Mid-and-Long-Term Decommissioning Action Plan 2022

March 31, 2022

Tokyo Electric Power Company Holdings, Inc.

TEPCO

Mid-and-Long-Term Decommissioning Action Plan 2022

The “Mid-and-Long-Term Decommissioning Action Plan” is created by TEPCO for indicating the main work processes involved in decommissioning as a whole, in order to achieve the goals laid out in the Mid-and-Long-Term Road-map and the NRA Risk Map.

This is our “Mid-and-Long-Term Decommissioning Action Plan 2022,” a revised version based on the achievements made during FY2021.

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.

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 2022” corresponds with the following plan indicated in the Mid-and-Long-Term Road-map.
－ Specific plan for achieving the main target processes, etc. specified in the Mid-and-Long-Term Road-map and the goals laid out in the NRA Risk Map.

Mid-and-Long-Term Road-map: Mid-and-Long-term Road-map for decommissioning the Fukushima Daiichi Nuclear Power Station of Tokyo Electric Power Company Holdings, Inc. (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 March 9, 2022)

Revisions in the Mid-and-Long Term Decommissioning Action Plan 2022

- Updated the plan to show progress in decommissioning work made in FY2021
- Add responses to newly identified challenges and plans that can be created in more detail
- Revisions of schedule to include newly identified challenges

	New plans	Major revisions of schedule
Contaminated water management	• Treat untreated water in the tank	• Reflected progress made in paving the inner side of the land-side impermeable wall • Made changes in the design of the α nuclide removal facility and alternative tanks, taking into consideration the effects of the February 2021 earthquake※ • Decided to continue the conceptual study of underground storage tank removal
Treated water management	• Install/operate facilities to discharge treated water into the sea • Conduct sea area monitoring	—
Spent fuel	—	• Made changes in the Unit 1 large cover installation schedule due to conflicting works
Fuel debris	• Conduct an internal investigation of the Unit 2 RPV	• Made changes in the scheduled time of completion of Units 1 and 2 SGTS piping removal completion due to crawler crane malfunctions
Waste management	• Optimize waste management • Transfer slurry in high integrity containers (HICs)	• Made Changes to the design of the 10 solidified waste storage vaults, large storage vault and slurry stabilization treatment facility tanks, taking into consideration the effects of the February 2021 earthquake※
Others	• Renovate partner companies' building within the controlled area	• Decided to continue building integrity assessments

※: Earthquake with an epicenter off the coast of Fukushima that occurred on February 13, 2021 (magnitude 7.3)

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Processes completed in FY2021

-List of processes completed

○Contaminated water management

- **Amount of contaminated water generated**
  - Completed paving over the inner side (sea side) of the land-side impermeable wall
- **Counter-measures for puddle**
  - Closed the reversing valve pit in May 2021 (achieved risk map targets)

○Spent fuel removal

- **Unit 1**
  - Completed removal of the building cover (residual parts) in June 2021

○Fuel debris retrieval

- **Further expansion of the scale of removal**
  - Completed removing the rubble on the south side of Unit 3 in March 2022

○Waste management

- **Completed the additional solid waste incinerator**
  - Completed in March 2022

○Other measures (natural disaster prevention measures)

- **Closed building openings**
  - Closed all openings in January 2022 (achieved risk map targets)
- **Building integrity assessment**
  - Completed inspecting the inside of the reactor buildings in December 2021

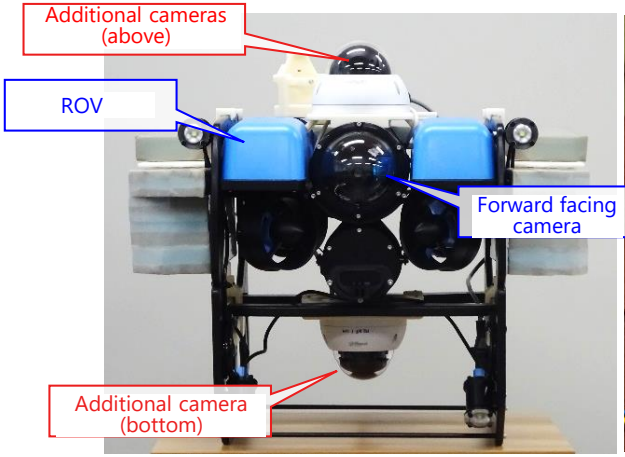
Contaminated water management

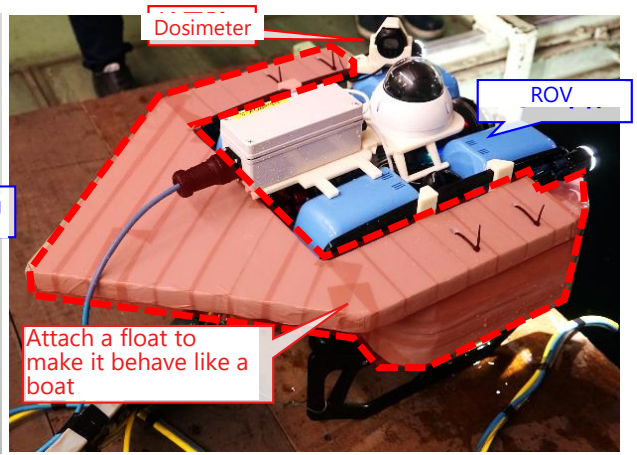
-Progress made in FY2021

○Progress made in FY2021 in processes that are ongoing

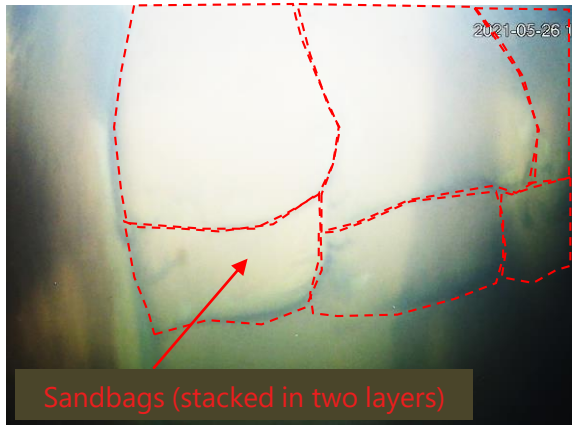
- **Stagnant water in the building**

– To collect the high-dose zeolite sandbags in the basements of the process main building (PM/B) and the high temperature incinerator building (HTI), the basements were searched using a boat-type ROV to locate the sandbags and measure the doses at water level.





Boat-type ROV used in the basement investigation



Zeolite sandbags found in the basement of the high temperature incinerator building (HTI)

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Contaminated water management

-Major work processes going forward (1/4)

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

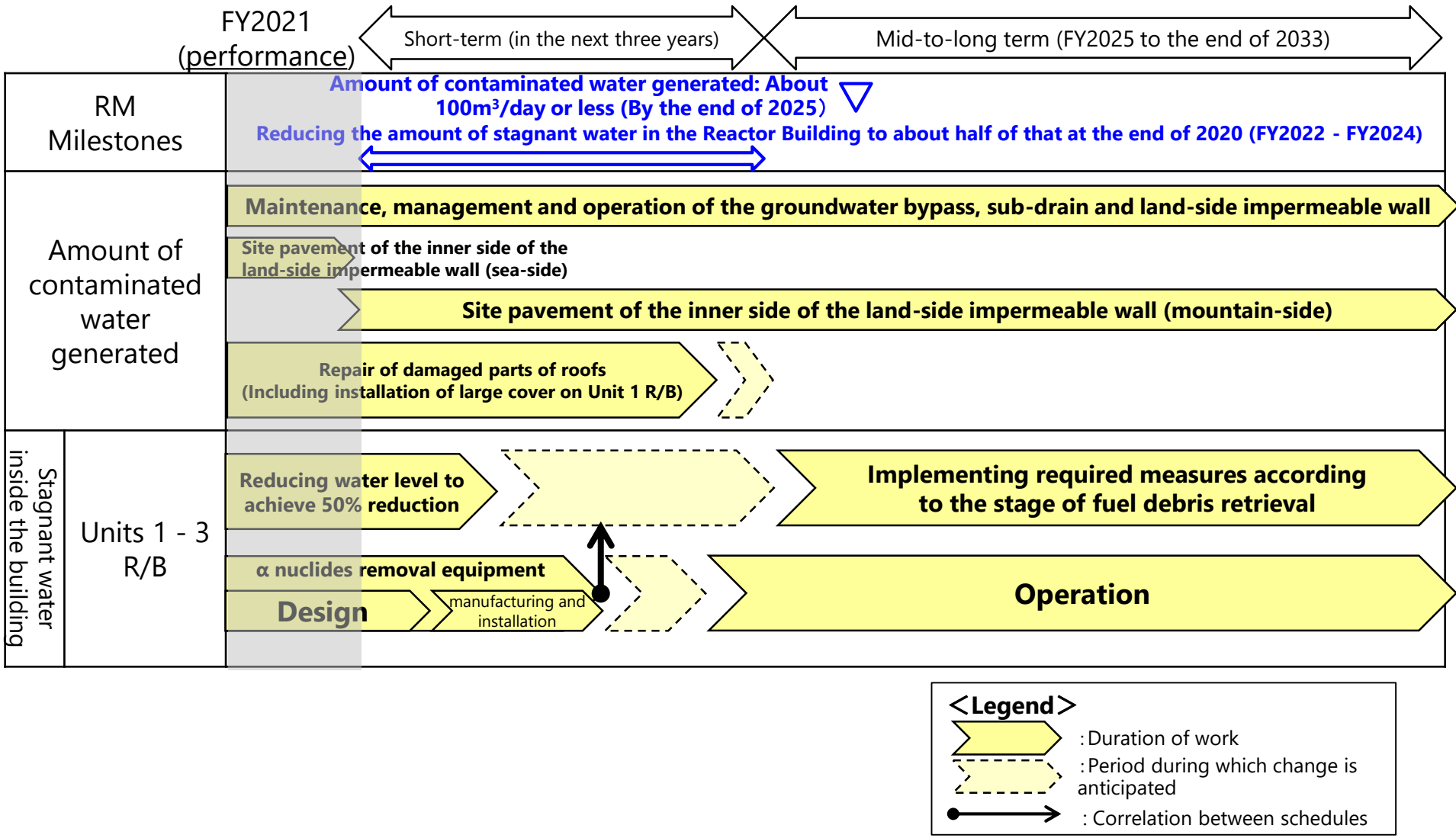
- **Reduce contaminated water generation to about 100 m^3/day or less (in 2025)**
  - The maintenance, management and operation of the groundwater bypass, sub-drain and land-side impermeable wall will continue and the level of the groundwater around the buildings will be kept low in a stable manner.
  - As measures to prevent rainwater seepage, site pavement will be carried out on the inner side (mountain-side) of the land-side impermeable wall and the damaged parts of building roofs will be repaired.

