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SAFETY ANALYSIS OF HELIUM COOLED CERAMIC BREEDER TEST BLANKET SYSTEM

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Institute of Nuclear Energy Safety Technology (INEST), Chinese Academy of Sciences (CAS) is one of the leading teams undertaking its corresponding research and development and mainly responsible for structure material development and safety analysis. After the kick-off meeting for PD phase of Helium Cooled Ceramic Breeder (HCCB) Test Blanket System (TBS) held by CN DA in early 2016, safety analysis becomes more and more important.
As an important part of the HCCB TBS safety assessment, accident analysis will be presented in this paper with the updated identification of reference accidents based on the approved version of preliminary safety report by IO, and more scenarios will be simulated and then analyzed using the thermal hydraulics code RELAP 5 and MELCOR. The results comparison of RELAP 5 and MELCOR will be done. The code-to-code comparisons can help identify code issues or implication errors that could go unrecognized. To understand the expected impact of modeling and data uncertainties, the uncertainty analysis approach of RELAP5 is Best Estimate Plus Uncertainty (BEPU) and will be extended for HCCB TBS to provide a direct understanding of the contribution of variations to specific parameters. The inventory of tritium will also be calculated under normal operation and its release under maintenance. To estimate consequences of airborne radioactive releases after accidents, the atmospheric radioactive transport and related potential for exposure will calculated by MACCCS combined with MELCOR. The primary objective of the above analysis is to evaluate the consequential radiological doses outside the ITER facility in scenarios selected to envelope all conceivable events, and thereby demonstrate compliance with the General Safety Objectives of the project.

Eligible for student paper award?

No

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