

## **The French Development Program for a UMo Fuel**

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Until now high density  $U_3Si_2$  fuels were satisfactory for LEU conversion of certain reactors, but their use is limited because their density is physically limited to  $5,8 \text{ gUt/cm}^3$  and they have very poor reprocessing capacities. After the end of the present US return policy in may 2006, the reactor operators will be indeed in a very difficult position with silicides. The international community is thus interested in a very high density fuel with good reprocessing capacities in order to convert most reactors and to find a back end solution.

In France, CEA, CERCA, and COGEMA have thus launched an important program in order to sort potential candidates of uranium alloys. UMo is one of the most interesting candidates.

After the selection of UMo alloys, France has pooled different skills to start an important program on UMo fuels:

- CEA has started an important project for a new reactor (Jules Horowitz);
- CERCA is the main manufacturer for MTR fuel;
- TECHNICATOME is the design expert for research reactors and associated cores;
- FRAMATOME is the parent company of CERCA and is interested in the development of new reactors.
- COGEMA is interested in reprocessing spent fuels

These five parties have signed an agreement and, some reactor operators agree to participate and assist the group in this research program. For example, the HFR reactor in Petten, offers the possibility of irradiating prototypes which is very invaluable .

The current project leader from CERCA has been nominated by the group.

This important program requires 45 million FF (about 7 million \$) for its implementation including operations such as irradiation of full-sized plates and fuel elements, post irradiation examinations and all qualification files. We expect to have results , that is to say a world wide qualified fuel, within 5 years.

This new fuel has three aims:

- To allow reactors to benefit from a high performing fuel;
- To have a reprocessable fuel to limit the fuel storage period and the associate safety problem, and solve the back end issue;
- To support the international effort for non proliferation involving the end of the use of HEU.

This high density fuel will decrease the number of fuel assemblies needed to run the reactors and decrease the global cost of the fuel cycle as the back end management cost is in proportion with the quantity of fuel. Reactor operators will thus derive an advantage from this new fuel, in term of economy.

What is proposed by the French development program offers a reliable back end solution that prevents reactor operators from looking for storage capacities in non nuclear countries which would present safety and financial uncertainties. The aim of this program is therefore to have UMo fuel qualified before the end of the present US return policy.

This program confirms the position of France as a major actor in the nuclear field and the motivation to reduce the enrichment of MTR fuel.

The success of this program is bound up with the support of the international MTR community.