WQB Status

David Harding

AD Proton Driver Meeting

14 April 2004

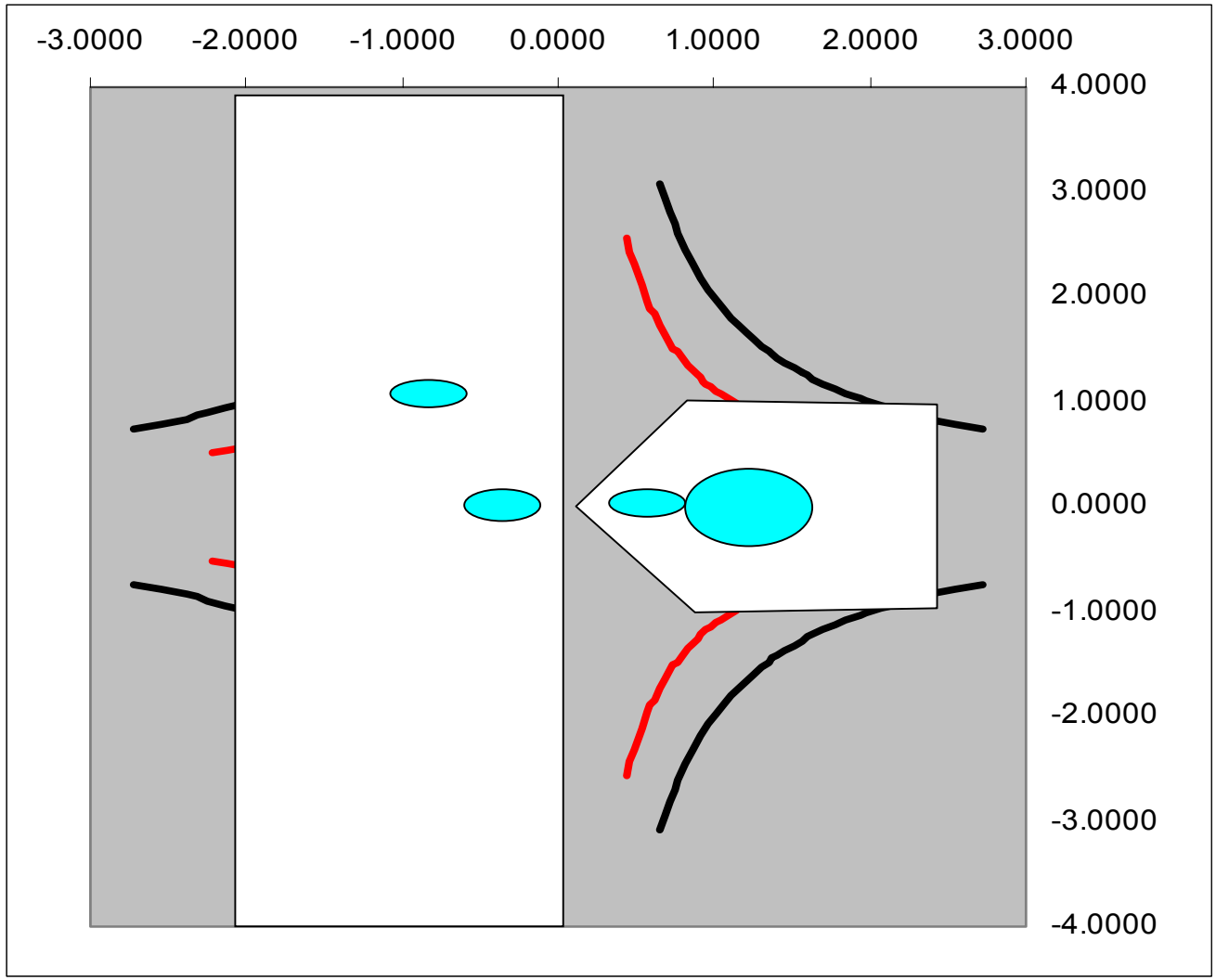
Summary

- Who
- Why
- Where
- What
- When

Participants to date

- Vladimir Kashikhin
- John Carson
- Bill Robotham
- Gregg Kobliska
- John Zweibohmer
- Hank Glass
- TJ Gardner
- Jim Jablonski
- Dave Johnson
- Leon Bartelson
- Lucy Nobrega
- Weiren Chou
- Francois Ostiguy
- Ioanis Kourbanis
- Bruce Brown

