Technical Strategic Plan 2025 for Decommissioning of the Fukushima Daiichi Nuclear Power Station of Tokyo Electric Power Company Holdings, Inc.

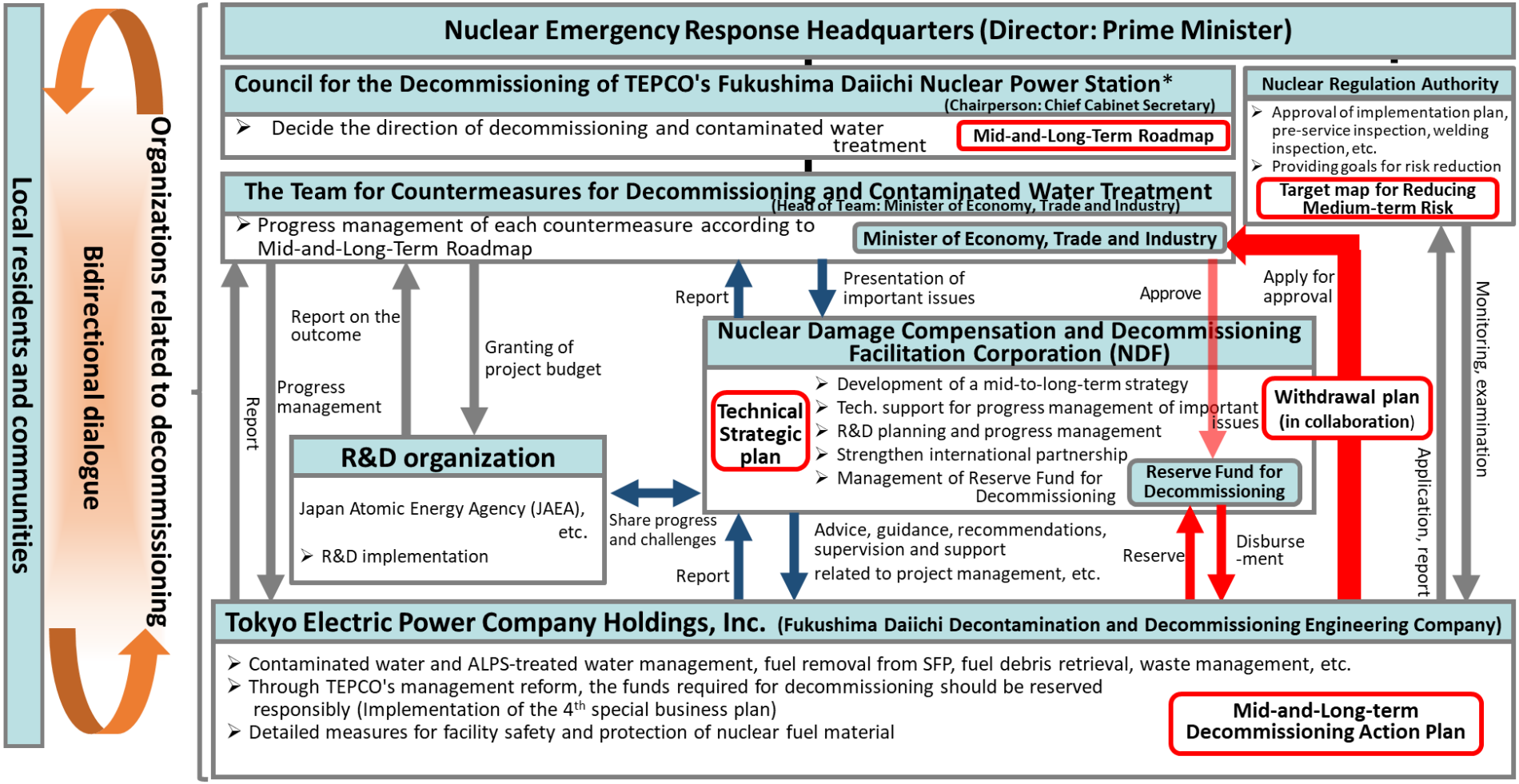
(Explanatory Material)

