

RESTORATION OF THE DIII-D SOLENOID*

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The DIII-D tokamak has been operated since June 1995 with constrained volt-second capability as imposed by the abandonment of half of its solenoid system due to a cooling water leak. The solenoid is comprised of "A" and "B" halves with separate multiple power leads to each half. The cooling water leak occurred in the lead of the B half of the solenoid. This leak occurred in a remote area under the DIII-D vessel and is believed to be caused by $I \times B$ forces developing cyclic bending loads on the conductors within the lead. Visual inspection of the lead using flexible bore scopes indicated that the structural fiberglass overwrap intended to band the DC supply and return leads into a primary-force canceling group had failed allowing individual conductors to become inadequately supported against bending loads. The overwrap failed as a result of poor vacuum encapsulation of the lead which was manufactured in 1978. Visual inspection of the A lead confirmed no overwrap failure and that the vacuum encapsulation of the A lead was proper and to specification.

In order to continue operations in 1995 and 1996, it was decided to abandon the B half of the solenoid and operate under reduced 5 Vs capability.

An *in-situ* approach was mandated by the extensive and lengthy effort required to assemble, correct and reassemble the tokamak. Access from outside the tokamak was severely limited. A plan to repair the damaged lead was developed and implemented over a 10 month period.

This paper describes the repair of the solenoid lead. A VCR video tape of these remote installation efforts has been assembled and will be shown.

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