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P4.236 Cernavoda Tritium Removal Facility – tritium supplier for fusion facilities

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ICSI has completed in 2015 the conceptual design of the Cernavoda Tritium Removal Facility (CTRF). CTRF is located at CNE Cernavoda, a NPP subsidiary of SNN Bucharest, and is sized to process heavy water from 2 CANDU reactors, treating 40 kg/h heavy water over 40 years with a detritiation factor of 100. CTRF removes tritium using liquid phase catalytic exchange (LPCE) paired with cryogenic distillation (CD). The design of CTRF uses expertise from ICSI (Pilot Plant for Tritium and Deuterium Separation) and from Canada (Kinectrics), together with experience of experts from Wolsung TRF project, research tritium laboratories and industry. CTRF project is the most updated project for a TRF, including last safety requirements for a tritium industrial facility.

The objectives of CTRF will be to reduce operators' doses and tritium releases during refurbishment of units and normal operation, later to support decommissioning of the reactors by reducing the tritiated heavy water quantities which else will be radioactive waste.

Construction of CTRF starts in 2018 and it is scheduled to begin detritiation of heavy water from reactor U1 in 2025. After this date tritium stored will become available to be used for fusion research and industrial facilities.

First phase of detritiation process is to reduce tritium content from 65Ci/kg to 10Ci/kg, second phase to maintain the tritium concentration up to 10Ci/kg and third phase to use CTRF to reduce tritium content as low as possible before decommissioning of the site.

The paper will present the technologies used, a prediction of tritium production and some considerations about possible use of CTRF for He-3 supply, as by-product of detritiation process.

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