Spectrometer Solenoid Update

MICE CM35
RAL/Abingdon

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Topics

- Control system upgrade
- Latest magnet training results
- Summary of 2nd magnet progress
- Schedule

Control System Upgrade

- A control system review was held at LBNL on December 11th and 12th, 2012
- The LBNL/MICE team has responded to the numerous recommendations from the review panel
- The main goal was to move towards a more robust system capable of preventing a repeat of the ice blockage and other potential failures
- A secondary goal was to move closer to the final system that will be operated in the MICE hall

Control System Upgrade

Some of the more important upgrades:

- Incorporated a stand alone PID controller for the cold mass heater circuit w/current monitor
- Added an alarm handler to the control software
- Installed a gas bottle backup system to prevent negative cold mass pressures; improved durability of pressure relief valves
- Added current shunts to directly measure the current going into the coils

Power Supplies and Control

Power Supplies

- New 500 A supply for center and end coils
- 5 supplies fully integrated
- Tested both into a short and into the cold magnet

Control rack

- Many upgrades installed
- UPS added
- New heater control loop

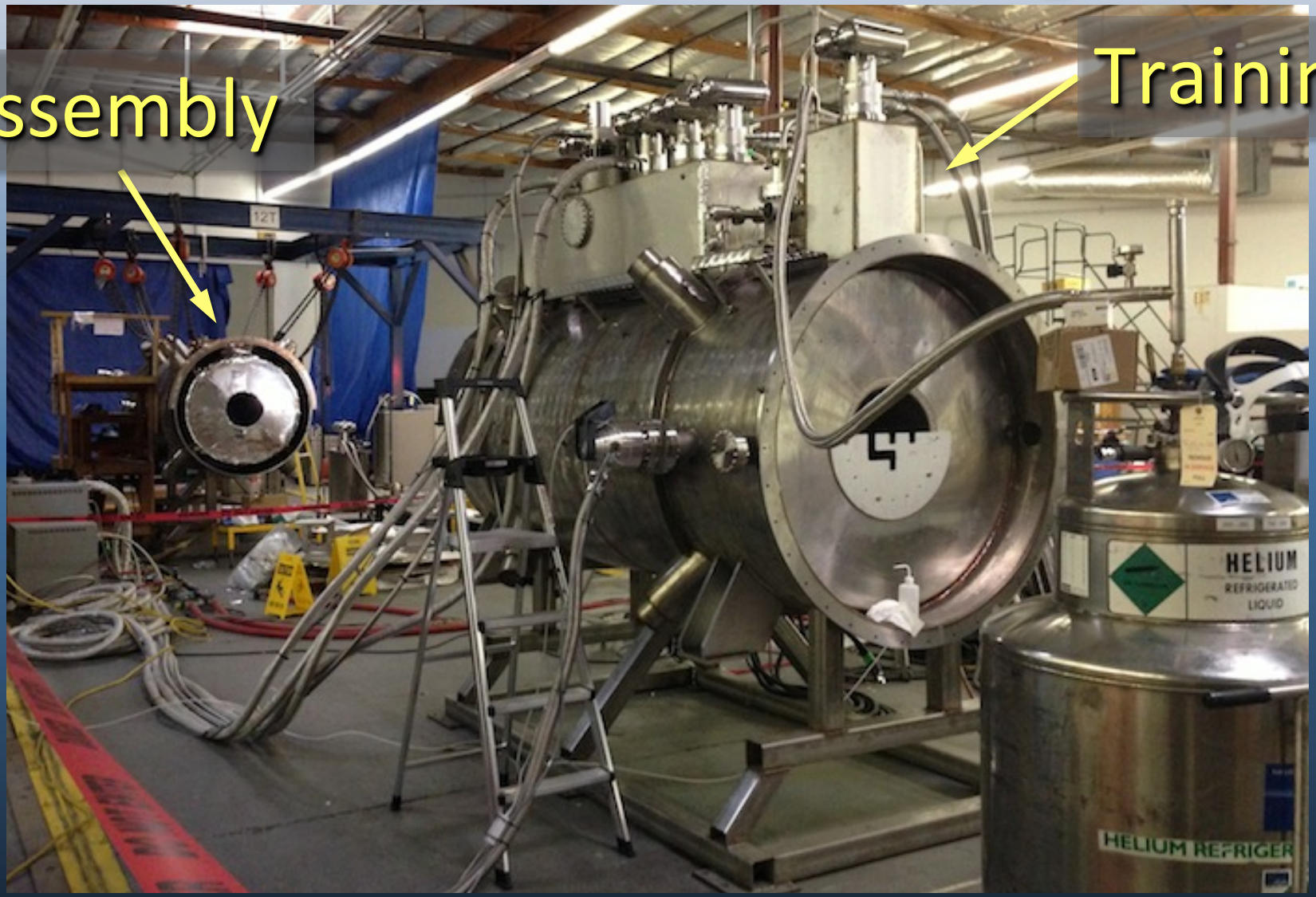
Recent Activity

Recent Effort by Many People

Many people have come to Wang NMR to help with system preparation and training:

- Control system: Steve Griffiths, Ian Mullacrane, Adrian Oates (Daresbury)
- Control software: Pierrick Hanlet (FNAL)
- Quench system: Roman Pilipenko (FNAL)
- Cooldown: Heng Pan, Tianhuan Luo, Allan DeMello, Andrew Lambert, Nanyang Li, Steve Virostek (LBNL)
- Training: Linda Coney, Maria Leonova (FNAL); Heng Pan, Tianhuan Luo, Etienne Rochepault, Steve Virostek (LBNL)
- And numerous others behind the scenes

