## The role of DEMO in a fast-track development of fusion power

I Cook, N Taylor and D Ward

EURATOM/UKAEA Fusion Association, Culham Science Centre, Abingdon, OX14 3DB, UK

## Abstract

This paper is concerned with the key aspects of plasma physics, technology and materials selection issues and requirements for DEMO, as these have emerged from the combination of recent European studies of:

- (i) fusion power plant conceptual designs (the PPCS and its follow-up);
- (ii) fast track development of the first generation of commercial fusion power plants (especially the conclusions of the recent UKAEA study).

The objective of the international fusion programme is the creation of power plants that will have very attractive safety and environmental features and viable economics. Fusion power plant studies have shown that these objectives may be achieved in a variety of conceptual designs based on relatively near-term plasma physics together with blankets and divertors based on reduced activation martensitic/ferritic steels as the structural material in association with coolant, neutron multiplier, tritium generating material and armour from a variety of alternatives.

The urgent need to find global solutions to the provision of environmentally benign sources of power has led to the widespread acceptance of a 'fast track' approach to fusion development. Fast track studies have analysed *inter alia* the requirements on DEMO(s) that would form the only step between the ITER/IFMIF generation of devices and the first generation of commercial plants.

This paper, based on further technical work developing the above studies, analyses the plasma physics, technology and materials selection issues and requirements for DEMO, and draws conclusions on the prioritisation of R&D.