 Dec 2021)
	IP submission
NRA Review Meetings (13 meetings)	
Draft review results reported and discussed by the NRA Commission (18 May 2022) Receiving public comments (19 May – 17 June 2022)	Submission of revised IP (28 April, 15 May 2022)
Results of public comment reported to the NRA Commission Decision on approval by the NRA Commission Approval of IP (22 July 2022)	
Start of Operational Safety Inspection (incl. Quality check of TEPCO's analysis)	Start of SSCs Installation
Review and approval of operational measures including selection scheme of source term and source monitoring program	Submission of IP for operational measures including selection scheme of source term and source monitoring program (14 Nov 2022) IP submission
NRA Review Meetings (5 meetings)	
NRA's Pre-service Inspection on SSCs (started in Jan 2023) Draft review results reported and discussed by the NRA Commission (22 Feb 2023) Receiving public comments **(23 Feb – 24 Mar 2023)**	Tests on SSCs Submission of revised IP (14 Feb, 20 Feb 2023)
Results of public comment reported to the NRA Commission Decision on approval by the NRA Commission Approval of IP **(10 May 2023)** Pass of NRA's Pre-service Inspection **(7 July 2023)**	Completion of Installation Start of operation **(22-24 Aug 2023)**
Operational Safety Inspection continues (incl. Quality check of TEPCO's source monitoring) Periodic Facility Inspection Independent source monitoring by the NRA's TSO	We are here

2. Inspection

Status of pre-service inspection and operational safety inspection

Pre-service Inspection

- ✓ Pre-service inspection of measurement/confirmation facility was completed on 15th March 2023.
- ✓ Pre-service inspections of transfer facility, dilution facility and discharge facility was completed on 7 July 2023.

Operational Safety Inspection

- ✓ For operational safety inspection to confirm operational measures are properly set based on the approved IP before the start of discharge, the following subjects were identified;
  1. *Quality assurance of nuclide analysis*
  2. *Operational framework for ALPS treated water discharge facility*
  3. *Operational management of ALPS treated water discharge facility*

- ✓ Operational safety inspection before the start of discharge was completed, and its completion was reported to the NRA Commission Meeting on July 5.

- ✓ Operational safety inspection has continued for the start of discharge and during the operation as necessary.

Pre-service Inspection

Status of Pre-service Inspections: completed
［Transfer, Dilution and Discharge Facility］
（As of July 7,2023）

［Legend］
☐ : Waiting
○ : In progress
● : Done

[1] Inspection to confirm the structure or performance of the reactor facility for nuclear power plants as specified in the implementation plan, including material inspection, dimensional inspection, visual inspection, inspection to confirm the state of assembly and installation, pressure resistance inspection, and leakage inspection.

[2] Inspection to confirm the functions or performance required for the operation of the reactor facility for nuclear power plants as specified in the implementation plan.

[3] Inspection to confirm the total performance of the reactor facilities for nuclear power plants as specified in the implementation plan, and other inspections necessary to confirm completion of the construction.

	Equipment	To confirm the structure of equipment	To confirm the function of the individual equipment	To confirm total performance of equipment
Transfer Facility	ALPS treated water transfer pump（Factory-Made）	●	–	●
	ALPS treated water flow meter	●	●	–
	Radiation monitor	●	●	–
	Emergency isolation valve（Factory-Made）	–	●	–
	ALPS treated water flow rate control valve（Factory-Made）	–	–	●
	Main pipes	●	–	●
	Leakage detectors and alarms	●	●	–
Dilution Facility	Seawater transfer pump（Factory-Made）	●	–	●
	Seawater flow meter	●	●	–
	Discharge vertical shaft（Upper-stream storage）	●	–	●
	Main pipes	●	–	●
Discharge Facility	Discharge vertical shaft（Down-stream storage）	●	–	●
	Discharge tunnel	●	–	●
	Discharge outlet	●	–	●

Operational Safety Inspection before the start of discharge

Completed:

1. Quality assurance of nuclide analysis

Through operational safety inspection, *the NRA confirmed that TEPCO's activities on quality assurance of nuclide analysis are conducted properly based on the Implementation Plan (IP)*, which was approved on 22nd July 2022 and 10th May 2023.

