MERIT Magnet Status and Testing Plans
Wednesday March 1 2006 VRVS

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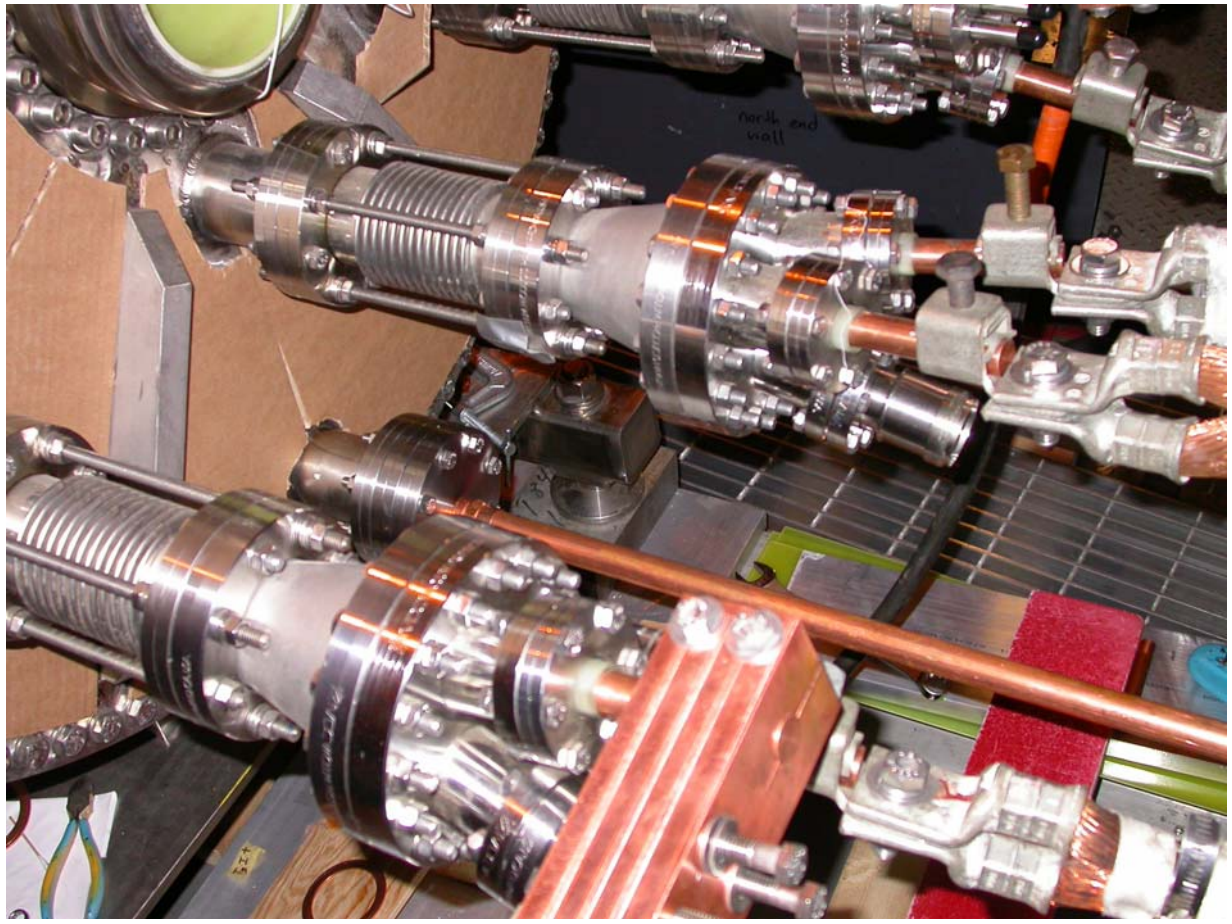


MERIT Pulsed Magnet –In PTF Facility at MIT-PSFC LN2 Feed Line Shown

Status:

-Still assembling things

PLC cooling water interlock logic bypassed

Bus Bar connections still being assembled – Bent bar held up at Ramsey Welding.

