

24.182

CONCEPTUAL DESIGN STUDY FOR THE ORMAK-F/BX FACILITY

P. N. Haubenreich, D. D. Cannon, A. P. Fraas,
R. S. Lord, and M. Roberts

Oak Ridge National Laboratory*

NOTICE

This report was prepared as an account of work sponsored by the United States Government. Neither the United States nor the United States Atomic Energy Commission, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness or usefulness of any information, apparatus, product or process disclosed, or represents that its use would not infringe privately owned rights.

Summary

Consideration is being given in the U. S. to a large, injection-heated tokamak that could attain the zero-power Lawson Criterion with H plasma in the late 1970's. The facility would be designed for subsequent replacement of some internal components and addition of shielding and containment to permit D-T burning experiments. An 8-manyear conceptual design study is to be accomplished in FY-1974 at Oak Ridge, This project is called ORMAK-F/BX for Oak Ridge Tokamak Feasibility and Burning Experiments. The F/BX reference design is now evolving. Conservative projections of plasma behavior indicate that the toroidal field coils must be about 5-meter bore diameter. Superconducting NbTi has been chosen for the TF coil windings and the plasma driving system will use an iron core and return yokes.

Rationale and Concept

Plans for the development of fusion power have generally shown as the next major device after the demonstration of scientific feasibility a plasma test reactor¹ that would involve actual fusion, with appreciable burnup and alpha particle heating.² In 1972 a group at ORNL conceived the idea of a tokamak facility designed so that after serving for demonstration of scientific feasibility it could be adapted, at a fraction of the cost of a new

* Operated by Union Carbide Corporation for the USAEC.

MASTER

100