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Curent Status Concerning Tritium Removal Technology and its Implementation at Cernavoda NPP(ROMANIA)

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In CANDU fission reactors and also in fusion reactors, tritium should be recovered from large amounts of effluents for environmental and staff protection, for safety and for various applications.
The combined cryogenic distillation(CD) with catalyzed isotopic exchange between deuterium and liquid tritiated water(LPCE) it's one of the most suitable technology for removal and its recovery.
For LPCE process, the key issue and driver force consists of in a very efficient and stable contact element which has to work in direct contact with liquid and vapor water for long time with high separation performances. In order to check and to prove CD-LPCE technology for tritium removal from tritiated heavy water from Cernavoda CANDU Power Plant, an experimental pilot plant for tritium removal (ExpTRF), has been built at ICSI Rm-Valcea and tested within comprehensive program.
Based on the authors'experiments and results, the present paper presents the current status and key aspects of activities concerning the operation of Tritium Removal Technology and its implementation at Cernavoda NPP in Romania. A comparison between present ExpTRF and the future Industrial Tritium Removal Facility (IndTRF) is shown and discussed.
The paper presents also a critical analysis on main contact elements used in LPCE module. The critical analysis it's focused on:
- selected types of hydrophobic catalysts and hydrophilic packing;
- methods and conditions for manufacture;
- key aspects in operation of TRF
- improvement of the performances of the proposed catalysts for industrial nuclear applications;
- extrapolation of research results at industrial scale;
As result, a new improved contact element, more compact, has been developed and it's still under testing at ICSI Rm-Valcea. This new improved contact element has been selected to equipped the LPCE column within Industrial Pilot Plant for Tritium Removal Facility at Cernavoda NPP.
This new improved contact element could be an option in the process of selection of catalytic mixed packing for Water Detritiation System(WDS) and Isotopic Separation System (ISS) from the ITER reactor.

Eligible for student paper award?

No

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