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MASTER

ENGINEERING FEATURES OF THE INTOR CONCEPTUAL DESIGN*

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Summary

The INTOR engineering design has been strongly influenced by considerations for assembly and maintenance. A maintenance philosophy was established at the outset of the conceptual design to insure that the tokamak configuration would be developed to accommodate maintenance requirements. The main features of the INTOR design are summarized in this paper with primary emphasis on the impact of maintenance considerations.

The most apparent configuration design feature is the access provided for torus maintenance. Particular attention was given to the size and location of superconducting magnets and the location of vacuum boundaries. All of the poloidal field coils are placed outside of the bore of the toroidal field coil and located above and below an access opening between adjacent toroidal field coils through which torus sectors are removed. A magnet structural configuration consisting of mechanically attached reinforcing members has been designed which facilitates the open access space for torus sector removal.

For impurity control, a single null poloidal divertor was selected over a double null design in order to maintain sufficient access for pumping and maintenance of the collector. A double null divertor was found to severely limit access to the torus with the addition of divertor collectors and pumping at the top. For this reason, a single null concept was selected in spite of the more difficult problems associated with the required asymmetric poloidal field system and higher particle loadings.

Tokamak support systems and the reactor building and facilities are also important to the overall design evolution and were included in the conceptual design effort. However, this paper discusses only the primary tokamak systems.

Introduction

The INTOR engineering design which evolved during the conceptual design phase represents a combined team effort by all four participating groups: Euratom, Japan, USSR, and the USA. Therefore, the design will be described with no attempt to identify the specific contribution made by each individual or group. Each participating group developed a national design[1,2,3,4] which was used as the basis for the detailed studies which subsequently led to the selection of the international design concept. The conceptual design report contains a complete description of the project including a discussion of major options considered, the rationale for selection, and supporting analyses.[5]

The key features of the design are illustrated in the perspective drawing shown in Figure 1. The principal engineering parameters are given in Table 1.

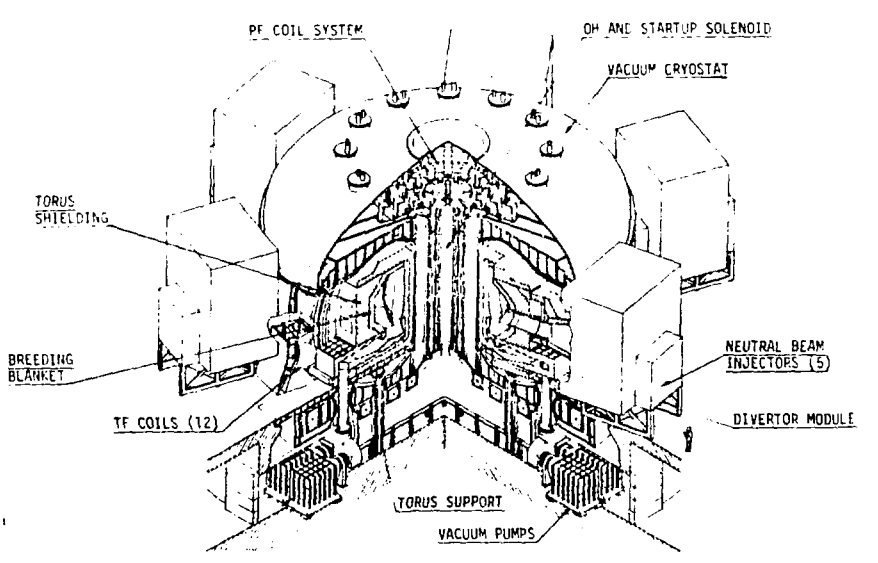

Figure 1. Perspective view of INTOR.

DISCLAIMER

*Research sponsored by the Office of Fusion Energy, U.S. Department of Energy, under contract W-7405-eng-26 with the Union Carbide Corporation.