Mid-and-Long-Term Decommissioning Action Plan 2024

March 28, 2024

Tokyo Electric Power Company Holdings, Inc.

Mid-and-Long-Term Decommissioning Action Plan 2024

The “Mid-and-Long-Term Decommissioning Action Plan” has been formulated to put forth the primary decommissioning work processes needed to achieve the milestones noted in the Mid-and-Long-Term Roadmap and the ideal state (FY2033) presented in the Nuclear Regulation Authority (NRA) Risk Map.

This is our “Mid-and-Long-Term Decommissioning Action Plan 2024,” a revised version based on the achievements made during FY2023.

Under the basic principle of “coexistence of reconstruction and decommissioning”, TEPCO aspires to carefully communicate about the future prospects of decommissioning in an easy-to-understand manner, so as to proceed with decommissioning while obtaining the understanding of the region and the people.

Furthermore, an outsourcing plan will be formulated based on the Mid-and-Long-Term Decommissioning Action Plan 2024 as we strive to expand outsourcing and get more local companies involved in decommissioning.

Moreover, the initiatives undertaken during the work of decommissioning the Fukushima Daiichi Nuclear Power Station are unprecedented in the world, and hence, we will revise this plan regularly in accordance with the progress made and the challenges faced, as we systematically proceed with safe and stable decommissioning.

(Note) The “Mid-and-Long-Term Decommissioning Action Plan 2024” corresponds with the following plan indicated in the Mid-and-Long-Term Roadmap.
— Specific plan for achieving the main target processes, etc. specified in the Mid-and-Long-Term Roadmap and the goals laid out in the NRA Risk Map.

Mid-and-Long-Term Roadmap: Mid-and-Long-term Roadmap towards the decommissioning of TEPCO’s Fukushima Daiichi Nuclear Power Station (Finalized by the Inter - Ministerial Council for Contaminated Water and Decommissioning Issues on December 27, 2019).
NRA Risk Map: Mid-term risk reduction goal map for TEPCO’s Fukushima Daiichi Nuclear Power Station (Finalized by the NRA on February 28, 2024)

Revisions to the Mid-and-Long-Term Decommissioning Action Plan 2024

○ Overall

- Reflections of NRA Risk Map

○ Contaminated water management

- Addition of processes for creating a countermeasures plan that reduces the need for management resources

○ Fuel debris retrieval

- Mention of prospective date for beginning the trial retrieval of fuel debris (by October 2024 at the latest)
- Details on the internal investigation of the primary containment vessel

○ Other

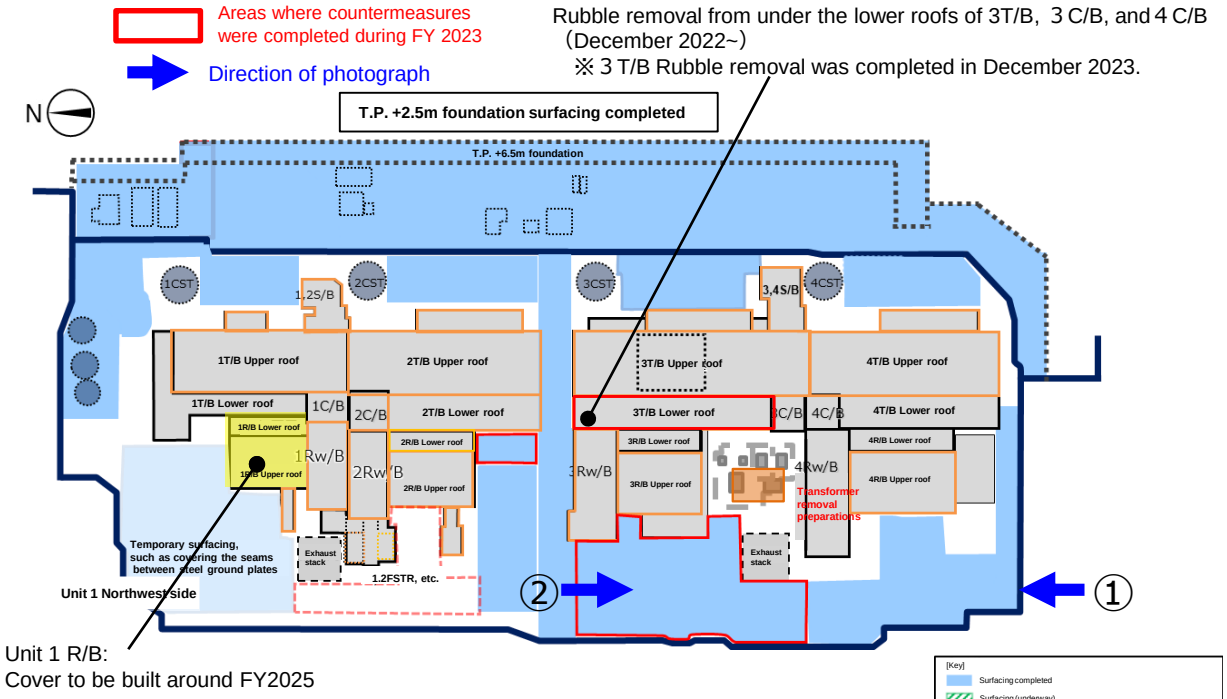
- Addition of installation processes for new ALPS/RO equipment
- Addition of processes for implementing slope countermeasures in the vicinity of earthquake resistant facilities

Contaminated water management

– Major progress made in FY2023

○ Major progress made in FY2023

- **Amount of contaminated water being generated**
  - We have continued to pave the surfaces inside the land-side impermeable wall and as of February 2024, the paving of approximately 50% of this area had been completed. We predict that the amount of contaminated water generated during FY2023 was 80m³/day, and will be conducting an assessment in the future to verify this figure.



① After surfacing
(Steel plates laid on top of asphalt): Wide view (February 2024)

② Asphalt paving completed (September 2023)

Progress with surfacing inside the land-side impermeable wall around Unit 1-4 buildings: Approximately 50%
(As of the end of February 2024. Does not include the area on the northwest side of Unit 1)

Contaminated water management

- Major work processes going forward (1/5)

○Schedule for achieving the milestones of the Mid-and-Long-Term RM

- **Reduce contaminated water generation to about 100 m^3/day or less (within 2025)**
  - The maintenance, management and operation of the groundwater bypass, sub-drain and land-side impermeable wall will continue and the level of the groundwater around the buildings will be kept low in a stable manner.
  - As measures to prevent rainwater seepage, site pavement will be carried out on the inner side of the land-side impermeable wall and the damaged parts of building roofs will be repaired.
  - **Reduce contaminated water generation to about 50-70 m^3/day (by the end of FY2028)**
    - Promote localized building water sealing as a measure to further suppress the amount of groundwater flowing into the buildings.
  - The countermeasures mentioned above are being implemented, and we are formulating countermeasures that minimize the need for operation/maintenance work, such as pumps for sub-drains and the land-side impermeable wall, etc., and consequently reduce the need for management resources.
  - Commencement of measures to reduce the amount of contaminated water pumped up at the 2.5m foundation

(Challenges)

- The constraints in carrying out site pavement (radiation environment of the work area, removing existing equipment, etc.)
- The constraints in carrying out rainwater measures for buildings (removing existing equipment, etc.)

Contaminated water management

- Major work processes going forward（2/5）

○ Initiatives for achieving the "ideal state (FY2033)" mentioned in the risk map

- **Reducing the amount of contaminated water being generated**
  - Complete localized water sealing of reactor buildings.
  - Commence measures to reduce the amount of contaminated water pumped up from the 2.5m foundation, including contaminated soil countermeasures.
  - Ascertain the relationship between the roles of the land-side impermeable wall/sub-drains and the generation of contaminated water, and formulate a plan to gradually phase these measures out.
- **Treating stagnant water in buildings**
  - Commence operation of α nuclide removal equipment, and dry out the process main building and HTI building.
    - In preparation for the treatment of stagnant water in buildings, install tanks that will be used as water storage tanks before the water is treated with cesium adsorption equipment (KURION/SARRY/SARRY-II)
    - The floor will be exposed after removing high radiation zeolite sandbags etc. on the lowermost subfloor.
    - Equipment for removing α nuclides present in the stagnant water will be designed/installed after ascertaining the characteristics of these nuclides.

    (Challenges)
    - Studying safety measures to be taken with regard to handling or implementing measures for high radiation zeolite sandbags etc.
    - Studying detailed methods for separating/removing α nuclides in the stagnant water

Contaminated water management

- Major work processes going forward（3/5）

○ **Other work related to contaminated water management**

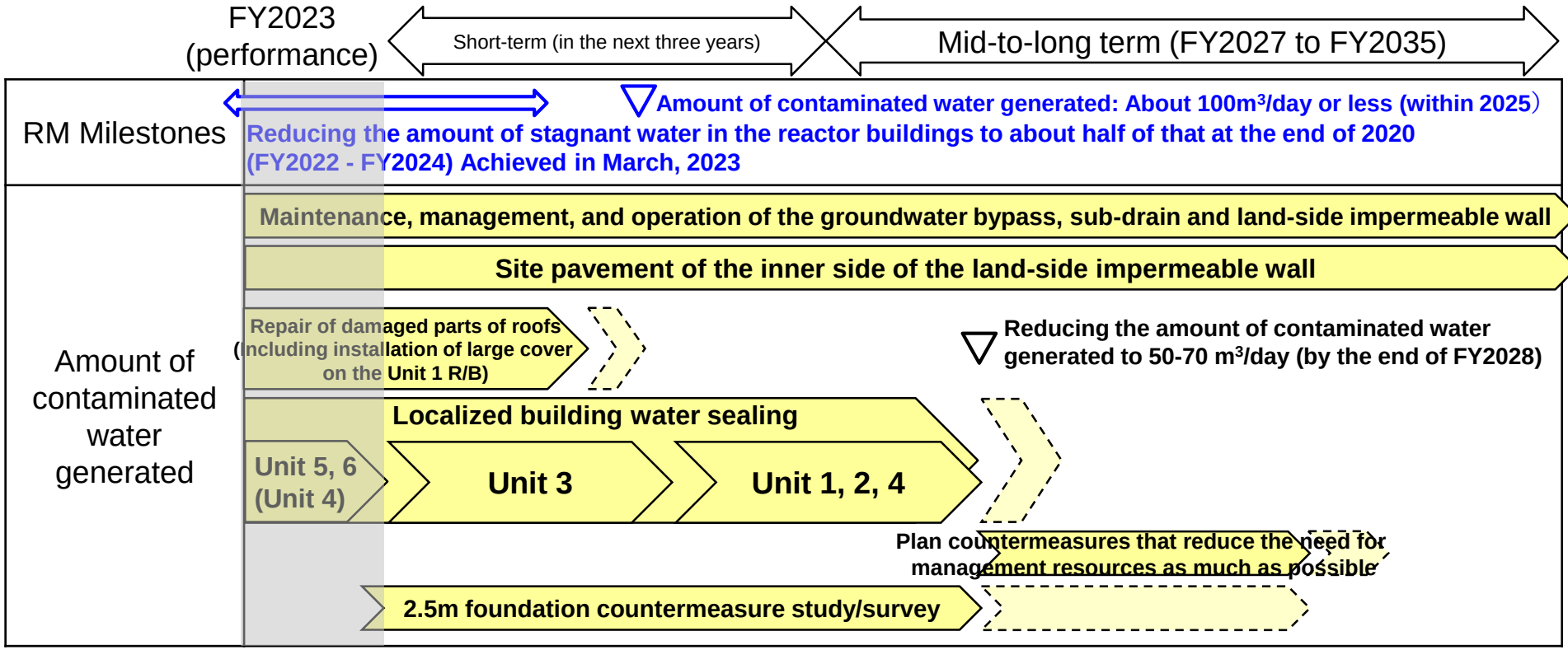
- **Countermeasures after removing stagnant water in the Units 1-4 T/B. etc.**
  - Study recovery methods and manufacture/install recovery equipment to handle sludge etc. that exists on the floor.
- **Countermeasures for puddle**
  - Puddle will be removed from the premises.
  - Puddles in trenches that have yet to be investigated because the areas in which they are located cannot be accessed due to high radiation levels will be investigated and removed.
  - The underground water storage tanks will be removed after studying the method of dismantling them while ensuring that dust is not scattered.
  - Untreated water in tanks (supernatant water) will be treated after trial pre-treatment.

