

RAMI evaluation of the beam source for the DEMO neutral beam injectors

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Abstract:

DEMO is a first-of-a-kind DEMOnstration fusion power plant [1], [2] and is intended to follow the ITER experimental reactor. The main goal of DEMO will be to demonstrate the possibility to produce electric energy for the grid from the fusion reaction early in the second half of the century. The injection of high energy neutral (1 MeV) particle beams is one of the main tools to heat the plasma up to fusion conditions, control the plasma burn phase and ramp the plasma down. Within the EUROfusion Framework a conceptual design of the Neutral Beam Injector (NBI) for the DEMO fusion reactor is currently being developed. Thereby, Reliability, Availability, Maintainability and Inspectability (RAMI) have to be taken into consideration for the conceptual design of the DEMO NBI, together with the exploitation of the currently available return of experience from the ITER NBIs. Comparing the failure risk of two different source concepts due to the considered failure modes has allowed for further design developments aiming at exploiting the advantages of the modular approach while minimizing its drawbacks.