  (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, method of closing contaminated piping, etc.)
- **Reduce the amount of stagnant water in the Reactor Building to about a half of that at the end of 2020 (FY2022 - FY2024)**
  - The water level will be reduced after checking the properties of stagnant water in the R/B.
  - Nuclide removal equipment will be designed and installed after ascertaining the properties of the α nuclides present in the stagnant water in the R/B.

  (Challenges)
  - Specific methods for separating and removing α nuclides present in stagnant water in the R/B will be studied.

Contaminated water management

-Major work processes going forward (2/4)



Contaminated water management

-Major work processes going forward (3/4)

○ Other work related to contaminated water countermeasures

- **Countermeasures after removing stagnant water in the reactor buildings of Units 1-4 T/B. etc.**

– Study recovery methods and manufacture/install recovery equipment to handle sludge etc. that exists at the bottom of the tanks.

- **Removal and treatment of stagnant water in Process Main Building (PM/B) and High Temperature Incinerator Building (HTI)**

– Since the basement of these buildings are being used for storing water before it is treated using cesium adsorption apparatus (KURION/SARRY/SARRY-II), additional tanks will be installed as alternative tanks.

– The floor will be exposed after removing high radiation zeolite sandbags etc. on the lowermost subfloor.

(Challenges)

• Studying safety measures to be taken with regard to handling or implementing measures for high radiation zeolite sandbags etc.

- **Countermeasures for puddle**

– Puddle will be removed from the premises.

– The underground water storage tanks will be removed after studying the method of dismantling them while ensuring that dust is not scattered.

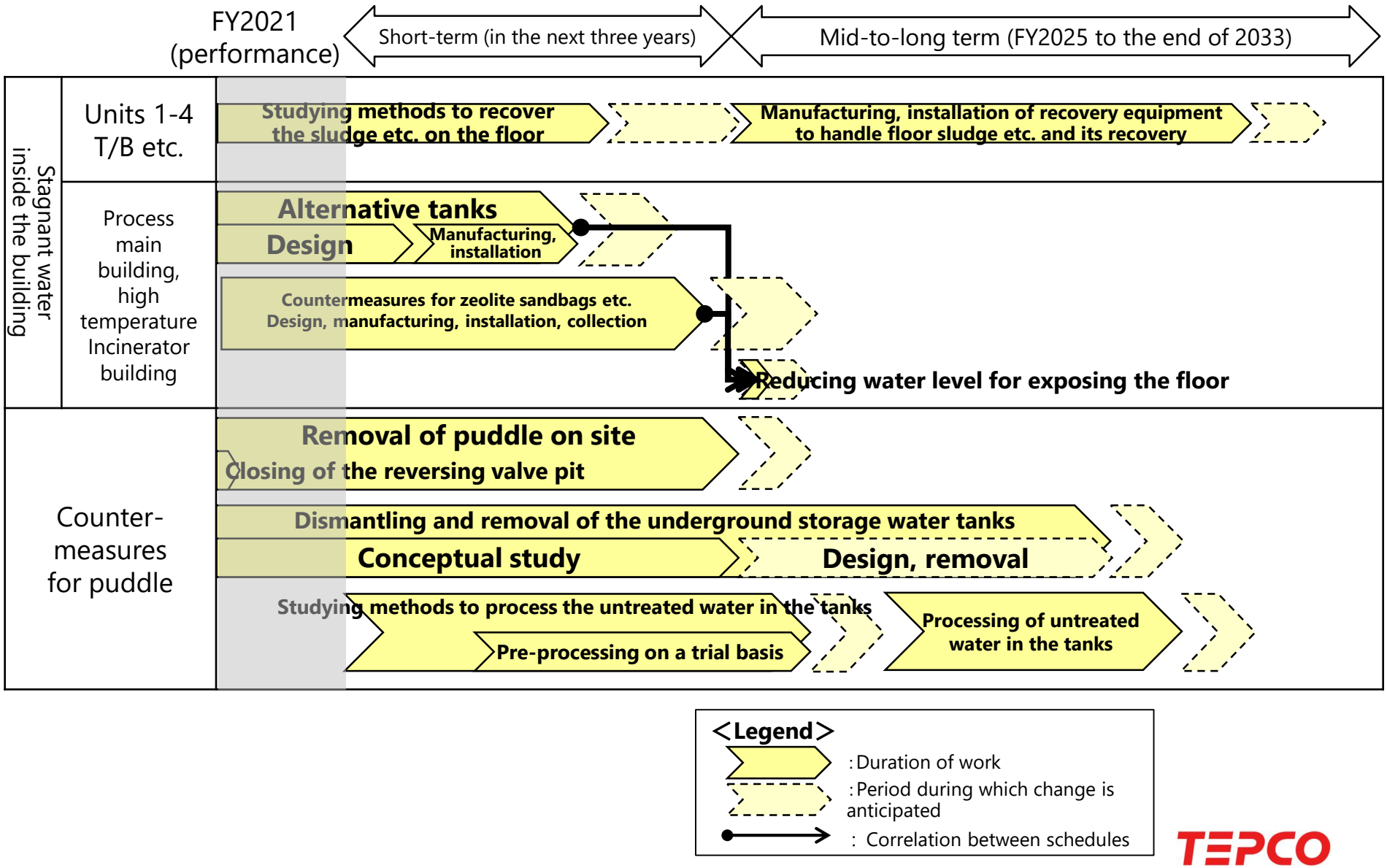
– Because the untreated water in the tanks (concentrated liquid waste) cannot be easily processed using existing water treatment facilities, a separate policy etc. will be studied to implement the processing.

(Challenges)

• Measures for volume reduction and storage of contaminated waste generated when the underground water storage tanks that store stagnant water are dismantled.

Contaminated water management

-Major work processes going forward (4/4)



Treated water management

-Progress made in FY2021

○Progress made in FY2021 in processes that are ongoing

- **Treated water management**
  - In April 2021, the Inter-Ministerial Council for Contaminated Water, Treated Water and Decommissioning Issues decided the Basic Policy on Handling of ALPS Treated Water.
  - We published our response to the government's basic policy in April 2021 and have been gradually implementing the following.
    - Conducted a radiation impact assessment on people and the environment (design stage) (November 2021)
    - Conducted a geological survey off the coast of the station (December 2021)
    - Applied for approval of changes to the implementation plan (December 2021)
    - Conducted agitation experiments (November 2021) and circulation agitation experiments (February 2022) for facilities used for measurement and confirmation purposes

Geological survey

Agitator to be installed in the tanks used for measurement and confirmation purposes

Treated water management

-Major work processes going forward (1/3)

○Work to achieve the government policy

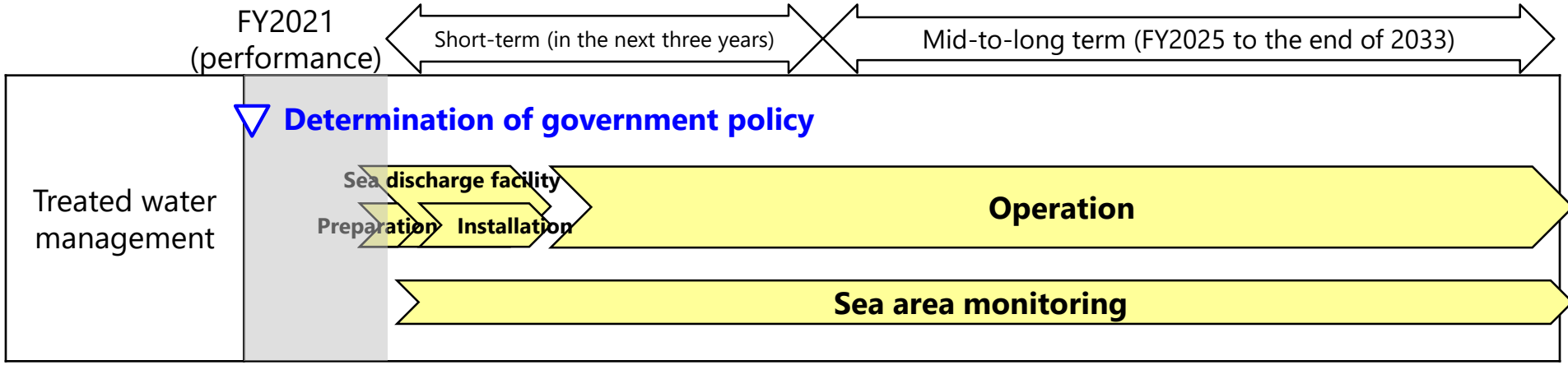
- **Treated water management**

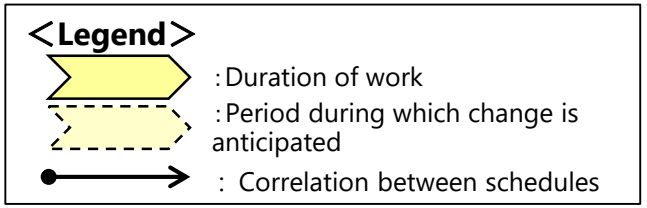
– Preparatory work and installation work for ALPS treated water dilution/discharge facility and other related facilities will be conducted.

– Sea area monitoring will be conducted to see how tritium is being scattered in the sea area, and how the radioactive materials is moving to the fish and seaweed.

