UPDATED SAFETY ANALYSIS OF ITER

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The licensing of ITER as a nuclear facility being constructed at Cadarache, France requires the demonstration of the safety of the installation. At the first stage in this process, a preliminary safety analysis was prepared [1] and submitted to the French nuclear safety authorities in 2008. A revised and expanded preliminary safety analysis has now been completed, taking account of

- additions requested by the authorities following their evaluation of the 2008 submission;
- improvements in the safety performance of ITER resulting from design changes that enhance safety provisions;
- other updates following the evolution of the design of some ITER systems.

This paper first recalls the safety approach for ITER which is based on the principle of Defence in Depth to assure the two main safety functions: confinement of radioactive material and limitation of exposure to ionizing radiation. This applies for both occupational safety, public safety and the protection of the environment. The main features of ITER systems implementing these safety functions are then outlined, highlighting those changes since the earlier studies which have an impact on safety. Amongst the improvements are the introduction of an intermediate circuit in the cooling systems of plasma facing components, and a completely redesigned vacuum vessel cooling circuit eliminating the external air heat-exchangers of the earlier concept.

An important part of the safety analysis is the modelling of postulated accident scenarios to assess the potential consequences. The selection of these scenarios has been extended, and many of the existing analyses repeated with revised assumptions. In addition, separate fire and explosion risk assessments have been performed. The outcome of these studies is summarized, and it is shown that the maximum consequences, in terms of both public and occupational doses, are well within the objectives adopted for the project.

This updated preliminary safety analysis of ITER shows a good safety performance. It has been submitted to the authorities in 2010, and will be the starting point for future studies, experiments and qualification tests and procedures to be performed in more depth as the licensing process continues. These will be mainly oriented to demonstrate that the safety requirements that have been presented will be fulfilled.

[1] N. Taylor et al., Fusion Science and Technology, **56**, 2009, 573-580