(Challenges)

- Measures for volume reduction and storage of contaminated waste generated when the underground water storage tanks that stored stagnant water are dismantled

Contaminated water management

- Major work processes going forward（4/5）



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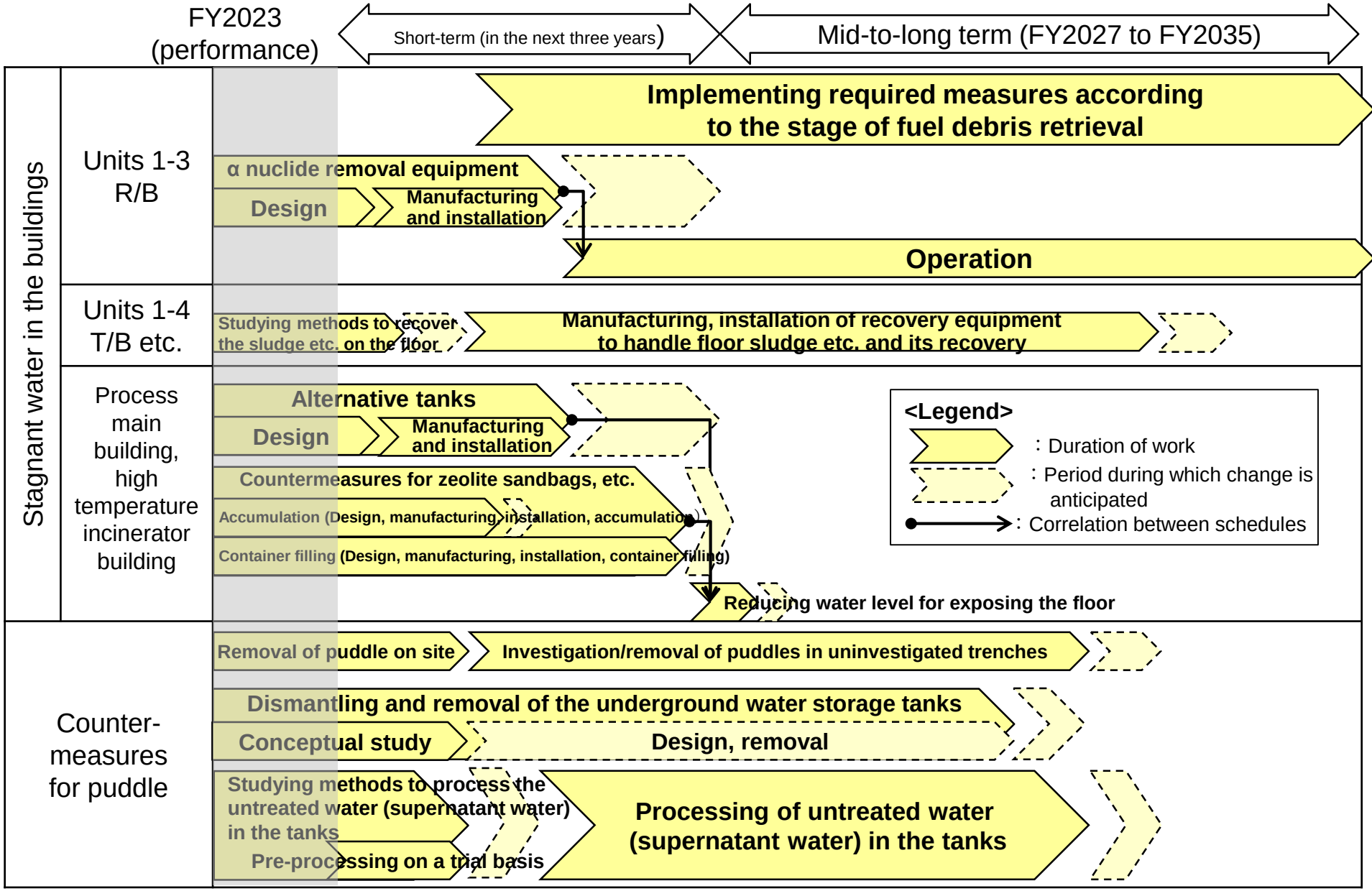
：Duration of work

：Period during which change is anticipated

：Correlation between schedules

Contaminated water management

- Major work processes going forward（5/5）



Treated water management

– Major progress made in FY2023

○ Major progress made in FY2023

- **Treated water management**
  - The following initiatives were implemented in preparation for the discharge of ALPS treated water into the sea.
    - The construction of ALPS treated water dilution and discharge facilities, and ancillary facilities, was completed in June 2023.
    - Pre-use inspections were conducted by the Nuclear Regulation Authority and a certificate of completion was received in July 2023.
  - The 6th Inter-Ministerial Council for Contaminated Water, Treated Water and Decommissioning Issues and the 6th Inter-Ministerial Council for Steady Implementation of the Basic Policy on handling ALPS Treated Water were held. Prospects for the day for initiating the discharge into the sea were presented. The Discharge of ALPS Treated Water into the sea was commenced in August 2023 in accordance with the implementation plan.
    - First discharge (August~September 2023)
    - Second discharge (October 2023)
    - Third discharge (November 2023)
    - Fourth discharge (February~March 2024)
  - Sea area monitoring performed by the Government, Fukushima Prefecture, and TEPCO since the commencement of ALPS-treated water discharge into the sea has confirmed that discharge is being carried out safely.
  - Facility inspections have been carried out during and after discharges, and it has been confirmed that there are no abnormalities.

Overall view of the discharge vertical shaft (upper-stream storage) (June 2023)

Discharge vertical shaft (down-stream storage) after being filled with water (June 2023)

Inside of the discharge tunnel after excavation (May 2023)

Treated water management

- Major work processes going forward （1/3）

○ Work to achieve the goals of the Government's plan

- **Treated water management**
  - Create a discharge plan each fiscal year that keeps the total amount of tritium at the time of discharge below 22 trillion Bq per year※1
  - Measure and confirm the radioactive substances in the water discharged to confirm that it is ALPS treated water※2
  - Dilute ALPS treated water with a large volume of seawater so that it is discharged into the sea only after the concentration of tritium has been reduced to less than 1,500Bq/liter※3
  - Water to be re-purified※4 will be purified before the start of the discharge until it satisfies safety standards for ALPS treated water
  - Conduct sea area monitoring in order to check the dispersion of tritium in the sea area and the transfer of radioactive materials to the fish and seaweed

※1: The operational target value for discharge of the Fukushima Daiichi Nuclear Power Station before the accident.
※2: Water for which the concentrations of radioactive substances, with the exception of tritium, fall below regulatory requirements for discharge into the environment (sum of the ratios of legally required concentrations is less than 1.)
※3: 1/40 of regulatory concentration limit (60,000Bq/L) for discharge into the environment, and approximately 1/7 of the World Health Organization's (WHO) drinking water quality guidelines (10,000Bq/L).
※4: Water for which the concentrations of radioactive substances, with the exception of tritium, exceed the regulatory requirements for discharge into the environment (sum of the ratios of legally required concentrations is 1 or higher.)

○ Initiatives for achieving the "ideal state (FY2033)" mentioned in the risk map

- **Fuel debris retrieval, etc.**
  - Continue the discharge of ALPS treated water into the sea as planned

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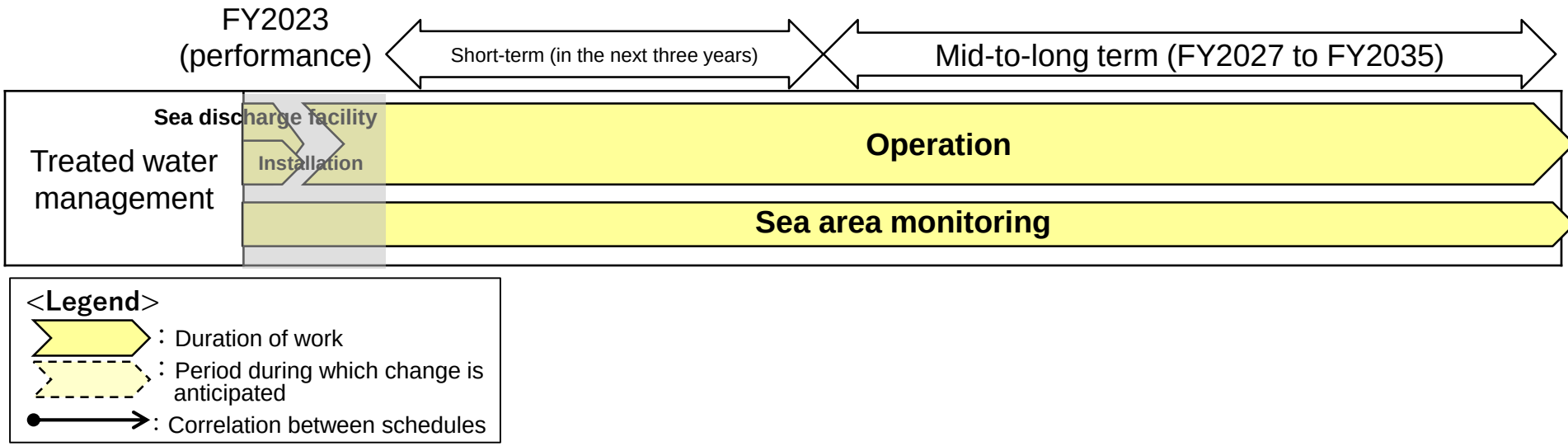
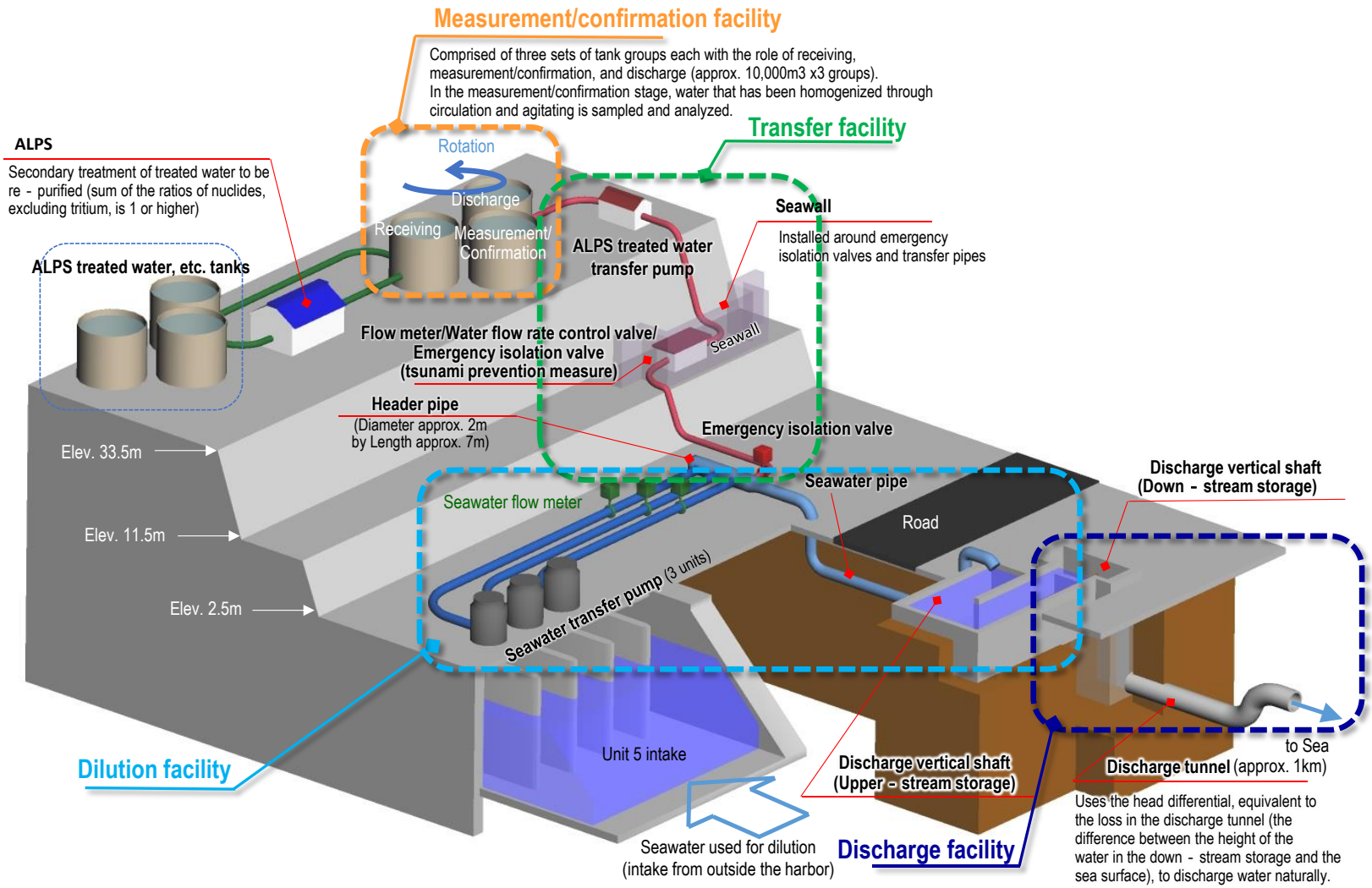
Treated water management