Treated water management

-Major work processes going forward (2/3)





Treated water management

-Major work processes going forward (3/3)

Secondary treatment facility（newly installed reverse osmosis membrane facility）
Secondary treatment of treated water to be re-purified (sum of the ratios of nuclides, excluding tritium, is between 1 and 10)

Secondary treatment facility（ALPS）
Secondary treatment of Treated water to be re-purified (sum of the ratios of nuclides, excluding tritium, is 1 or higher)

Measurement/confirmation facility (K4 tank group)
Comprised of three sets of tank groups each with the role of receiving, measurement/confirmation, and discharge. In the measurement/confirmation stage, water that has been made homogenized through circulation and agitating is sampled and analyzed (approx. 10,000m³ × 3 groups)

ALPS treated water transfer pump

Seawall
Installed around emergency isolation valves and transfer pipes

ALPS treated water, etc. tanks

Rotation
Discharge
Receiving
Measurement/ confirmation

Flow meter/water flow rate control valve/ Emergency isolation valve
(tsunami prevention measure)

Seawall

Header pipe
(diameter approx. 2m by length approx. 7m)

Emergency isolation valve

Seawater flow meter

Seawater pipe

Discharge vertical shaft (Down-stream storage)

Road

EL 33.5m

EL 11.5m

EL 2.5m

Unit 5 intake

Seawater transfer pump
3 units

Discharge vertical shaft (upper-stream storage)

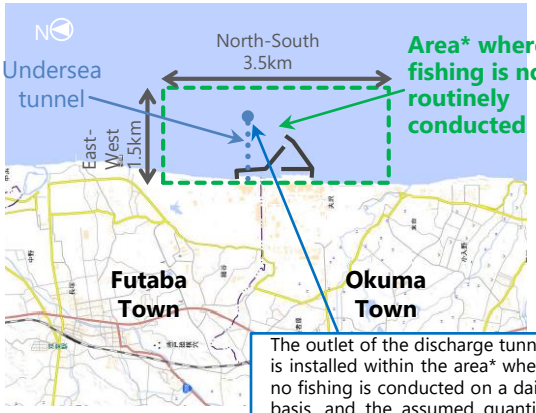
Discharge to sea

Discharge tunnel
(approx. 1km)

Seawater used for dilution
（intake from outside the harbor）

Utilize the vertical shaft for the time being, and initiate discharge after confirming directly that seawater and ALPS treated water has mixed and diluted.

Source: Developed by Tokyo Electric Power Company Holdings, Inc. based on the map developed by the Geospatial Information Authority of Japan (electronic territory web)
https://maps.gsi.go.jp/#13/37.422730/141.044970/&base=std&ls=std&disp=1&vs=c1j0h0k0l0u0t0z0r0s0m0f1



*Area where common fishery rights are not set

The outlet of the discharge tunnel is installed within the area* where no fishing is conducted on a daily basis, and the assumed quantity of water within the subject area is approx. 60 billion(6.0E+10) liters.

Overview of facilities for securing safety

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Spent Fuel Removal

-Progress made in FY2021

○Progress made in FY2021 in processes that are ongoing

●Unit 1

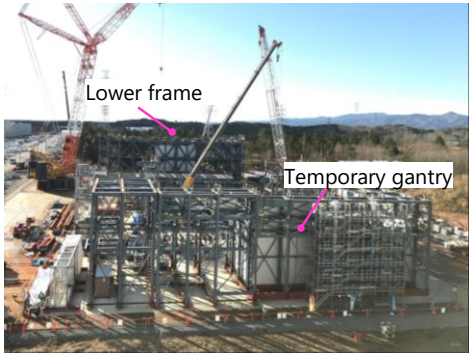
- Steel bars were assembled in the yard outside of the premises to install the large cover

●Unit 2

- Preparation for ground improvement was conducted to install a gantry on the south side
- Dose reduction measures were implemented for the top most floor of the R/B

● Unit 3

- Underwater camera surveys were conducted from July to October 2021 to remove the high dose equipment being stored in the spent fuel pool



Steel bar assembly in the yard outside of the premises (December 2021)

Decontamination of the top most floor of the Unit 2 R/B

Rubble accumulating in the center of the Unit 3 pool

Spent fuel removal

-Major work processes going forward (1/5)

○ **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.

- **Start fuel removal from Unit 1 (FY2027 – FY2028)**

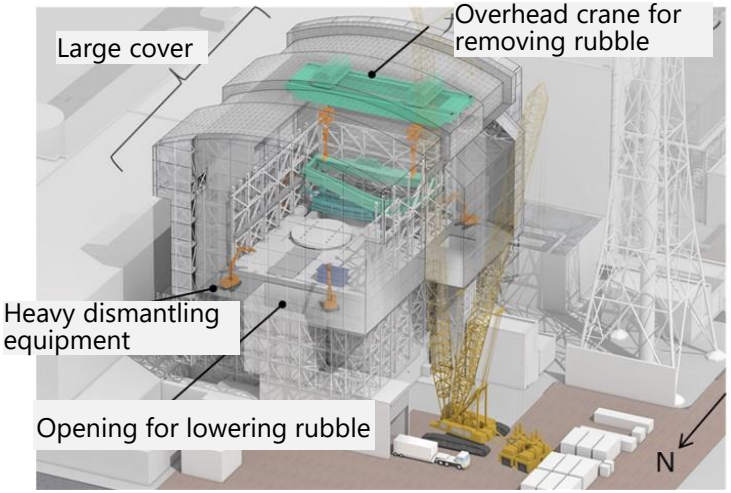
– Fuel handling system required for fuel removal will be fabricated.

– The fuel handling system 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 that take into account other interfering work to be conducted in the work areas
- 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 refueling floor.
- Studying and implementing plans for handling damaged fuel stored from before the earthquake disaster.



Unit 1 Large cover (Image)

Spent fuel removal

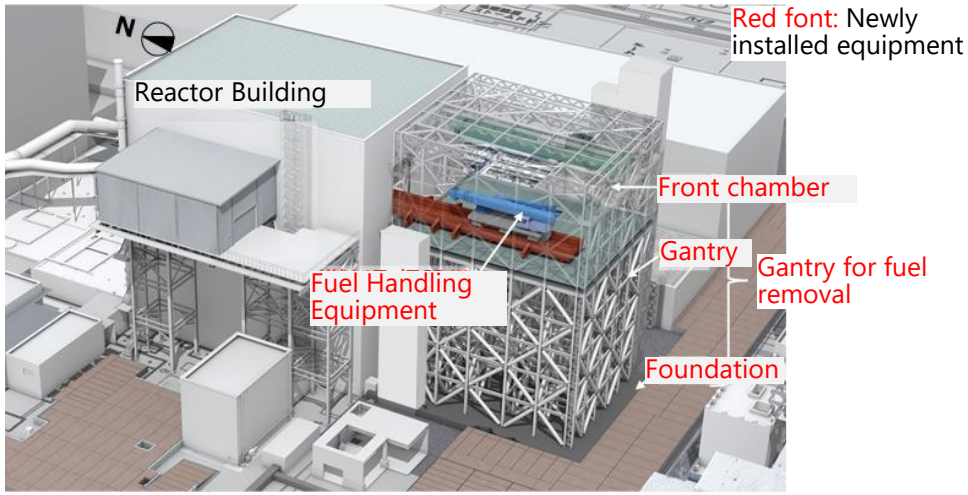
-Major work processes going forward (2/5)

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

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

(Challenges)

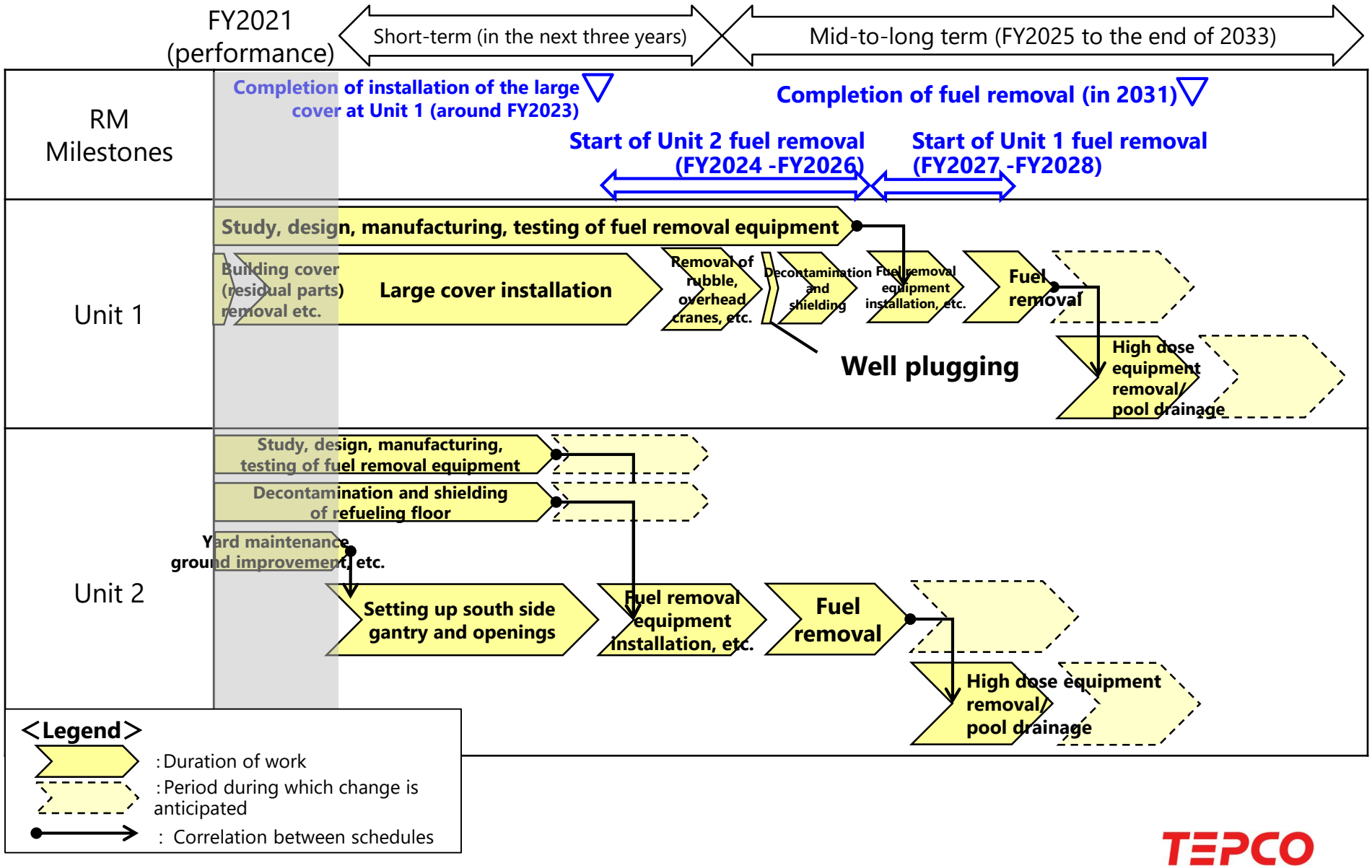
- Studying and implementing plans for effective decontamination and shielding in order to reduce the dose on the refueling floor.



Unit 2 gantry for fuel removal (Image)

Spent fuel removal

-Major work processes going forward (3/5)



Spent fuel removal

-Major work processes going forward (4/5)

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

- **Complete fuel removal from Units 1 - 6 (in 2031)**
  - Fuel will be removed from Units 5 & 6 in a way that does not interfere with work at Units 1 & 2.
  - Since the common pool receives spent fuel from each unit, the spent fuel from 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 & 6.

