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P4.234 Safety Important Classification of DEMO components

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The identification of structures, systems and components (SSCs) performing safety functions is of a paramount importance for an EU DEMO development consistent with their implications in each phase of the project: design, fabrication, commissioning, operation, maintenance, inspections and tests. Moreover, this activity has to be performed at the early design stage for the correct definition of systems requirements, preliminary layout and integration. In addition, it may also be exploited as a supporting criterion for selection among the plant variants, e.g. alternative blanket concepts. Those SSCs assigned to a Safety Importance Class (SIC) will receive adequate attention during the different design, layout integration, construction, qualification and operational stages. The objective is to ensure and demonstrate that they will meet the minimum performance and reliability requirements throughout their intended lifecycle so that the safety function guarantee when required.

A graduation of safety important SSCs is adopted for DEMO on the basis of the IAEA Guide No. SSG-30, on SSCs classification. Three safety importance classes (SIC-1, SIC-2 and SIC-3) are identified for the SSCs on the basis of: a) the consequences the loss of their safety function could lead to, b) the involvement of the SSCs in preventing, detecting or mitigating an incident or an accident and, c) the involvement of the SSCs in bringing and maintaining the plant in a safe state. In this paper, the study performed for the safety classification of the Primary Heat Transfer System (PHTS) related to the Helium Cooled Pebble Bed (HCPB) and Water Cooled Lithium Lead (WCLL) blankets of DEMO is presented. From the results obtained it can be concluded that:

- HCPB PHTS SSCs can be classified as SIC-3 safety level for the confinement function;
- WCLL PHTS SSCs can be classified as SIC-2 safety level for the confinement function.

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