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Manufacturing of the SEMPER FIDELIS UMo irradiation experiment

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ABSTRACT

In the framework of the joint international efforts to reduce the risk of nuclear proliferation by minimizing the use of highly enriched uranium, a research reactor fuel based on uranium-molybdenum (UMo) alloys is being developed by the HERACLES consortium. HERACLES is composed of AREVA-NP – CERCA, CEA, ILL, SCK•CEN and TUM. This development includes comprehension experiments, manufacturing developments, and finally the qualification of the fuel.

Part of this work, SEMPER FIDELIS is an irradiation experiment funded by the European commission. 8 full-size plates UMo dispersed fuel were manufactured by AREVA NP and the first plate batch is under irradiation in BR2 reactor (Mol, SCK•CEN). The post-irradiation experiments will focus on the effect of the coating and the thermal treatments of the fuel particles on the fission density and the fission rates.

This paper will present an overview of the first phase of that experiment and, will focus on the manufacturing of the fuel plates and their properties.