9 Development of Technology on Nuclear Cycle Backend

R&D for Decommissioning and Rad-Waste Management

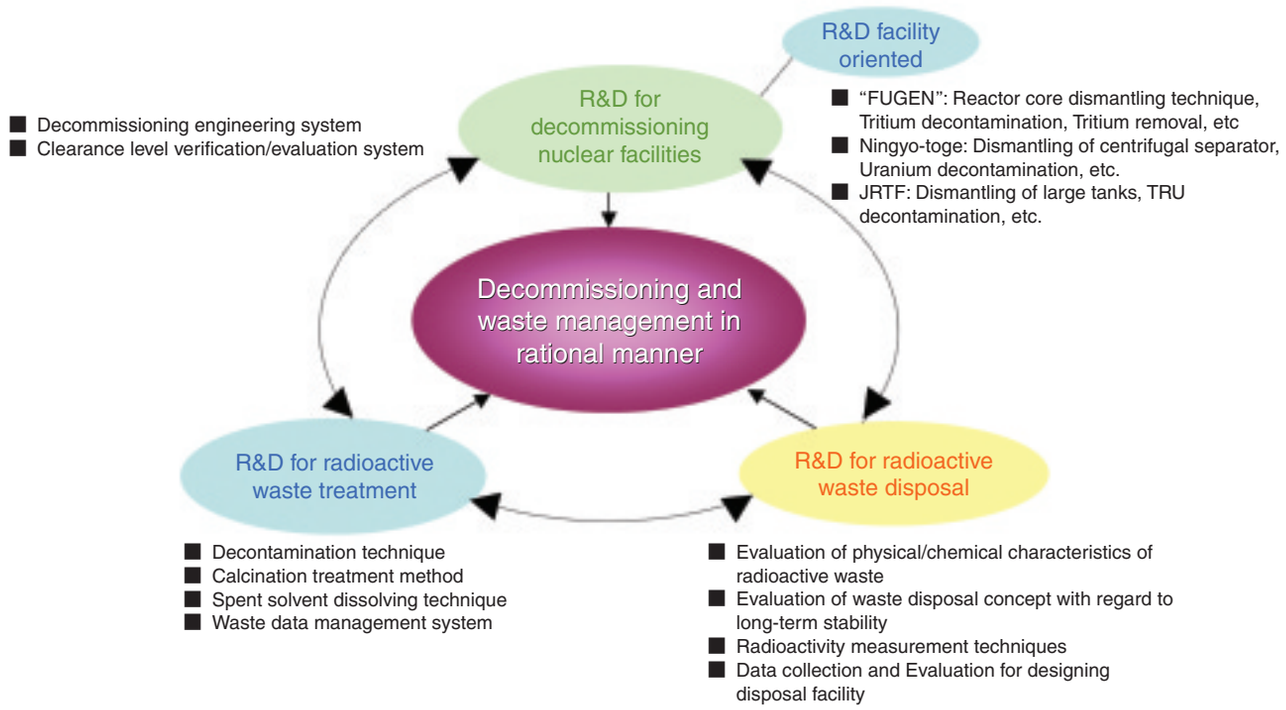

Fig.9-1 Research & Development for decommissioning and rad-waste management

It is the facility owner's and/or waste generator's responsibility to decommission unneeded facilities and to treat/dispose of generated radioactive waste, respectively. Research & Development (R&D) might be necessary for decommissioning and rad-waste management measures allowing these processes to be carried out in a cost effective manner while securing safety. We therefore determined the technology necessary for decommissioning and rad-waste management measures supporting the R&D shown in Fig.9-1, and then dedicated our midterm plan (2005-2009) to development of this base technology. The major progress achieved in this R&D is as follows.

R&D for Decommissioning

A lot of know-how and data on removal remote handling, waste management, etc. have been gained through past decommissioning experiences. Utilizing this knowledge effectively, we are developing a decommissioning engineering system and a clearance level verification/evaluation system to support the planning of decommissioning and clearance implementation, respectively. A prototype version of clearance level verification/evaluation system was built and the relevant data on clearance were collected for the system.

In addition, R&D is under way at facility sites, considering specific conditions. At the Fugen site, performance of abrasive water jet cutting was tested for reactor components (Topic 9-1). Decontamination capability of a uranium contaminated centrifuge machine at the Ningyo-toge site was tested. The waste storage tanks contaminated with transuranic nuclides were dismantled to evaluate the efficiency of techniques applied at the reprocessing test facility in the Tokai site.

R&D for Waste Treatment

For accumulation of data on calcination treatment, studies are in progress to evaluate the behavior of aluminum metal materials during melting and oxidation, obstruction of smoke exhaust routes by metal materials with low-melting-temperature, and transfer of radio nuclides in the calcination process. Further, decomposition treatment of organic waste liquids was tested using actually used solvents. In addition, basic designs for the waste data management system with input/output functions for waste identification, etc. were studied, and radioactivity data is continuously being collected for the database.

R&D for Waste Disposal

For disposal of radio-isotope and laboratory waste, studies were conducted on selection of essential nuclides for safety evaluation and physical, chemical and radiological characteristics of wastes. Evaluation of influence of cement and nitrate content on nuclide migration in disposal systems, and long-term stability of transuranic waste disposition is being carried out, and nuclide migration behavior studies are planned.

A multi- γ-ray measurement device was built for simplified and rapid measurement of radioactivity for evaluation of waste disposal. A simplified tritium measurement method was also developed for giving clearance to concrete debris (Topic 9-2).