The MYRRHA ADS project in Belgium enters the Front End Engineering Phase

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MYRRHA (Multi-purpose hYbrid Research Reactor for High-tech Applications) is a multipurpose research facility currently being developed at SCK•CEN. MYRRHA is based on the ADS (Accelerator Driven System) concept where a proton accelerator, a spallation target and a subcritical reactor are coupled. MYRRHA will demonstrate the ADS full concept by coupling these three components at a reasonable power level.

As a flexible irradiation facility, the MYRRHA research facility will be able to work in both critical as subcritical modes. In this way, MYRRHA will allow fuel developments for innovative reactor systems, material developments for GEN IV and fusion reactors, and radioisotope production for medical and industrial applications. MYRRHA will be cooled by lead-bismuth eutectic and will play an important role in the development of the Pb-alloys technology needed for the LFR (Lead Fast Reactor) GEN IV concept.

MYRRHA will also contribute to the study of partitioning and transmutation of high-level waste. Transmutation of minor actinides (MA) can be completed in an efficient way in fast neutron spectrum facilities (critical reactors and sub-critical ADS). A sub-critical ADS operates in a flexible and safe manner even with a core loading containing a high amount of MA leading to a high transmutation rate. The sub-criticality is therefore rather a necessity for an efficient and economical burning of the MA.

The MYRRHA design has progressed through various framework programmes of the European Commission in the context of Partitioning and Transmutation. The MYRRHA design has now entered into the Front End Engineering Phase covering the period 2012-2015. The engineering company which will handle this phase has been selected and the works have begun in 2013.

As stated above, MYRRHA will demonstrate the ADS full concept by coupling the three components (accelerator, spallation target and subcritical reactor) at reasonable power level to allow operation feedback, scalable to an industrial demonstrator and allow the study of efficient transmutation of high-level nuclear waste. Since MYRRHA is based on heavy liquid metal technology (lead-bismuth eutectic), it significantly contributes to the development of Lead Fast Reactor Technology. In critical mode, MYRRHA will play the role of European

Technology Pilot Plant in the roadmap for LFR.

During the presentation we will focus on the ADS programme in the EU through the MYRRHA project. We will present the most recent developments of the MYRRHA design in terms of primary system, reactor building and plant layout as existing mid- 2014.