US LHC ACCELERATOR PROJECT

berkeley - brookhaven - fermilab

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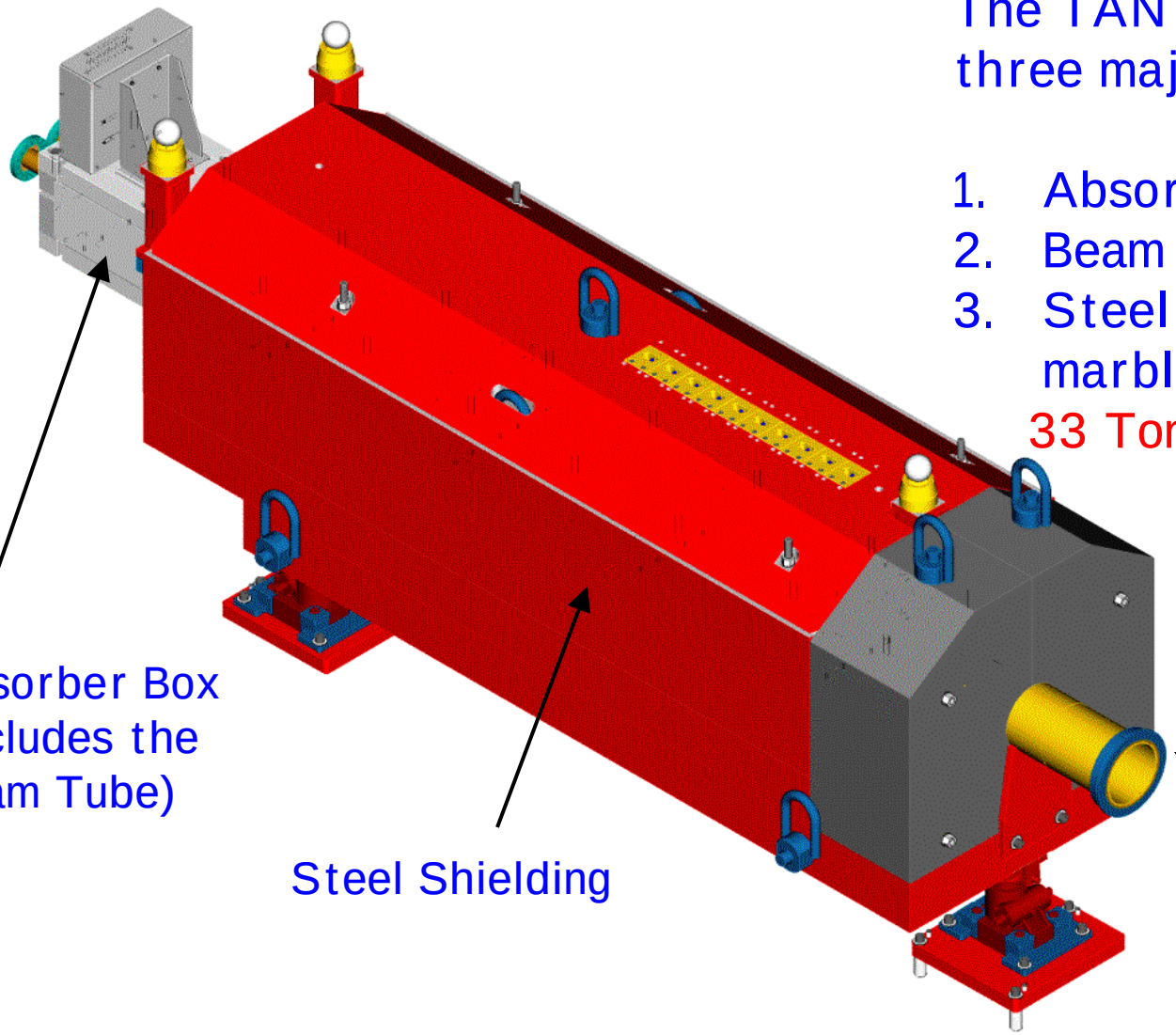
LBNL

DOE Lehman Review
Meeting at Germantown
26 July 2004

Outline

- Project Overview
- IR Absorbers (TAS and TAN)
- Cryogenic Distribution Boxes (DFBX)
- DFBX Delivery Schedule
- DFBX Budget Data
- Summary

IR Absorber Overview - TAN



The TAN consists of three major assemblies;