October 2025

Nuclear Damage Compensation and Decommissioning Facilitation Corporation

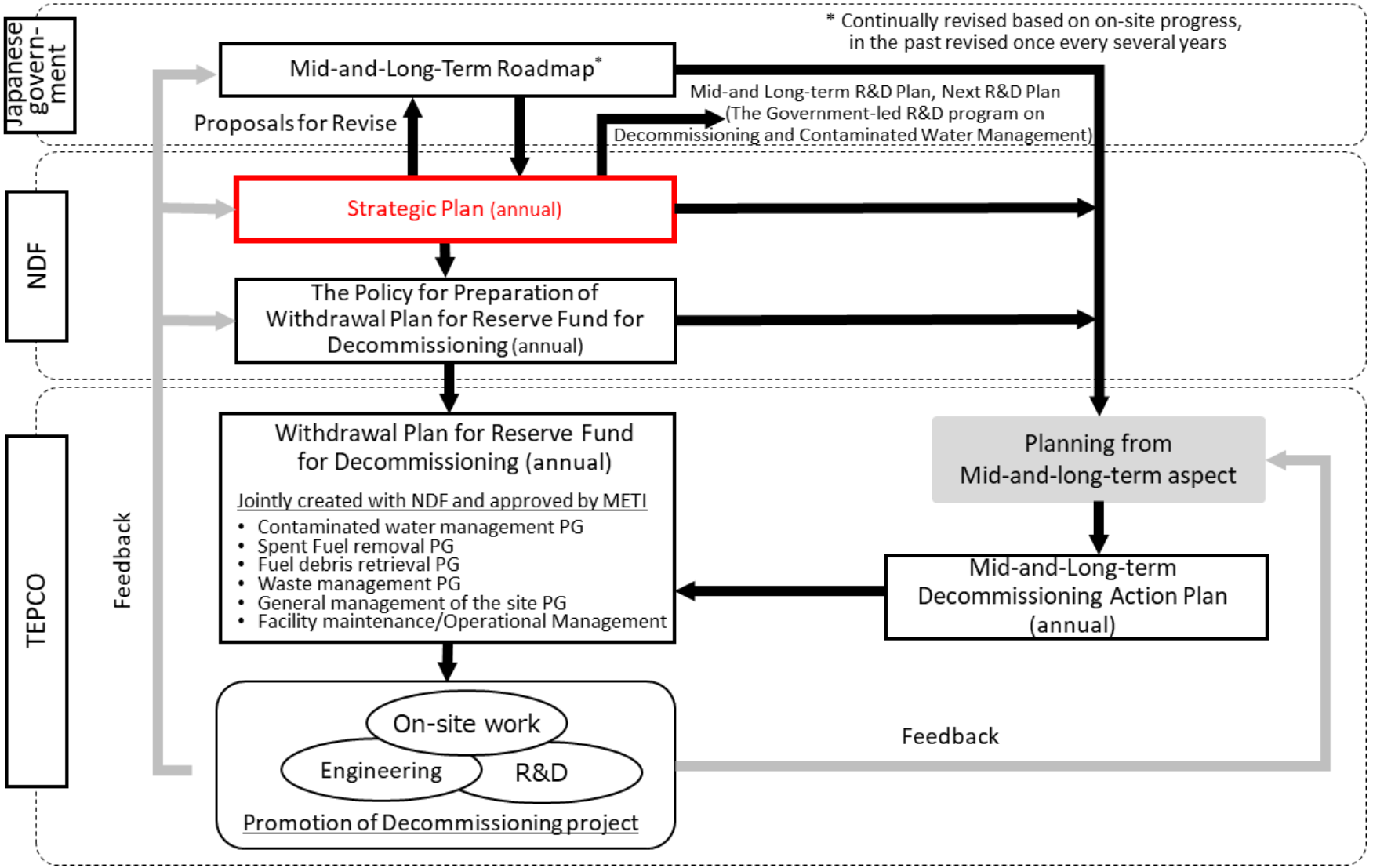
Table of Contents

Division of roles of related organizations responsible for decommissioning of the Fukushima Daiichi NPS



* In response to the ALPS-treated water disposal policy decided on April 13, 2021, "Council for the Decommissioning of TTEPCO's Fukushima Daiichi NPS toward steady implementation of basic policy on ALPS-treated water disposal" was founded.

Positioning of the Technical Strategic Plan



Issues to be addressed in preparation for full-scale fuel debris retrieval

The decommissioning of the Fukushima Daiichi NPS has shifted from short-term risk reduction phase for emergency response to mid-to-long-term risk reduction phase, where various decommissioning operations, including fuel debris retrieval, proceed simultaneously.

Issues and strategies

Conduct fuel debris retrieval, an unprecedented technological challenge that involves remote operations in a high-radiation dose environment.

- TEPCO needs to collaborate with partner companies at each stage from survey to retrieval work to accomplish the efforts.
- Retrieved fuel debris is characterized and analyzed to determine the technical storage conditions and will be placed in safe containers and stably stored on the premises.

Handling of retrieved fuel debris

- Specific technical requirements for processing/disposal will be presented once analysis and studies of fuel debris have progressed to a certain degree.

Share the technical prospects of the decommissioning with local residents and communities

- Honest and transparent dialogues with local communities will be continued until understanding is gained.
- NDF plans to continue direct dialogs with local residents and expand the target areas.

Quantitative assessment of risk

Target

Bringing the risk levels into the “Sufficiently stable management region” (the pale blue area)

⬇ Red arrows present major changes from the Technical Strategic Plan 2024.

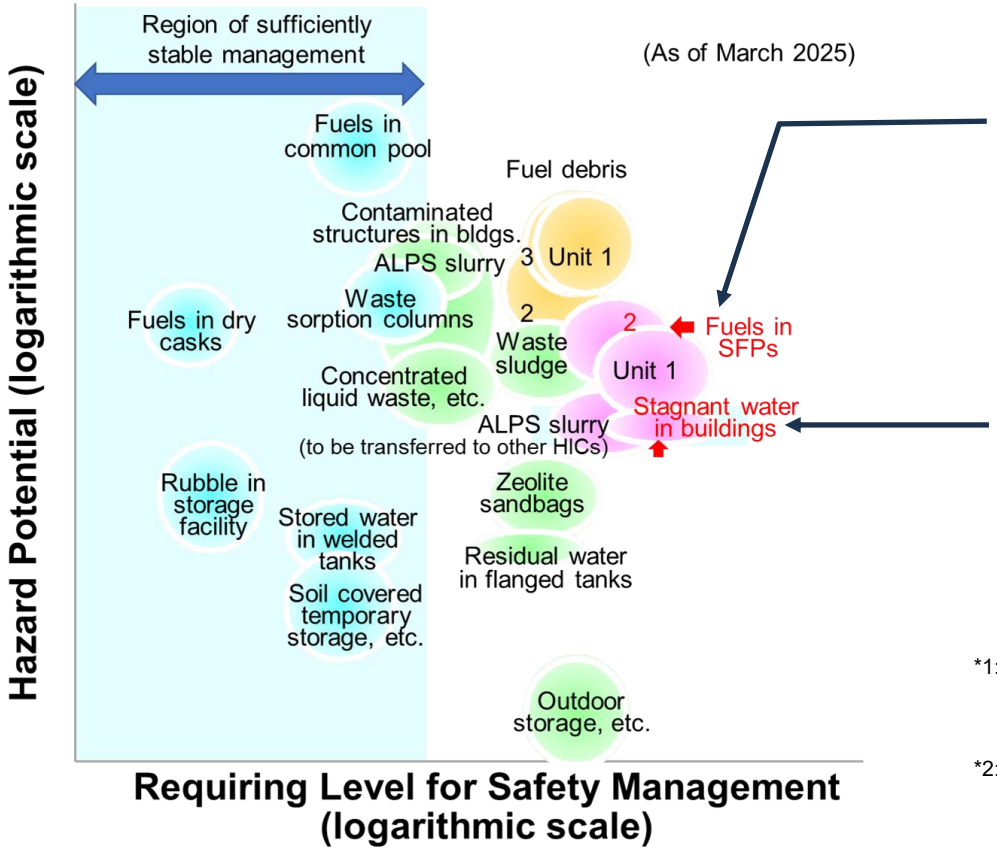


Fig. Risk levels posed by major risk sources at the Fukushima Daiichi NPS

Major changes (1) Fuel in the pool (Unit 2)

Decrease in the Required Level for Safety Management

A series of work was completed in Unit 2 SFP, including the removal of obstacles, decontamination, and the installation of shielding on the operating floor. The fuels in the pool have been moved to the left because the Requiring Level for Safety Management has decreased due to improvements in the work environment.

Major changes (2) Stagnant water in buildings (Unit 1)

Increased Hazard Potential

The stagnant water in buildings has been moved upward because the Hazard Potential has increased due to increased radioactivity concentrations*1 in the stagnant water resulting from the transfer of the water in the S/C in Unit 1 to the underground stagnant water in the reactor building*2.

*1: Regarding the lowered water level in the S/C, it is assumed that the radioactive concentration increased because water inside the S/C flowed into the stagnant water in the reactor building due to leakage from the system connected to the lower part of the S/C.

*2: It is expected that the radioactivity concentration in the stagnant water in the underground area of the reactor building will decrease, and **the increased hazard potential will also decrease due to the reduced amount of S/C water transferred to the reactor building after lowering the S/C water level in Unit 1 and continuing purification treatment**.
The improved seismic resistance of the PCV resulting from the lowered S/C water level in Unit 1 can reduce the risk of deterioration in the containment performance for fuel debris (in Unit 1).

Approach to risk reduction in decommissioning work

Basic policy

- Instillation and thorough implementation of a safety-first policy -

In order to reduce the risks associated with uncertain decommissioning work at the Fukushima Daiichi NPS, with safety as a matter of paramount importance and the overriding priority, it is important to evaluate and analyze decommissioning work from the viewpoints of “proven,” “efficient,” “timely,” and “field-oriented,” and to make comprehensive judgments based on the acquired information.

