

Decommissioning Process “Processing/Disposal/Environment Remediation (including Wastes containing Alpha Nuclides originating from Fuels)”Investigation Subject **“Waste volume reduction and waste conditioning”**Issue **“Reuse and volume reduction”**

Needs

1. Reusing, recycling, and reducing the volume of waste

Desired state and reasons for it

- In the processing of radioactive waste, it is desirable to reduce the amount of both waste itself and waste requiring processing in a stable manner from the viewpoint of reducing the cost of storing, processing and disposal.
- The target wastes include rubbles, structures removed together with debris retrieval, water treatment secondary wastes, and soils, including those that have already been generated and those that will be generated in the future.
- In order to reduce the amount of radioactive waste and its processing and disposal cost, it is desirable to reuse and recycle such waste where possible.
- The volume reduction of concrete components is also important, but since such components can be recycled and used, it is required to establish the concept of both volume reduction and recycling (including using them as they are, separating and dismantling them, and resolving them to materials and recycling)
- Since solid waste will continue to be generated, it is important to investigate referring to the advanced cases in other countries in order to further reduce the waste volume. It is desirable to materialize the project in consideration of effectiveness and feasibility.

Current state against ideal

- Concrete debris is crushed and recycled into roadbed material after surface dose rate is confirmed to be equivalent to background.
- Melting and decontamination are being investigated as decontamination methods for recycling metals. In Government-led R&D Program on Decommissioning, Contaminated and Treated Water Management, investigations are underway on elucidation of nuclide distribution behavior during melting and decontamination, and verification methods after melting treatment.
- With the start of operation of the expanded solid waste incineration facility (May 2022) and the volume reduction facility (February 2024), volume reduction processing is now possible for both combustible and noncombustible materials.
- In February 2024, an incident occurred where the fire detector in the expanded solid waste incineration facility building activated, and as a result, inspections and restoration of the equipment are underway with the aim of resuming operation in fiscal year 2026.

Issues to be resolved

- Since there are various kinds of radioactive wastes generated, it is necessary to predict the properties and amount of waste generated and choose a technology for appropriate reuse and volume reduction in accordance with each waste type.

- Some wastes, such as multiphase oxides and metal complexes, have not been reduced in volume so much. It is necessary to gather knowledge on their volume reduction by physical or chemical separation.
- It is also necessary to have concept and criteria for sorting waste for volume reduction or for recycling.
- In order to reduce the overall burden of waste management, it is necessary to enforce the waste volume reduction efforts throughout the whole decommissioning activities, referring to examples from other countries where the concept of waste hierarchy is practiced.
- Metal recycling by the molten slag decontamination method is considered a promising candidate technology because it has already been proven in many Western countries. It is necessary to evaluate the applicability of this technology by focusing on the nuclides and other conditions that differ between Western countries and the Fukushima Daiichi Nuclear Power Plant.
- It is necessary to collect data on the leaching rate of nuclides, etc., which is necessary to investigate the disposal of slag generated when contaminated metals are melted and decontaminated for volume reduction and reuse.
- Since concrete debris will be continuously generated as the decommissioning work progresses, it is necessary to appropriately evaluate the balance between the volume of generation and recycling in the future, and if additional measures are required, it is necessary to investigate a measure considering the lead time.

Relevant Issues

- PDR-203 "Establishing disposal concept"
- PDR-204 "Performance assessment"
- PDR-205 "Verification and analysis method on waste body"