1. Absorber box
2. Beam tube, 15 ft long
3. Steel shielding and marble headstone

33 Tons total weight

Absorber Box (includes the Beam Tube)

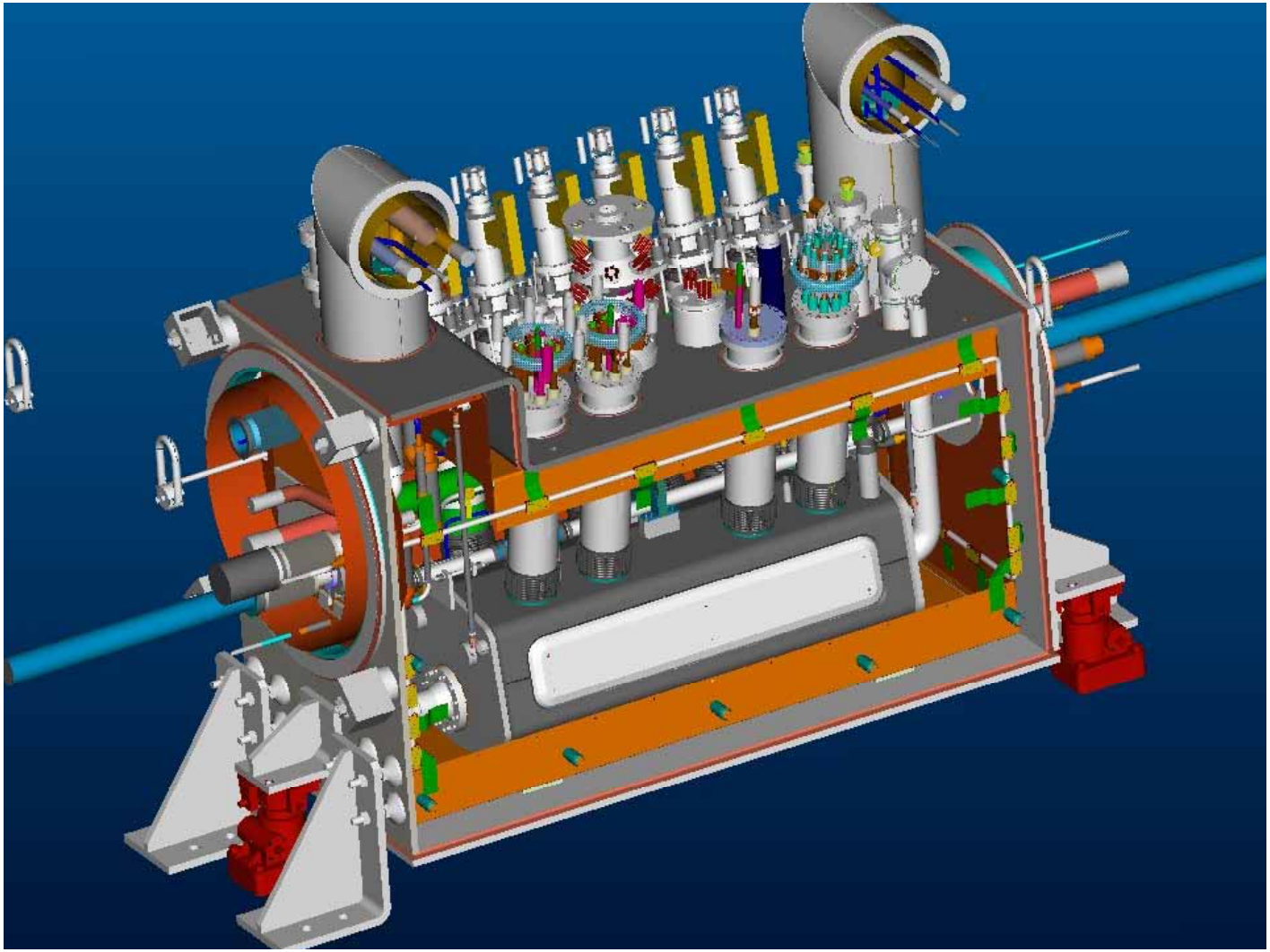
Steel Shielding

Beam Tube

TAN Arrived at CERN 5 April, 2004
Working on Acceptance by CERN

Shipping to CERN, Jul 2003
Vacuum Chamber Inspection by CERN Complete

CAD Model of DFBX Illustrates Complexity



DFBX Highlights Since Last Year's Review

- Great progress was achieved toward completing the DFBX project
- Major fabrication of Government Furnished Material at LBNL and FNAL is complete
- Major fabrication, assembly and integration operations are underway at Meyer Tool and Mfg Inc.
- Some schedule setback due to leaks in the 6 inch dia. Chimney bellows and vapor cooled leads

