

Decommissioning Process “**Fuel Debris Retrieval**”  
Investigation Subject “**Sorting fuel debris**”  
Issue “**Sorting fuel debris and radioactive waste**”

## Needs

### 1. Establishing a sorting method

Fuel Debris Retrieval : **[Short]**

#### Desired state and reasons for it

- It is desirable to investigate the amount of material to be handled as fuel debris from a safe and rational point of view and to establish a method to sort fuel debris and radioactive waste in order to improve the estimation of the retrieval period and amount of material, and safety during storing.
- In the Technology Strategic Plan, it is considered that the essence of fuel debris is the presence or absence of nuclear fuel materials. It is desirable to sort fuel debris based on the concentration of nuclear fuel materials.
- In order to sort and distinguish fuel debris from radioactive waste, it is necessary to detect, sort, and quantify nuclides by retrieved material or by storage canister as accurately as possible and to measure (estimate) the nuclides and their concentration in nuclear fuel material.

#### Current state against ideal

- For material retrieved from the PCV, it is important to determine whether it should be treated as fuel debris or radioactive waste, as early as possible through the process from retrieval to storing, even if the prior information is limited. However, there are no sorting standards nor methods.
- Fuel debris contains a heterogeneous mixture of many nuclides and elements, including neutron absorbers, which may interfere with measurements, including voids. Therefore, the effects of the hindrance factors are evaluated by extensive simulation analysis for fuel debris of various possible compositions. Important points are planned to be confirmed by tests using existing test equipment. Based on these results, conceptual design of equipment and sorting scenarios are being studied.
- The following chart shows an example of a concept of fuel debris to be retrieved in the Fukushima Daiichi NPS which experienced the accident.

