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P3.200 Preliminary Analysis on A Maintainable Test Cell Concept for IFMIF-DONES

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The IFMIF-DONES (International Fusion Material Irradiation Facility- DEMO Oriented NEutron Source) is planned to deliver an intensive neutron source (5×10^{16} n/s) for irradiation experiments that are confined and shielded by the Test Cell (TC). During the operation of the facility, unexpected degradation (by irradiation or corrosion) or damage (by handling etc.) of the TC leak tight liner, surrounding biological shielding walls, and active water cooling systems would need intensive repair work in an activated environment. Further technical difficulties will have to be confronted when the liner is tightly attached to the permanent massive concrete shielding walls with cooling water systems embedded inside.

A maintainable TC concept, which is targeting replacing TC key components in case of damages, is proposed in this paper. With this configuration, the TC liner and the primary shielding components with high failure possibilities are decoupled from the permanent construction structures, and are expected to be replaced in case of damage. Mechanical solution of this configuration is described in this paper. Technical feasibilities of this configuration are preliminarily analyzed for the aspects of independent liner enclosure structure, interfaces with other IFMIF-DONES key systems, maintenance scenarios using remote handling systems, and etc.

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