Decommissioning of Fukushima-Daiichi NPP
Waste and Water

Long-term Decommissioning Plan

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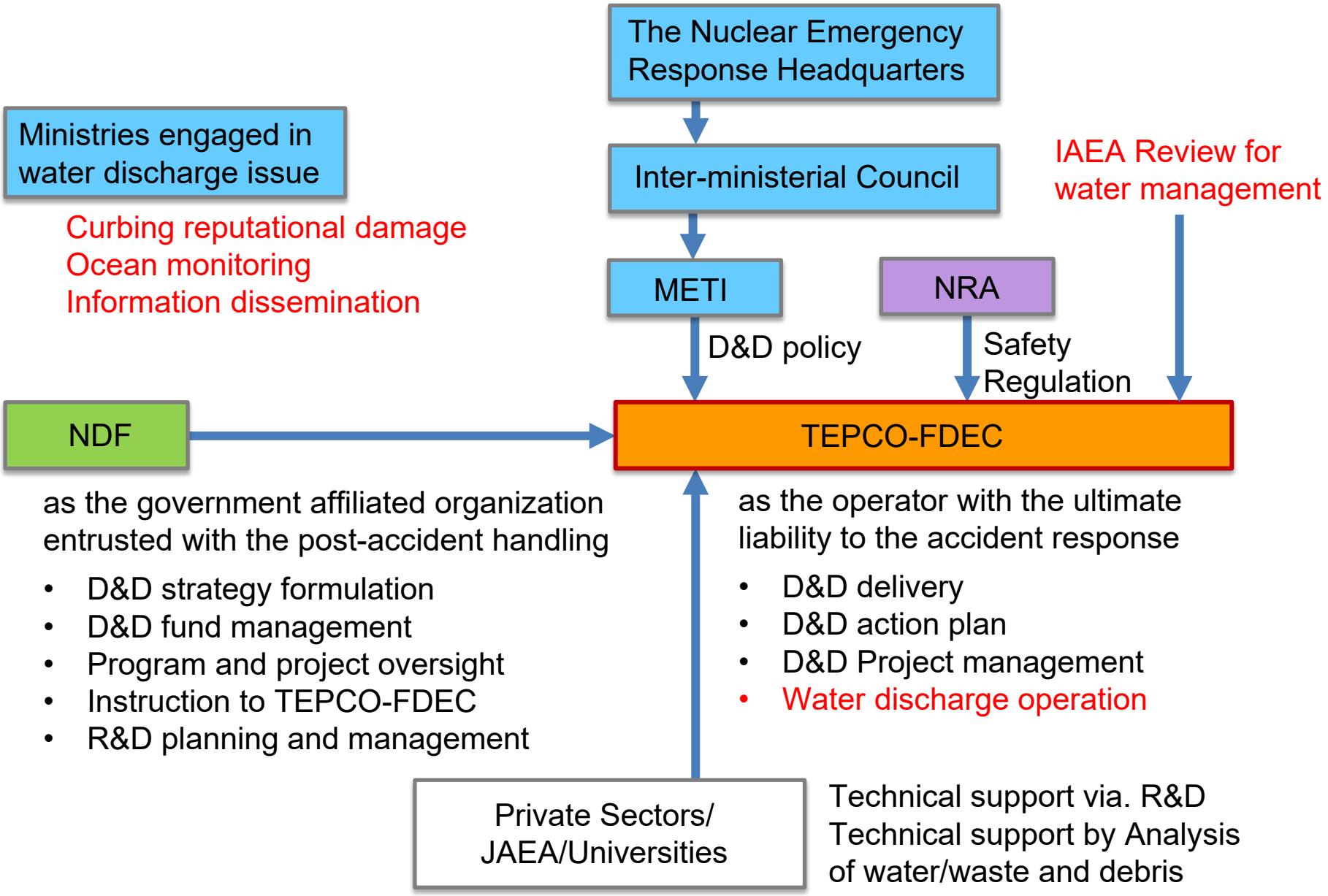
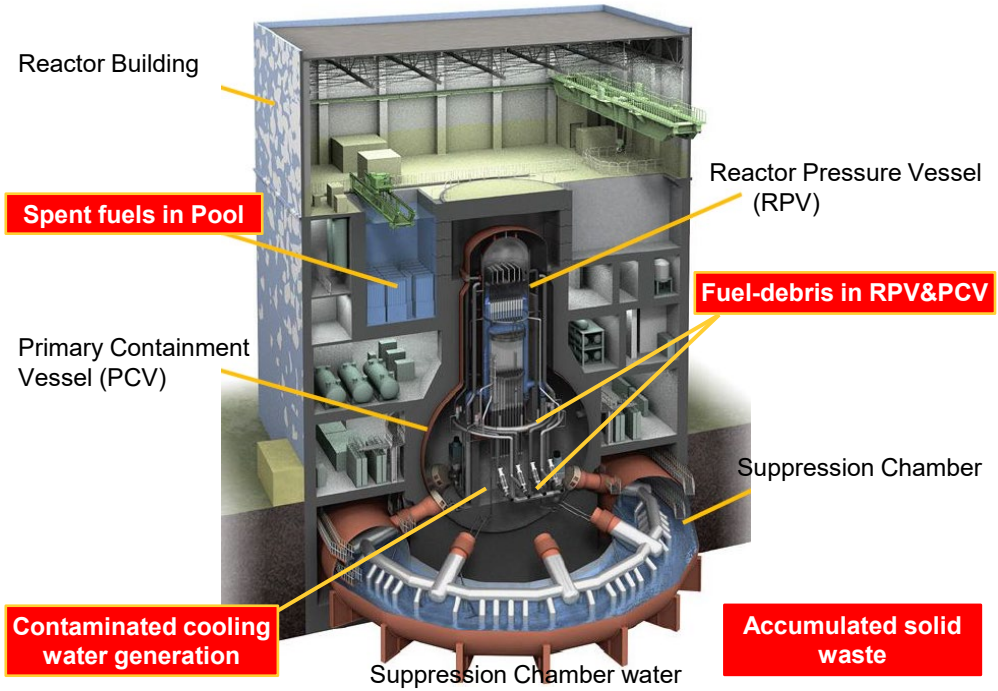
Organization and responsibility