○ Other spent fuel removal related work

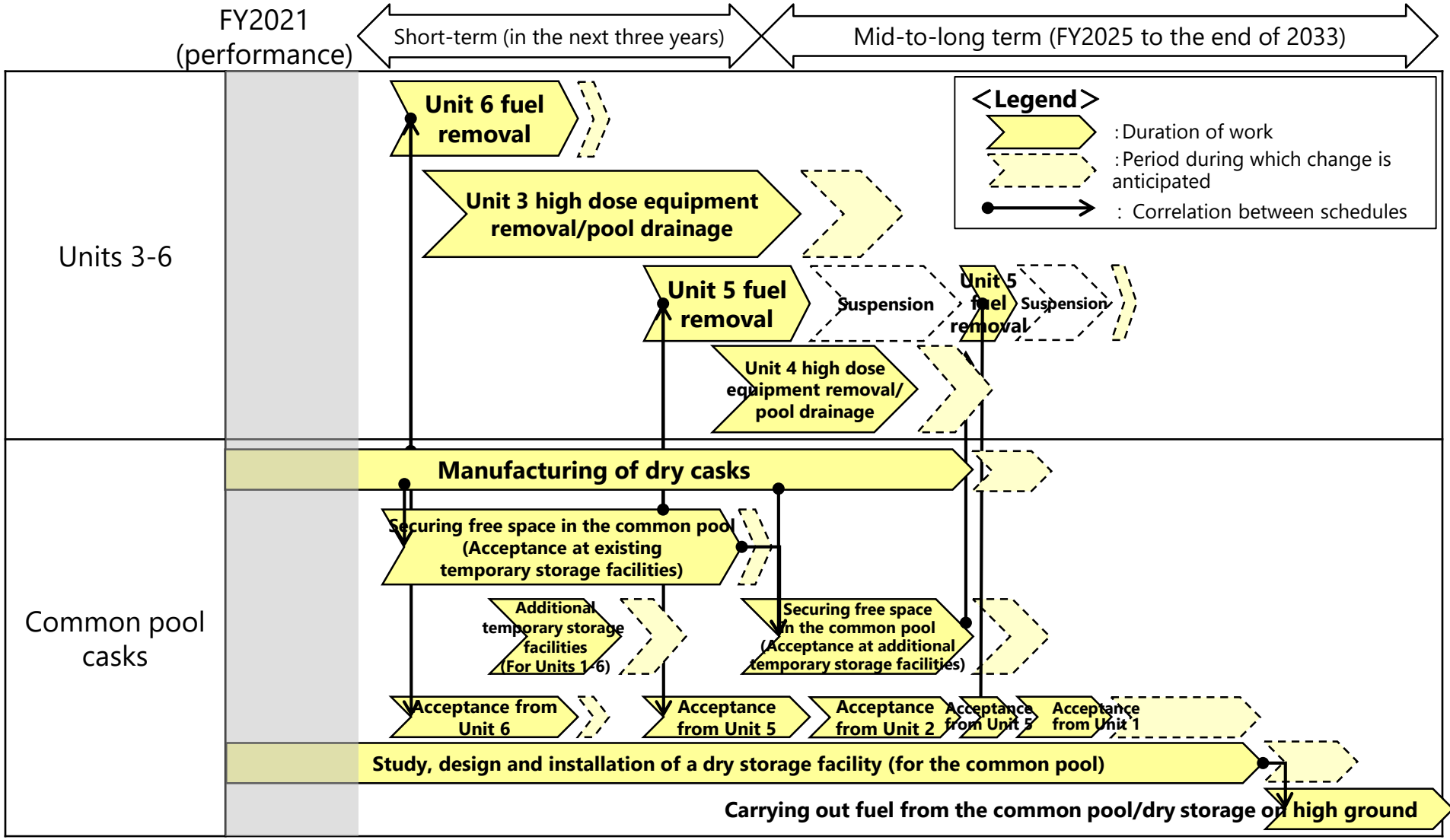
- After removing fuel from each unit, highly radioactive equipment such as spent control rods, etc. will be removed.
- Study, design and install a dry storage facility on high ground in preparation for the storage of fuel currently being stored in the common pool.

(Challenges)

- Study of specific method for removing diverse equipment with varying sizes and shapes. (remote operation, transfer and storage)

Spent fuel removal

-Major work processes going forward (5/5)



Fuel debris retrieval

-Progress made in FY2021

○Progress made in FY2021 in processes that are ongoing

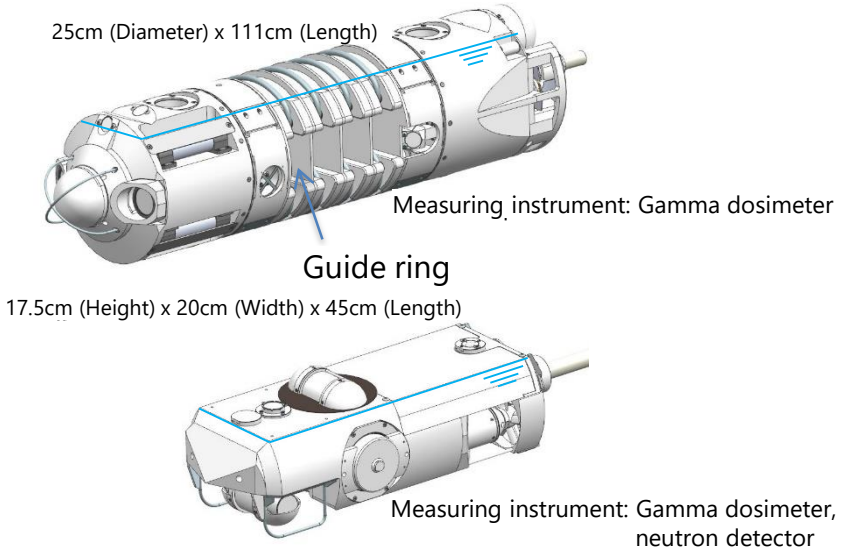
●Efforts for trial retrieval (Unit 2)

– The performance of fuel debris trial retrieval devices (robot arms) that were developed in the UK are being tested in the Naraha Mockup facilities

●Efforts for internal survey of the Unit 1 Primary Containment Vessel

– Following preparation work including an investigation of interfering objects in the Primary Containment Vessel (PCV) and the removal of such interfering objects, a PCV internal investigation was conducted in February 2022

Robot arm performance confirmation test



Survey device for the Unit 1 PCV internal investigation

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

Fuel debris retrieval

-Major work processes going forward (1/4)

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

● **Start fuel debris retrieval from the first implementing unit**

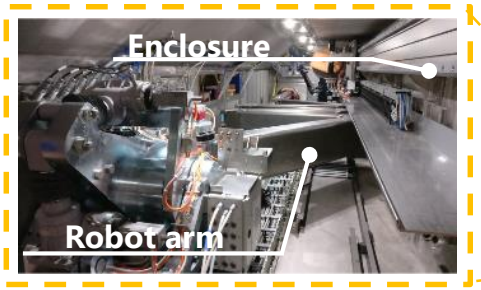
– Towards the trial retrieval in Unit 2, research and development will be undertaken, engineering work will be carried out to apply the results of R&D on site, and fuel debris retrieval equipment (access equipment, recovery equipment, etc.) will be manufactured and installed. Primary Containment Vessel (PCV) internal investigation will be implemented in accordance with retrieval.
Since the development of equipment in the UK has been delayed due to the COVID-19 pandemic, performance confirmation tests, etc. will be conducted in Japan to minimize the delay to approximately one year.

– 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

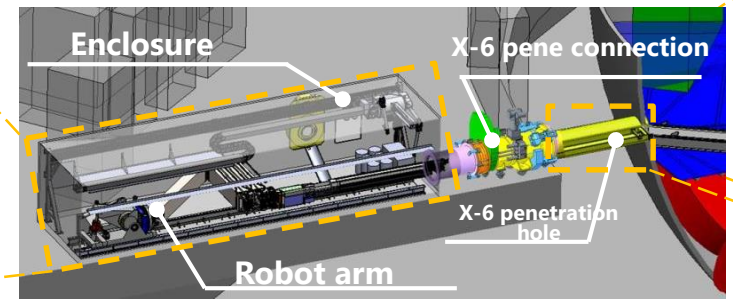
– The deposits or obstacles in the existing opening (X-6 penetration hole) that leads to the inside of the PCV will be removed.

(Challenges)

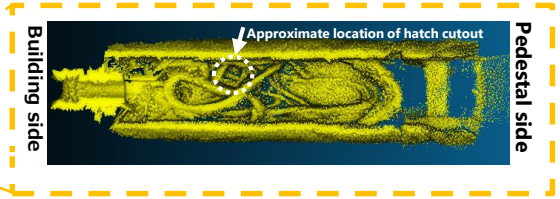
• Study on measures to control scattering of dust while removing the deposits or obstacles from the access route, and developing relevant devices



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 (2/4)

○ Other fuel debris retrieval related work

Expand the scale of retrieval gradually (Unit 2)

– In order to increase the scale of retrieval in stages, research and development will be undertaken. Also, engineering work will be carried out to apply the results of R&D on site, and based on the knowledge, etc. obtained through trial retrieval, designing, manufacturing and installation of fuel debris retrieval equipment, safety systems (containment, maintaining cooling, criticality control, etc.), fuel debris temporary storage facilities and equipment for the maintenance of the retrieval equipment will be carried out.

– 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 reactor pressure vessel (RPV) in Unit 2 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 expand the scale of retrieval (Units 1/3)

– In order to further increase the scale of retrieval, research and development will be undertaken. Also, engineering work will be carried out to apply the results of R&D on site, and based on the knowledge, etc. obtained through retrieval in Unit 2, the retrieval method will be determined, and designing, manufacturing and installation of fuel debris retrieval equipment, etc. will be carried out. We will also move forward with the construction of a training facility for acquiring required skills.

– In addition to the internal investigation of the PCV, that is planned to be implemented at present, further investigations such as internal investigation of PCV, internal investigation of RPV, etc. in Unit 3, will be studied.