Vacuum Jacket Pressure Hasn't been checked but it is believed to be stable.

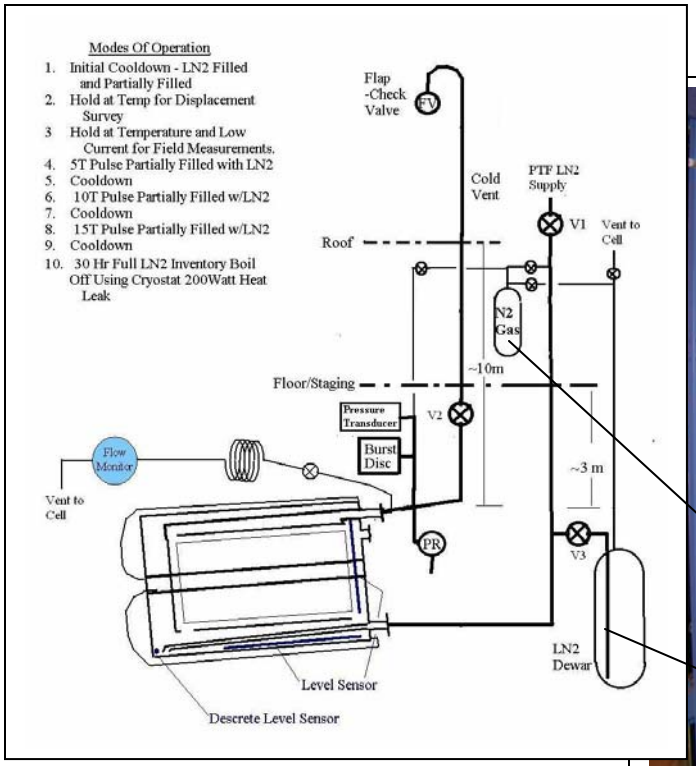
Vent pipe components are cut, many are welded.

Most cryogenic lines have been run.

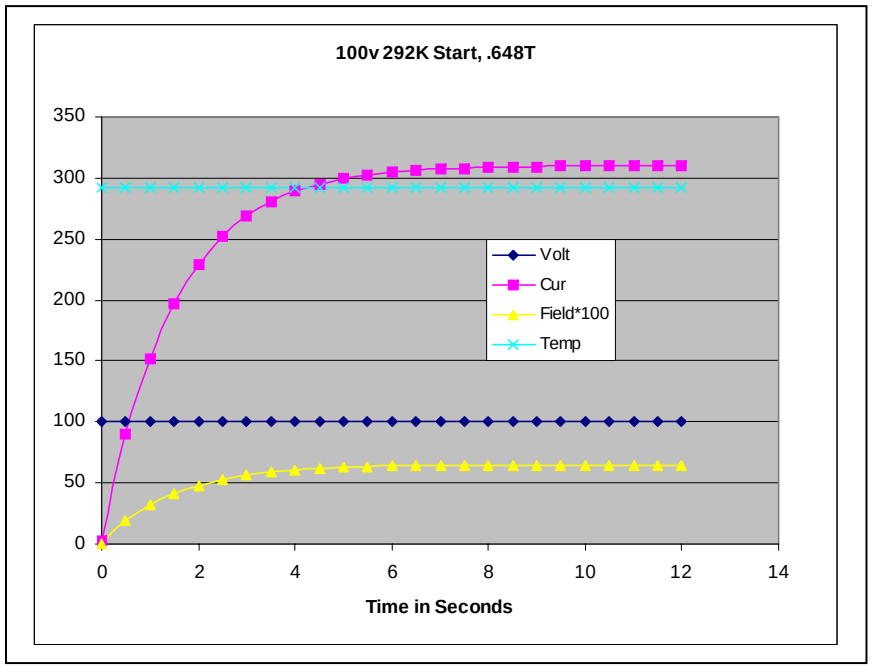
Roof penetration finally welded – waiting for warm weather for installation !