Considerations for reducing risks in decommissioning work

- Ensuring safety throughout the entire decommissioning period
  - ✓ Consider how to implement safety measures, including design and operation based on an evaluation of the most likely scenarios, and prepare to mitigate the effects of situations beyond the evaluated scenarios in consideration of the balance between a temporary increase in risk associated with decommissioning work and risk reduction over the entire decommissioning period.
- Reduction of occupational safety risks
- Step-by-step approach to overcoming uncertainties
- Further strengthening of independent efforts to reduce risks in the decommissioning work

Major targets and progress for fuel debris retrieval

Major targets

Retrieve fuel debris safely after thorough and careful preparations and bring it to a state of fully managed stable storage in appropriate storage containers and facilities. To achieve that:

- Promote the internal investigation including “trial retrieval” of fuel debris in Unit 2 and proceed with a series of operations, such as “gradual expansion of fuel debris retrieval”.
- Proceed with internal investigations of the RPVs and PCVs and improve the environment inside and outside the reactor buildings.
- Utilize the information and experience gained from fuel debris retrieval in Unit 2, internal investigations, research and development, and the on-site environmental improvements, etc., for “further expansion of the retrieval scale”, and determine the methods for preparing, retrieving, containing, transferring, and storing fuel debris.

Progress (Unit 1)

PCV water level lowering for improving the seismic performance of the S/C

- The PCV water level has been lowered by decreasing the amount of water injected into the reactor. The water level decrease in the S/C was also confirmed and will continue to be monitored and reflected in the plan for S/C water level decrease.
- Considering the possibility of changes in the PCV internal environment due to a decrease in PCV water level, environmental investigation inside the PCV was conducted. The information obtained will be reflected in the design of future investigation equipment and the configuration of mock-up testing and training environments.

Issues and technical strategies for "trial retrieval" in Unit 2 (internal investigation and fuel debris sampling)

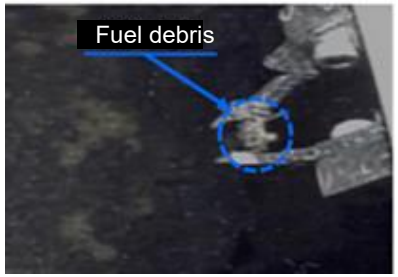
Significance

Fuel debris retrieval is the first attempt at the Fukushima Daiichi NPS, and expanding the containment barriers to the outside of the PCV is a basic on-site configuration for planned retrieval operations.

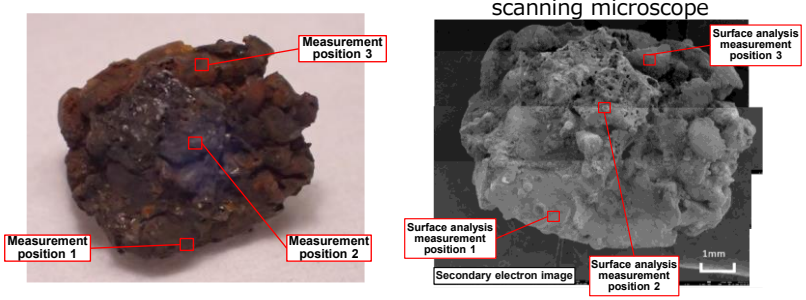
Issues and technical strategies

The issue is to carry out fuel debris retrieval work steps in uncertain internal condition of the PCV.

- ✓ Two fuel debris sampling operations using the telescopic device were completed, and the samples are currently being analyzed. The experience and information gained will be leveraged in future decommissioning efforts



Fuel debris held by a tip jig (October 30, 2024)



Fuel debris sample appearance

- ✓ Verify the functions of the robot-arm through mock-up tests and other means for further collection of fuel debris and internal investigation using the robot-arm
- ✓ Proceeded safely and carefully, taking into account experience with past problems and other incidents in work

Work step for trial retrieval

01. Preparations (completed)
02. Install isolation chamber (completed)
03. Open the hatch of penetration X-6 (completed)
04. Remove deposits inside the penetration X-6 (completed)
05. Install penetration X-6 connection structure (complete)
06. Install telescopic device (complete)
07. Fuel debris sampling (trial retrieval)
08. Contain fuel debris
09. Accept/measure in glove box
10. Remove container/ store in canister and carry out
11. Off-site transport and off-site analysis

* Continue conducting fuel debris sampling and internal investigations using robotic arms.

"Further expansion of the retrieval scale" in Unit 3 Examining retrieval method

Issues

Retrieval method selection and specific designs study need to be made toward starting fuel debris retrieval work.

Based on the recommendations by the **"Sub-Committee for the Evaluation of Fuel Debris Retrieval Methods"**, TEPCO has outlined the results examined for fuel debris retrieval methods and established the following major processes.

【Major processes for fuel debris retrieval】

Only the works and processes involved in the preparation can be presented with the technical basis.

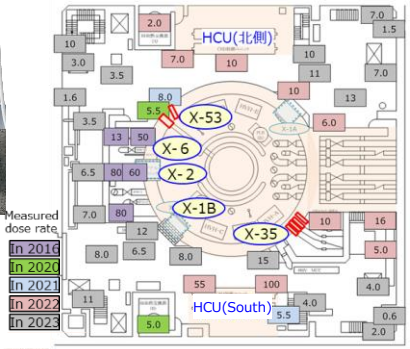
Review based on the information obtained in the preparatory process

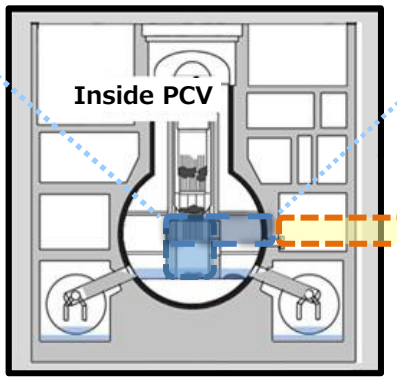
Preparation process

Environmental improvement → Internal investigation /sampling *1 → Verification of processing/collection technologies *2 → Full-scale fuel debris retrieval → On-site transfer → Storage

