

Coupling Coil Update

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MICE CM31

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OUTLINE

- Progress since CM30
 - RFCC Update: RF (A. DeMello)
 - **The CC magnet design and fabrication**
 - Cold-mass
 - Cooling circuit and cryostat
 - Quench protection
 - Testing of the 1st cold-mass
- Progress at HIT
- Plans and schedule for FY12



Progress since CM30 (1/7)

- Fabrication of the 1st cold mass:
 - Welding of the cover plate for the cold-mass completed in early August 2011 at HIT



Cover plate welding at HIT in early August 2011

Progress since CM30 (2/7)

- The welded cold-mass has been packed & ready for shipping at HIT in mid-August, 2011 and shipment was delayed by required document, insurance and payment method;
- Shipment cargo left China on Sept. 21 and arrived LBNL on October 14, 2011.



Progress since CM30 (3/7)

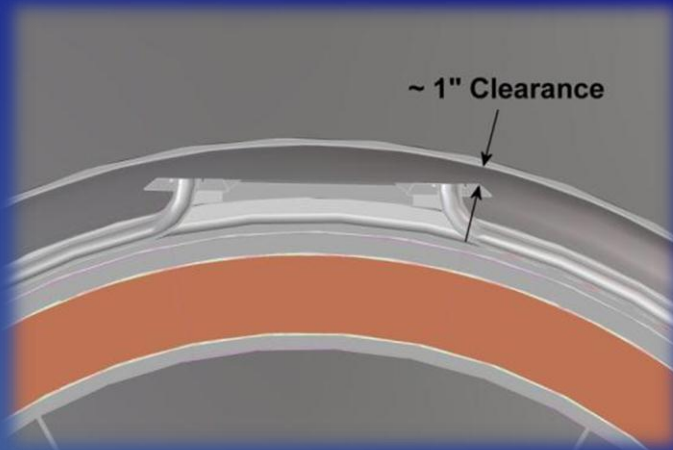
- No shipping damage was observed from visual inspection;
- Preparation for vacuum potting, LHe pipe welding started at LBNL
 - Five pipes ordered and arrived LBNL Monday this week
 - Epoxy ordered
 - Measurement plan is in progress: electrical and physical
 - Welding fixture, die for pipe bending and welding plan developed



Progress since CM30 (4/7)

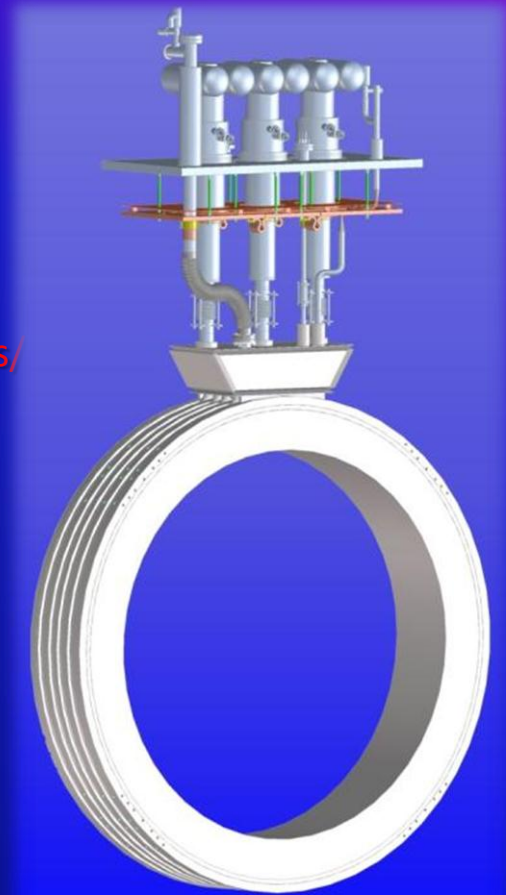
Preparation of the 1st cold mass testing:

- **CAD model to check and show the cold-mass test setup in the FSU cryostat**
- Before shipping to Fermilab:
- LHe pipes will be welded on at LBNL
- Vacuum impregnation
- No bottom (eliminated from the new design) and upper reservoir
- Top reservoir parts complete
- Fill-line and diffuser purchased



Progress since CM30 (5/7)

- Cooling circuit and cryostat design completed;
- The design has been updated recently
 - Bottom LH reservoir has been removed,
 - Circuit analysis complete (by Tapio)
- Over two hundred 2D drawings have been sent out for reviewing and these drawings can be accessed at:
http://www-eng.lbl.gov/~spvirostek/Muon/Coupling_Coil/LBNL_Drawings/
- In preparation for the cryostat fabrication review
 - Dr. A. Bross and Fred Nobrega (Fermilab) and Derun Li visited QH Company and the company QH contracted for fabrication;
 - S. Virostek and A. DeMello went to Fermilab to discuss the drawings and review plan
- The cryostat fabrication review has been postponed to Jan. 2012
 - Reviewing and updating the drawings from SINAP
 - Vacuum vessel stress analysis (by H. Pan)



Progress since CM30 (6/7)

- **Quench Protection**
 - **Revisited QP design recently at LBNL**
 - QP design should work for the 1st as-built coil
 - Need detailed engineering/mechanical designs/drawings for QP, current lead stabilizations
 - **Contract with MIT group is in progress**
 - QP analysis and design for SS and CC magnets
 - Current leads stabilizations
 - **Originally proposed Schedule by MIT was to complete the design by December 2011, but will be delayed due to the paperwork of the contract.**



Progress since CM30 (7/7)




- Testing of the 1st cold mass:
 - Current plan is to test the 1st CC cold-mass at Fermilab using FSU cryostat
 - A joint meeting (LBNL, MIT and Fermilab) was held at Fermilab in late July
 - Assessment studies of testing at Fermilab complete
 - Fermilab team visited FSU in early August 2011
 - Disassembled and shipped to Fermilab
 - Testing plan is being developed (testing starts ~ Apr. or May 2012)




FSU cryostat at Fermilab TD parking lot



Latest News on the CC Testing at Fermilab

from Steve Gourlay  reply reply all forward archive junk delete 10/24/2011 10:56 AM
subject Fwd: MICE Coupling Coil Electrical Requirements other actions
to Derun Li , Soren Prestemon 

From: **Ruben Carcagno** <ruben@fnal.gov>
Date: Mon, Oct 24, 2011 at 6:53 AM
Subject: MICE Coupling Coil Electrical Requirements
To: Steve Gourlay <sagourlay@lbl.gov>, Alan Bross <bross@fnal.gov>, John Tompkins <jct@fnal.gov>

Strong support from Fermilab management 

Steve, Alan, John,

Last week I received direction from Stuart and Giorgio to give priority to the MICE coupling coil test over completion of VTS 2&3. I am directing department resources accordingly.

I would also like to prepare a document with the test requirements and then circulate it for your review and approval. I believe I have enough information for the cryo requirements, but I need more input for the electrical requirements such as:

1. Power Supply: is a power supply available for this test? If so, can you provide details? If not, can you specify parameters so we can procure?
2. Voltage Taps: will the coil come with voltage taps? If so, how many and where?

Summary of the CC Status

- The detailed design of the Coupling Coils is complete with the exception of the quench protection system and the lead stabilization detailed designs (to be undertaken by MIT)
- LBNL is currently carrying out changes to the fabrication drawings as well as translation from Chinese to English
- Winding and fabrication of the first Coupling Coil cold mass was completed at the Qi-Huan Company in Beijing, China
- The coil arrived at LBNL Oct. 14 where cooling tube welding and epoxy potting will be completed in two months
- Additional superconductor for the two MICE coils is currently being procured



Progress at HIT

- Prep for the $\frac{1}{4}$ CC testing: almost daily report from HIT

The screenshot shows an Outlook window with a list of 17 messages. The selected message is from 王玥玫 (Wang Yueqi) dated 10/18/2011 12:34 AM. The subject is 'MICE项目四分之一线圈测试工作进展报告'. The recipients are 李立毅 (Li Liyi), 徐风雨 (Xu Fengyu), 陈安斌 (Chen Anbin), Derun Li, and Nanyang Li. The email body contains a report on the progress of the MICE project's quarter-coil testing.