Trial retrieval (Unit 2)		Increasing the scale of retrieval in stages (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 (3/4)

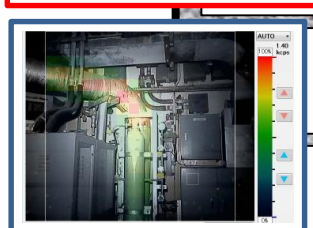
- In order to improve the environment inside the buildings, radioactive sources will be investigated and eliminated for reducing the radiation dose at the work site (in particular, highly contaminated pipes). In addition, equipment, etc. that could hinder future work will be removed. Moreover, the PCV water level will be reduced by developing equipment that draws water from the Unit 3 PCV.
- 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)

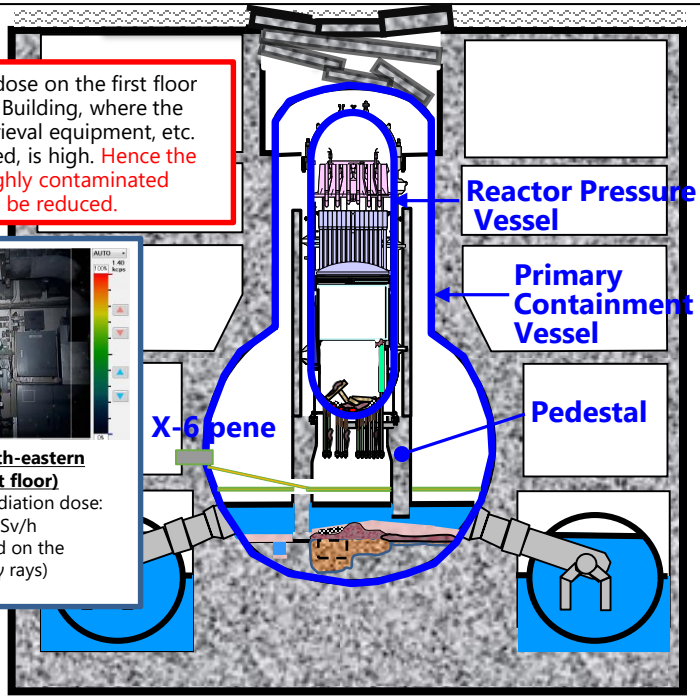
- Study on the method of reducing the dose of highly contaminated pipes by means of remote operations (removal or decontamination) and the method of installing equipment for retrieval and water intake, etc., since the dose at the work site in Units 1/3 is higher compared to that in Unit 2.

Unit 1

The radiation dose on the first floor of the Reactor Building, where the fuel debris retrieval equipment, etc. is to be installed, is high. Hence the dose of the highly contaminated pipes needs to be reduced.

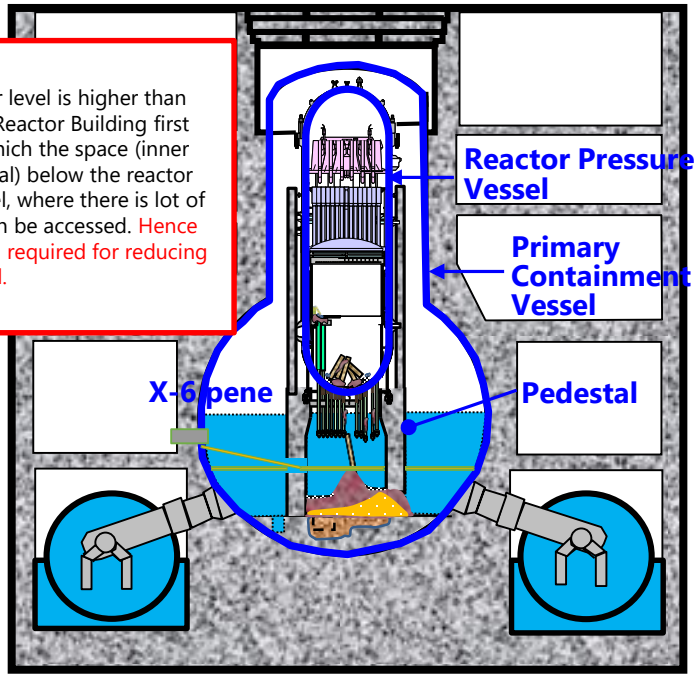


AC piping (south-eastern area on the first floor)
Surface 50cm radiation dose: Approx. 1,000 mSv/h
(Estimated based on the intensity of the γ rays)



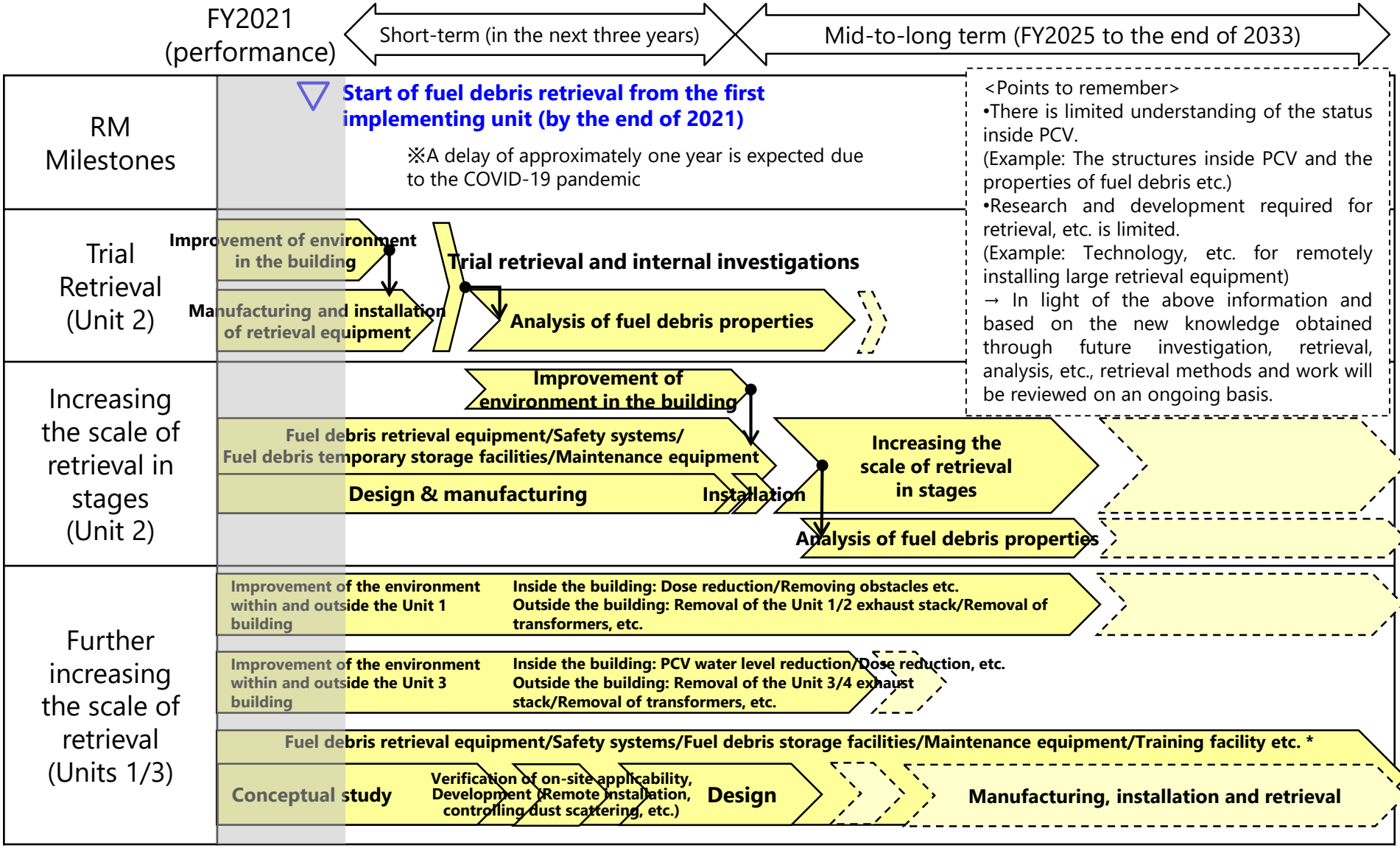
Unit 3

The PCV water level is higher than the opening (Reactor Building first floor), from which the space (inner side of pedestal) below the reactor pressure vessel, where there is lot of fuel debris, can be accessed. Hence water intake is required for reducing the water level.



Fuel debris retrieval

-Major work processes going forward (4/4)



* Assuming that studies will be carried out giving precedence to Unit 3, and Unit 1 will be studied thereafter

Waste management

-Progress made in FY2021

○Progress made in FY2021 in processes that are ongoing

- **Efforts to eliminate temporary storage areas outside for rubble etc.**
  - A waste volume reduction facility that severs metals and crushes concrete is being built

Waste volume reduction facility being constructed
(photo taken in October 2021)

Waste management

-Major work processes going forward（1/4）

○ **Work processes 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 facilities, etc., for reducing the volume of incombustible materials (metal, concrete) will be installed and their operation will be 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 facility.
  - If the projection of the amount of solid waste that will be generated in the future, fluctuates and storage facilities are inadequate as a result, additional storage facilities will be built after securing space within the premises.
  - Materials on site premises including construction materials, temporarily gathered materials and rubble, regardless of their classification, needs to be stored appropriately. Materials with characteristics that require additional safety measures need to be extracted and prioritized appropriately so that scattering and leakage prevention measures will be thoroughly implemented

    Because the materials on site will need to be stored according to their classification to maintain their appropriate storage state, the review of operations and implementation plans will be studied and implemented as needed

(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（2/4）

○ **Other work related to waste countermeasures**

– 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 substances analysis and research facility that is currently under construction.

● **Secondary waste generated from contaminated water treatment**

– Secondary waste generated from contaminated water treatment (adsorption vessels, etc.) will be moved to the large-sized waste storage vault.

– Since the slurry, which is secondary waste generated from contaminated water treatment carried out using multi-nuclide removal equipment, has lots of water content, dehydration and stabilization treatment will be carried out for the slurry.