Removal of interfering objects outside the reactor building

Reduction of radiation dose inside reactor buildings





Integrated monitoring facility

Outdoor

Pre-storage treatment facility

Storage facility

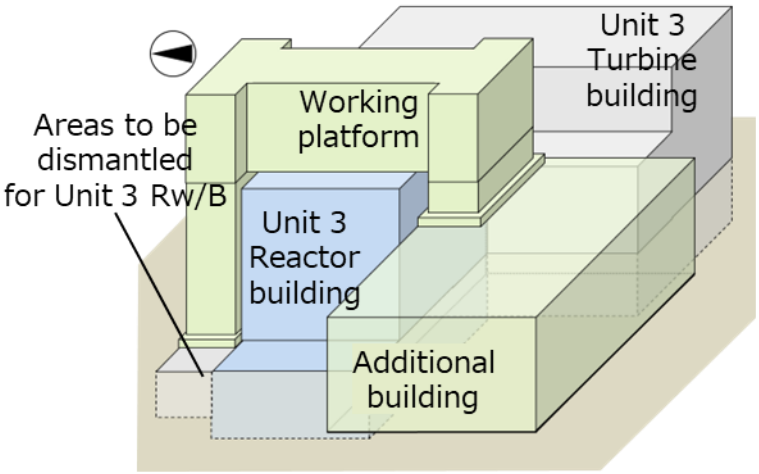
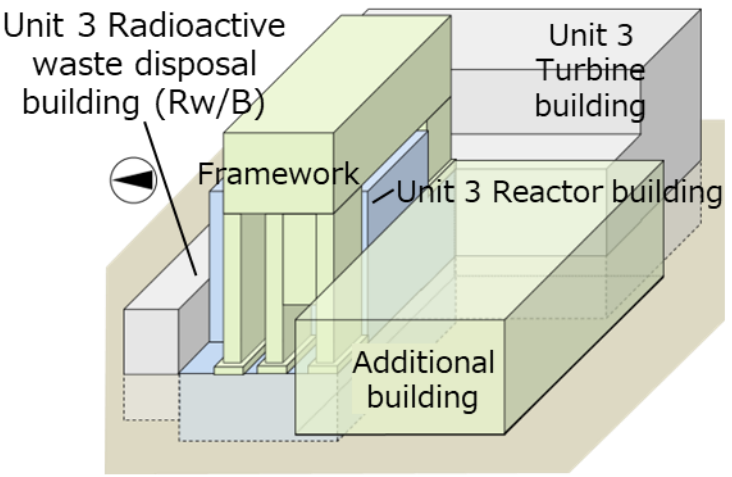
Control room

*1: Small amount of fuel debris is collected and analyzed for composition and properties
*2: Expanding data related to measures against dust dispersion, water quality changes, and storage associated with processing, collection, etc.)

"Further expansion of the retrieval scale" in Unit 3 Support structures

- Access to the inside of the PCV and RPV for fuel debris retrieval is provided from the top (operating floor) and the side.
  - ✓ For top-access, cells with containment functions and retrieval equipment are installed on the operating floor.
  - ✓ In light of the damage to Unit 3 reactor building (R/B), it is difficult to impose major loads on it, the loads must be borne by a support.

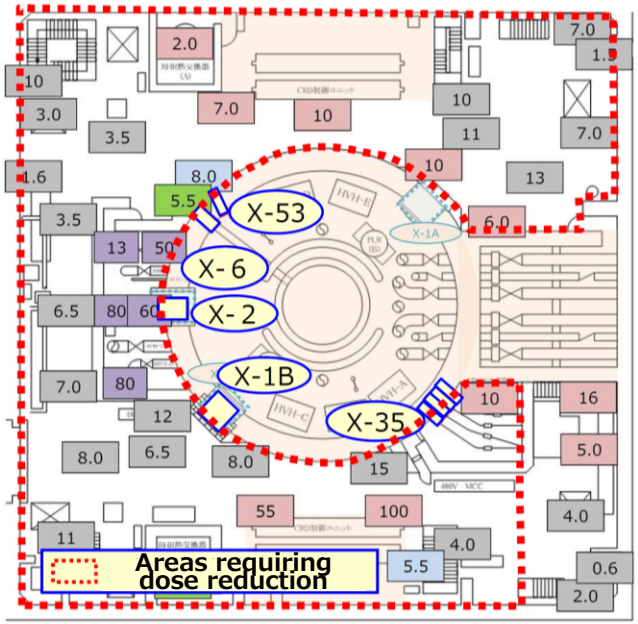
■ Proposed support structures for top-access

Examples of study	North-South working platform plan	East-West framework plan
Schematic diagram		
Expected main issues	■ Interference with Unit 3 radioactive waste disposal building (Rw/B))	■ Restrictions on loading equipment due to the load capacity of the reactor building

"Further expansion of the retrieval scale" in Unit 3
Environmental improvement

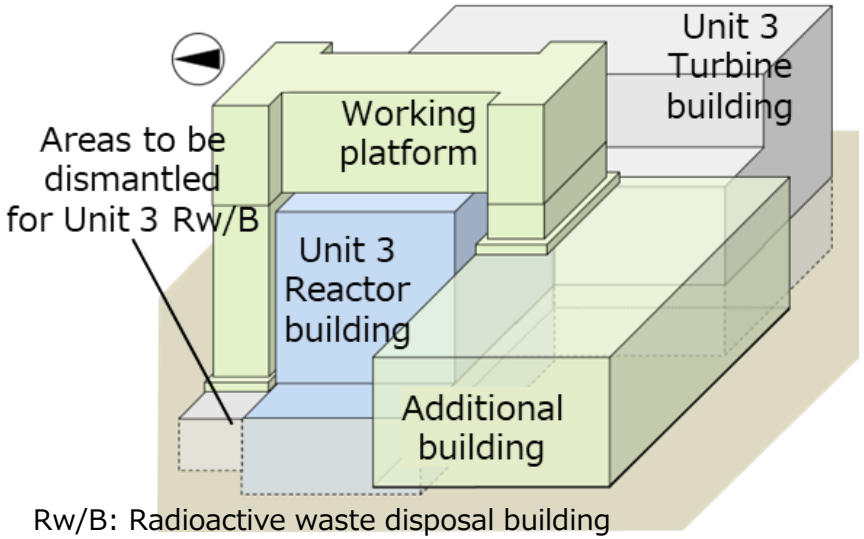
- In retrieving fuel debris, appropriate environmental improvement will be needed (e.g., reducing radiation dose and removing interfering objects).
  - ✓ Mainly to reduce radiation dose inside the reactor building.
  - ✓ To remove buildings and structures outside the reactor building that interfere with the installation of support structures and additional building.

①Radiation dose reduction and interference removal inside the reactor building



✓ It is important for reducing worker exposure during the installation and operation of equipment for side-access.