- Major work processes going forward（2/3）



Treated water management

- Major work processes going forward（3/3）



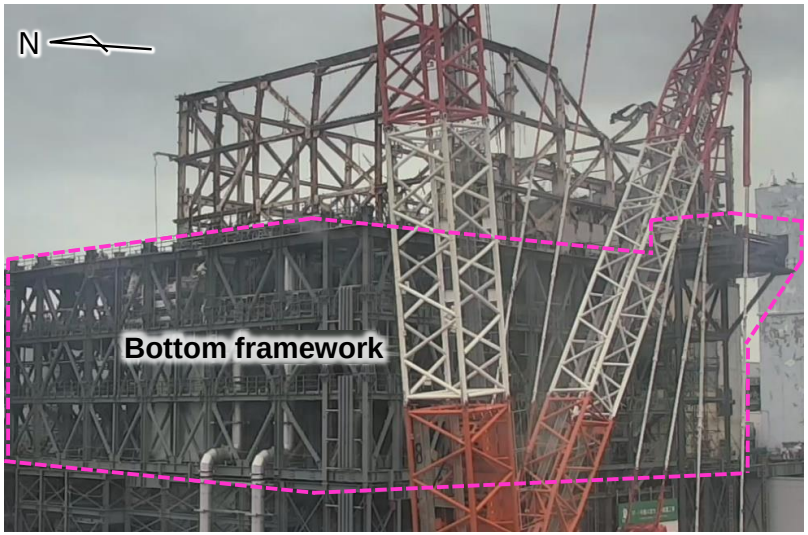
Overview of ALPS treated water dilution/discharge facility and related facilities

Fuel removal from spent fuel pools

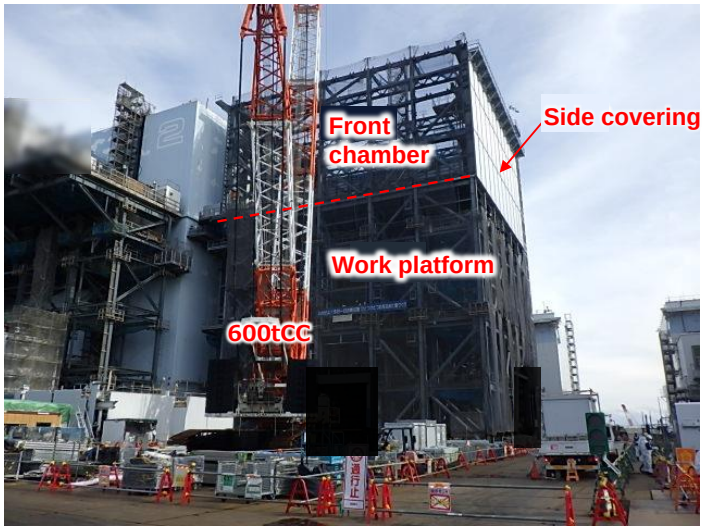
– Major progress made in FY2023

○Major progress made in FY2023

- **Unit 1**
  - Preassembly of the steel frame, etc. is underway in the off-site yard in preparation for large cover installation. On site, installation of the main body steel frame (bottom framework) of the large cover began.
- **Unit 2**
  - In the building, decontamination of the operating floor to reduce doses was completed in October 2023, and installation of shielding will be completed in March 2024.
    Outside the buildings, a front chamber is being built as part of the construction of the fuel removal work platform.



Construction of the Unit 1 large cover (northwest side) (photographed on March 12, 2024)



Construction of the Unit 2 work platform (south side) (photographed on February 9, 2024)

Fuel removal from spent fuel pools

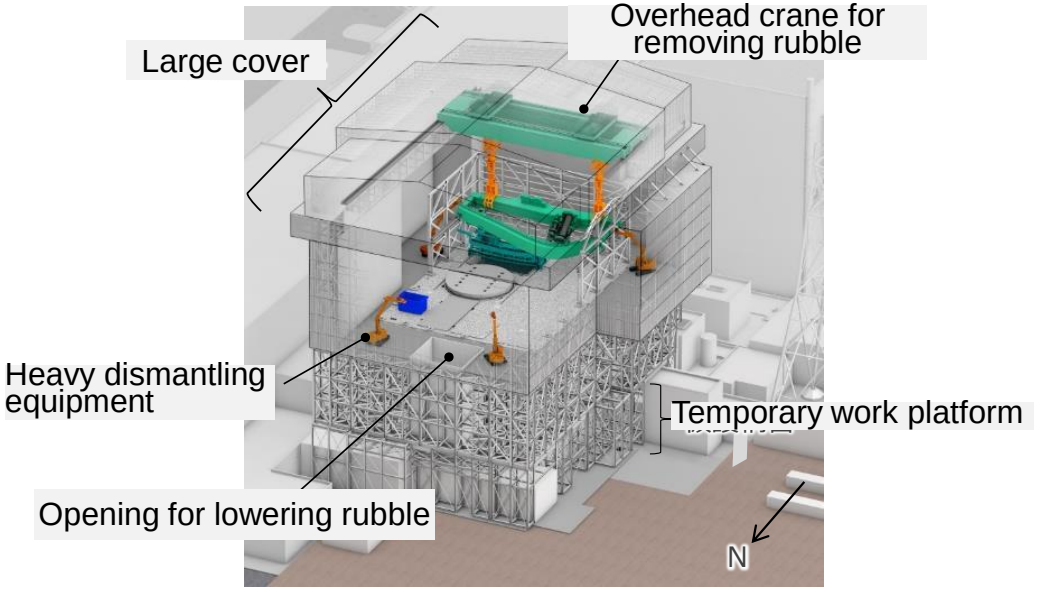
- Major work processes going forward（1/7）

○ Schedule for achieving the milestones of the Mid-and-Long-Term RM

- **Complete installation of the large cover at Unit 1 (around FY2023)**
  - A large cover will be installed to control scattering of dust while removing rubble.
    Based on the results of a detailed investigation into how this construction will impact other work in the vicinity of the reactor building (Unit 1, 2 SGTS pipe removal, etc.), and the need to implement safety measures for high-dose locations on the walls of the reactor buildings, the construction of the Unit 1 large cover should be completed around the summer of FY2025.

(Challenges)

- Studying and implementing plans that take into account other interfering work to be conducted in the work areas
- Studying and implementing plans that consider high-dose locations



Unit 1 Large cover (Image)

Fuel removal from spent fuel pools

- Major work processes going forward（2/7）

○ Schedule for achieving the milestones of the Mid-and-Long-Term RM

- **Start fuel removal from Unit 1 (FY2027 - FY2028)**
  - Fuel handling equipment required for fuel removal will be fabricated.
  - The fuel handling equipment will be installed after removing rubble, collapsed overhead crane, etc., handling the well plug (shielding concrete installed on top of the reactor containment vessel) that has gotten out of alignment due to the accident, and reducing the dose by means of decontamination and shielding, etc.
  - Fuel removal will be started after conducting training on fuel handling.

(Challenges)

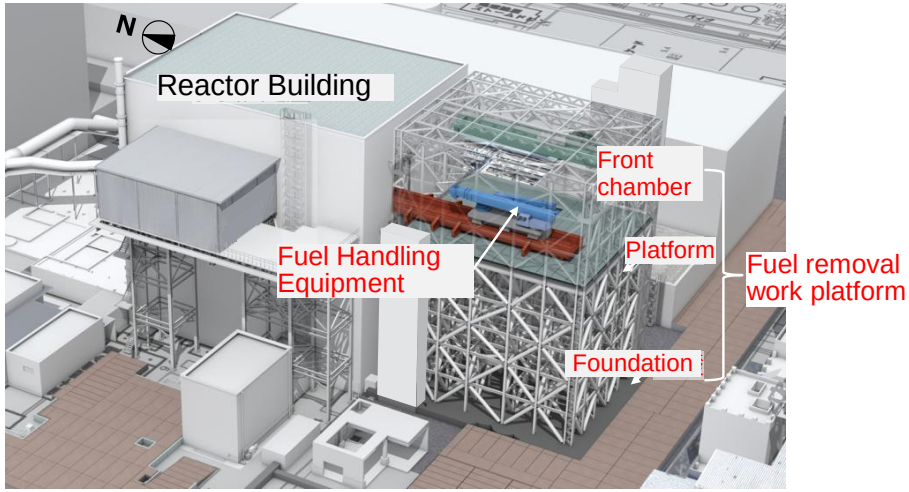
- Studying and implementing plans for removing rubble for which dust scattering can be reliably controlled
- Studying and implementing plans for effective decontamination and shielding in order to reduce the dose on the operating floor
- Studying and implementing plans for handling damaged fuel stored from before the disaster

Fuel removal from spent fuel pools

- Major work processes going forward（3/7）

○ Schedule for achieving the milestones of the Mid-and-Long-Term RM

- **Start fuel removal from Unit 2 (FY2024 - FY2026)**
  - Fuel handling equipment required for fuel removal will be fabricated.
  - A platform will be installed on the southern side of the reactor building for removing fuel from openings of R/B walls.
  - Fuel handling equipment will be installed after reducing the dose on the operating floor by means of decontamination and shielding.
  - Fuel removal will be started after conducting training on fuel handling.