Working on Both Magnets



Current Progress

- Magnet has been successfully cooled down, and training is now under way
- All five power supplies are being used at various ramp rates and under computer control
- New cold mass heater control loop working well
- Three training quenches are now complete
- Three unrelated issues have caused premature quenches during training: failed contactor relay, short circuit in charging circuit, trim supply control issue
- These problems all appear to have been remedied

Problem Fixes

Contactor relay

- It appears the faulty relay had been cycling when the magnet was warm and eventually wore out
- The unit was replaced by the Daresbury team, and there have been no problems since

Charge/discharge circuits

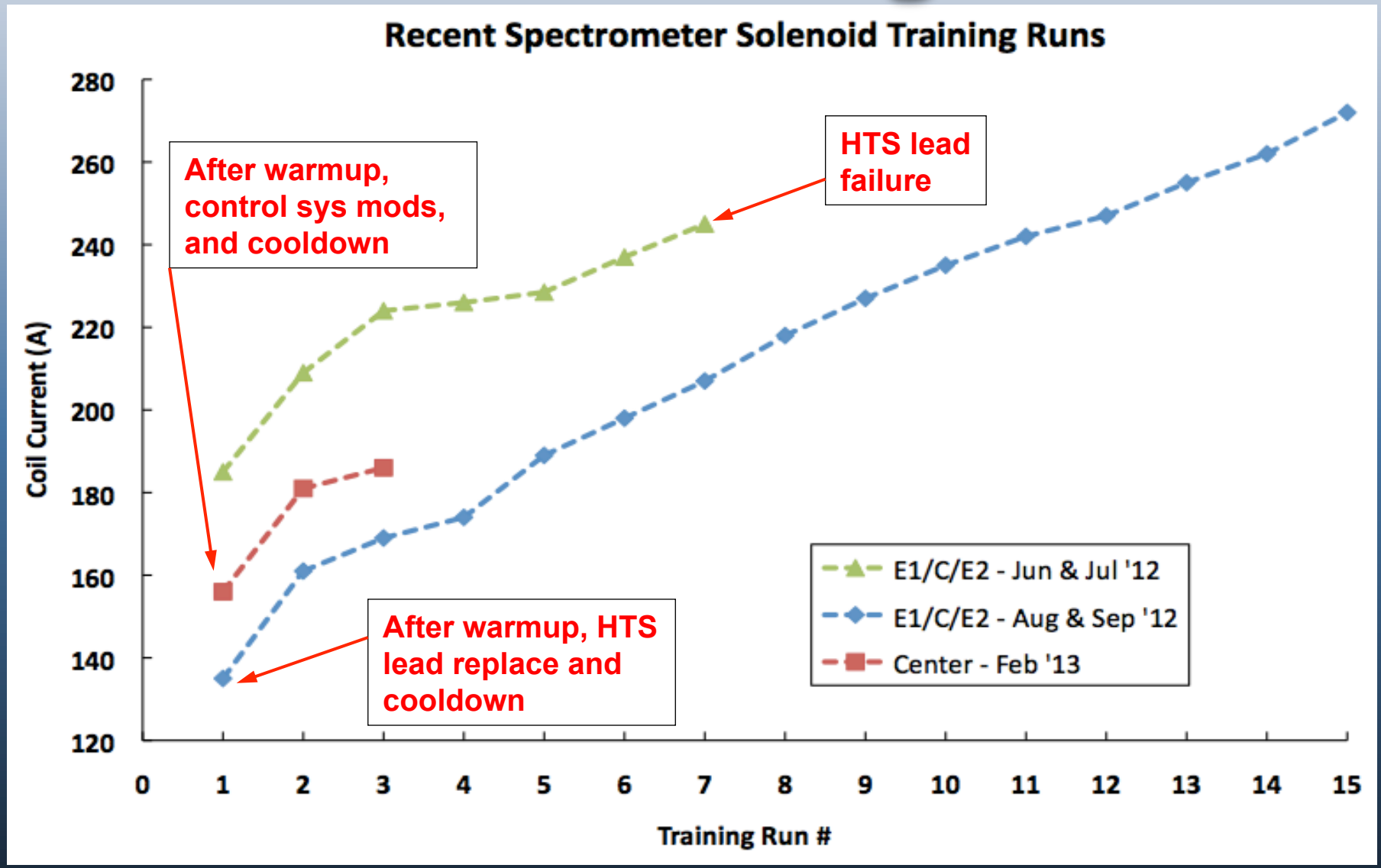
- Short circuits were discovered in two of the units between the diodes and the heat sink block
- All four units were rebuilt: disassemble, contacts cleaned, replace Kapton film, reassemble, torque bolts, checkout

Trim supply control

- Control system reboot appears to have fixed problem

Charge/discharge Circuits

Recent Training Runs



2nd Magnet Progress

- The second cold mass/shield assembly is now complete - in the vacuum vessel, MLI wrapped
- Benchtop assembly of the vacuum vessel tower is nearing completion – delayed by availability of additional cryocooler sleeves
- LBNL mechanical technicians playing a key role in assembly – currently affected by ALS shutdown
- Cryocooler tests are also under way – 4 coolers purchased by U. Miss., test of 2X length hoses

2nd Magnet Progress

2nd Magnet Progress

Schedule

- Cooldown completed at the end of January
- Training and magnetic measurement likely continue into early March
- 2nd unit assembly expected to be complete in April – training to follow shortly after
- Current schedule calls for both magnets to be delivered to RAL in early August '13
- 2nd magnet progress affected by 1st magnet training and LBNL tech availability