②Interference removal outside the reactor building



Rw/B: Radioactive waste disposal building

Example of construction of support structures and an additional building (Case with North-South Platform)

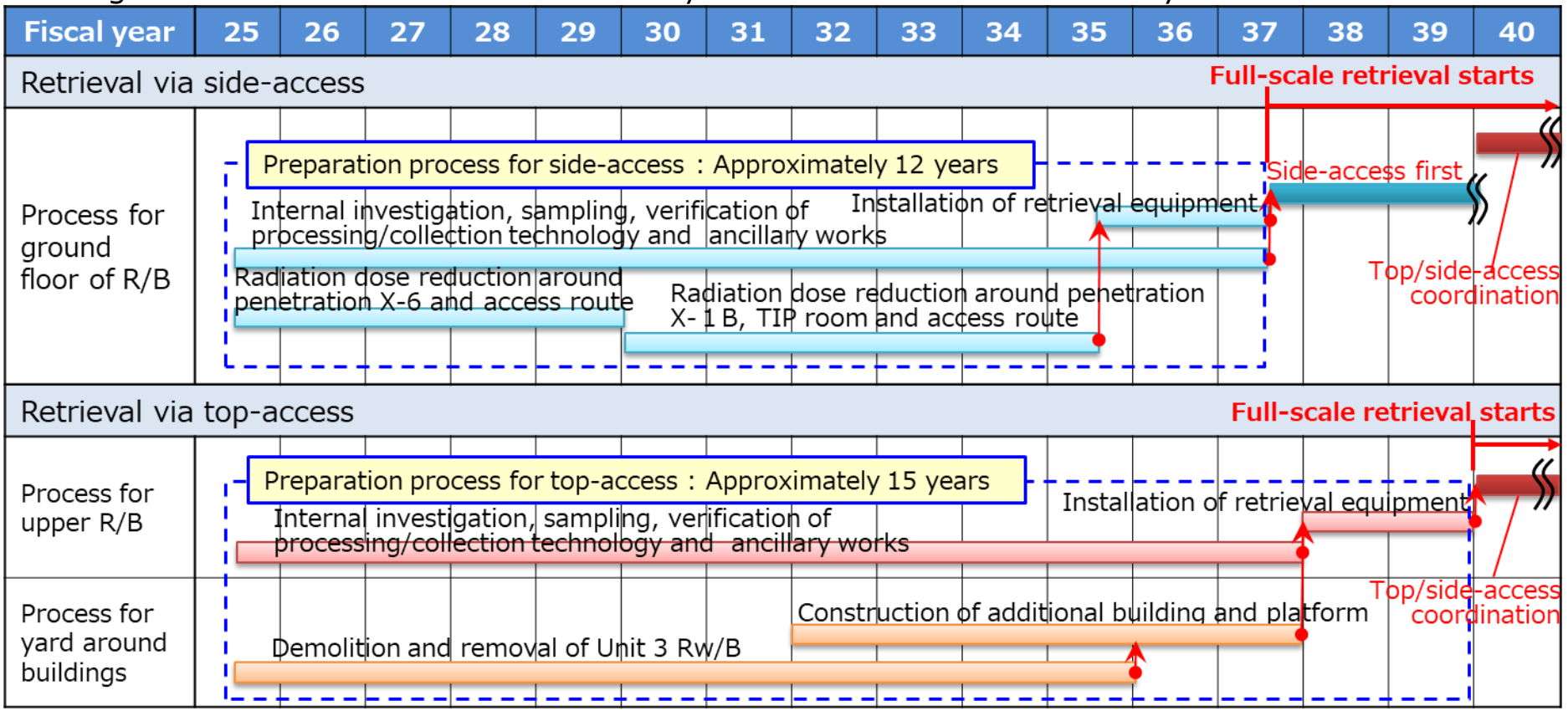
✓ Removal of surrounding facilities interfering with retrieval equipment is required.

"Further expansion of the retrieval scale" in Unit 3
Preparatory processes up to the start of full-scale retrieval

- TEPCO examined the processes up to the start of full-scale retrieval (preparatory process) under certain assumptions.
- Currently, it is estimated that it will take about 12 to 15 years for preparatory processes to develop environment and install retrieval equipment.

*The result of this estimation assumes that progress is made as expected for uncertain matters.

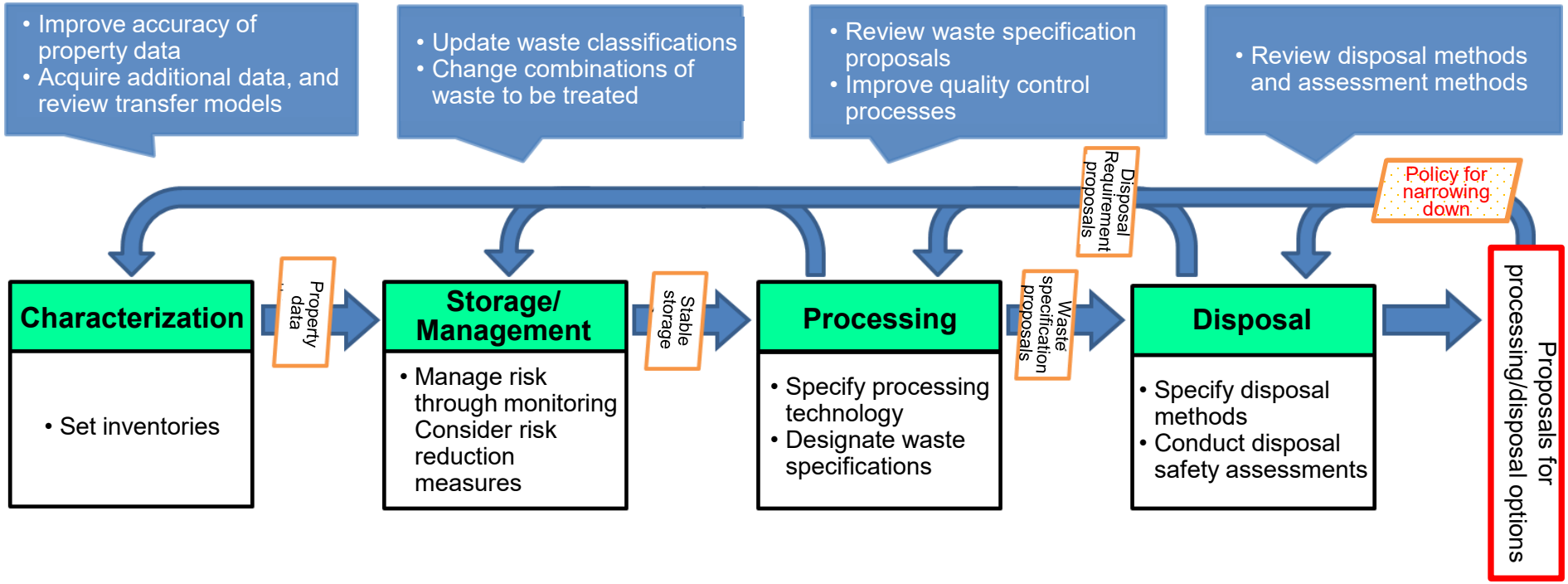
- For matters requiring additional verification, TEPCO will proceed with on-site investigations and design verification over about one to two years to reassess their feasibility.



Major targets for waste management

Major Targets

- Appropriate measures should be studied as management approaches for overall solid waste to establish waste streams*.
  * Individual waste streams, the flow of integrated measures from characterization to recycling and disposal of individual solid wastes, is evaluated, and the options that are recognized as safe and feasible are accumulated and integrated together.
- Analysis plans are formulated and updated, and the analysis necessary for each stage of the study from storage/management to disposal of waste is steadily conducted.