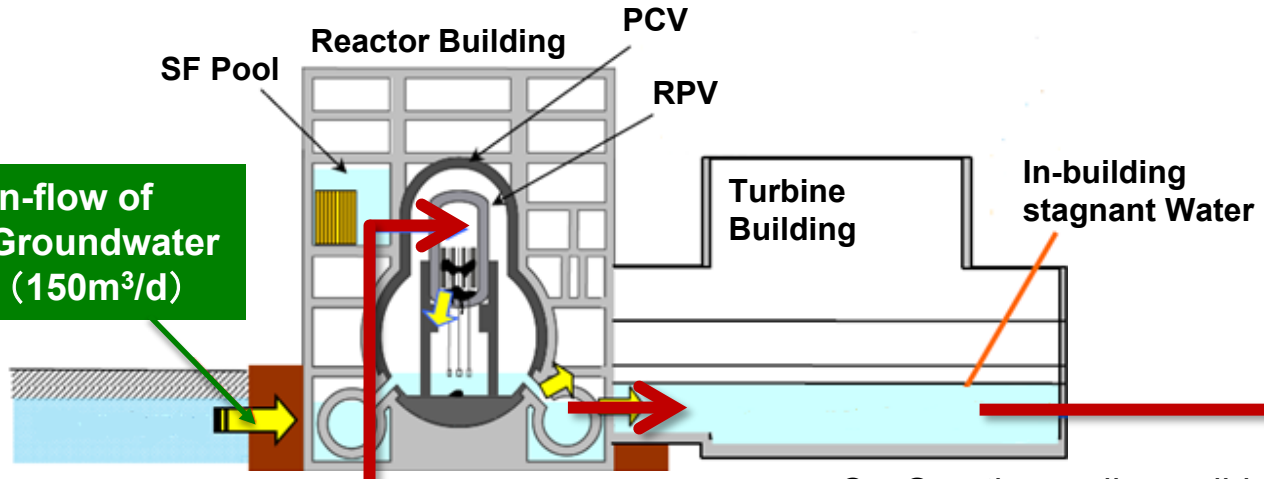
Progress and future decommissioning plan

Mar,2011-Dec.2011	Dec.2011-Nov.2013	Nov.2013-2022	2022-2031	2031-around 2050
Accident Early period	Phase 1	Phase 2	Phase 3	Fulfilment
			Phase 3-(1)	Phase 3-(2)
• Cold shutdown • Significantly reducing the release of radioactive materials	• Spent fuel removal started in 2013 for the first implementing unit	• Small-scaled fuel debris retrieval is to start within 2022 for the first implementing unit	• From the end of Phase 2 through the end of decommissioning (Target period will be 30 to 40 years after Step 2)	



- Spent fuel removal from Units 1 to 6 completed
- Trial retrieval of fuel debris gets started
- Gradual expansion of fuel debris retrieval
- Minimize contaminated water generation
- Proceed with waste storage

