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Safety and waste management studies as design feedback for a fusion DEMO reactor in Japan

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This paper presents safety and waste management studies for a fusion DEMO reactor. It was found that an impact of a large-scale ex-vessel loss-of-coolant accident (LOCA), i.e., a guillotine rupture of a main pipe of the primary cooling system with pressurized water reactor (PWR) condition (320°C, 16 MPa), can be mitigated by using a vault for the Tokamak Cooling Water System (TCWS) with a pressure suppression system. A management scenario of radioactive waste generated in every replacement of in-vessel components was developed in consideration of residual heat, dose rate and tritium removal. An additional important finding is that all the radwaste will be disposed of in shallow land burial after the 10 year interim storage for cooling down the radioactivity.

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Primary author: Dr SOMEYA, Youji (Japan Atomic Energy Agency)

Co-authors: MASUI, Akihiro (Japan Atomic Energy Agency); TANIGAWA, Hisashi (Japan Atomic Energy Agency); WATANABE, Kazuhito (Japan Atomic Energy Agency); TOBITA, Kenji (Japan Atomic Energy Agency); Dr NAKAMURA, Makoto (Japan Atomic Energy Agency)

Presenter: Dr SOMEYA, Youji (Japan Atomic Energy Agency)

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