# development of a fusion power plant safety framework

R.E. JENNINGS

UKAEA

Culham, UK

Email: robert.jennings@ukaea.uk

R.E. JENNINGS1, S.A. FORBES1, B.R. COLLING1, S. GONZALEZ DE VICENTE2  
P. CALLE-VIVES2, M. AOKI2, S. CALPENA3

1UKAEA, Culham, UK

2IAEA, Vienna, Austria

3ITER, Cadarache, France

Email contact of corresponding author: robert.jennings@ukaea.uk

The IAEA is undertaking the development of a fusion power plant safety framework. The objective is to first gather member states experience on regulation and design safety. This will help the IAEA to consider in the future the need to develop safety guidelines and associated high level design principles (including the interface between safety, security and safeguards) for demonstration and commercial fusion power plants (FPP).

In the area of Design Safety, the work is being developed based on the following steps, in addition to the information already provided by:

* Collection of technical information and relevant experience from different fusion projects, including radioactive inventories, initiating faults and fault sequences that can lead to offsite releases, safety functions, requirements for the functions and associated SSCs and interface between safety, security, safeguards.
* Analysis of the information collected to identify general characteristics of FPP safety and design principles.
* Identification of knowledge gaps.
* Review of the relevant safety standards to identify requirements that are applicable based on the characteristics of FPP identified in the design analysis (GSR-Part 3, GSR-Part 4, SSR 2/1, etc.).
* List of general principles based on the design principles identified in the design analysis, completed by relevant applicable safety standards requirements and with account of knowledge gaps.

In the area of Regulation, the work is being developed based on the following steps:

* Complete collection of information, including organization of a workshop to finalize and update collection of information.
* Identification of areas of commonality and options
* Launch a regulatory forum to discuss the TECDOC information and way forward.

The work is progressing through a series of Technical and Consultancy Meetings, with participation from a number of member states. Final output will consist in the production of two IAEA TECDOCs: TECDOC 1 – Regulatory Framework for Fusion Power Plants, and TECDOC 2 – Safety Assessment and Design Experience for Fusion Power Plants.