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Availability Considerations in the Design of K-DEMO

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A DEMO device has been considered the next step following ITER as a near-term prototypical reactor design that is tritium self-sufficient and produces a limited amount of net electricity. The machine maintenance approach and planned configuration concept plays a major role in establishing the design point. DEMO will also need to show that adequate operating availability can be achieved over a reasonable time period, as a last step before full-scale electricity production. The ability to operate with high availability/reliability plays a key ingredient in defining the DEMO configuration, fostering the need for rapid removal/replacement of limited-life in-vessel components. DEMO pre-conceptual studies are being carried out by China, EU, Japan and South Korea (with US participation). The device designs span a range of maintenance approaches from full radial extraction of large in-vessel modules through all TF horizontal openings to vertical maintenance of segmented in-vessel components. Progress made on the S. Korea's K-DEMO design will be provided with emphasis on the design choices identified to promote high availability and a review of how these design selections compare with the choices made on the Chinese, EU and Japan concepts.

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