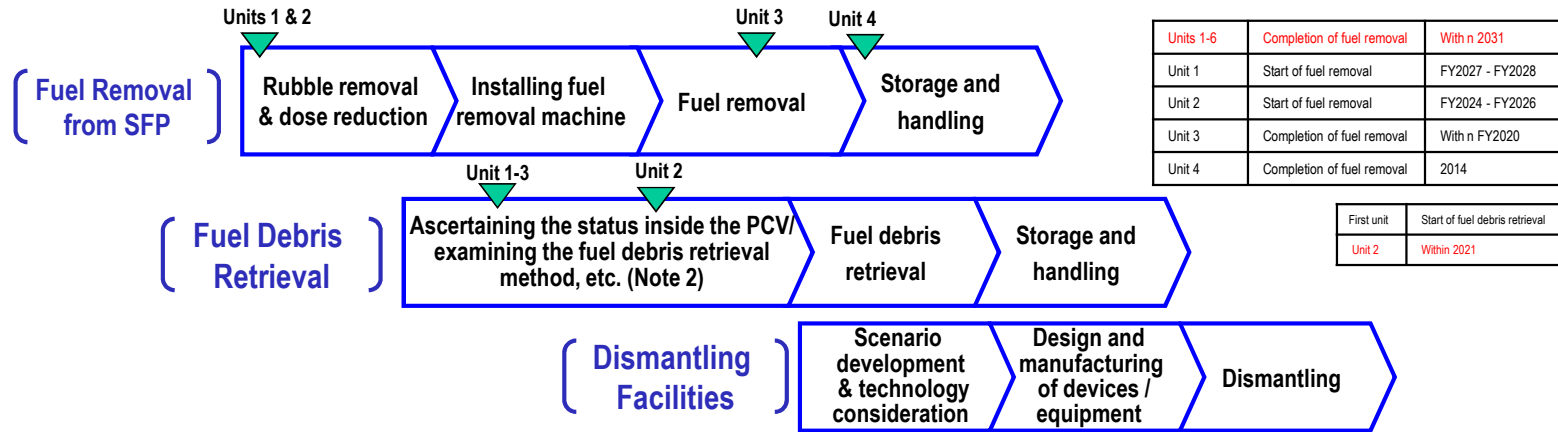


## Main decommissioning work and steps

Fuel removal from the spent fuel pool was completed in December 2014 at Unit 4 and started from April 15, 2019 at Unit 3. Dust concentration in the surrounding environment is being monitored and work is being implemented with safety first. Work continues sequentially toward the start of fuel removal from Units 1 and 2 and debris (Note 1) retrieval from Units 1-3.

(Note 1) Fuel assemblies having melted through in the accident.



### Fuel removal from the spent fuel pool

Fuel removal from the spent fuel pool started from April 15, 2019 at Unit 3. With the aim of completing fuel removal by the end of FY2020, rubble and fuel are being removed.



Removed fuel (assemblies)

**315/566**

Fuel removal (April 15, 2019) (As of August 27, 2020)

Contaminated water management proceeds with the following three efforts:

### (1) Efforts to promote contaminated water management based on the three basic policies

#### [Three basic policies]

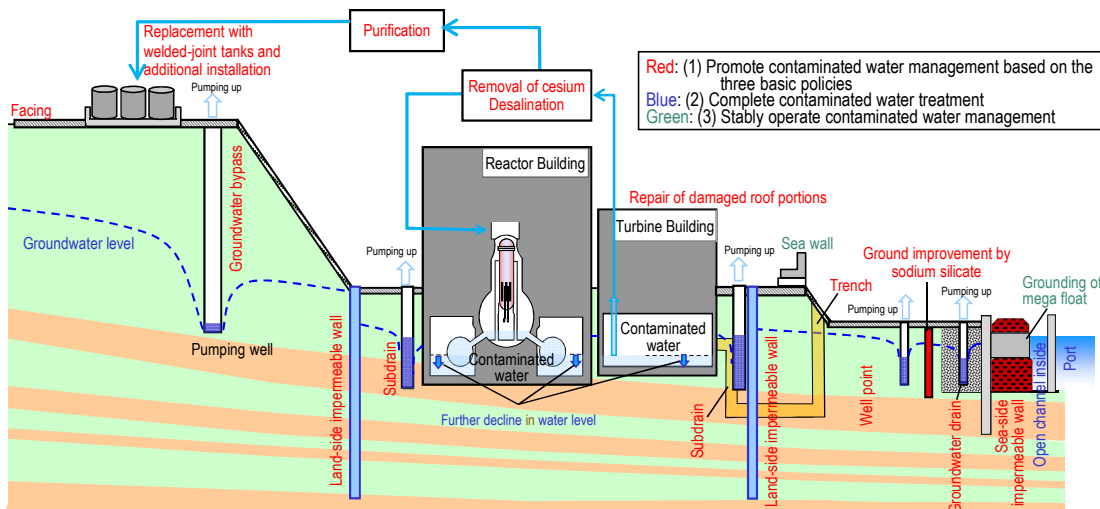
1. "Remove" the source of water contamination
2. "Redirect" fresh water from contaminated areas
3. "Retain" contaminated water from leakage