Key issues and technical strategies concerning waste management

Issues

Characterization

Waste management requires characterization of waste through analysis, and a medium-to long-term analysis strategy is required in which determining the priority, purpose, and quantitative target for various kinds of waste generated in large volume

Storage/management

More reasonable waste management is required, in order to safely and rationally proceed with storage/management of solid waste that will continue to be generated

Processing/disposal

Studies on appropriate handling methods in the management of solid waste in general need to be made in order to decide conditioning specifications and production method

Technical strategies

- For efficient analysis, consider an approach based on analysis planning methods using statistical techniques, etc.
- Promote the systematic development and operation of the supply chain, as well as the expansion of analytical capabilities and the streamlining of analytical methods, in consideration of the division of roles among related facilities for analysis
- Shift from management by surface radiation dose rate to management by radioactivity concentration, for more reasonable waste management
- Study the waste stream to properly manage all solid wasten in order to cope with the increase in solid waste generated as the decommissioning progresses

Identify processing and disposal options through studies on technical issues and options of solid waste processing

↓

Use waste property data obtained by analysis, and consider establishing a waste stream that is suitable for each type of solid waste

Major targets and technical strategies concerning contaminated water and treated water management

Major targets

- **Control the amount of contaminated water generated to about 50 to 70 m³/day by the end of FY2028**
  [The target of approximately 100 m³/day or less achieved in FY2023 was also achieved in FY2024.]
- **Embodiment of contaminated water management for medium- and long-term prospects**
- **Securing site and other resources to steadily advance the entire decommissioning process**

Technical strategies

《Measures against rainwater inflow》
Continue paving and measures including roof covering

《Measures against groundwater inflow》
- Continue operation of the frozen soil wall and sub-drains
- Localized water shieling of buildings

Establish contaminated water purification systems and measures to stop the water flow in buildings according to fuel debris retrieval methods, while considering the interference with decommissioning work such as fuel debris retrieval

Continue safe and reliable discharge of ALPS-treated water and proceed with dismantling of storage tanks in a planned manner

Results of ALPS-treated water discharge

- A total of 15 discharges have been conducted to date. Total volume discharged: Approx. 120kilo m^3 [Storage volume at the start of discharge: Approx. 1.3 million m^3]
- No abnormalities were observed in treated water transfer facilities, dilution and discharge facilities, etc., and their stable operation continues. Prompt measurement of tritium concentration in the seawater near the outlet of treated water found that the concentrations are lower than the index values (level to decide discharge suspension/level to trigger surveillance), verifying that treated water is being discharged safely.

Fiscal year	Time of discharge	Period	Pre-dilution tritium concentration	Concentration of radionuclides other than tritium (Total notification concentration ratio)	Post-dilution tritium concentration	Amount of discharge	Total amount of tritium
FY2023	First	Aug 24 to Sep 11, 2023	140 K Bq/L	0.28 (≤1)	220 Bq/L	7,788m^3	Approx. 1.1 tn Bq
	Second	Oct 5 to Oct 23, 2023	140 K Bq/L	0.25 (≤1)	189 Bq/L	7,810m^3	Approx. 1.1 tn Bq
	Third	Nov 2 to Nov 20, 2023	130 K Bq/L	0.25 (≤1)	200 Bq/L	7,753m^3	Approx. 1.0 tn Bq
	Fourth	Feb 28 to Mar 17, 2024	170 K Bq/L	0.34 (≤1)	254 Bq/L	7,794m^3	Approx. 1.3 tn Bq
FY2024	First	Apr 19 to May 7, 2024	190 K Bq/L	0.31 (≤1)	266 Bq/L	7,851m^3	Approx. 1.5 tn Bq
	Second	May 17 to June 4, 2024	170 K Bq/L	0.17 (≤1)	234 Bq/L	7,892m^3	Approx. 1.3 tn Bq
	Third	Jun 28 to Jul 16, 2024	170 K Bq/L	0.18 (≤1)	276 Bq/L	7,486m^3	Approx. 1.3 tn Bq
	Fourth	Aug 7 to Aug 25, 2024	200 K Bq/L	0.12 (≤1)	267 Bq/L	7,897m^3	Approx. 1.6 tn Bq
	Fifth	Sep 28 to Oct 14, 2024	280 K Bq/L	0.078 (≤1)	405 Bq/L	7,817m^3	Approx. 2.2 tn Bq
	Sixth	Oct 17 to Nov 4, 2024	310 K Bq/L	0.083 (≤1)	436 Bq/L	7,837m^3	Approx. 2.4 tn Bq
	Seventh	Mar 12 to Mar 30, 2025	310 K Bq/L	0.076 (≤1)	403 Bq/L	7,859m^3	Approx. 2.4 tn Bq
FY2025	First	Apr 10 to Apr 28, 2025	310 K Bq/L	0.083 (≤1)	489 Bq/L	7,853m^3	Approx. 2.9 tn Bq
	Second	Jul 14 to Au. 3, 2025	250 K Bq/L	0.11 (≤1)	351 Bq/L	7,873m^3	Approx. 2.0 tn Bq
	Third	Aug 7 to Aug 25, 2025	380 K Bq/L	0.12 (≤1)	500 Bq/L	7,908m^3	Approx. 3.0 tn Bq
	Fourth	Sep 11 to Sep 29, 2025	210 K Bq/L	0.12 (≤1)	288 Bq/L	7,872m^3	Approx. 1.7 tn Bq

Major targets and technical strategies for fuel removal from spent fuel pools

Major Targets

- The aim is to complete fuel removal from all spent fuel pools (SFP) of Units 1 to 6 by the end of 2031.
  - Retrieval from Unit 1 started in FY 2027 to FY 2028
  - Retrieval from Unit 2 started in FY 2024 to FY 2026
- The spent fuel transferred to the Common Spent Fuel Storage Pool will be transferred to Dry Storage Facilities, which will be constructed in the future.
- The high radiation dose equipment will be transferred from the SFPs in Units 1 to 4. The pool water will be drained to eliminate the need for management of SFPs, and the load on the reactor buildings will be reduced to improve seismic resistance.

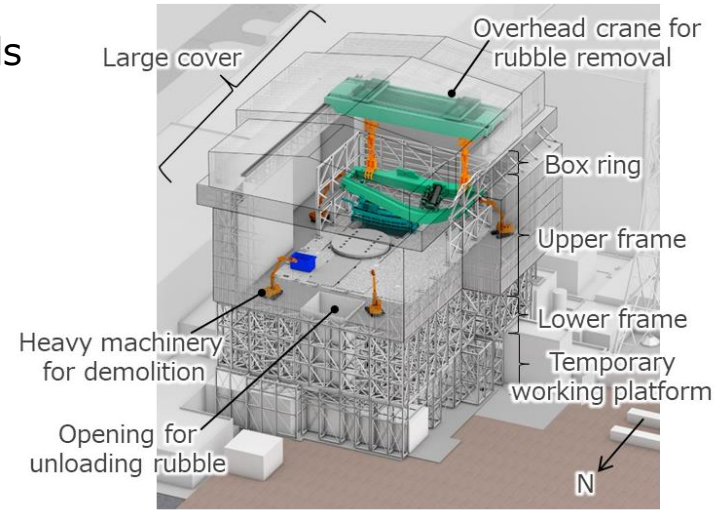


Fig. Outline of rubble removal from Unit 1 (Conceptual drawing)

Issues and technical strategies

Unit 1

In order to remove the overhead crane in an unstable state, a thorough investigation is needed.