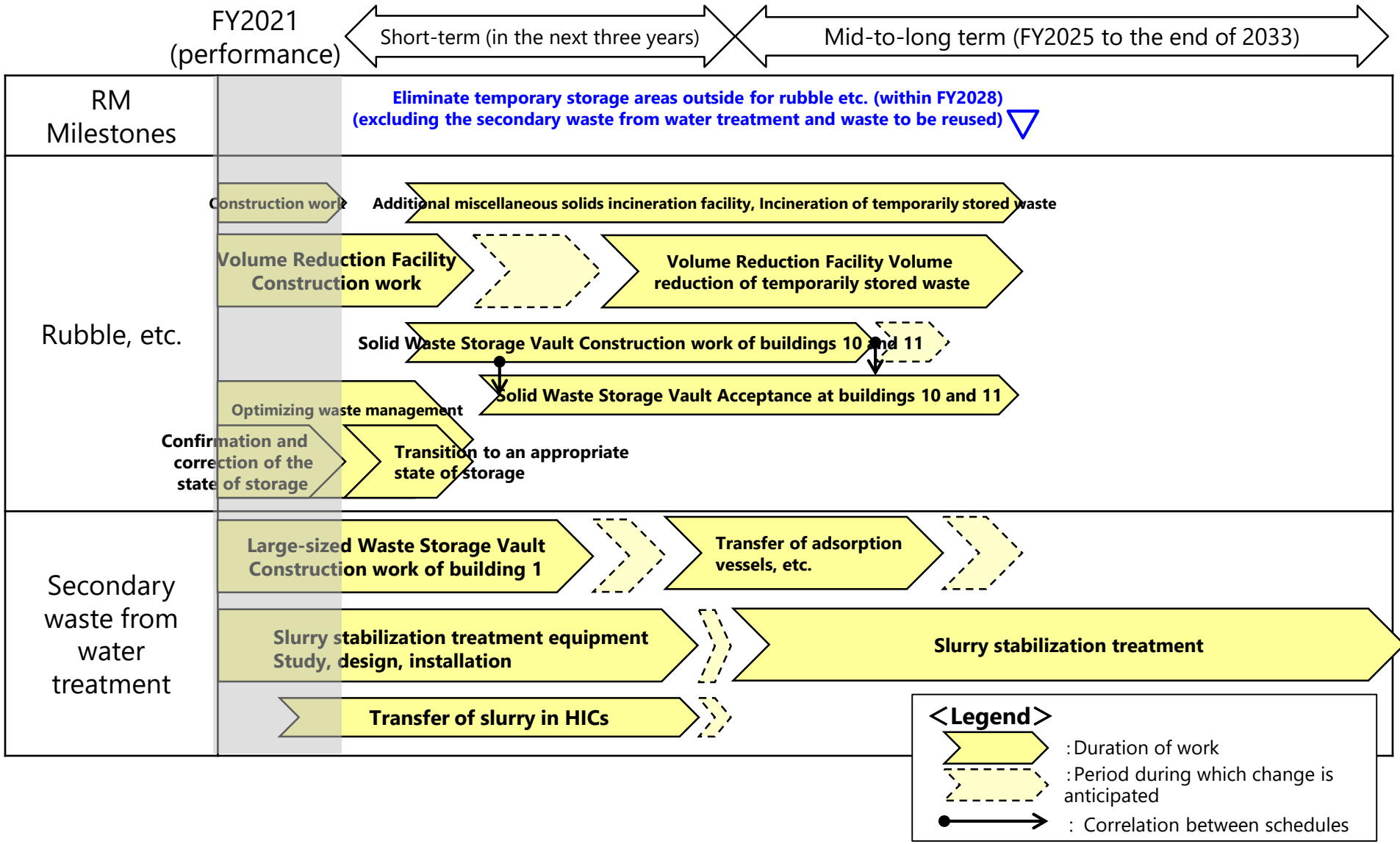
– The slurry is stored in high integrity containers (HIC). While it will not leak if the HICs are stationary, the slurry will be transferred from HICs whose integrity cannot be confirmed if it were to fall before the start of operation of the slurry stabilization treatment facility, in consideration of the effects of slurry radiation

(Challenges)

- Designing the slurry stabilization treatment equipment and study on the specific method for its operation.

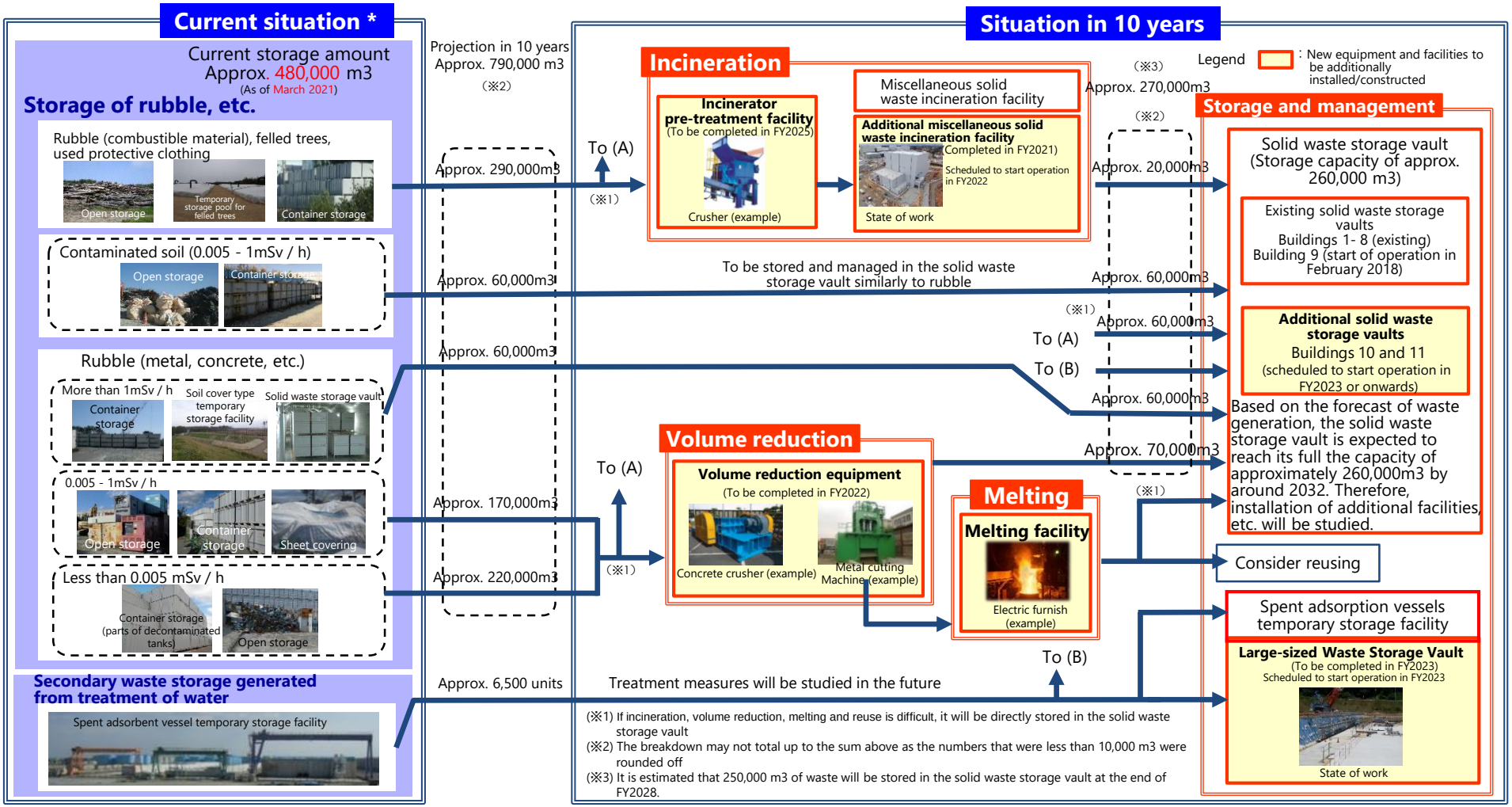
Waste management

-Major work processes going forward（3/4）



Waste management

-Major work processes going forward (4/4)



Note) 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.

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Other measures

-Progress made in FY2021

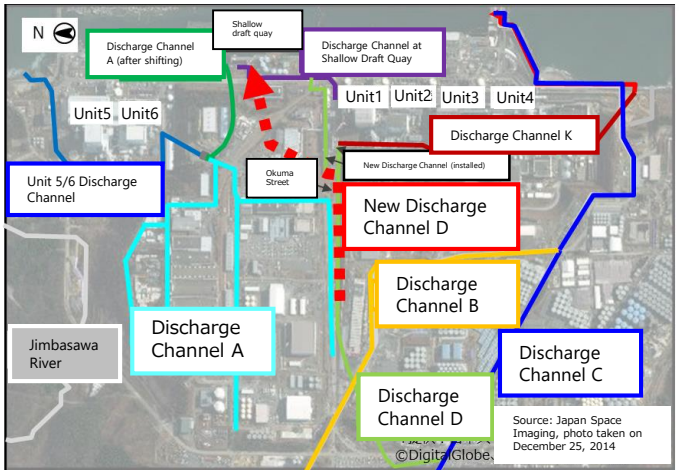
○Progress made in FY2021 in processes that are ongoing

●Natural disaster prevention measures

– Following field trial, installation work for a concrete wall of the Japan Trench Tsunami seawall is underway

– To mitigate risks from torrential rain, digging for a new 800 m D drainage channel has been started

Installation work for the Japan Trench Tsunami seawall (left: before, right: after)



Overview of the drainage channels

Other measures

-Major work processes going forward (1/3)

