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Maintenance strategy selection in the IFMIF-DONES LINAC components following an ALARA-based methodology for Remote/Hands-off/Hands-on

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classification: Implications for availability studies

The IFMIF-DONES project is aimed at building a neutron source facility for fusion materials development and qualification, which will provide a database of materials exposed to conditions akin to those anticipated in the DEMO reactor. Neutron generation will be achieved by means of a 150 mA, 40 MeV deuteron beam impacting onto a liquid lithium film target.

An important aspect of the IFMIF-DONES project design phase is to assess the system availability across all stages of the facility lifecycle. To this end, it is very relevant to define the maintenance strategy and methodologies for different components of the facility. In this context, it is particularly important to consider the areas subjected to material activation, such as the LINAC, where maintenance operations shall be limited to reduce the doses to personnel following ALARA principle.

In this sense, a novel methodology to classify between Remote/Hands-off/Hands-on maintenance strategy is being recently proposed in the project, based on both the dose rates and exposure times. In this work, we apply this methodology to the IFMIF-DONES LINAC, resulting in available maintenance times for Remote/Hands-off/Hands-on maintenance based on ALARA and project goals of yearly Occupational Radiation Exposure to personnel. In addition, the required time needed to perform the maintenance operation for each component is estimated so a crosscheck between both available and required maintenance times can be made, resulting in a classification assigning each component to a type of maintenance: Remote/Hands-off/Hands-on.

We then provide these new constraints to enhance the precision of the RAMI models to evaluate the compliance with reliability and availability expectations for the IFMIF-DONES facility.

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