### (2) Efforts to complete contaminated water treatment

4. Treatment of contaminated water in buildings
5. Measures to remove α-nuclide and reduce the concentration in contaminated water
6. Measures to alleviate the radiation dose of Zeolite sandbags in the Process Main Building and High-Temperature Incinerator Building and examine safe management methods

### (3) Efforts to stably operate contaminated water management

7. Planning and implementing necessary measures to prepare for large-scale disasters such as tsunami and heavy rain
8. Periodically inspecting and updating facilities to maintain the effect of contaminated water management going forward
9. Examining additional measures as required, with efforts to gradually expand the scale of fuel debris retrieval



### (1) Efforts to promote contaminated water management based on the three basic policies

- Strontium-treated water from other equipment is being re-treated in the multi-nuclide removal equipment (ALPS) and stored in welded-joint tanks.
- Multi-layered contaminated water management measures, including land-side impermeable walls and subdrains, have stabilized the groundwater at a low level and the increased contaminated water generated during rainfall is being suppressed by repairing damaged portions of building roofs, facing onsite, etc. Through these measures, the generation of contaminated water was reduced from approx. 540 m<sup>3</sup>/day (in May FY2014) to approx. 180 m<sup>3</sup>/day (in FY2019).
- Measures continue to further suppress the generation of contaminated water to approx. 150 m<sup>3</sup>/day within FY2020 and 100 m<sup>3</sup>/day or less within 2025.

### (2) Efforts to complete contaminated water treatment

- Contaminated water levels in buildings declined as planned and connected parts between Units 1 and 2 and 3 and 4 were respectively separated. For α-nuclide detected as water levels progressively declined, characteristics are being determined and treatment methods examined.
- Treatment of contaminated water in buildings will be completed within 2020, excluding Unit 1-3 Reactor Buildings, Process Main Building and High-Temperature Incinerator Building. For Reactor Buildings, the amount of contaminated water there will be reduced from the level at the end of 2020 during the period FY2022-2024.
- For Zeolite sandbags on the basement floors of the Process Main Building and High-Temperature Incinerator Building, measures to reduce the radiation dose are being examined with stabilization in mind.

### (3) Efforts to stably operate contaminated water management

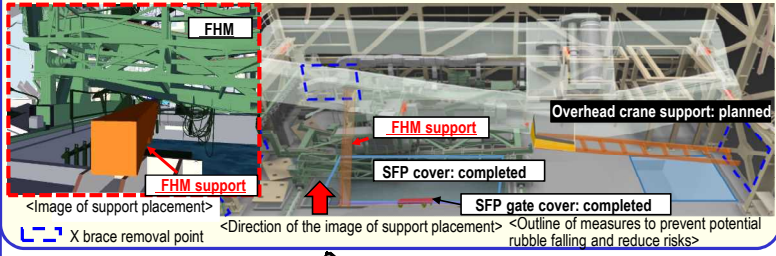
- To prepare for tsunamis, measures including closing building openings, installing sea walls and transferring and grounding the mega float are being implemented. For heavy rain, sandbags are being installed to suppress direct inflow into buildings while work to enhance drainage channels and other measures are being implemented as planned.