Unit 2 gantry for fuel removal (Image)

Fuel removal from spent fuel pools

- Major work processes going forward（4/7）

○ Schedule for achieving the milestones of the Mid-and-Long-Term RM

- **Complete fuel removal from Units 1-6 (within 2031)**
  - Fuel will be removed from Units 5 and 6 in a way that does not interfere with work at Units 1 and 2.
  - Since the common pool receives spent fuel from each unit, the spent fuel in the common pool will be stowed in dry storage containers (casks) in advance and stored on high grounds.
  - Additional temporary storage facilities will be installed after securing sites within the premises.

(Challenges)

- Setting up additional temporary storage facilities for dry casks in accordance with the fuel removal plan including fuel removal from Units 5 and 6

○ Initiatives for achieving the "ideal state (FY2033)" mentioned in the risk map

- **Completing fuel removal**
  - Complete the removal of fuel from all spent fuel pools

Fuel removal from spent fuel pools

- Major work processes going forward（5/7）

○Other fuel removal related works

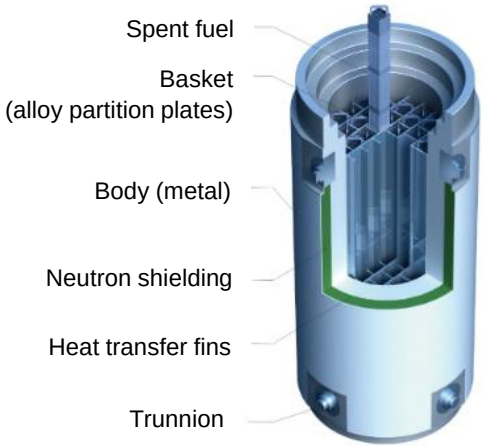
– After removing fuel from each unit, highly radioactive equipment such as spent control rods will be removed.

– Study, design, and installation of new facilities for storing high-dose radioactive equipment, etc. from Units 1 and 2. Preparations for removing large, high-dose radioactive equipment from the Unit 4 pool will be made.

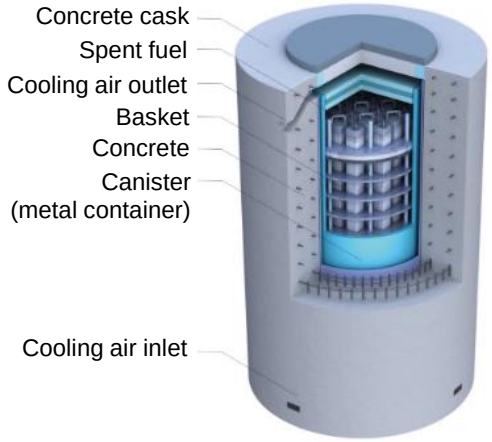
– In addition to existing metal casks, the use of dry storage facilities (concrete casks) that use canisters with a proven track record overseas will be studied as another dry storage option at the high ground for fuel being stored in the common pool.

(Challenges)

- Study of specific method for removing diverse equipment with varying sizes and shapes (remote operation, transfer and storage)
- Study of dry storage methods for damaged fuel that was in storage prior to the disaster



Metal casks (example)



Concrete casks (example)

Source: Federation of Electric Power Companies “Spent Fuel Storage Countermeasure Initiatives” (in Japanese only)
https://www.fepc.or.jp/library/pamphlet/pdf/18_chozo_taisaku_torikumi.pdf

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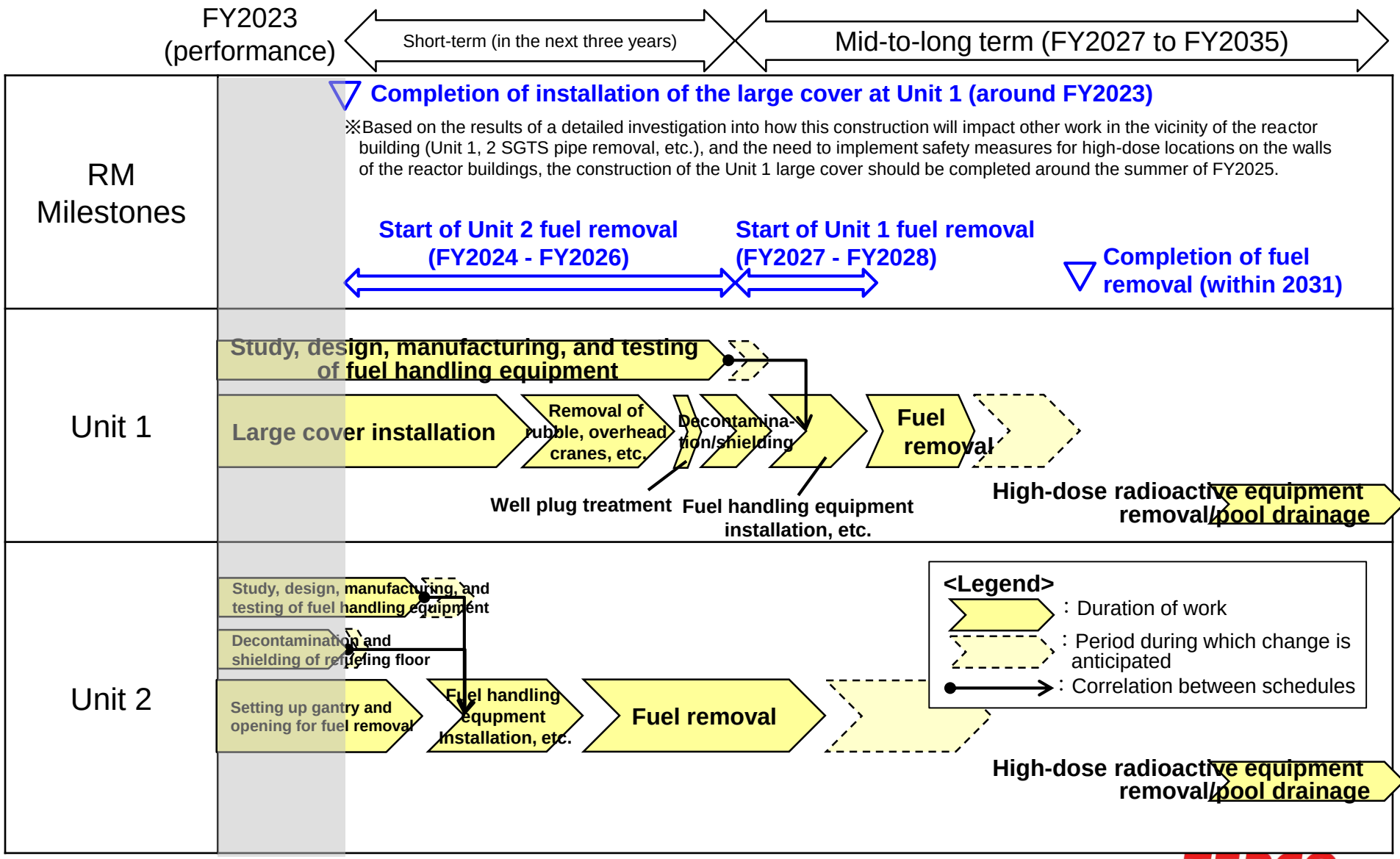
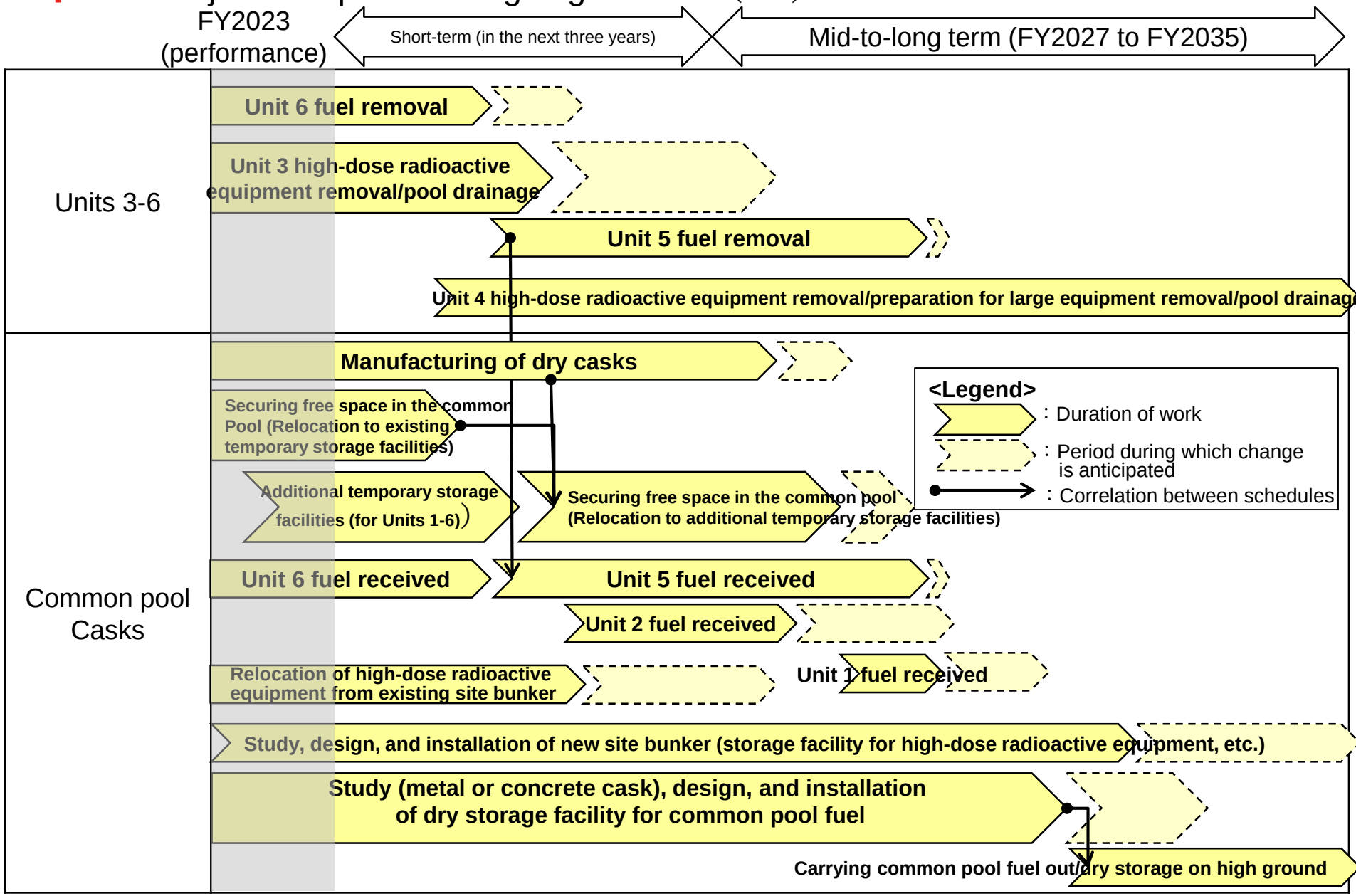
Fuel removal from spent fuel pools

