

Decommissioning is referred to as actions taken to remove regulatory control from a retired nuclear facility by removing radioactive materials for reuse of its site.

It is necessary to consider safe and rational implementation of such activities as dismantling, decontamination and rad-waste management.

## 1. ABSTRACT

The study is directed to systematize the methodology of decommissioning engineering using the data and lessons learned so far for safe and rational implementation of a decommissioning project. The study will be applied to decommissioning nuclear power plants such as Fugen NPP and Fukushima Daiichi Units 1 to 4.

## 2. RESEARCH ACTIVITIES

### System Engineering for Decommissioning Projects

It is a necessary process to characterize a decommissioning project by precise estimation of project parameters such as cost, waste arising and worker dose. A study is underway to develop a computer system for calculating the project parameters taking into account the technology and working conditions to be applied to the decommissioning work. The study also include the research on optimization of a decommissioning plan and optimum combination of technology using MCDA (multi-criteria decision analysis) method (Fig 1).

### Project Evaluation Methodology

Since decommissioning work requires a variety of technology, it is necessary to evaluate the applicability of these technologies. The methodology has been studied by constructing work break down structures (WBS) on a computer for analyzing decommissioning scenarios where potential applicability of the technology, safety, work efficiency are evaluated (Fig. 2). The methodology will be applied to the fuel debris removal work and planning of decommissioning at the Fukushima Daiichi Units 1 to 4 to select the best scenario.

### Evaluation of Radioactive Inventory

It is important to evaluate accurate radioactive inventory in advancing the decommissioning work. A computer system for radioactive inventory estimation was developed by applying neutron transportation and radioisotope production/decaying codes. The study is in progress to evaluate characteristics of radioactive waste arising from decommissioning by using calculated results of the computer codes.

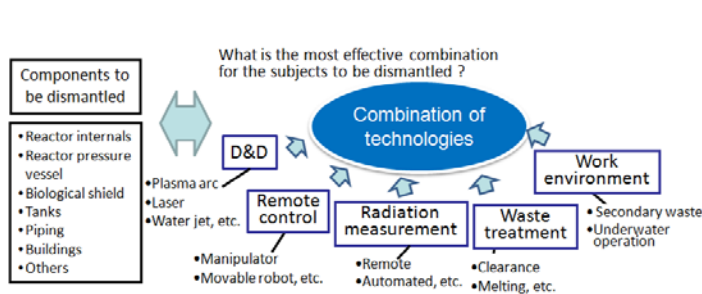


Fig.1 Conceptual drawing of optimization study

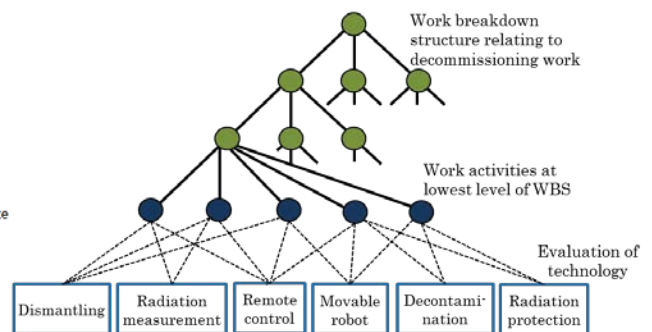


Fig.2 Sequence of data processing for evaluation of project parameters

## 3. FUTURE PERSPECTIVE

Plant life management is an essential factor throughout designing, construction, operation and decommissioning which is the final stage of the life. The study is intended to optimize a decommissioning plan by overlooking the plant life. Evaluation of radioactive inventory and technology availability are the major subjects for evaluation of rational decommissioning plan in the future.

Systematization of decommissioning engineering

### Message for Applicants:

The social demand for science and technology might vary according to the times. It is important to consider application of knowledge by fulfilling the demand of times as well as gaining the basic knowledge in the university. Decommissioning engineering is a requirement of the present age. We will make an effort to educate students to be practicable to cope with the demand of times through the study on decommissioning.