## Progress status

- ◆ The temperatures of the Reactor Pressure Vessel (RPV) and Primary Containment Vessel (PCV) of Units 1-3 have been maintained within the range of approx. 20-40°C<sup>\*1</sup> over the past month. There was no significant change in the concentration of radioactive materials newly released from Reactor Buildings into the air<sup>\*2</sup>. It was concluded that the comprehensive cold shutdown condition had been maintained.
- \* 1 The values varied somewhat, depending on the unit and location of the thermometer.
- \* 2 In July 2020, the radiation exposure dose due to the release of radioactive materials from the Unit 1-4 Reactor Buildings was evaluated at less than 0.00005 mSv/year at the site boundary. The annual radiation dose from natural radiation is approx. 2.1 mSv/year (average in Japan).

### Toward installation of support to the Unit 1 FHM

Before removing the fallen roof on the south side and other objects, to minimize the risk of the overhead crane/ fuel-handling machine shifting, becoming imbalanced and subsequently falling, materials to support the fuel-handling machine (FHM) from below will be installed. For the FHM, preparation will start from September and the installation will be completed within October.

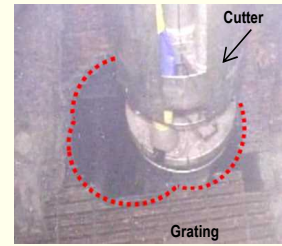


### Cutting of obstacles inside the PCV toward insertion of a robot to investigate inside Unit 1

As part of efforts to investigate inside the Unit 1 Primary Containment Vessel (PCV), work to cut obstacles inside the PCV on the route for the investigation equipment started from May 26.

For the defect of the abrasive supply part having occurred on July 7, the nozzle unit was replaced and the lack of any abnormality was confirmed. Work resumed from August 2 and cutting of the grating was completed on August 25.

Cutting of obstacles will continue.

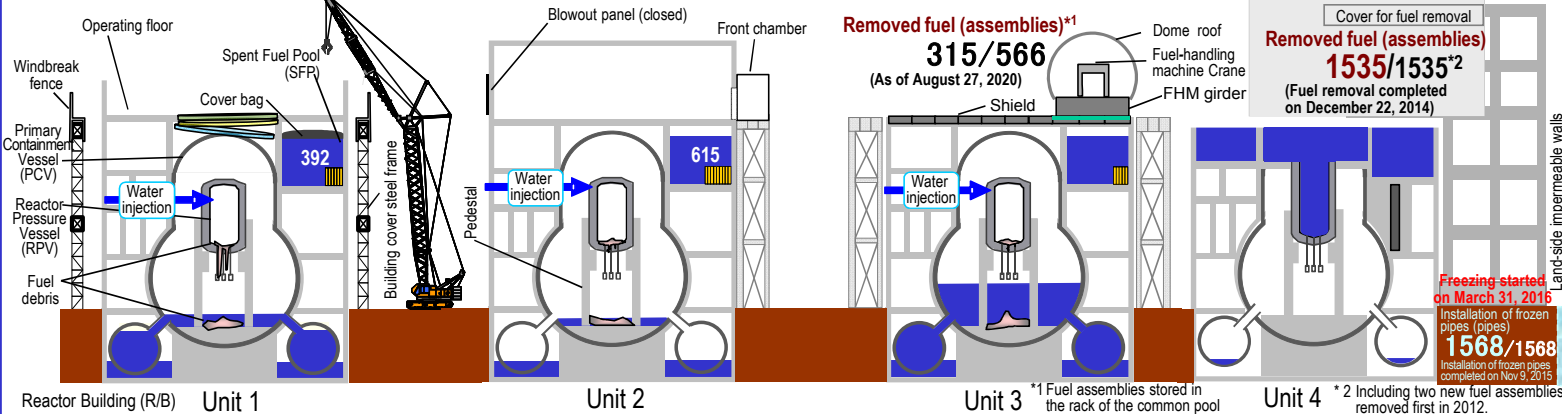


### Test to suspend water injection into the Unit 2 reactor (flash report)

For Unit 2, a test to suspend water injection for about eight hours was conducted in FY2019 to optimize the emergency response procedures.

A test to suspend water injection was also conducted for longer (period: August 17-20 (about 74 hours)) to verify the reproducibility of the temperature evaluation model while suspending water injection to the reactor and examine how best to inject water in future.