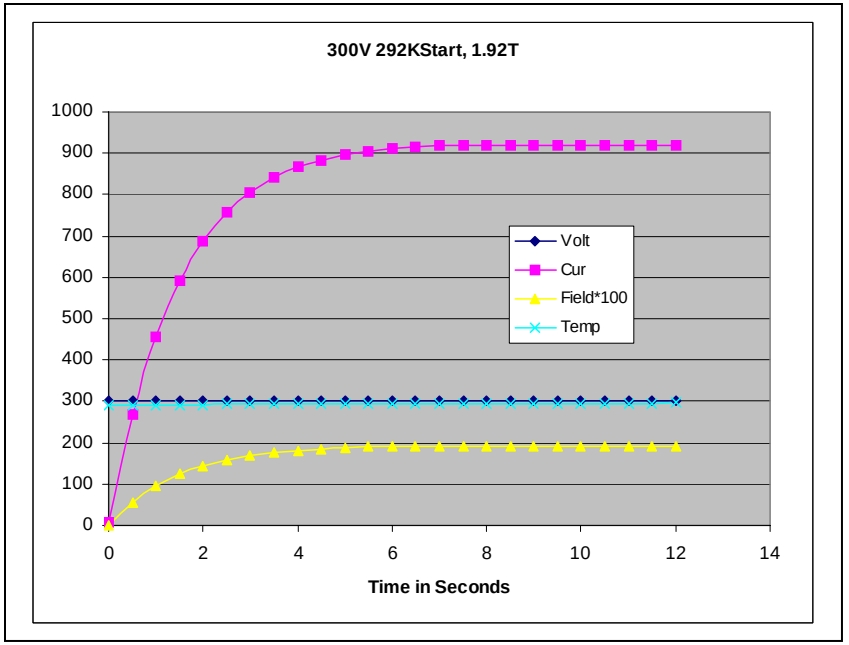
Armaflex insulation on a ring section of the vent pipe Two segments of smaller diameter pipe insulation is used for the 6 inch vent