- Major work processes going forward（6/7）



Fuel removal from spent fuel pools

- Major work processes going forward（7/7）

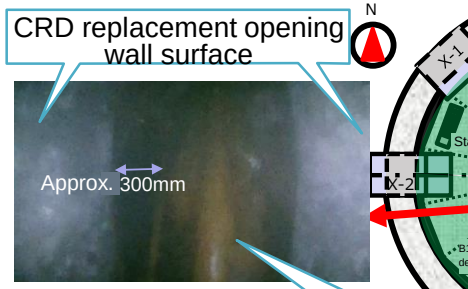


Fuel debris retrieval

– Major progress made in FY2023

○Major progress made in FY2023

- **Unit 2 trial fuel debris retrieval**
  - Mockup testing are underway at the Naraha mockup facility under conditions that simulate actual field conditions.
  - Deposits are being removed from the primary containment vessel penetrations (X-6 penetration).
- **Unit 1 PCV internal investigation (non-submerged area)**
  - Non-submerged area investigation of the primary containment vessel using small drones has been underway since February 2024.
- **Unit 1,2 SGTS pipe removal**
  - The cutting and removal of pipes that will interfere with the construction of the Unit 1 large cover was completed by July 2023. We will continue to cut away and remove the remaining pipes.



CRD replacement opening conditions (after footage noise correction)

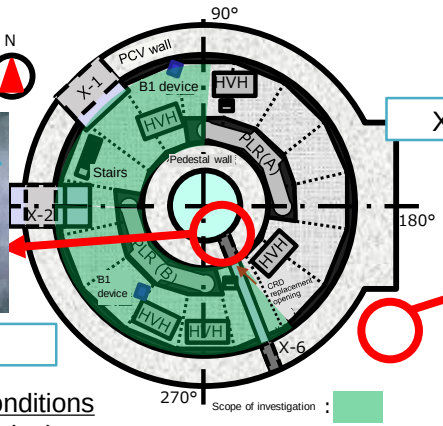
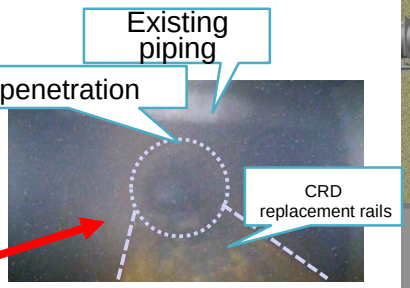
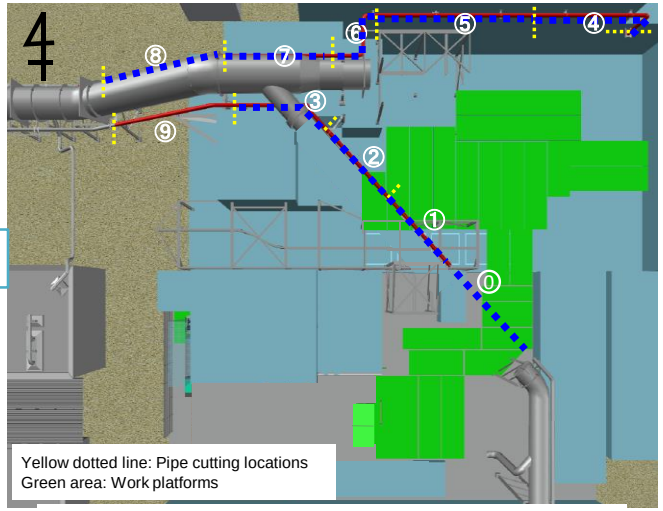


Diagram of the inside of the Unit 1 primary containment vessel



X-6 penetration conditions



Unit 1, 2 SGTS pipe cutting locations

CRD: Control rod drive mechanism

Fuel debris retrieval

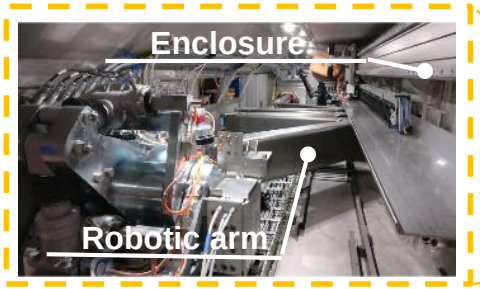
- Major work processes going forward（1/5）

○ Schedule for achieving the milestones of the Mid-and-Long-Term RM

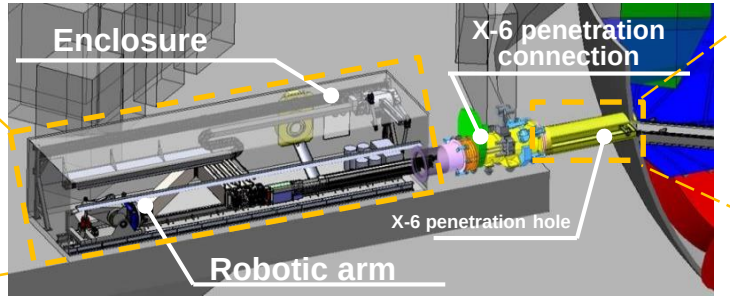
- **Start fuel debris retrieval from the first implementing unit**
  - Towards the trial retrieval in Unit 2, research and development will be undertaken, engineering work will be carried out to apply the results of R&D on site, and fuel debris retrieval equipment (access equipment, recovery equipment, etc.) will be manufactured and installed. Primary Containment Vessel (PCV) internal investigation will be implemented in accordance with retrieval. Fuel debris will be sampled using the telescopic device that has proven successful during past internal investigations, after which the robotic arm will be used to perform an internal investigation and sample more fuel debris. We predict that the commencement of the trial retrieval of fuel debris will begin no later than around October 2024.
  - The operation of the existing gas management system will be changed for enhancing the function of monitoring radioactive substances and for preventing dust from scattering to outside the PCV.
  - The deposits or obstacles in the existing opening (X-6 penetration hole) that leads to the inside of the PCV will be removed.

(Challenges)

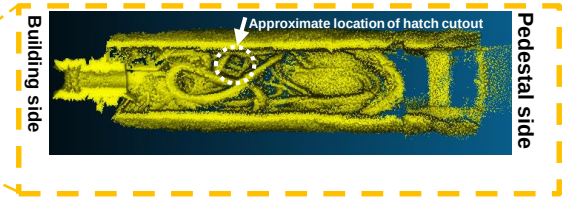
- Study on measures to control scattering of dust while removing the deposits or obstacles from the access route, and developing relevant devices.



Enclosure and robot arm



Overview of equipment for trial retrieval



3D scan from above the X-6 penetration

*This document leverages the results of the International Research Institute for Nuclear Decommissioning (IRID).

Fuel debris retrieval

- Major work processes going forward（2/5）

○Initiatives for achieving the "ideal state (FY2033)" mentioned in the risk map

- **Optimal management of the internal reactor environment**
  - The reactor will be managed using optimal cooling methods (air cooling/water spraying, etc.) after comprehensively considering the state of fuel debris and the generation of contaminated water, etc.
  - An inert atmosphere will be maintained in consideration of hydrogen and facility degradation risks while optimal methods (equalization/negative pressure, etc.) are used to manage the atmosphere inside the reactor in consideration of radioactive substance dispersion risks.
  - Safety measures required in conjunction with the implementation of the aforementioned internal reactor environment management methods will be identified.
    - Optimal methods for maintaining the environment inside the reactor until fuel debris is completely retrieved will be studied by ascertaining internal reactor behavior through Unit 1/3 cooling water injection shutdown tests and feed/exhaust gas flow rate change tests, etc.

- **Fuel debris retrieval, etc.**
  - The retrieved fuel debris will be stored in a stable conditions.

Fuel debris retrieval

- Major work processes going forward（3/5）

○ Other fuel debris retrieval related work

- **Expansion of the scale of retrieval gradually (Unit 2)**
  - In preparation to expand the scale of retrieval in stages, research and development will be undertaken, and engineering work will be carried out to apply the achievements of such R&D to the field. Taking also into account the knowledge, etc. obtained through trial retrieval, design, manufacturing and installation of fuel debris retrieval equipment, safety systems (containment, maintaining cooling, criticality control, etc.), fuel debris storage facilities and equipment for the maintenance of the retrieval equipment will be carried out as well.
  - For improving the environment inside the building, the radiation dose in the west-side area on the first floor of the reactor building will be further reduced.
  - Internal investigation of the Unit 2 reactor pressure vessel (RPV) will be studied.

  (Challenges)
  - Study on measures to control scattering of dust while crushing fuel debris or removing structures from inside the PCV
- **Efforts for determining methods for processing and disposal of fuel debris**
  - After starting fuel debris retrieval, analysis, etc. of fuel debris properties will be performed.
- **Further expansion of the scale of retrieval (Units 1/3)**
  - In preparation to enlarge the scope of fuel retrieval, we are pushing forward with engineering that can be applied to the field based on the assessment results and suggestions offered by the Sub-Committee for the Evaluation of Fuel Debris Retrieval Methods, and research and development successes. The knowledge we gain from the trial retrieval of fuel debris from Unit 2 will be leveraged to determine the retrieval method to be used going forward as we design/manufacturer/install fuel debris retrieval equipment and make preparations, such as preparing the environment in the vicinity of Unit 2. We will also continue to construct training facilities to enable the required skills to be obtained by the personnel implementing these tasks.

Trial retrieval (Unit 2)		Gradual expansion of the scale of retrieval (Unit 2)	
Access equipment	Fuel debris retrieval equipment	Access equipment	Fuel debris retrieval equipment
	 Proposed metal brush  Proposed vacuum container		 Proposed gripper tool  Proposed digging recovery tool

*This document leverages the results of the International Research Institute for Nuclear Decommissioning (IRID).

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Fuel debris retrieval

- Major work processes going forward（4/5）

– In addition to the Unit 1 PCV internal investigation (underwater investigation), we are also studying the implementation of other investigations such as Unit 1 PCV internal investigation (non-submerged area) and the sampling of deposits from within, etc., an internal investigation of the Unit 3 PCV, as well as an internal investigation of the Unit 3 RPV. The information we obtain through these investigations will be used for assessments and to study countermeasures.

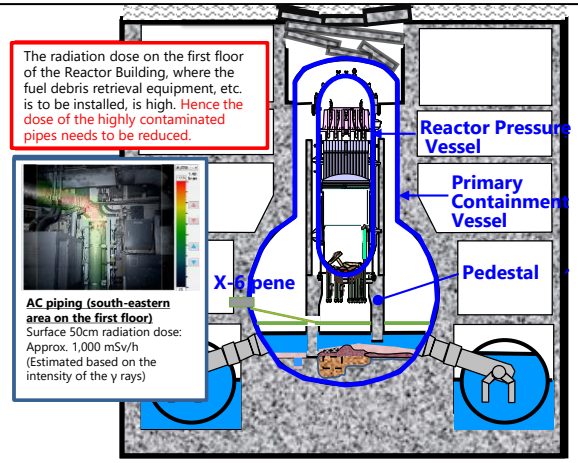
– In order to improve the environment inside the buildings, radioactive sources will be investigated and eliminated for reducing the radiation dose at the work site (in particular, highly contaminated pipes). In addition, equipment, etc. that could hinder future work will be removed. And the PCV water level will be reduced such as by decreasing the amount of water injected into the reactor.