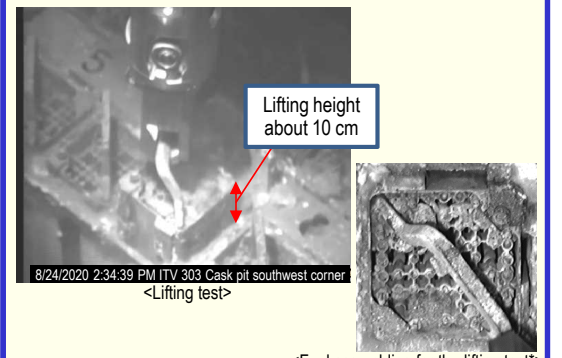
During the suspension period, temperatures at the RPV bottom and PCV increased by about 11.5 and 0.5°C respectively, showing variation almost within the assumed range.



### Ongoing Unit 3 fuel removal proceeding steadily

Since the resumption on May 26, the fuel removal has progressed steadily and 315 of 566 fuel assemblies were removed.

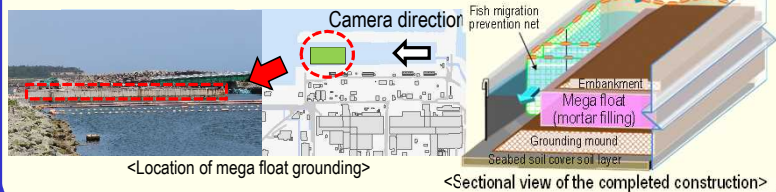
At the same time, rubble removal also proceeded steadily. On August 24, a lifting test was conducted for one fuel assembly with a deformed handle, which was excluded from the previous lifting test in May, and one fuel assembly, with which a deformed handle was detected after the previous lifting test. Based on the test results, it was confirmed that both fuel assemblies could be lifted.



### Completion of mega float grounding to reduce the tsunami risk

To reduce the risk of floating due to tsunamis, work is being implemented to transfer the mega float to the inside of the Unit 1-4 open channel and utilize it as a bank.

Filling mortar into the mega float started from April and its grounding was completed on August 3. This work reduced the risk of floating due to tsunamis.



### Treatment completion of temporarily stored Sr-treated water

Treatment of Sr-treated water temporarily stored while awaiting treatment of multi-nuclide removal equipment and other facilities was completed on August 8, except for operation tanks necessary to treat the contaminated water generated daily.

Following the completed treatment of Sr-treated water, performance verification of secondary treatment will commence from September 2020 for water treated by the multi-nuclide removal equipment or other facilities and its sum of concentration ratios required by law\*, except for tritium, is 100 or more (approx. 2,000 m<sup>3</sup>). The performance verification will involve checking that the sum of concentration ratios required by law, except for tritium, is reduced to less than 1 following treatment by multi-nuclide removal equipment or other facilities. The procedures and process of nuclide analysis and others will also be reconfirmed.

\* The sum of concentration ratios calculated to the concentration limits required by law as specified for each radioactive material.



# Major initiatives – Locations on site

Cutting of obstacles inside the PCV toward insertion of a robot to investigate inside Unit 1

Completion of mega float grounding to reduce the tsunami risk

Toward installation of support to the Unit 1 FHM

Sea-side impermeable walls

Ground improvement

Land-side impermeable walls

Subdrain

Unit 6

Unit 5

Unit 1

Unit 2

Unit 3

Unit 4

MP-1

Test to suspend water injection into the Unit 2 reactor (flash report)

Groundwater flow

Groundwater bypass

Ongoing Unit 3 fuel removal proceeding steadily

Area for installation of waste treatment and storage facilities

Area for installation of waste storage facilities

Area for installation of tanks

MP-2

Site boundary

MP-3

MP-4

MP-6

Treatment completion of temporarily stored Sr-treated water

MP-5

MP-8

MP-7

\* Data of Monitoring Posts (MP1-MP8.)

Data (10-minute values) of Monitoring Posts (MPs) measuring the airborne radiation rate around site boundaries showed 0.385 – 1.249  $\mu$ Sv/h (August 1 - 25, 2020).

We improved the measurement conditions of monitoring posts 2 to 8 to measure the air-dose rate precisely. Construction work, such as tree-clearing, surface soil removal and shield wall setting, were implemented from February 10 to April 18, 2012.

Therefore, monitoring results at these points are lower than elsewhere in the power plant site.

The radiation shielding panels around monitoring post No. 6, which is one of the instruments used to measure the radiation dose at the power station site boundary, were taken off from July 10 - 11, 2013, since further deforestation, etc. had caused the surrounding radiation dose to decline significantly.

Provided by Japan Space Imaging, photo taken on June 14, 2018  
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