8 Nuclear Fuel Cycle Technological Development

To Establish the Nuclear Fuel Cycle

We execute various types of research and development of spent nuclear fuel reprocessing and mixed oxide (MOX) fuel fabrication, etc., including joint research projects, to promote development of nuclear fuel cycle technology in Japan.

Moreover, we actively carry out technical co-operation based on the results of our research and development with Japan Nuclear Fuel Ltd. (JNFL), which is engaged in the nuclear fuel cycle business as private entrepreneur in Rokkasho village, Aomori Prefecture.

1. Technological Development of Spent Fuel Reprocessing

JAEA's Tokai Reprocessing Plant (TRP) terminated reprocessing operations based on the service contract with electric power companies at the end of FY2005, and changed over to research and development operations in FY2006.

In the "07-1 campaign" starting in February 2007, TRP began a reprocessing examination that used "FUGEN type B" MOX spent fuel whose content of plutonium and burn-up were higher than the fuel which had been reprocessed before ("FUGEN type A" MOX spent fuel). We are planning examination of dissolution characteristics and solvent degradation etc. that will examine the features of the MOX spent fuel over several years. We also will continue research concerning behavior and separation etc. of minor actinide nuclides such as Neptunium and technological development to upgrade light-water reactor spent fuel reprocessing technologies such as safeguard technology.

As for the vitrification technology of high-level radioactive waste, we will continue operation of an improved type of glass melter which has been operating since FY2004, and accumulate data on the operation stability of this melter. Moreover, we will carry out technological development into a long-lived melter and glass melter dismantlement.

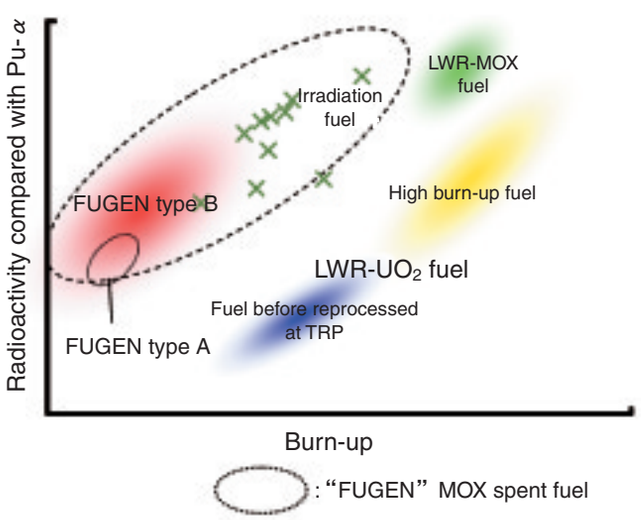

Fig.8-1 Features of "FUGEN" MOX spent fuel (ex.)
"FUGEN" MOX fuel has characteristics close to those of LWR-MOX fuel, such as high specific α-radioactivity of Pu, in spite of its relatively low burn-up.

2. Technical Co-operation

(1) Technical Co-operation to Enrichment Businesses

We continue to execute technical co-operation to JNFL, dispatching engineers and transferring enrichment technology of JAEA etc. for the super-efficient new material centrifuge (new model) cascade examination that JNFL began in April, 2006.

Moreover, as entrusted by JNFL, we executed quality control of the centrifuge for cascade examination, operation management of the Rokkasho Enrichment Plant, and consulting for the uranium adhesion amount measurement system for the centrifuge etc.

(2) Technical Co-operation to Reprocessing Business

We provided technical co-operation allowing the smooth execution of an active examination of the Rokkasho Reprocessing Plant (RRP) that JNFL had been carrying out since March 2006, such as dispatch of an engineer who had operation experience in TRP and dispatch of an analysis technical leader as urgent support when there was pollution trouble, etc.

Moreover, entrusted by JNFL, JAEA executed technological training of JNFL engineers in TRP, electromagnetic field analysis of a micro wave denitrate heater, and measurement of physical properties of powder uranium oxide that had been obtained from the RRP uranium-plutonium mixture denitrate facility, etc.

In addition, JAEA and JNFL concluded an agreement to extend expiration date of their "Agreement concerning providing technical assistance during trial operation of reprocessing plant" in May, 2007.

(3) Technical Co-operation to MOX Fuel Fabrication Business

The MOX fuel fabrication business of JNFL is now in the stage of safety assessment by the government prior to permission for operation. We have started negotiations for a co-operation plan, including dispatch of engineers, for construction and operation of the MOX fuel fabrication plant with JNFL.

Moreover, entrusted by JNFL, we executed technological training of JNFL engineers in the Tokai MOX Fuel Fabrication Facility, did a confirmatory examination of MOX fuel powder adjustment equipment, etc.

(4) Other Technical Co-operation

We dispatched engineers according to a request from the Nuclear Material Control Center (NMCC), and executed technical co - operation concerning nuclear material management in the Rokkasho district.

Moreover, we accepted a request from JNFL and concluded an agreement for technical co-operation to enable use of the technical knowledge that we gained in its cooperation with JNFL, to promote the Global Nuclear Energy Partnership (GNEP) that the United States Department of Energy (USDOE) advocates in cooperation with French company AREVA, in June, 2007.