– For improving the environment outside the building, facilities that pose an impediment (Unit 1/2 exhaust stack, Unit 3/4 exhaust stack, etc.) will be removed, thereby securing space for fuel debris retrieval equipment, etc.

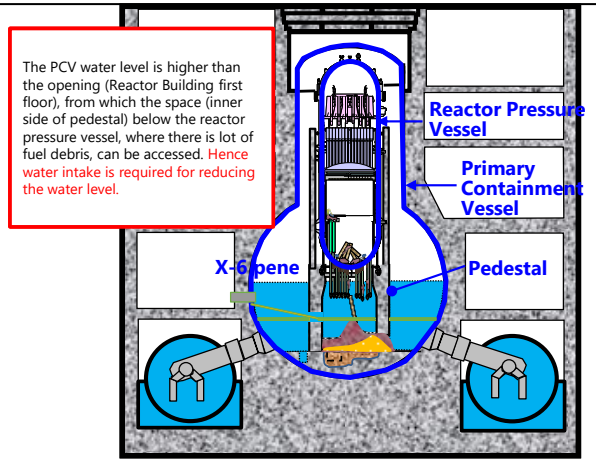
(Challenges)

- Study on the method of reducing the dose of highly contaminated pipes by means of remote operations (removal or decontamination) and the method of installing equipment for retrieval and water intake, etc., since the dose at the work site in Units 1/3 is higher compared to that in Unit 2
- Accumulated hydrogen gas that may be found during fuel debris retrieval preparations, etc.

Unit 1

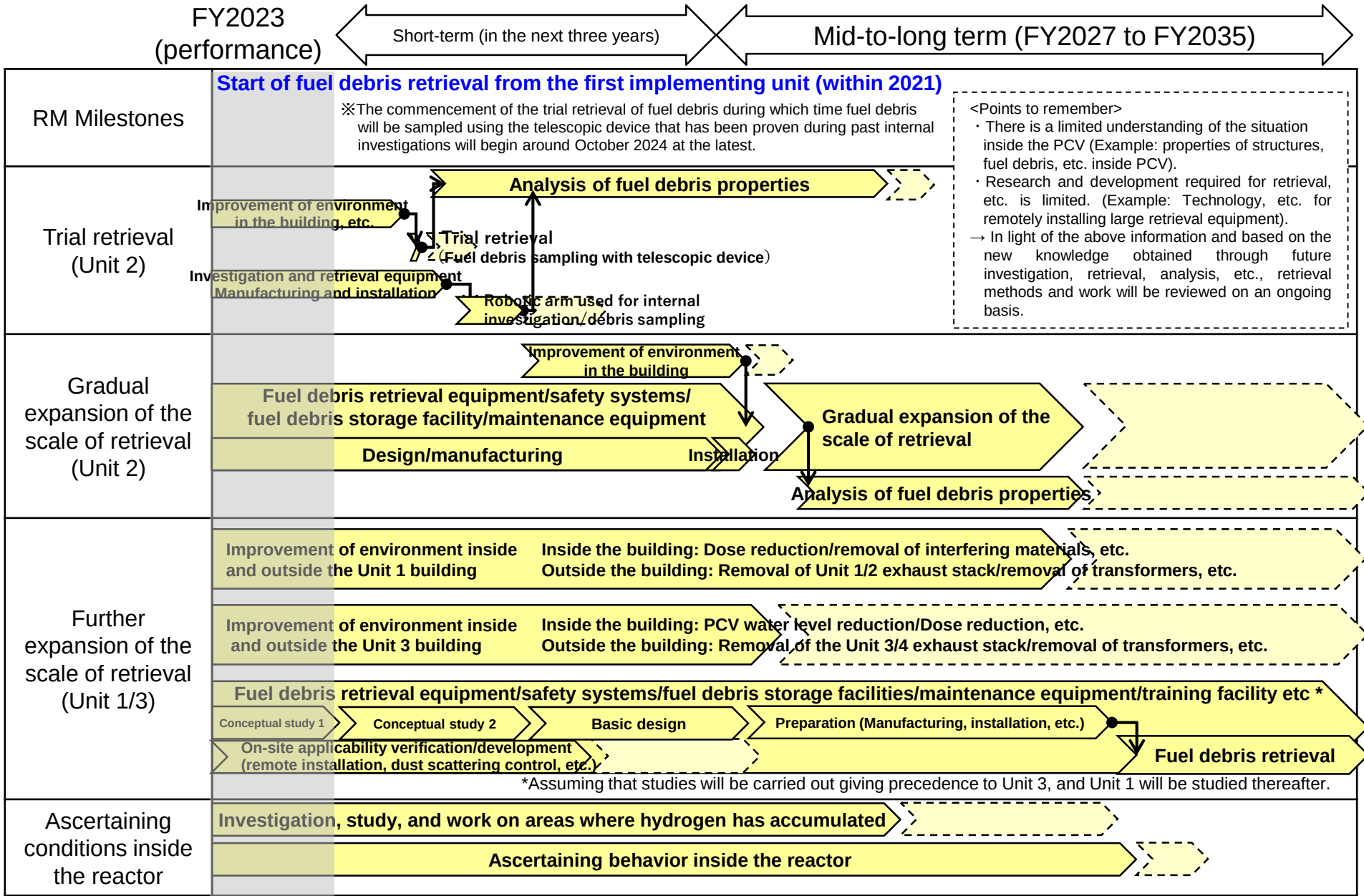


Unit 3



Fuel debris retrieval

- Major work processes going forward（5/5）



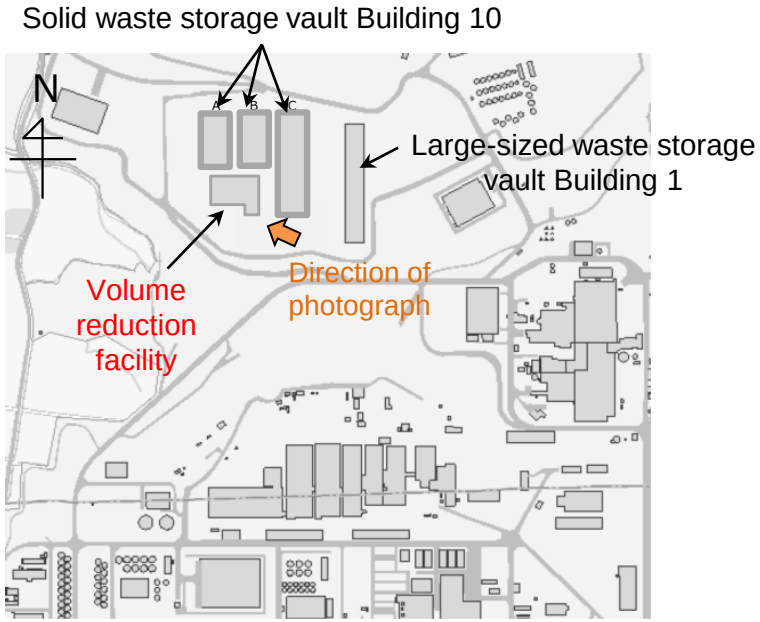
Waste management

– Major progress made in FY2023

○Major progress made in FY2023

- **Rubble, etc.**
  - In February 2024 the volume reduction facility was put into operation in order to reduce the volume of incombustible solid waste.

Site photograph



Facility layout diagram

Volume reduction facility
(Left: Site photograph, Right: Facility layout diagram)

Waste management

- Major work processes going forward（1/8）

○ Schedule for achieving the milestones of the Mid-and-Long-Term RM

- **Eliminate temporary storage areas outside for rubble and other waste (in FY2028)**
  - Additional miscellaneous solid waste incineration facilities for reducing the volume of combustible materials or volume reduction equipment, etc., for reducing the volume of incombustible materials (metal, concrete) was installed and their operation was started.
  - Incineration and volume reduction of waste that is temporarily stored outdoors, will be carried out and it will be stored in the solid waste storage vaults.
  - If the projection of the amount of solid waste that will be generated in the future fluctuates and the capacity of storage facilities is short, additional storage facilities will be built after securing space within the premises.

(Challenges)

- Reflection of fluctuation in the projection of the amount of waste that will be generated in the future into the storage management plan

Waste management

- Major work processes going forward（2/8）

○Initiatives for achieving the "ideal state (FY2033)" mentioned in the risk map

- **Radioactivity density assessment and management**
  - Establish a method for assessing the radioactivity density of existing rubble (including ash, slag) and store/manage appropriately in accordance with density.
    - Based on the status of progress of future decommissioning work, characterization required for studying treatment and disposal of solid waste will be carried out utilizing the radioactive substance analysis and research facility.
    - We will continue to analyze existing rubble and construct means for managing radioactivity density.

    (Challenges)

    - Analysis for transitioning to radioactive density management
- **Full-scale leveraging of on-site reusing**
  - We will organize logical methods for the storage and on-site reusing of waste, including outdoor storage depending on the radioactivity density of the waste, and put these methods into use.
  - We will start operation of melting facilities and carry out volume reduction of metal rubble, etc.
    - Melting facilities will be built in order to decontaminate/reduce the volume of objects to be melted. The types of waste to be melted will be revised as necessary going forward in accordance with design progress.

Waste management

- Major work processes going forward （3/8）

○Initiatives for achieving the "ideal state (FY2033)" mentioned in the risk map

- **Formulating methods for dismantling buildings**
  - We will formulate a common model (building dismantling model) that includes methods for investigating/assessing contamination conditions, and decontaminating/dismantling contaminated facilities, etc.
    - Through the study of a dismantling model we will formulate methods for dismantling/decontaminating buildings, storing/managing waste, and managing radioactivity density that will be applied to buildings dismantled in the future.