The details of the confirmation results are as follows:

- ✓ Radionuclides to be measured and evaluated are properly selected based on the selection scheme which has been stipulated in the IP.
- ✓ *Procurement process for outsourcing* as well as responsibility and authority for analytical activities are clearly defined in in-house manual. Also, requirements for procurement, validation of procured products, and corrective action are properly implemented based on the IP.
- ✓ TEPCO and its contractor implements *activities to secure human resources and train workers.*
- ✓ *Traceability* is ensured by the certification standards that the contractor has obtained, uncertainties are evaluated properly, and detection limit is below 1/100 of regulatory concentration limit. Additionally, traceability of those analytical methods which are not certificated, is also secured by inter-comparison analysis.

Operational Safety Inspection before the start of discharge

Completed:

2. Operational framework for ALPS treated water discharge facility

- ✓ Operational framework, which was approved on 10th May 2023, was to be applied from the day when the ALPS treated water discharge facility starts operation. The NRA confirmed that the transition of the responsibilities for operation and maintenance was properly prepared.
- ✓ The NRA confirmed that manuals about capability management, education and training for operation of ALPS treated water discharge facility are properly established and education/training is conducted accordingly.

Operational Safety Inspection before the start of discharge

Completed:

3. Operational management of ALPS treated water discharge facility

The NRA inspected the preparation status including manuals for operational management of ALPS treated water discharge facility (1. receiving, 2. measurement/confirmation, 3. discharge), based on the IP. The confirmed items includes:

- ✓ ***Operational procedure for the receiving process***
  - Operational procedure of ALPS treated water transfer pump and receiving valve
  - Procedure to respond to unusual events
- ✓ ***Operational procedure for the measurement/confirmation process***
  - Operational procedure for circulation and agitation
  - Procedure for sampling
  - Procedure to respond to unusual events
- ✓ ***Operational procedure for the discharging process***
  - Operational procedure of seawater transfer pumps
  - Procedure to respond to unusual events (e.g., to suspend discharge immediately)
  - Operation to input the concentration of tritium
  - Setting the flow rate based on the input tritium concentration
  - Planning of the annual discharge amount of tritium
  - Periodic confirmation process of radionuclides to be measured and evaluated
- ✓ ***Set unusual values in sea area monitoring***
- ✓ ***Maintenance and management of the facility***
  - Addition of items to the inspection plan and the long-term maintenance management plan
  - Manuals for patrol inspection (patrol route and its frequency)