○ Other related work

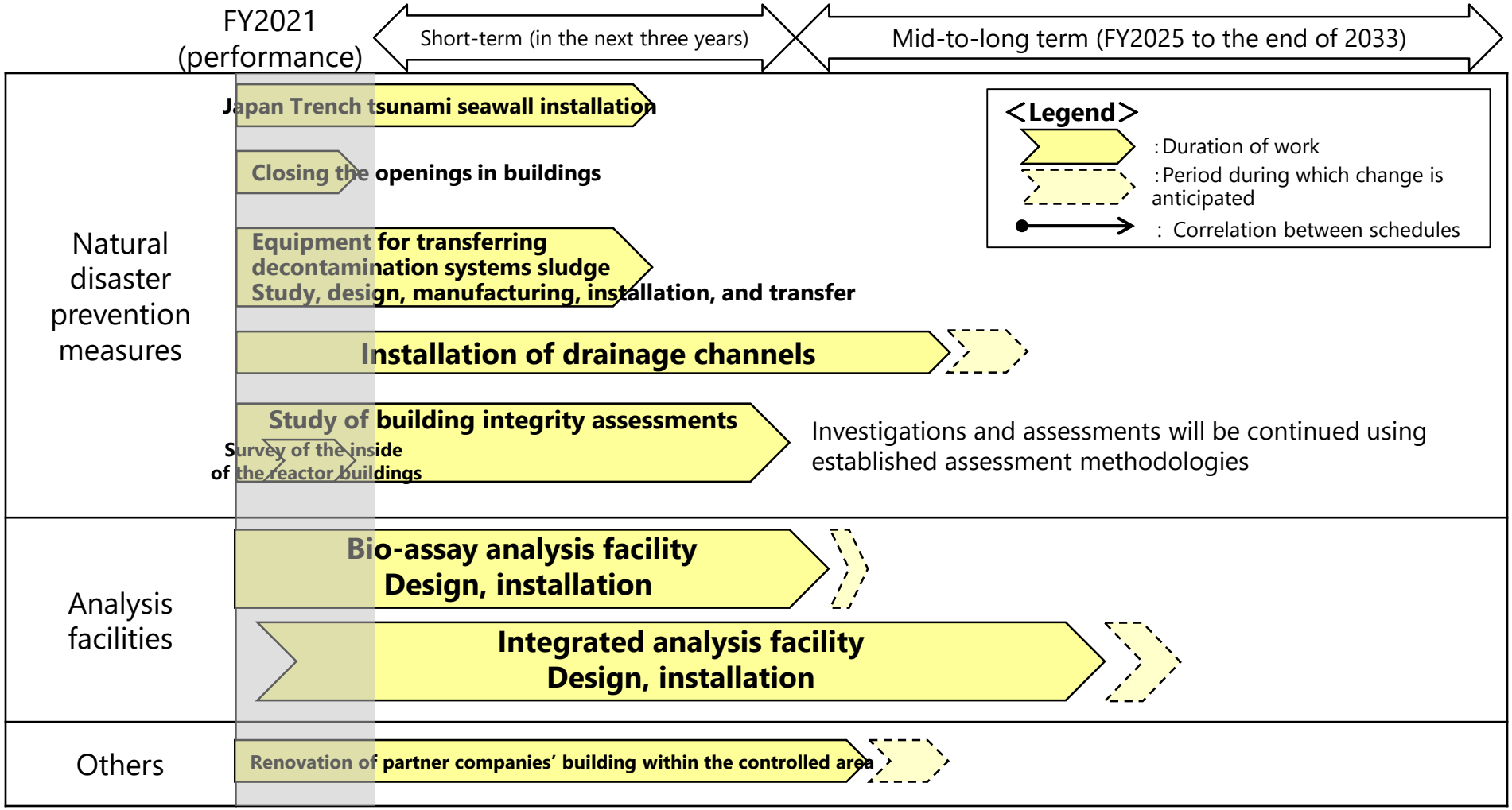
- **Natural disaster prevention measures**
  - Countermeasures for possible tsunami such as installation of Japan Trench tsunami seawall, extraction of decontamination systems sludge from PM/B, etc. will be implemented.
  - A drainage channel will be installed in preparation for large-scale rainfall.
  - The integrity of the reactor building of Units 1-3 that needs to be ensured in the long-term before debris retrieval completion will be assessed by trend analysis through investigations of the inside of the building and seismometers.

  (Challenges)

  - Measures other than sea wall as tsunami countermeasures (protecting the freezing brine transfer pipes, moving the sub-drain tank to an elevated location, etc.)
  - Studying safety measures to be taken with regard to handling and evaluating remote recovery and dewaterability of decontamination systems high radiation sludge from PM/B.
  - Study of methods to investigate integrity inside high dose buildings
- **Analysis facilities**
  - Install facilities that has the analysis capability to be required as decommissioning progresses
- **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

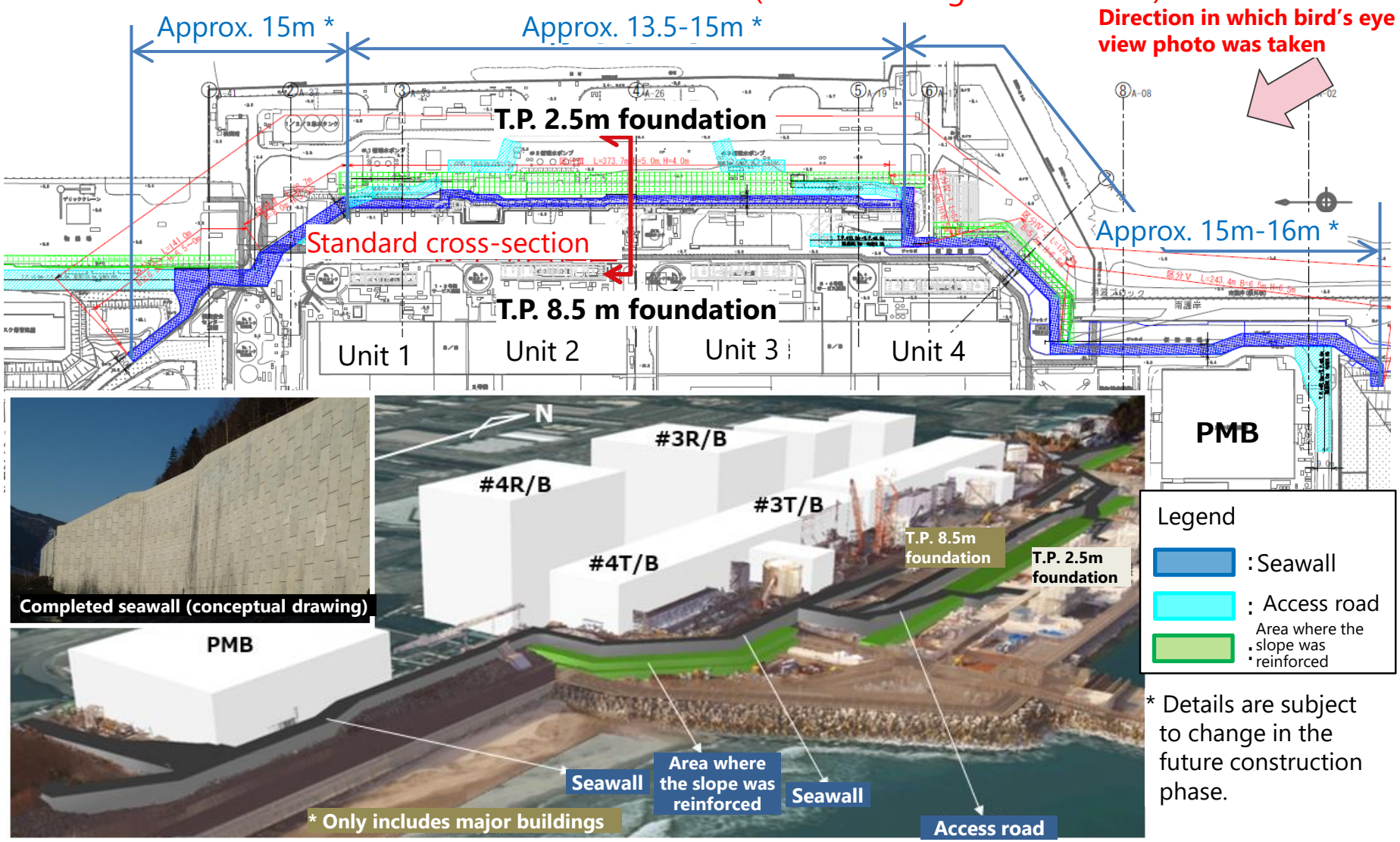
-Major work processes going forward (2/3)



Other measures

-Major work processes going forward (3/3)

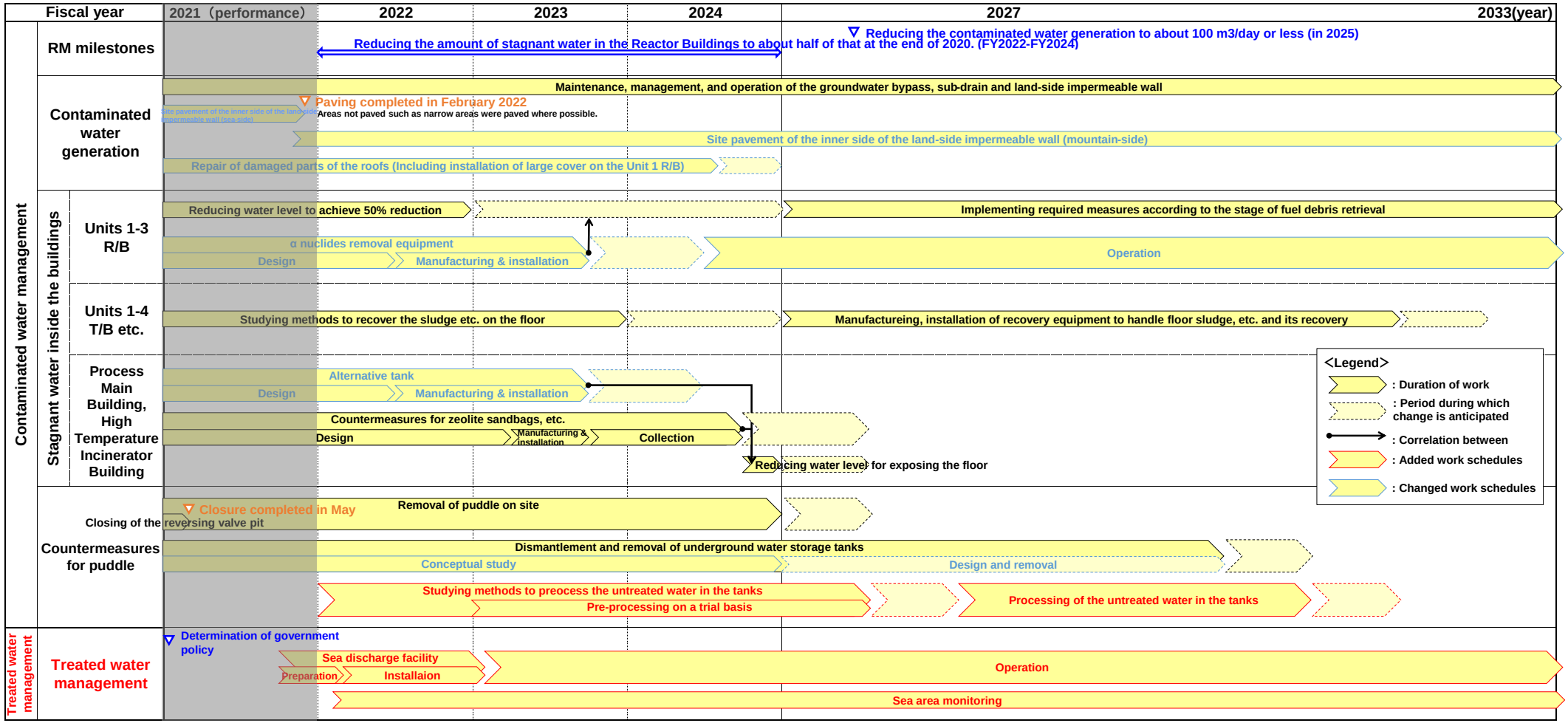
(**In blue：**Height of seawall)



* Details are subject to change in the future construction phase.