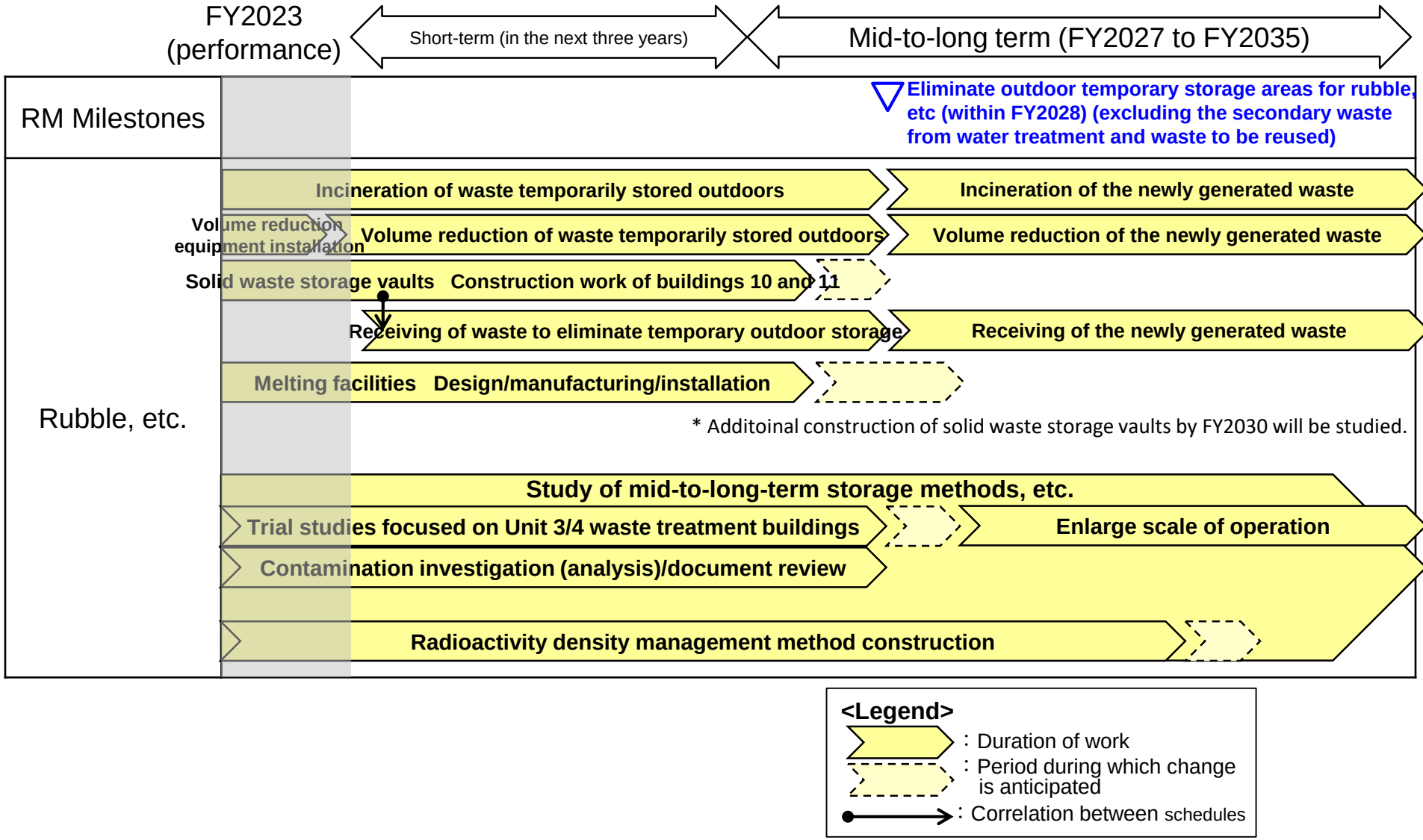
- **Managing dismantling waste in accordance with radioactivity density**
  - The amount of waste generated from the dismantling of buildings will be calculated and reflected in storage management plans.
  - Dismantling waste will be managed properly in accordance with radioactivity density.

○ Other waste management-related tasks

– We will study the additional construction of a solid waste storage vault by FY2030.

Waste management

- Major work processes going forward（4/8）



Waste management

- Major work processes going forward （5/8）

◯Initiatives for achieving the "ideal state (FY2033)" mentioned in the risk map

- **Eliminating outdoor storage and properly storing waste**
  - Zeolite and decontamination system sludge will be collected. Secondary waste from water treatment including them will be stored in a seismic-resistant large waste storage vault.
    - Secondary waste from water treatment(adsorption vessels) will be relocated to the large-sized waste storage vault.
  - ALPS slurry is being steadily dewatered and the dewatered products will be stored appropriately in solid waste storage vaults. The dewatering of accumulated ALPS slurry will be completed.
    - Slurry, which is the secondary waste generated from treatment of water by multi-nuclide removal equipment, contains a lot of water and must be dewatered/stabilized.
- **Commencement of solidification**
  - We will install/commence using the solidification facility to solidify dewatered slurry.
  - Based on analysis results we will determine methods for solidifying other secondary waste from water treatment while keeping in mind that we may have to transition to disposal forms in accordance to classification (waste body, etc.).
    - We will formulate plans for the solidification of secondary waste from water treatment and develop technologies based on those plans.

Waste management

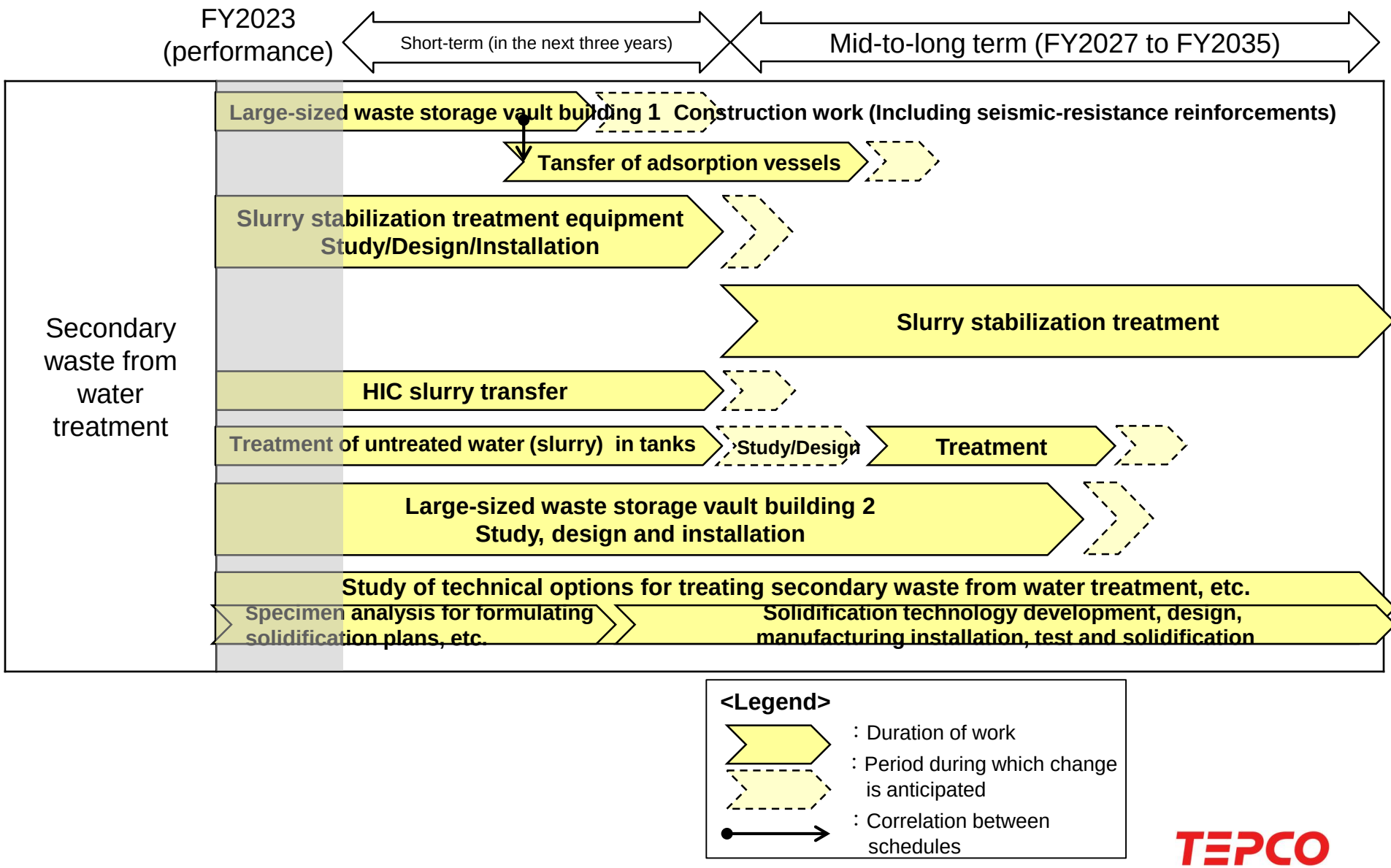
- Major work processes going forward（6/8）

○Other work related to waste countermeasures

- **Secondary waste from water treatment**
  - The slurry is stored in high integrity containers (HIC). While it will not leak if the HICs are stationary, the slurry will be transferred from HICs whose integrity cannot be confirmed if it were to fall in consideration of the effects of slurry radiation, by the start of operation of the slurry stabilization treatment equipment.
  - Untreated water in tanks (slurry) will be treated with slurry stabilization treatment equipment. Treatment will commence after testing, etc.

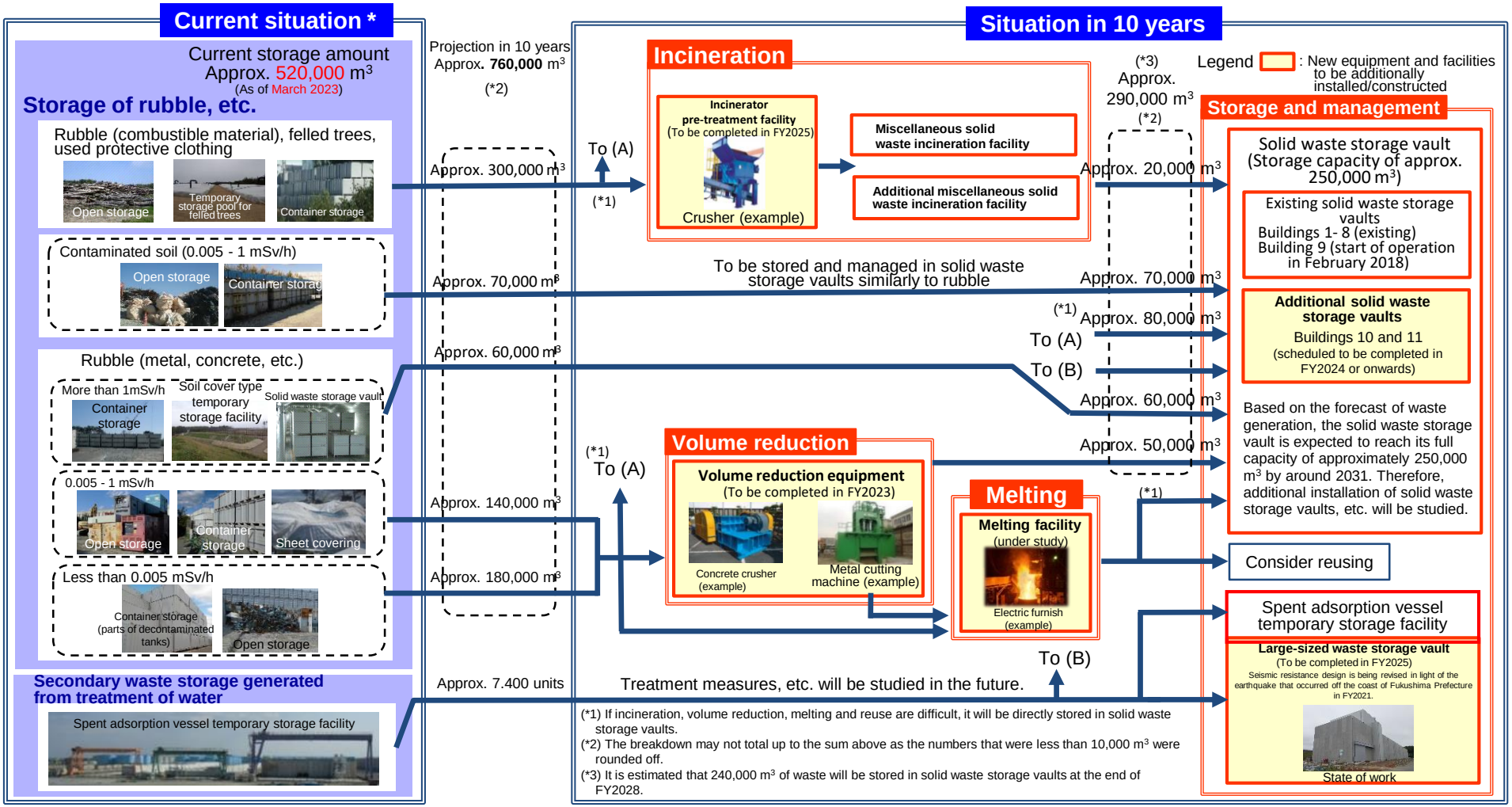
Waste management

- Major work processes going forward（7/8）



Waste management

- Major work processes going forward（8/8）



(*1) If incineration, volume reduction, melting and reuse are difficult, it will be directly stored in solid waste storage vaults.
(*2) The breakdown may not total up to the sum above as the numbers that were less than 10,000 m³ were rounded off.
(*3) It is estimated that 240,000 m³ of waste will be stored in solid waste storage vaults at the end of FY2028.