→ Promptly investigate it as soon as investigation becomes possible and incorporate into safety assessment and rubble removal plans.

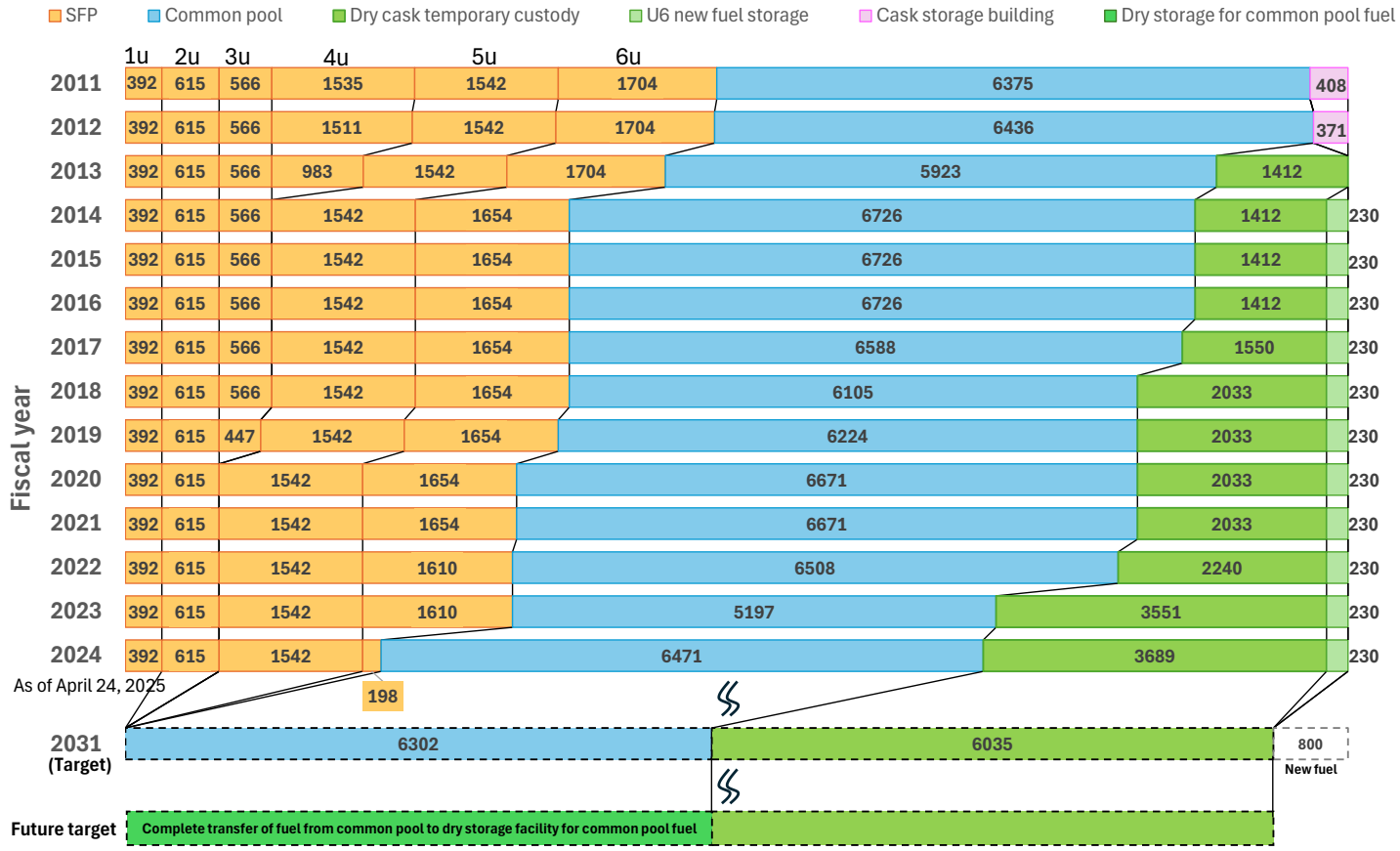
Unit 2

The issue is to ensure that a fuel handling machine with a boom- type crane, which has not been used for nuclear facilities in Japan, is operated remotely.

→ Identify risks associated with operational and equipment problems, to be sufficiently familiar with the operation and functionality of systems beforehand through trial operations and training,

Transition of the fuel storage status

Spent fuel is steadily transferred to the safer common pool and stored appropriately.



* Dry cask at the temporary cask custody area: Started operation in 2013 Unit 4: Removal from spent fuel pool completed in 2014 Unit 3: Removal from spent fuel pool completed in 2021 Unit 6: Removal from spent fuel pool completed, excluding 198 new fuel assemblies in 2025. Cask storage building (Cask storage building located beside the shallow draft quay before the accident): Stored dry casks were transferred to the Dry cask at the temporary cask custody area in FY 2013. New fuel as of 2031 (800 units) will be transported out of the site. 95 casks will be stored in the Dry cask at the temporary cask custody area.

Fig. Number of fuel of Fukushima Daiichi NPS at the end of each fiscal year

Purpose of the analysis and the analysis targets for Decommissioning

Purpose and significance

A wide range of analyses will be conducted on various samples to safely handle fuel debris and solid waste generated by the accident at the Fukushima Daiichi NPS, and to properly store and manage them.

- ✓ Fuel debris: The U-235/total uranium isotope ratio, uranium concentration range, structure and element distribution of fuel debris, and other properties will be verified to incorporate the results into the studies on fuel debris handling, storage, and management.
- ✓ Solid waste: For studying storage, processing, recycling and disposal methods, assess the properties of solid waste and obtain data.
- ✓ ALPS-treated water: ①Ensure that ALPS-treated water falls below the regulatory standard for safely discharging it into the sea.
  ②Continue marine monitoring activities to confirm the condition of radioactive materials in the environment.
- ✓ Promote development of facilities for analysis, training of analytical personnel, and development of efficient analysis/ evaluation methods, in order to steadily proceed with a wide range of analyses.