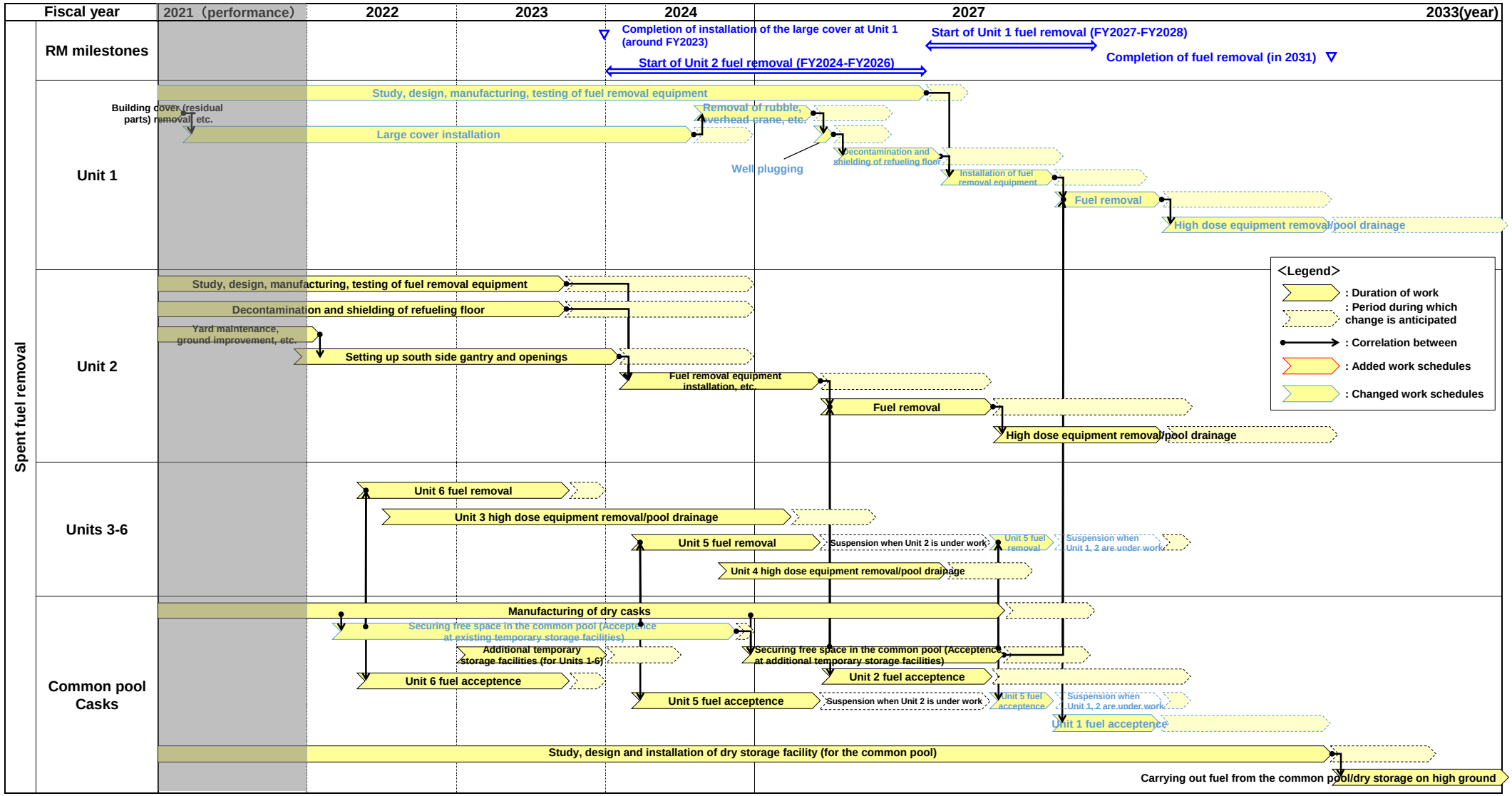
Ground plan and bird's eye view plan of the Japan Trench Tsunami Seawall

Mid-and-Long-Term Decommissioning Action Plan 2022



Note: The contents may change depending on future studies.

Mid-and-Long-Term Decommissioning Action Plan 2022



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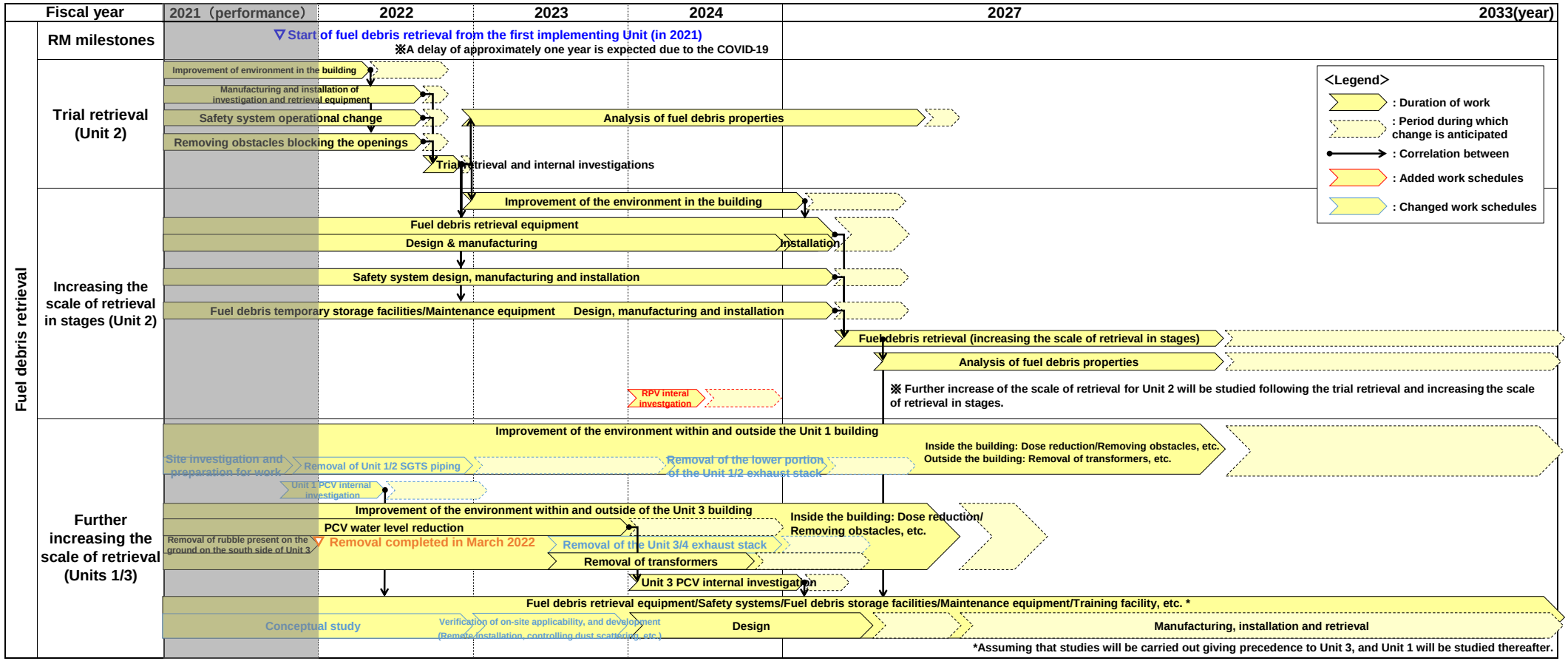
Mid-and-Long-Term Decommissioning Action Plan 2022



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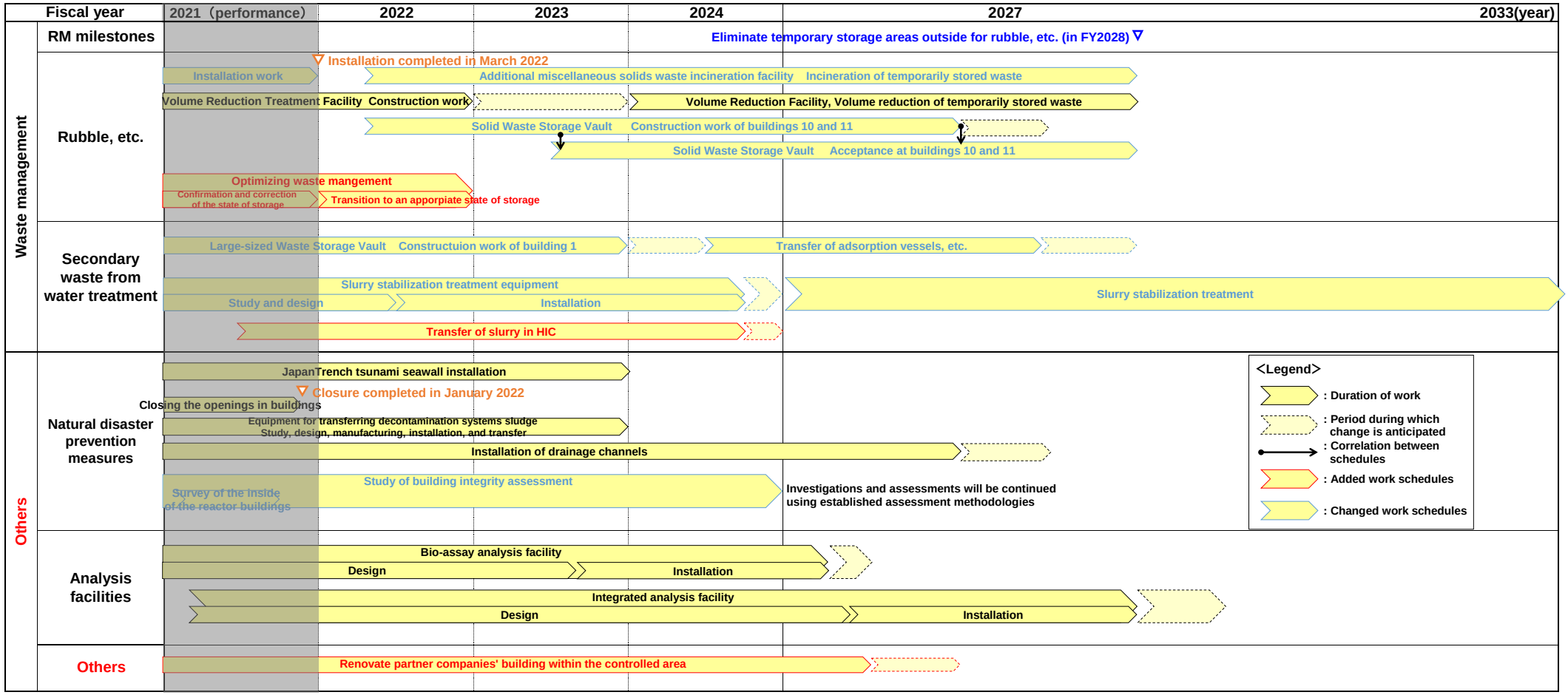
Mid-and-Long-Term Decommissioning Action Plan 2022



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