

Promotion of Nuclear Fuel Cycle Development and Technical Co-operation with Industry

We are carrying out research and development of the nuclear fuel cycle, specifically such activities as examination of mixed oxide (MOX) spent fuel for reprocessing and development of technology for vitrification of high-level radioactive waste, to support and promote reprocessing and plutonium recycling in Japan.

Moreover, in our technical co-operation with the nuclear fuel cycle private business of Japan Nuclear Fuel Ltd. (JNFL) at Rokkasho village, Aomori Prefecture, we are providing technology transfer of results of our research and development, dispatching our engineers and training their engineers, etc. as requested by JNFL, to ensure that their business progresses satisfactorily.

1. Reprocess technology development

We began examination of reprocessing of the “FUGEN” reactor MOX type B spent fuel which has higher plutonium content and higher burn-up than the fuel which has been reprocessed since February 2007 at Tokai Reprocessing Plant (TRP). We obtained various data on dissolving processes, undissolved residue, solvent degradation, etc. of MOX spent fuel (Fig.8-1). We will be organizing these data, and reconsidering our plans for examinations after FY 2009 based on evaluation of the earthquake resistance improvement measures carried out at TRP.

To develop technology for vitrification of high-level radioactive waste, we obtained data on stable operation of the melter during the manufacturing of vitrified canisters. We are executing research and development concerning an advanced vitrification melter which is to have long life. We made a small test melter in FY 2007 and will test it in order to set specifications for a commercial melter in the future.

To develop technology for reduction and stabilization of low-level radioactive waste, we examined cement solidification of simulated low-level liquid waste, and clarified the solidification conditions suited to various kinds of waste fluid. Moreover, we carried out tests of nitrate decomposition of low-level radioactive liquid waste containing nitrates, and gathered data

concerning the decomposition performance etc. of reductants, confirming their applicability.

In addition, we are making arrangements with related organizations for examination of light-water nuclear reactor high burn-up spent fuel reprocessing to upgrade reprocess technology for high burn-up of fuel.

2. Technical co-operation

(1) Technical co-operation for uranium enrichment business

We are carrying out technical co-operation with JNFL for their R&D of a super-efficient new material centrifuge, sharing our uranium enrichment technology.

We will continue to execute technical co-operation with JNFL necessary for the introduction of this super-efficient new material centrifuge into the Rokkasho Enrichment Plant.

(2) Technical co-operation for reprocessing business

We are carrying out technical co-operation, such as dispatch of our engineers who have operation experience at TRP, and extra funding for operation and management of the vitrification facility etc. to support smooth execution of the tests for activation of the Rokkasho Reprocessing Plant JNFL which have been going on since March 2006.

(3) Technical co-operation to MOX fuel fabrication business

We are adjusting our engineer dispatch plan with JNFL for operation of a MOX fabrication facility, a permit for which JNFL has applied.

(4) Other technical co-operation

We dispatch our engineers upon request of the Nuclear Material Control Center, and provide technical co-operation concerning nuclear material control in Rokkasho district.

Moreover, we are offering our technical information to JNFL, based on the “Agreement of technical co-operation concerning technological proposals for the NFRC construction as part of the GNEP plan of the United States” concluded with JNFL in June, 2007.



Undissolved residue collected from dissolution step of reprocessing

Fig.8-1 “FUGEN” MOX spent fuel reprocessing test

Componential analysis and grain degree distribution measurement of the undissolved residue collected from the dissolution step of reprocessing are to be carried out for data on MOX spent fuel reprocessing.