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CENTRAL-CELL BLANKET-MODULE-
MAINTENANCE APPROACH FOR THE MARS HIGH-
TEMPERATURE BLANKET

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**CENTRAL CELL BLANKET MODULE
MAINTENANCE APPROACH FOR THE MARS
HIGH TEMPERATURE BLANKET**

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The objectives of the blanket module maintenance systems on MARS is to minimize machine down time for normal and off-normal events while safely removing and replacing the blanket modules. Remote, manual, and automated handling methods will be used depending on radiation levels and the task. Since blanket replacement is a yearly maintenance operation, considerable effort is being expended to design the modules and module handling systems for rapid removal and replacement. The use of remote techniques increase the time required to perform any task. While good component design for remote handling can lessen the maintenance time, it cannot compare with normal manual servicing. Therefore, it is prudent to maximize the number of operations that can be performed "hands-on". By selectively increasing the shielding in certain high maintenance areas, maintenance time can be reduced. The machine availability is maximized by moving a small number of large integral units on a fixed rail or roller system. The number of operations, their complexity and the cost of equipment is also reduced. This technique has been used successfully in shipbuilding programs to decrease construction time. All central cell components are designed for rapid replacement. Failure of any component, including a central cell superconducting magnet, will not result in excessive downtime.

The general maintenance philosophy for replacement of modules is reviewed in this paper. This includes a discussion of the method for disassembly of the spent module in a hot bay area. An initial equipment requirements list is developed to support the maintenance approach.

In general, blanket module components weighing several hundred tons or less will be handled with an overhead (gantry) crane. Items in excess of this weight will be moved on a track or roller system specifically designed for and incorporated into the MARS facility. Use of several mobile transporters will eliminate the need to have a transport system built into each of the 24 modules. This results in considerable cost savings and reduced machine complexity. Such a system requires that access to modules must be provided. Consequently, service lines, main coolant piping, bus systems and all service lines must approach the machine from one side and from the top of the machine. Disconnection and make up of these connections is a candidate for hands-on maintenance.

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Structural components removed from within the modules will be highly activated. These structures must be prepared for shipment off site in shielded containers or for on-site storage. High level waste requiring off-site storage will probably be compacted to permit easier and more economical packaging. It may also be possible to dilute wastes for on-site low level storage. To accomplish this, a waste preparation area has been proposed for the maintenance area. This area would be equipped to further disassemble and cut up the activated structures by totally remote means. A packaging and package decontamination area will also be provided.

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