Cartoon Beam at Lambertsons



Interesting Locations

- High energy extraction – 4 locations
- Injection – 1 location
- Recycler transfers – 2 locations
- Spares - 2

Considerations

- Same integrated gradient
- Same bus
- Track other quads
- Same mechanical length
- Larger aperture $\Rightarrow$ more turns
- Larger aperture $\Rightarrow$ higher pole tip field
- Field quality no worse than other quads

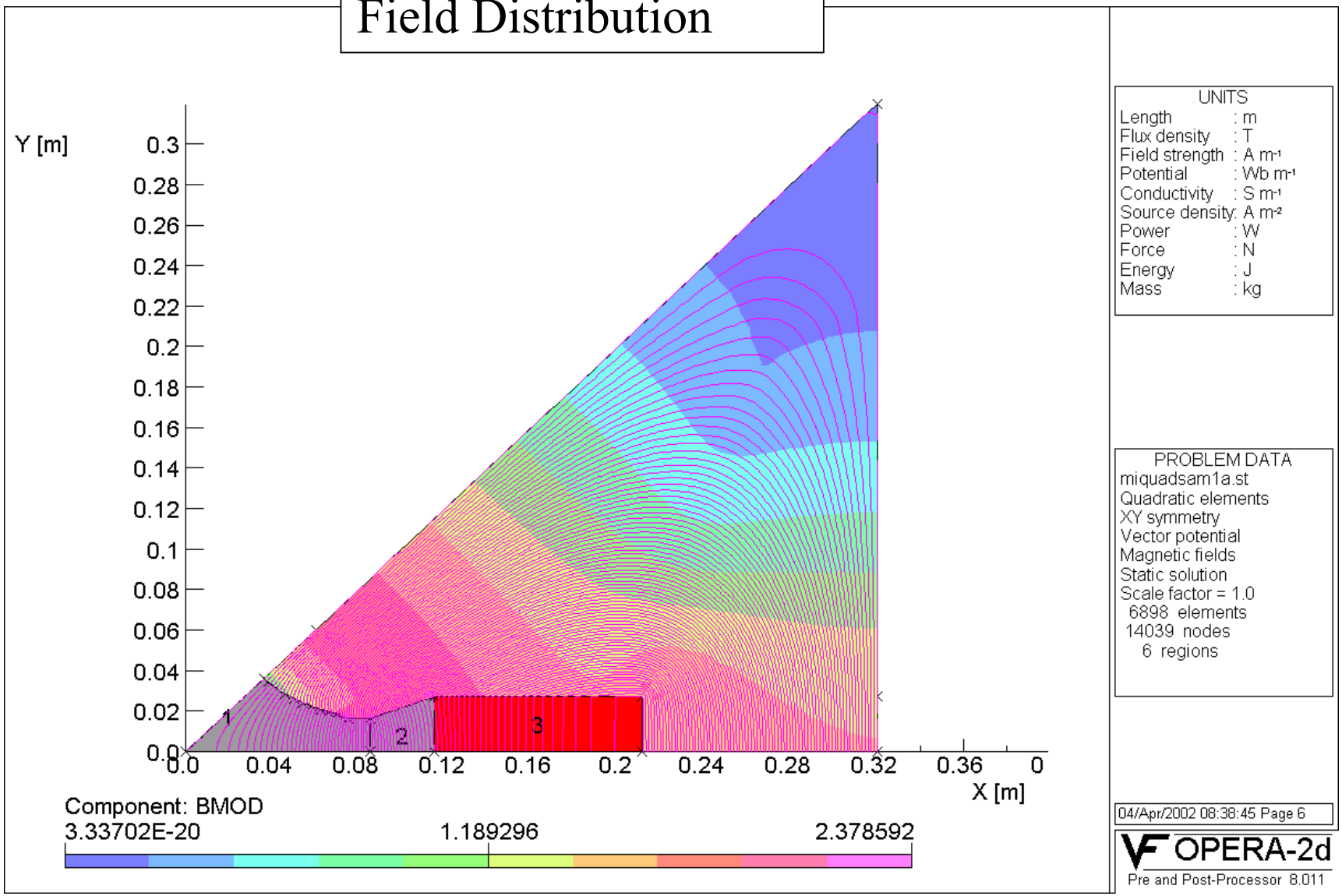
Name: WQB

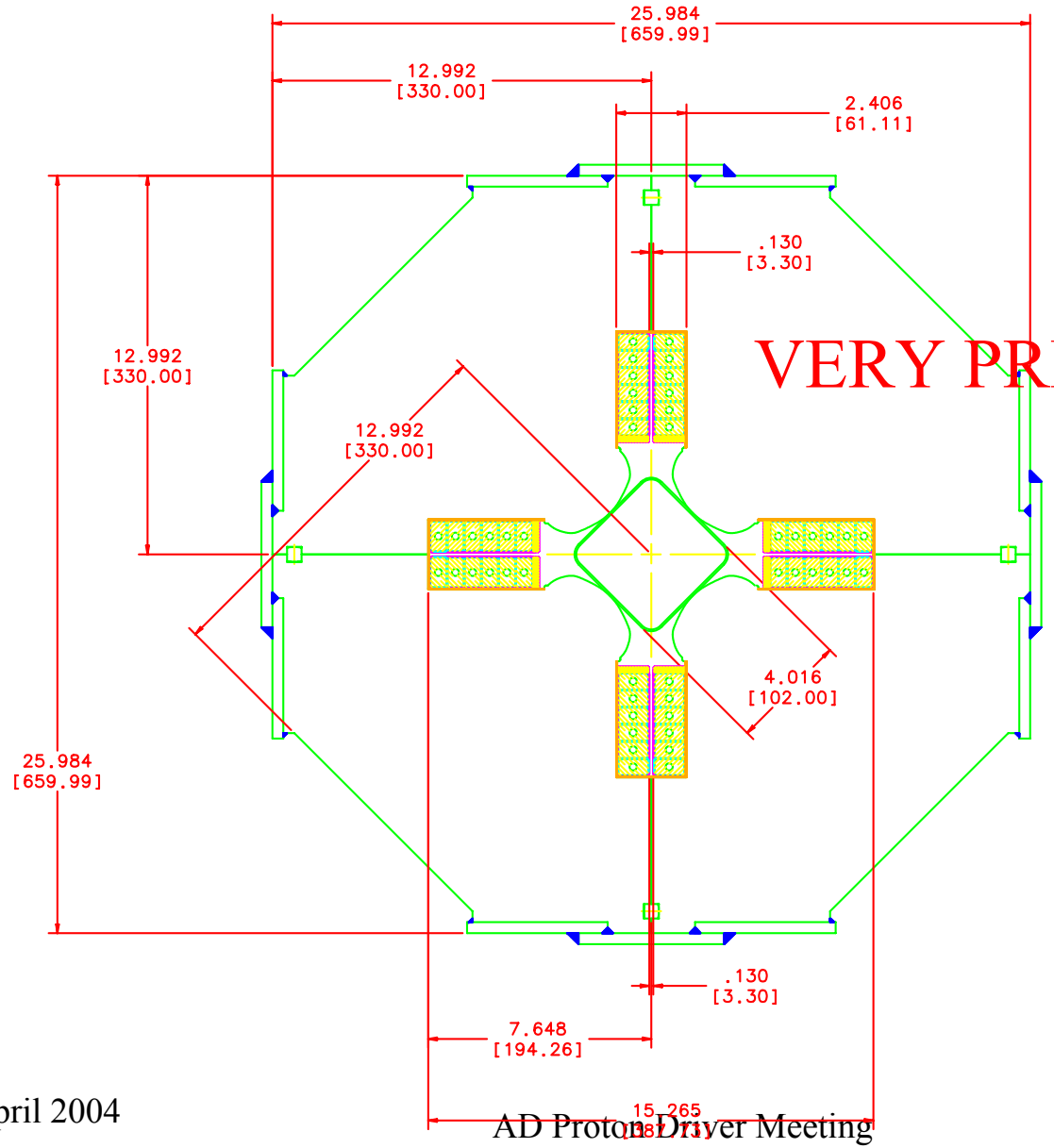
- Q for quadrupole
- B for 84”, like IQB in Main Injector
- W for Wide aperture