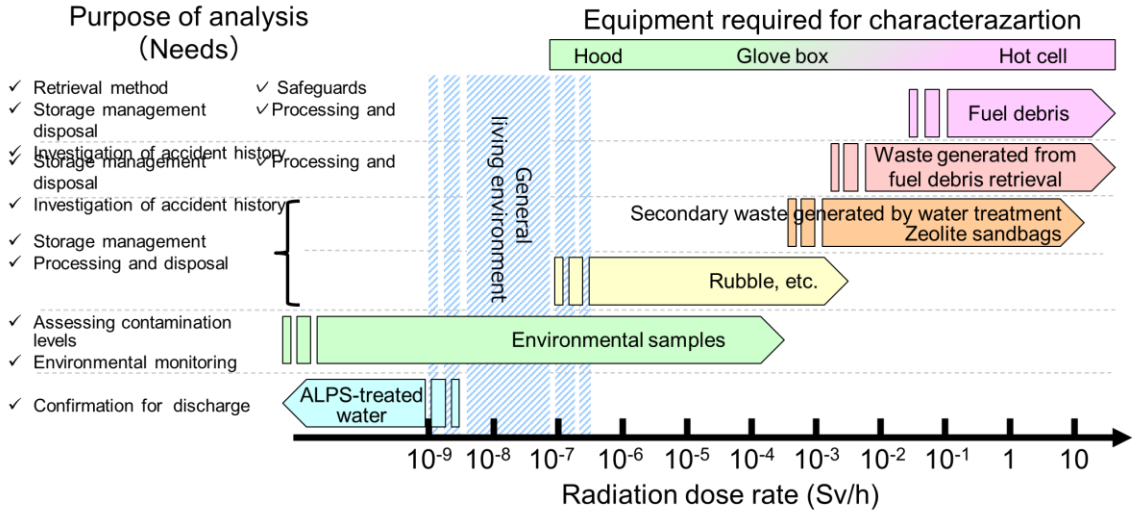


Fig. Relationship between the purpose of the analysis, equipment required for characterization, and radiation dose rates of the analysis targets

Issues and strategies related to analysis for decommissioning

Issues and strategies

Strengthening analysis structures and methods

A systematic analysis is required to flexibly respond to the growing demand for analysis

▶ Formulate/update characterization policies and analysis plans based on waste with a high priority for analysis.

Solid waste is characterized by its variety and large quantity, making it necessary to efficiently assess its properties.

▶ Efforts are being made to develop analytical methods for obtaining data easily and quickly, its standardization, and to develop measurement and analytical methods for handling various sample forms.

Requires advanced skills that would be difficult for a single individual, who can perform analysis planning in anticipation of how the analysis results will be used.

▶ Organize the “Characterization Plan Coordination Council” and the “Analysis Support Team” to provide advice for enhancing the capacity of each individual. In addition, promote the development of young and mid-level personnel within the organization through discussions on providing advice and other support.

Diversification of analytical techniques to increase sample size and volume

The issue with sample analysis is that each analysis takes a long time, and the amount analyzed is small.

▶ Examining application method of non-destructive measurement is important, which can measure large volume in a short time.

5. Efforts to facilitate research and development for decommissioning of the Fukushima Daiichi NPS

Significance

The steady promotion of decommissioning requires further promotion of research and development to solve many challenging and technical issues.

Current status

- According to the recommendations by the Sub-Committee, TEPCO is proceeding with engineering work toward “further expansion of the retrieval scale”.
- In November 2024, fuel debris was retrieved for the first time and has been analyzed using the analytical method developed in the Subsidized project for decommissioning.

Strategies

- TEPCO accelerates its engineering work and actively identifies R&D needs. **Relevant organizations (TEPCO, JAEA, NDF, etc.) need to discuss issues, including basic/fundamental research,** and to further encourage R&D in the subsidized project for decommissioning, the World Intelligence Project, and TEPCO’s technical development.
- In the subsidized project for decommissioning, NDF will continue to ensure its capability to propose and plan R&D by **consolidating technical information through RFI from a wide range of sources**, and to strengthen the collaboration between basic/fundamental research and applied/practical application research.

Capabilities, organization, and personnel to proceed with decommissioning

Significance

- To achieve goals in project-based operations such as the decommissioning of Fukushima Daiichi NPS, **it is essential to clarify the objectives, means, resources required, schedules, and risks and to manage project execution.**

Strategies

- TEPCO's capabilities to be strengthened strategically
  - ✓ Enhancement of engineering based on safety and operator's perspectives and investigation capabilities in the upstream side of the project
- Building collaborative relationship with business partners
  - ✓ Diversify contract methods to promote cooperative project progress toward risk reduction based on an understanding and sharing of the mission and risk factors of the project by the ordering party and the contractor
  - ✓ The One Team initiative is undergoing a trial implementation, in which dedicated workers from both TEPCO and its partner companies engage in tasks with high exposure and safety risks to enhance safety, quality, and efficiency
- Initiatives to secure and foster human resources
  - ✓ Activities to secure human resources necessary in a medium-to long-term and systematic development of leaders who will be responsible for the decommissioning are needed.
  - ✓ Implement initiatives for secondary and higher education stages, with a view to diverse areas of study, in the nuclear energy field and beyond.

Strengthening international cooperation

Significance

- To learn lessons from precedent overseas cases, and **utilize the world's highest level of technology and human resources**
- **To share decommissioning experience in Fukushima Daiichi with the international community** is Japan's responsibility.
- **To gain international understanding and interest** in the decommissioning efforts of Fukushima Daiichi

The 9th International Forum on the Decommissioning of the Fukushima Daiichi NPS (August 2025)

Strategies

Integrate and give back wisdom and knowledge from around the world

- ✓ TEPCO and NDF maintain and strengthen their cooperation with their counterparts according to their organizational roles
- ✓ Continue the collection of technical information from overseas experts, including but not limited to nuclear technology, that contributes to decommissioning

Maintain and develop international community's understanding, interest and cooperation in decommissioning

- ✓ Separate approaches to overseas experts and approach to the overseas general public.
- ✓ Participate in conferences of international nuclear-related organizations and hold the International Forum on the Decommissioning of the Fukushima Daiichi NPS

Stakeholder involvement

Significance

In achieving “Coexistence of reconstruction and decommissioning”, **revitalizing decommissioning-related industries is an important pillar of TEPCO’s contribution to the reconstruction of Fukushima.**

Current initiatives

- **TEPCO actively disseminates information and accepts visitors to the Fukushima Daiichi NPS**
- **NDF exchanges opinions with local residents and relevant organizations through the Dialogue on the Decommissioning of TEPCO's Fukushima Daiichi NPS (dialogue meeting) and other opportunities**
- **Employment for Fukushima Daiichi NPS**
  - ✓ Approx. 3,600 to 4,900 workers engage in operations on weekdays (daily average for the last 2 years up to August 2025)
  - ✓ Among them, about 70% are hired from the local communities (as of September 2025)
- **A total of 1,726 matching sessions (e.g., exchange meetings)** were held as of the end of September 2025 for decommissioning-related industries

Strategies

Interactive communication with local residents

- ✓ TEPCO continues to organize dialogue meetings with local communities, accept visitors to the Fukushima Daiichi NPS, and provide round-table discussions
- ✓ NDF continues to organize dialogue meetings to communicate the progress of the decommissioning and to listen to the concerns and questions of local residents directly, and is considering expanding the target region

Creating more opportunities for local companies to participate in decommissioning work

- ✓ Promote the establishment of a public-private partnership structure through the Fukushima decommissioning council for coexistence with the local community, in order to identify issues and opinions from the perspective of prime contractors and other stakeholders, and to encourage the participation of local companies
- ✓ Consider implementing initiatives in which TEPCO and its prime contractors collaborate to facilitate the participation of local companies, and initiatives from which local companies can expect continuous orders of a certain scale