* Used protective gear that is not yet incinerated and is determined at this point in time to be processed/reused and concrete waste at the BG level are not included.

- The dose on the site boundary is expected to decrease due to incorporation into indoor storage and elimination of outdoor storage.
- The dose of the exhaust gas from the incineration facility and the dose on the site boundary are measured and published on the website, etc.

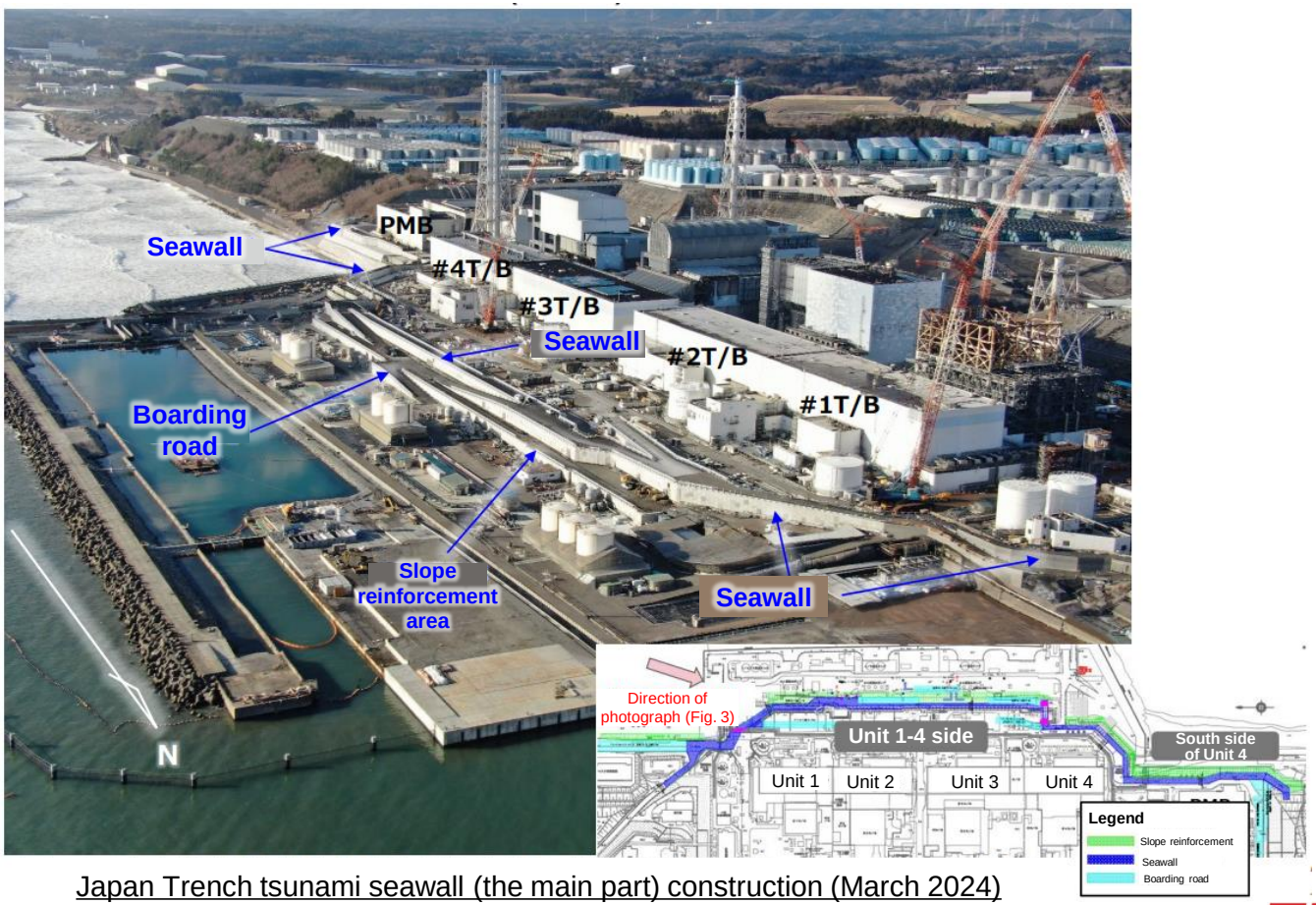
TEPCO

Other measures

– Major progress made in FY2023

○Major progress made in FY2023

- **Natural disaster prevention measures**
  - The Japan Trench tsunami seawall was completed in March 2024.



Japan Trench tsunami seawall (the main part) construction (March 2024)

Other measures

- Major work processes going forward（1/6）

○Initiatives for achieving the "ideal state (FY2033)" mentioned in the risk map

- **Degradation status inspection/assessment and improving reliability**

  - Status of degradation of reactor buildings will be inspected/assessed using integrity assessment methods.
    - The integrity of the Units 1-3 reactor buildings that needs to be confirmed in the long-term before debris retrieval completion will be assessed through investigations of the building inside, trend analysis using seismometers, etc.

      In addition, a seismometer will be installed on the fifth floor of the Unit 1 reactor building after rubble is removed.

    (Challenges)

    – Study of methods to investigate integrity inside high dose buildings.
  - We will continually update decommissioning equipment that will be used over the long-term to improve reliability in consideration of risks such as equipment aging/degradation.
    - We will formulate plans pertaining to the maintenance/removal of decommissioning facilities and update equipment in order to improve reliability in accordance with these plans.
    - Facility improvements that take into account operation/maintenance will be made as part of recurrence prevention measures in light of the body contamination incident that occurred during the cleaning of additionally installed ALPS piping in October 2023, and the leak of water containing radioactive substances from the high temperature incinerator building that occurred in February 2024.
    - In light of the fact that the discharge of ALPS treated water into the sea will take place over a long period of time, we will study/design/manufacturer/install new ALPS so that ALPS treatment, including secondary treatment, can be steadily maintained over the long-term.
    - In order to improve the reliability of desalination equipment (RO) we will study/design/manufacturer/install new RO equipment.

Other measures

- Major work processes going forward （2/6）

○Initiatives for achieving the "ideal state (FY2033)" mentioned in the risk map

- **Degradation status inspections/assessment and improving reliability**
  - We will move forward with countermeasures to improve the resilience of equipment/facilities to external events, such as by completing slope modifications to prevent landslides.
    - In consideration of the risk of a slope collapse caused by standard seismic motion used for studies, we will implement slope countermeasures in the vicinity of common operation assistance facilities (common pool building) that are shared for Fuel removal from spent fuel pools, etc.

- **Facility removal**
  - Planned removal of unneeded facilities, such as ALPS treated water storage tanks, will be implemented.

Other measures

- Major work processes going forward （3/6）

○Initiatives for achieving the "ideal state (FY2033)" mentioned in the risk map

- **Completing analysis required to achieve the "ideal state"**
  - We will complete the following analyses
  - ✓ Analyses needed to commence the solidification of dewatered slurry
  - ✓ Analyses needed to determine methods for solidifying other secondary waste from water treatment
  - ✓ Analyses needed to develop methods for assessing/managing the radioactivity density of existing rubble.
  - ✓ Analyses needed to formulate a building dismantling model
- **Securing analysis capabilities**
  - We will maintain/secure analysis facilities/capabilities required to conduct analyses pertaining to building dismantling and the transition to waste body (after FY2033).
    - Construct facilities that have analysis functions required to proceed with decommissioning in the future.
    - Establish an analysis framework that can flexibly handle changes to analysis demands.

Other measures

- Major work processes going forward（4/6）

○ Other related work

- **Natural disaster prevention measures**
  - Countermeasures for possible tsunami such as removal of decontamination system sludge, etc. will be implemented.
  - Drainage channels will be upgraded in preparation for large-scale rainfall.

(Challenges)

- Measures other than seawall as tsunami countermeasures (protecting the freezing brine transfer pipes, etc.)
- Study of safety measures to be taken with regard to remote recovery, dewaterability evaluation, and handling of decontamination system high radiation sludge

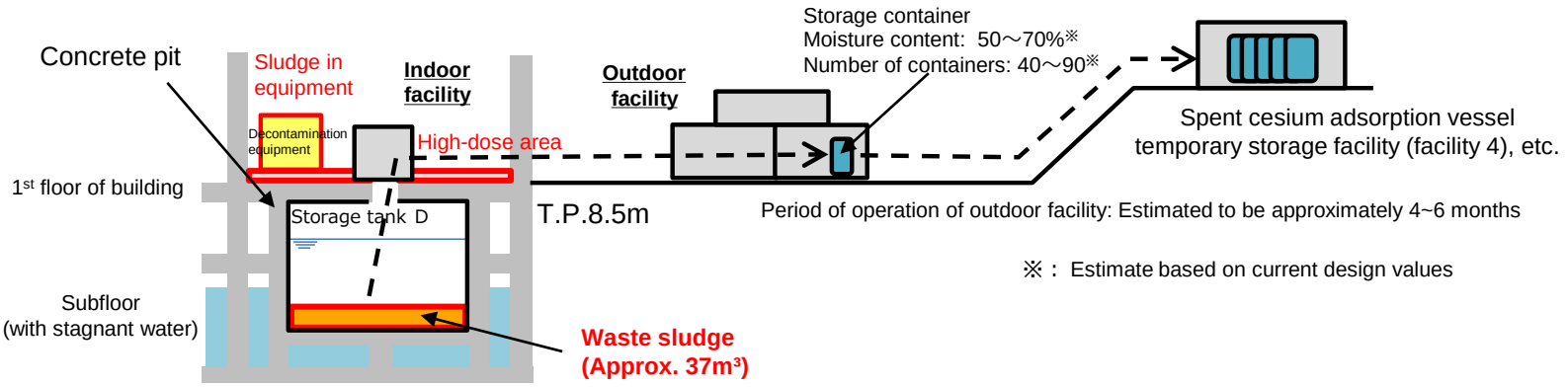


Diagram showing the building structure in the vicinity of storage tank D in the process main building (cross-section)

Decontamination system sludge extraction process

Other measures

- Major work processes going forward（5/6）

○ Other related work

- **Other**
  - In order to improve work efficiency, partner companies' building within the controlled area will be renovated so that it can be used as a resting place, etc.

Other measures

- Major work processes going forward（6/6）