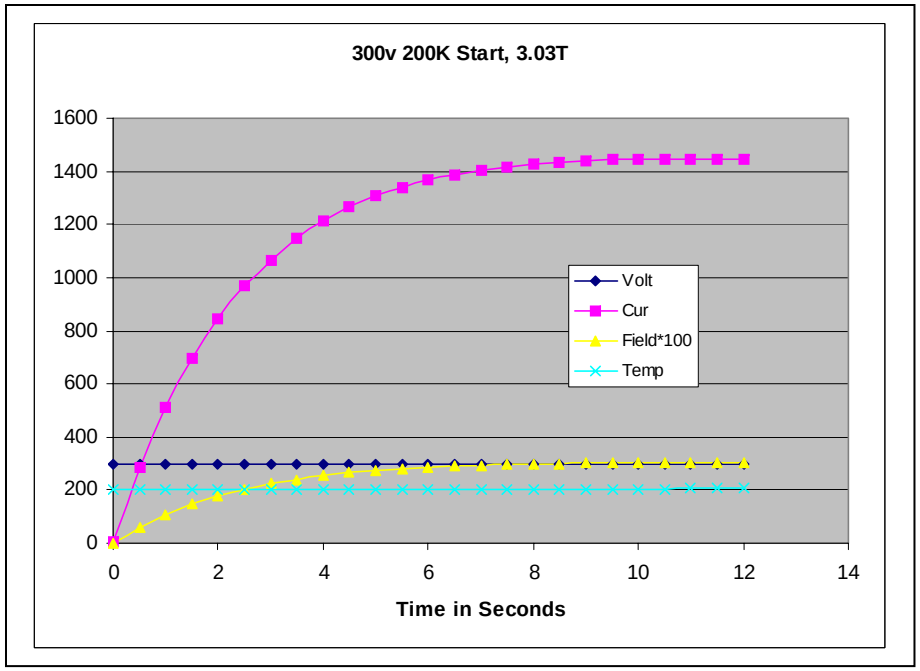
Cryogenic System

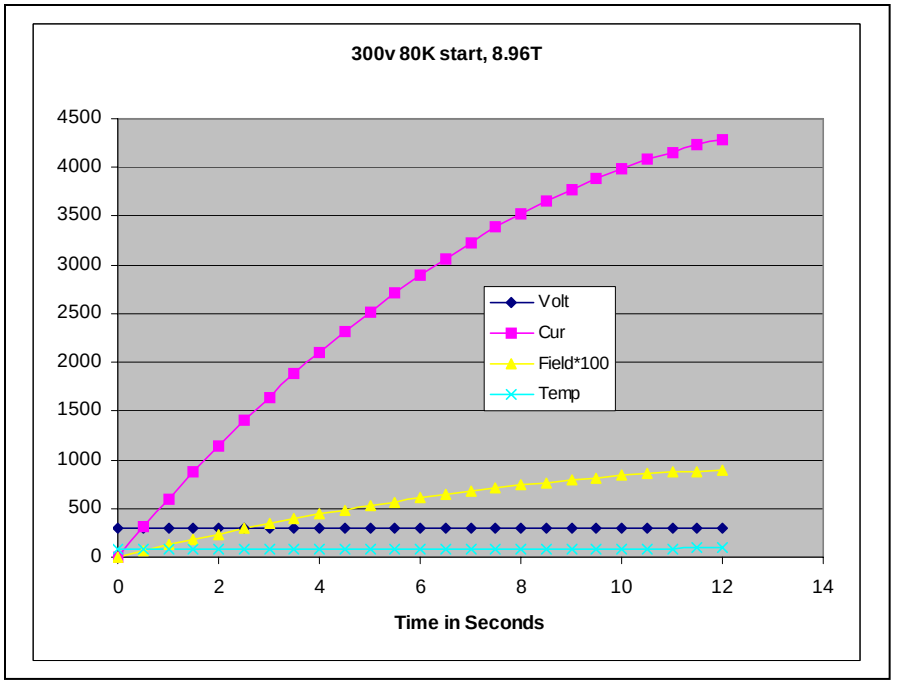


Main LN2 Control Valve. (Long Stem Cryo Valve)

