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THE OAK RIDGE TNS/PEPR PROGRAM IS CONSIDERING MODIFIED PHYSICS AND ENGINEERING CRITERIA TO EASE REMOTE MAINTENANCE PROBLEMS*

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Early work on TNS/PEPR at ORNL consisted of systems trade studies to establish a baseline design. Representative parameters are shown in Table 1. Development of these parameters into a mechanical design focussed on the complexity of the device disassembly. Three modifications to the physics and engineering criteria are being studied to ease these problems of remote disassembly:

1) Increase allowable field ripple from 1% to a maximum of 3%, thereby reducing the number of TF coils. The result is increased access between coils.

2) Provide sufficient clearance in the bore of the toroidal coils to raise and lower the EF coils during torus segment removal. This assumes a requirement for equilibrium field (EF) coils close to the plasma.

3) Investigate a secondary vacuum enclosure (e.g. vacuum building concept) to eliminate the need for welded torus joints and TF coil dewars.

This paper discusses these modifications, as well as some overall cost implications relating to ripple.

INTRODUCTION

Early work on The Next Step (TNS) Program at Oak Ridge consisted of Systems Trade Studies for several tokamak configurations. Using consistent physics and engineering criteria, device cost sensitivities were evaluated, along with TNS objectives, in order to establish an initial configuration. The result of this effort is the baseline design[1] shown in Figures 1 and 2. Some of the key parameters and major components are listed in Table 1.

Development of the baseline drawings focussed attention on the difficulties of machine disassembly which should be accomplished with simple, radial, nonrotational removal of components. One of the most difficult areas to reach, from a maintenance perspective, is the toroidal joint on the inner vacuum vessel/shield, the torus area closest to the machine vertical centerline. Our early TNS studies indicated that operations on any inner joints would have to be done remotely from inside the toroidal shell; this is an operation

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