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RESUMPTION OF OPERATION OF THE PHENIX HOT CELLS: THE SAWING LINE REFURBISHMENT

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The Phenix Irradiated Elements Cell was started up in 1973 and the Annex Cell in 1981. They are dedicated to the dismantling of the spent fuel sub-assemblies, to the post-irradiated nondestructive examinations on the sub-assemblies, the irradiated capsules and the pins, and, in the early stage of operation to the refabrication of new experimental capsules with irradiated pins.

The mechanical process related to the sub-assemblies dismantling line were put in the Annex Cell. They were chosen and designed to remove the pins from the stainless steel hexagonal wrapper in such a way that the mechanical stresses due to the high cumulative dose rate could be released without any risks for the integrity of the stainless steel cladding, the first barrier. The first step of this process consists in sawing the sub-assembly simultaneously in three or four parts depending on its nature, fissile fuel or breeder : the spike, the fuel (or breeder) pins bundle, the upper axial blancket pins bundle (for a fuel sub-assembly) and the upper neutron shielding with the handling head. Until recently, the bench was equipped with two or three retail standard fully hydraulic hacksaws from KASTO®. Only the electric and hydraulic connectors and the base were replaced to be compatible with the hot cell environnement. After more than 35 years of operation and despite a maintenance program reinforced during the last decade these saws were not allowing to have enough confidence and were bringing no more guaranties about the safety of the cutting. Furthermore, the decontamination procedures necessary before a manual maintenance done in a low level activity workshop had become more and more complex due to the decontamination products short-listed by the Marcoule effluents treatment facility that have been not enough efficient to clean the aggregates of irradiated grease and activated stainless steel chips.

For both reasons it was decided in the beginning of 2008 to start the refurbishment of the sawing bench. The main specifications of the new design were : the compatibilty to the unchanged fixing system constituted of two centering pins and a locking pin for each sawing position, the volume of the new saw, a brick building principle to facilitate the decontamination of the only broken part of the saw, a maximum of standard spare parts available at retail, the remote handling of the valves of the hydraulic group by telemanipulator, a limited quantity of hydrolic fluid according to the criticality rules of the cell, a higher reliablity of the cutting guidance, and a performance of more than 1000 cuts without maintenance. After two years of developpement and several reliable and endurance tests five saws were delivered in Phenix on April 2013. After several inactive dry tests the first three saws were put in the cell on December 2013. After the qualification testing the new sawing line was used to dismantle an experimental sub-assembly. During this operation many problems had been appeared. In the face of this unsatisfactory feedback it was decided to implement a program of modifications.

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