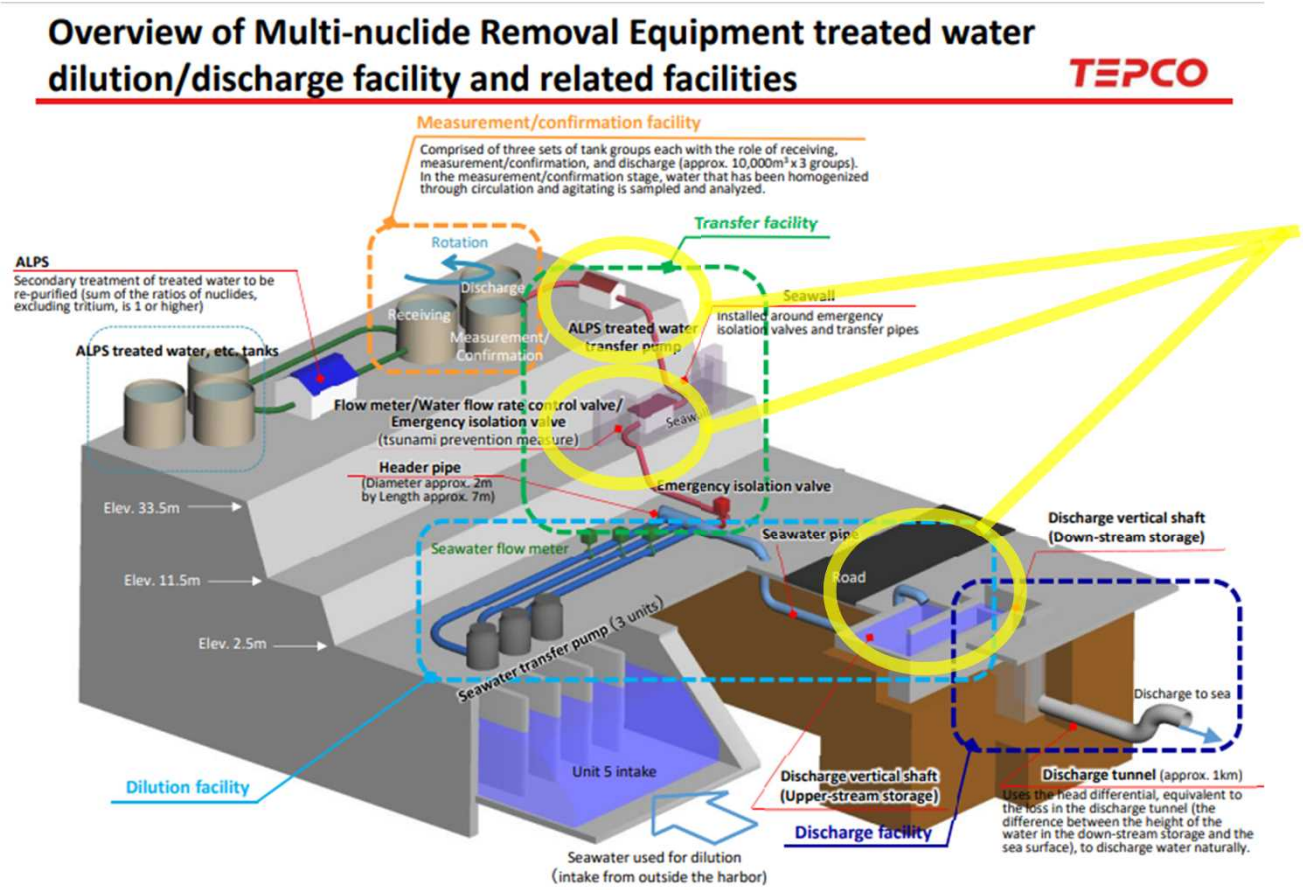
As a result of operational safety inspection, the NRA confirmed that the contents of IP are properly reflected in the in-house manuals.

Operational Safety Inspection

continued:

For the start of the first discharge on 22-24 August,

- ✓ Resident inspectors checked whether operation was done according to the manuals established under the approved IP, for each step i.e., the first step (dilution), sampling of the diluted water, and the second step (discharging the diluted water into the sea).



Check points for inspection:

- Control room
- ALPS treated water transfer pump
- ALPS treated water flow meter
- Sea water transfer pump
- Vertical shaft (including sampling from upper-stream vertical shaft)

Source: TEPCO's material on 22 Aug 2023
Information about the Discharge of Multi-nuclide Removal Equipment Treated Water into the Sea (tepco.co.jp)

Operational Safety Inspection

continued:

During operation,

- ✓ Resident inspectors check, as necessary, whether operation is conducted according to the approved IP, including those items below:

1. ***Operation management (approx. once/week)***
   - ✓ Operation status at each step (1. receiving, 2. measurement/confirmation, 3. discharge), decisions made by a responsible person at the holding points
   - ✓ Maintenance status based on the plan
   - ✓ Status of education and training
2. ***Quality assurance (approx. once/month)***
   - ✓ Quality assurance activities on analysis of ALPS treated water, tritium analysis during discharging operation
3. ***Project management (approx. twice/week)***
   - ✓ Hearing of the status of project management
   - ✓ Observing at the operator's relevant meetings (e.g., safety risk management meeting, ALPS treated water program team meeting)
   - ✓ Status of establishing the annual discharge plan
4. ***Trouble management (each time)***
   - ✓ Status of discharge suspension by usual or emergency process in response to unusual events
   - ✓ Status of countermeasures and corrective actions to troubles such as equipment failure or leakage