Subject	From	Date	Size
Fw: MICE项目四分之一线圈工作进展报告20111025	王玥玫	10/25/2011 2:06 AM	20.3 MB
MICE项目四分之一线圈工作进展报告20111024	王玥玫	10/24/2011 1:42 AM	12.6 MB
Re: Checks or TT?	徐风雨	10/22/2011 7:33 PM	8.3 KB
MICE项目四分之一线圈工作进展报告20111022	王玥玫	10/22/2011 1:23 AM	2.7 KB
MICE项目四分之一线圈测试工作进展报告20111021	王玥玫	10/21/2011 12:51 AM	12.6 MB
MICE项目四分之一线圈测试工作进展报告20111021	王玥玫	10/21/2011 12:50 AM	30.4 MB
Fw: Re: Two pay checks for PO 6985744	徐风雨	10/20/2011 10:46 PM	542 KB
MICE项目四分之一线圈测试工作进展报告20111020	王玥玫	10/20/2011 1:18 AM	12.8 MB
MICE项目四分之一线圈测试工作进展报告20111019	王玥玫	10/18/2011 11:26 PM	18.7 MB
MICE项目四分之一线圈测试工作进展报告	王玥玫	10/18/2011 12:34 AM	13.7 MB
Re: Fwd: Coupling coil arrives at LBNL	徐风雨	10/16/2011 5:36 PM	12.3 KB
Re: Fwd: Coupling coil arrives at LBNL	bguo	10/15/2011 12:37 AM	8.2 KB
Re: MICE 1/4耦合磁体线圈测试 2011-10-09	徐风雨	10/10/2011 7:14 PM	9.7 KB

from 王玥玫
subject MICE项目四分之一线圈测试工作进展报告
to 李立毅
cc 徐风雨, 陈安斌, Derun Li, Nanyang Li

李老师，

MICE项目四分之一线圈测试前期工作已于10月初开始启动，现将今天工作进展报告如下：

- 1、图014 止逆阀已经焊接连接完成；
- 2、图016 铜管焊接完成，万向节已安装完成；

4 attachments size unknown

照片 014.jpg 照片 016.jpg 照片 018.jpg 照片 019.jpg



Progress at HIT (cont'd)

- $\frac{1}{4}$ testing coil testing preparation at ICST/HIT
- Delays due to vacuum leaking
- Testing to be started when is ready



CC Magnets Plan

- Current plans call for all three cold masses to be tested and trained to full current at Fermilab prior to magnet assembly
- A suitable test cryostat obtained from FSU is now at Fermilab being prepared for coil testing
- All parts for the magnet cryostats will be fabricated in China by the Qi-Huan Company and shipped to the US
- Current plan is for Qi-Huan to also wind the 2nd and 3rd coils
- Various options for cryostat assembly and welding being explored: outside vendor (Meyer Tool or other), FNAL, LBNL
- Assembly of the first unit likely to occur at FNAL or LBNL
- Assembly of 2nd and 3rd units still in planning: options include Qi-Huan, FNAL, LBNL, RAL, outside vendor