Design parameters

- Steel length: 2.134 m (84”)
- Turns per pole: 4 → 6
- Pole tip diameter:
  83.48 mm (3.287”) → 102.24 mm (4.025”)
- Peak pole tip field: 0.82 T → 1.00 T
- Trim coils

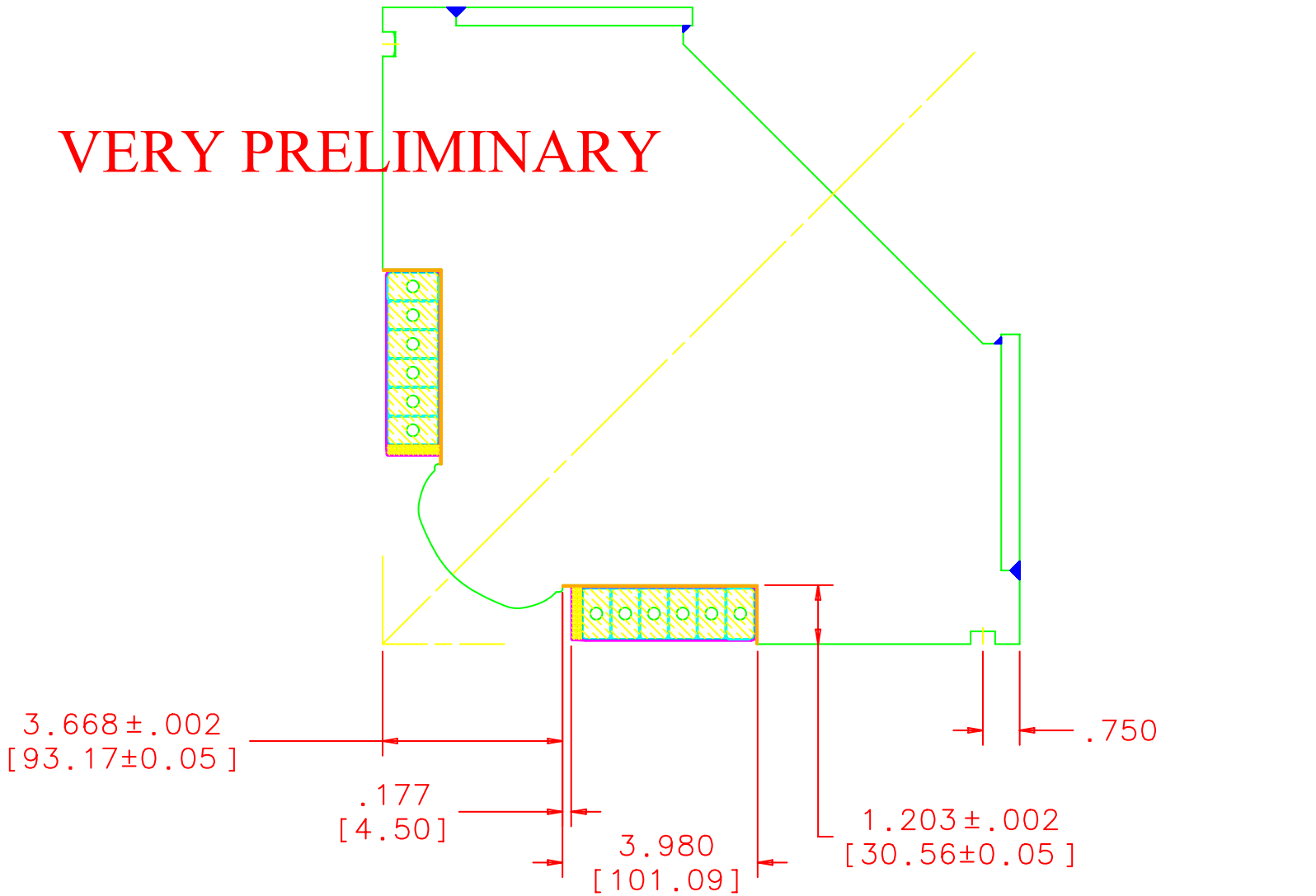
Field Distribution





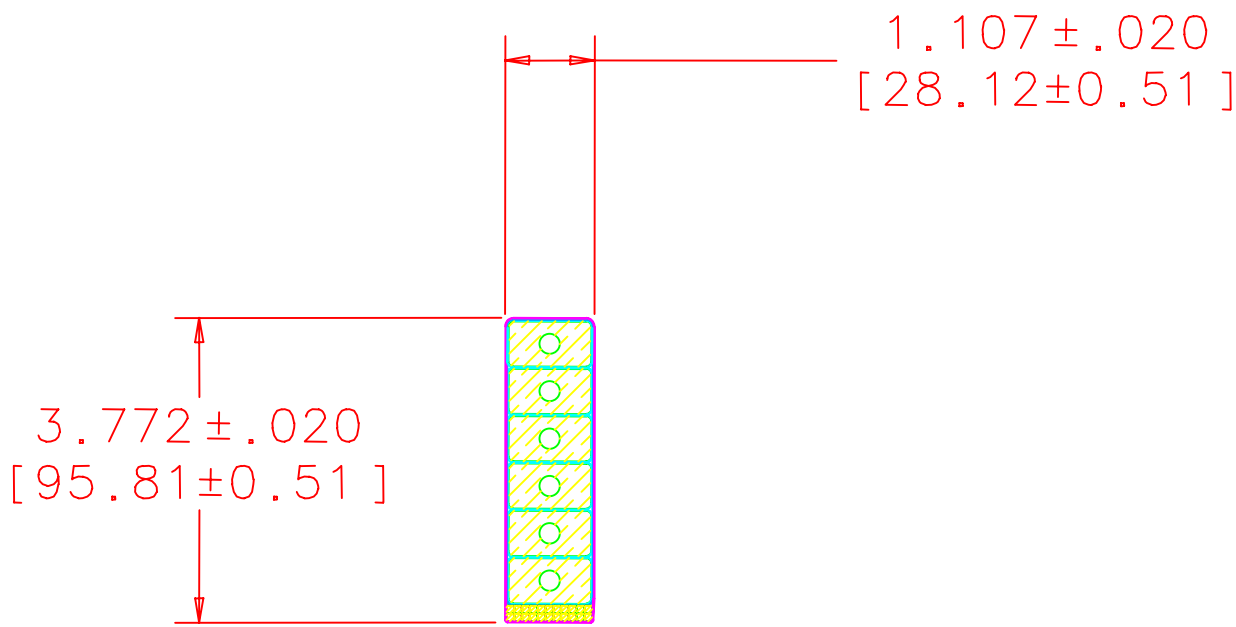
VERY PRELIMINARY

WIDE APERATURE QUAD-1A



WIDE APERATURE QUAD-2A

VERY PRELIMINARY



WIDE APERATURE QUAD-4A

Materials

- Core – low carbon steel laminations
- Main Conductor – left over 4Q120 hollow copper
- Trim conductor - #10 (#11 square)
- Coil – vacuum impregnated
- Beam tube – left over 4Q120, perhaps stretched

Rough Cost Estimate

(no contingency)

	FY04	FY05	Total
M&S per magnet	17 K	14 K	31 K
M&S all magnets	153 K	126 K	279 K
M&S tooling	61 K	10 K	71 K
M&S total	**214 K**	**136 K**	**350 K**
Labor per magnet		37 K	37 K
Labor all magnets		333 K	333 K
Labor EDIA, tooling	67 K	9 K	76 K
Labor total	**67 K**	**342 K**	**409 K**
Project total	**281 K**	**478 K**	**759 K**

Schedule

- Design details -- now – July 2004
- Procurement -- now – Nov 2004
- Build first article -- Dec 2004 – Feb 2004
- Study first -- March 2005
- Build, test the rest -- April 2005 – July 2005