3. Independent monitoring

✓ NRA's independent source monitoring to complement operational safety inspection on TEPCO's organizational framework for analyzing "nuclides to be measured and evaluated" and their quality assurance activities

Before the start of discharge

Analytical Institute: JAEA Nuclear Safety Research Center/ TSO of the NRA

Radionuclides measured:

Major 7 nuclides (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

Results *TEPCO's analysis for the first batch was confirmed to be valid.*

After the start of discharge

Analytical Institute: JAEA Nuclear Safety Research Center / TSO of the NRA

Radionuclides to be measured:

C-14 and I-129 (the main contributors in REIA), Major γ-emitter nuclides (Co-60, Ru-106, Sb-125, Cs-134, Cs-137)

Frequency of analysis: Once a year (for the first year, the second batch of discharge)

Result *> see another presentation*

4. Actions from the January Mission

NRA categorized the actions into two groups:

- ✓ "Short-term" to be responded before the start of discharge > Closed
- ✓ "Long-term" > To be reviewed by the NRA when enough operational experiences accumulated

Follow-up List of 2nd Review Mission to the NRA

Short-term		Cat.
1	The NRA agreed that it will ensure action levels / tolerances are defined, agreed and included in formal documentation where appropriate (e.g., approved Implementation Plan, Inspection Manuals, and documents that include source and environmental monitoring requirements). The Task Force requested that NRA provide a copy of the enforcement procedure/policy and other relevant inspections procedures to highlight how the above-mentioned issues are captured in existing documentation. NRA subsequently provided the requested information for the Task Force's review.	Pre-service inspection
2	The Task Force noted that NRA intends to conduct oversight of the quality assurance programmes at FDNPS for analysis work but requested to see a matrix of the clauses in ISO 9001 and ISO/IEC 17025 that are included in inspections under the quality assurance plan.	Operational safety inspection
3	The Task Force requested that NRA provide a copy of the enforcement procedure/policy and other relevant inspections procedures to highlight how the above-mentioned issues are captured in existing documentation. NRA subsequently provided the requested information for the Task Force's review.	Operational safety inspection
4	The Task Force requested NRA to provide further information about the roles and responsibilities of the expert group mentioned during the mission, how the group will operate and how discrepancies in monitoring data results will be investigated.	Source & Environmental monitoring
5	Additionally, the Task Force noted that NRA should ensure TEPCO establishes a process for the collection of information following a discrepancy in monitoring data results to enable root cause analysis to be undertaken. The Task Force also advised that the NRA should ensure that TEPCO establishes a process for the collection of information when a discrepancy is found in monitoring results to enable root cause analysis to be undertaken.	Source & Environmental monitoring

Short-term		Cat.
6	The Task Force requested NRA to provide examples of how TEPCO is required (e.g., through the Implementation Plan) to conduct checks to ensure workers are adequately trained and understand how to implement activities at FDNPS (relevant to the ALPS discharges) in a way that ensures the doses to workers are consistent with expectations. Following the mission, NRA provided additional information to the Task Force. The Task Force will continue to review the latest information provided by NRA.	ORP
7	The Task Force noted that long term storage of such information in a dose registry has a crucial role for supporting a regulatory authority in their oversight role.	ORP

Optimization of protection

Long-term		Cat.
8	The Task Force encouraged NRA to set discharge limits for other radionuclides that have a more significant radiological impact (i.e., I-129 and C-14). This would become particularly important in the event the discharge limit for tritium changes in response to the future optimization of protection of people and the environment for the discharge of ALPS treated water.	Protection
9	The Task Force noted that NRA could request that TEPCO considers using alternative characterization approaches if there are future revisions of the source term, and after operational experience has been gathered.	Source term
10	The NRA agreed to require TEPCO to review optimisation of protection for the discharge of ALPS treated water based on operational experience and associated monitoring following the start of the discharges.	Optimization

Thank you for your attention.