MERIT Collaboration Meeting

ISSUES RELATING TO THE
Hg-JET TARGET SYSTEM

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Outline Of Issues

• Solenoid
  – Stray Fields
  – Replacing Nozzle/Plenum In Situ

• Nozzle Tests
  – Schedule

• Material Compatibility for Windows
  – Welding Ti Alloy to Stainless Steel

• MHD Simulations
  – Jet Stability, Shape Distortion
  – Reaction Forces Across Field Lines

• Laser Optics
  – Schedule

• Activation Products
  – Filters?

• MERIT Schedule
Stray Magnetic Fields

- Hydraulic Cylinders/Hg Pump Cylinder
- Hydraulic Hoses and Fittings

Magnetic field distribution: the axes are in meters; the rectangle is one half of the solenoid.

- The volume within the conductor is > 9.7 T (red), > 6.1 T (orange).
- The field at Z=0, R=0.6 is >0.6 T, at R=1.0 (base support structure), B>~0.1 T (1000 G).
- The field at Z=-2.5, R=0.4 (pump motor) is 0.03<B<0.07 T (300-700 G).
Field Issues (cont.)

• Position hydraulic pump to minimize field effects

• Max field at cylinders between 0.17T & 0.26T

• Need steel cover plates for magnetic shielding over cylinders?

• Remote valve or sensor concerns?
Stray Field Values

>9.7T
>3.9T
>6.1T
>2.5T
>1.6T
>1.0T
>0.68T
>0.41T
>0.26T
>0.17T
>0.11T
>0.07T
>0.04T
>0.03T

221in (563cm)
Field Near Equipment
Nozzle Tests

• Results are needed as soon as possible in order to make changes during the fabrication of the plenum/nozzle components
  – Must be before April ’06 when the target system is delivered to ORNL
Beam Windows

- There is concern regarding welding titanium alloy to stainless steel
  - Mechanically attached windows require more space
MHD Simulations

- MHD simulations are needed to assess jet stability, distortion, and reaction forces for a nozzle crossing field lines
Laser Optics

- The laser optics should be delivered to ORNL as a module ready to install
  - Detailed interface drawings have been provided
  - Deliver equipment in early April ‘06
Activation Products

- Develop list of radionuclides and their half lives
  - Establish the safe time for access into the secondary enclosure
  - Assess the effectiveness of secondary containment air filtration
## Schedule

### Highlights

- **Solenoid Tests at MIT** Jan ’06
- **Target Tests at ORNL** May-Aug ’06
- **Integrated Tests at MIT** Sep-Oct ’06
  - Retest, if needed Nov ’06
- **Beam Tests at CERN** Apr ’07
  - Retest, if needed Jun ’07