20 Pairs 7,500A HTS Current Leads Fabrication and Test

- Fabrication is Complete at Pirelli
- 19 pairs were cold tested at Fermi Lab
- Two pairs were returned to Pirelli for repair:
  - One pair had instrumentation problems
  - One pair had leak problems and will need to be cold tested at Fermi Lab
- Repair is underway at Pirelli

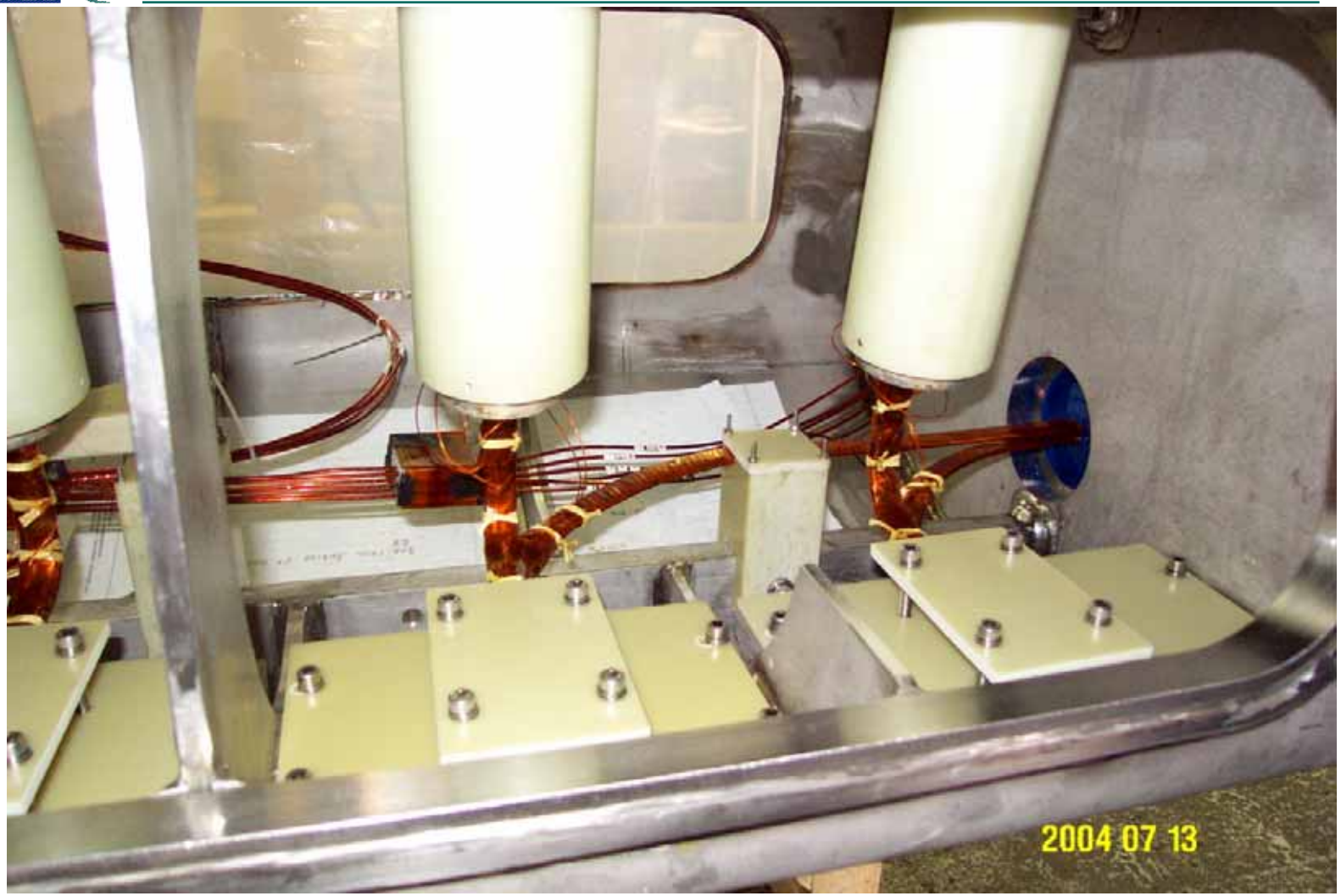
32 Each Vapor Cooled Power Leads Fabrication is Complete