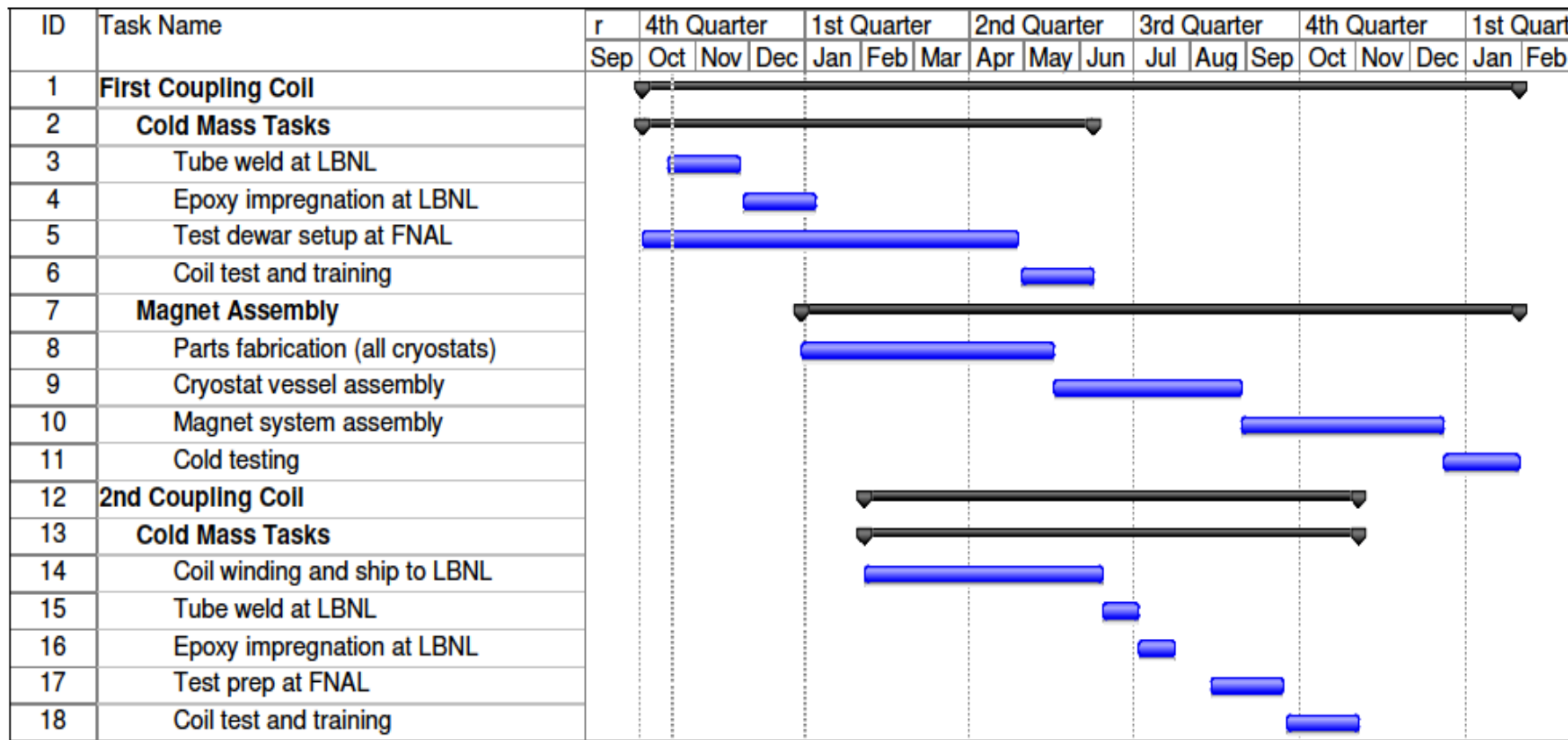


RFCC Module Status and Plan

- Work on other RFCC components has continued at LBNL at a slower pace due to Coupling Coil delays and limited funding
- All associated design work has been completed
- Ten copper RF cavities are complete and at LBNL
- Cavity tuner prototype has been fabricated and tested
- RF and beryllium windows for first module are now on hand
- Activities for FY12 include:
 - Surface prep and electro-polishing of cavities;
 - Fabrication of tuner actuators;
 - Fabrication of RF couplers for prototype and single MICE cavities;
 - Fabrication of tuner arms for a single cavity test.



FY12 Schedule



The plan and schedule discussed at MAP management meeting and strongly supported by MAP management.