Water management in Fukushima Daiichi



Cs, Sr, other radio-nuclides

Sr and others

Desalination by RO

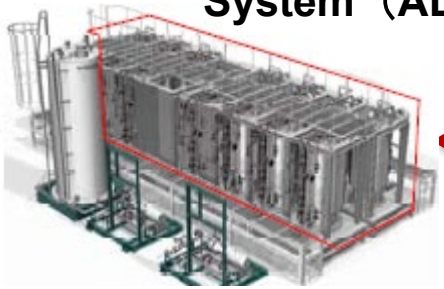
^{3}H

Cooling water

^{3}H

Sr and others

Advanced Liquid Processing System（ALPS）



Removal of all radio-nuclides except for ^{3}H

Sr and others

^{3}H

1.4 Mm³, currently stored

Treated water solely with ^{3}H

Release after dilution

Water discharge plan

■ Status* of ALPS treated water etc.

- Volume of storage : 1,270,000 m^3
- Increase rate : 50,000 m^3 per year
- Tritium inventory : 780 TBq
- Tritium average conc. : 60,000 Bq/L

* As of December 2021

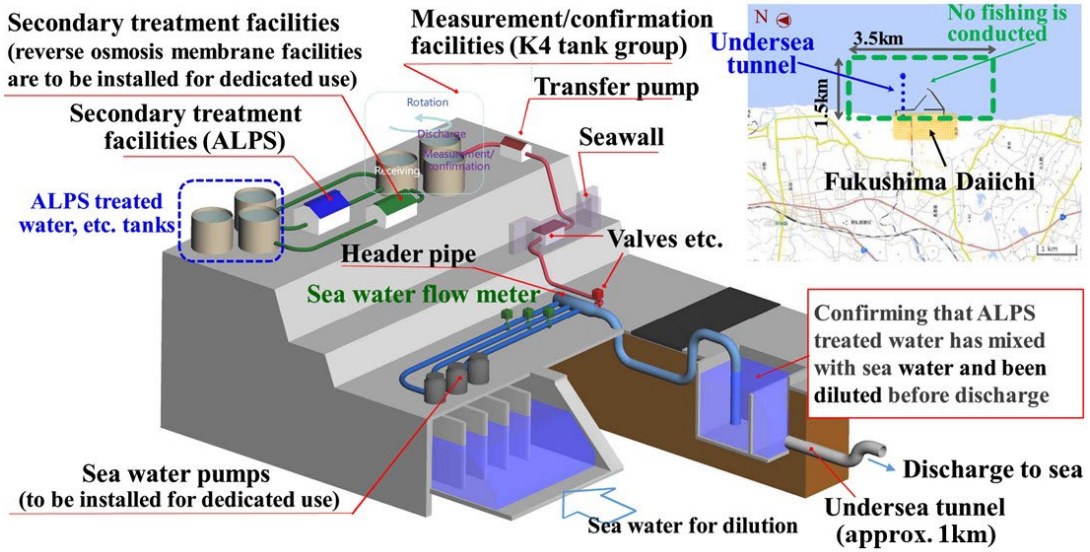
■ Plan of the ocean discharge

- Dilution rate : > 100
- Tritium amount : < 22 TBq per year
- Tritium conc. : <1,500 Bq/L
- Conc. of other nuclides : < 0.01 of standard**

** Sum of ratios of each radionuclide concentration to the regulatory standard in ALPS treated water is reduced less than 1 and the diluted more than 100 times.

■ Facility for the ocean discharge

- Discharge method : Undersea tunnel
- Length of tunnel : approx. 1km
- Depth of discharge point : approx. 10m



Design and operations for ALPS treated water discharge

Annual amount of discharge of tritium water

Nuclear facility	Annual approx. discharge (TBq)
Fukushima Daiichi (6 units)	< 22
BWRs in the world	0.3 - 4
PWRs in the world	20 - 110
CANDUs in the world	30 - 800
Reprocessing facilities in Europe	400 – 11,000

Continued challenges

Status

- Collaborative structure composed of multiple organizations is addressing the Fukushima Daiichi Decommissioning under the strong leadership by the government.
- TEPCO has been reinforcing its project management structure.
- Major progress:

  1F-site has been safely controlled under drastically improved radiation environment
  Spent fuels removal from damaged units has been steadily progressing
  Inside inspection of damaged units with small-scaled fuel-debris sampling will start soon
- Engineering works have been geared up for the full-fledged fuel-debris retrieval expected to start from around 2030.
- A prospect for the safety of the solid waste disposal has been confirmed by NDF.

Challenges

- Ocean discharge of the treated water:

  Urgency of the discharge due to the limitation of the water storage capacity

  Obtaining understanding of public and the world

  Quality, credibility, and transparency of the analysis of the discharged water

  Implementation of the socio-economic measures to curb the reputational damage
- Fuel-debris retrieval will embark on the stage of full-scale engineering.