- Fabrication at American Magnetics (AMI) is complete and all leads were shipped to MTM:
  - 16 ea 6-lead, 600 A assemblies
  - 8 ea 2-lead, 600 A assemblies
  - 8 ea 10-lead 120 A assemblies
- Leak to ambient was discovered after installing first set in DFBX-G
- All 32 leads were shipped back to AMI for repair
- First set for DFBX-G is repaired and delivered to MTM last week

Two Boxes being Assembled
Spool Pieces and HTS Leads are Installed

Two Boxes are Ready for VCL Installation

View Inside LHe Vessel Shows Lambda Plug and HTS lead Splice Blocks



Leak Problems with Lead Chimney Bellows Were Corrected

- Performed life cycle tests at MTM and BOA
- Revised close out weld to reduce heating effect
- Ordered more spare bellows to have on hand if needed

Summary DFBX Production Status at Meyer Tool

- Major fabrication of all components for 8 boxes is complete
- Mechanical components for the two most complex boxes are basically assembled
- Pressure tests and vacuum leak tests of critical assemblies are complete
- Electrical components assembly and test are underway
- Assembly and test operations took less time than planned in the MTM's schedule
- The remaining major assembly operations are vacuum vessel closeout weld and final leak test
- We now have the technical experience and actual task duration data to set credible shipping dates
- LBNL and FNAL will continue to provide aggressive oversight and timely support to Meyer Tool to insure that production stays on track

DFBX Production Schedule

- Leak problems with bellows and VCL resulted in 3.5 months delay of first box
- Revised the assembly processes to work around the VCL, and authorized 2000 hours of overtime, resulting in:
  - First two boxes are at the same assembly stage
  - Schedule slippage at the front end is reduced to 2.5 months
- We have maintained 2 months schedule contingency at the end of the project. In part because:
  - Assembly process modification and overtime
  - BCR 64 – Change definitions (and dates) of L2 delivery milestones to be "approved for shipment."

DFBX Shipping Schedule

System	Ready to Shipping	Constraint Date*
➢ DFBX No. 1	15 Sep 04	Oct 04 **
➢ DFBX No. 2	15 Oct 04	Oct 04
➢ DFBX Nos. 3 and 4	1 Feb 05	Mar 05
➢ DFBX Nos. 5 and 6	1 May 05	Jul-Sep 05
➢ DFBX Nos. 7 and 8	1 Aug 05	30 Sep 05

* level 2 Milestones from BCR 64

** warm fit-up test at CERN

LBNL Cost Performance Summary Through June 2004

WBS	Description	BAC	% Complete	
1.1.1	IR Quads	2,363.3	99	Complete 2002, except recent $32k cable effort
1.1.3	Cryo Feedboxes	9,166.3	85	
1.1.4	IR Absorbers	5,419.9	100	Complete 2004
1.3.2	SC Cables	1,033.0	100	Complete 2001
1.4.3	Accelerator Physi	844.2	100	Complete 2002
1.5.1	US LHC PM	47.3	14	
1.5.4	Project Mgmt	1,711.0	98	
Total (k$)		20,584.9	93	

1.1.3 DFBX Cumulative Cost & Schedule Variance

- Exercising firm change control procedures to manage MTM's fabrication
- LBNL's internal allowance for change requests is spent to address problems with VCL and bellows, and some minor design changes
- Cost contingency risk analysis was performed for the DFBX. Remaining major risk is associated with vacuum vessel close out weld
- Future change requests will draw on LHC project contingency
- EDIA has not experienced any significant negative CV creep since procurement was placed.
- LBNL's management is committed to hold the line on EDIA

Summary

- IR absorber TAS/TAN are complete and safely arrived at CERN
- Continue to make progress on the DFBX fabrication
- Major fabrication of LBL furnished material is complete
- Vacuum leak problems in bellows and vapor cooled leads are corrected
- Excellent working relationship with the vendor proved essential in resolving fabrication problems in a timely fashion
- Continue to hold two months schedule float for shipping of last DFBX with respect to Project Completion milestone
- LBNL and FNAL will continue to provide aggressive oversight and timely support to Meyer Tool to keep production on schedule