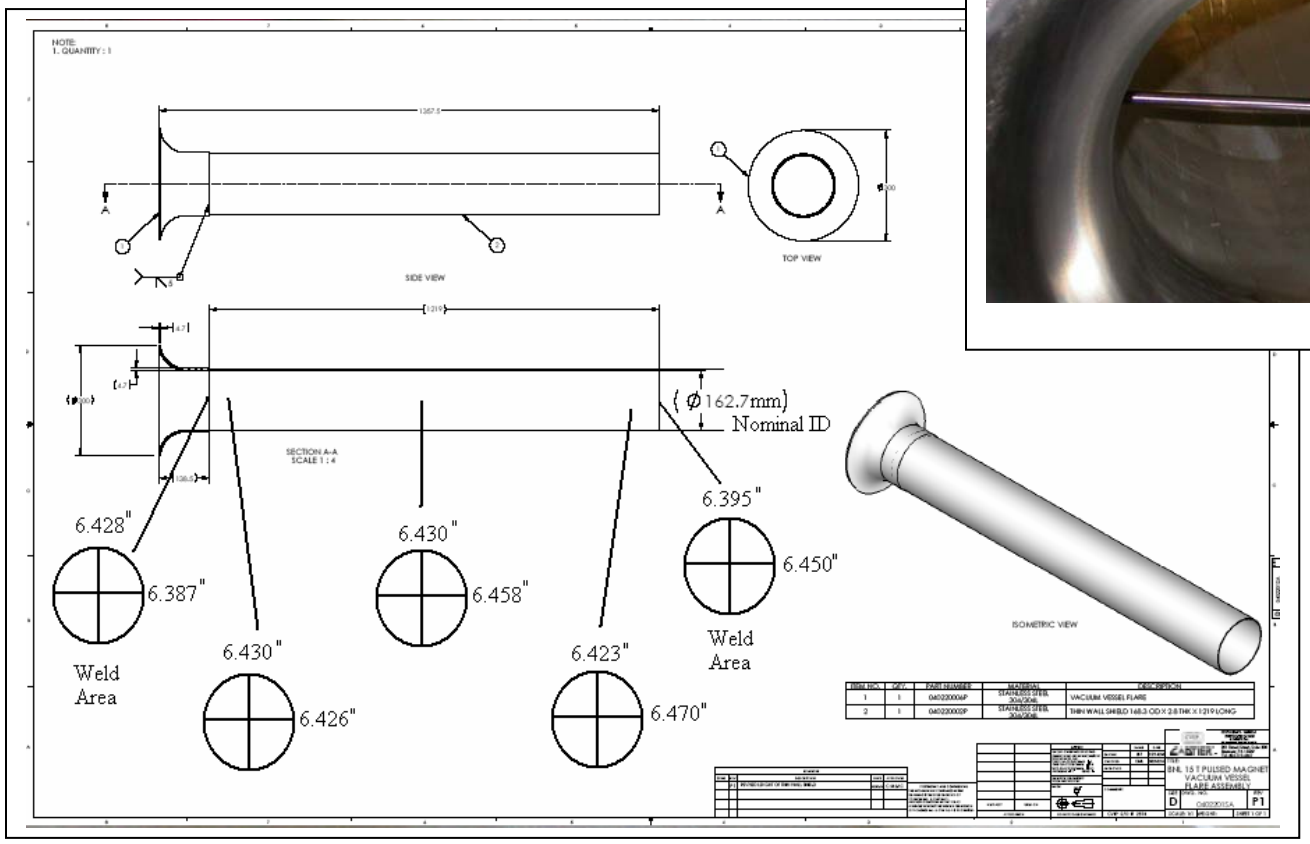

100v 292K Start, .648T
350
300
250
200
150
100
50
0
0
2
4
6
8
10
12
14
Volt
Cur
Field*100
Temp
Time in Seconds

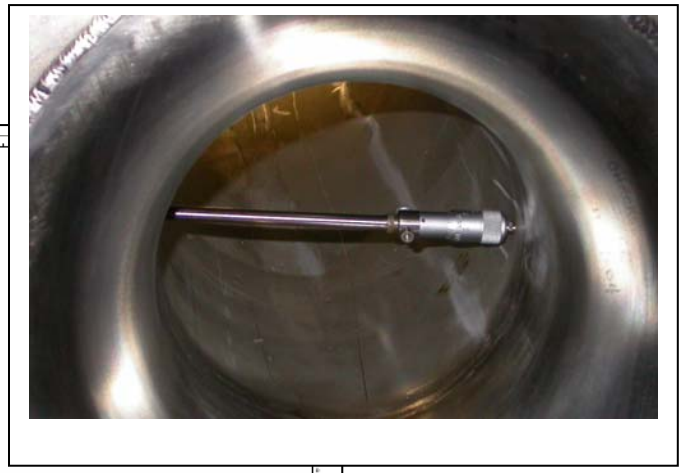

300V 292KStart, 1.92T
1000
900
800
700
600
500
400
300
200
100
0
0
2
4
6
8
10
12
14
Volt
Cur
Field*100
Temp
Time in Seconds


300v 200K Start, 3.03T
1600
1400
1200
1000
800
600
400
200
0
0
2
4
6
8
10
12
14
Volt
Cur
Field*100
Temp
Time in Seconds

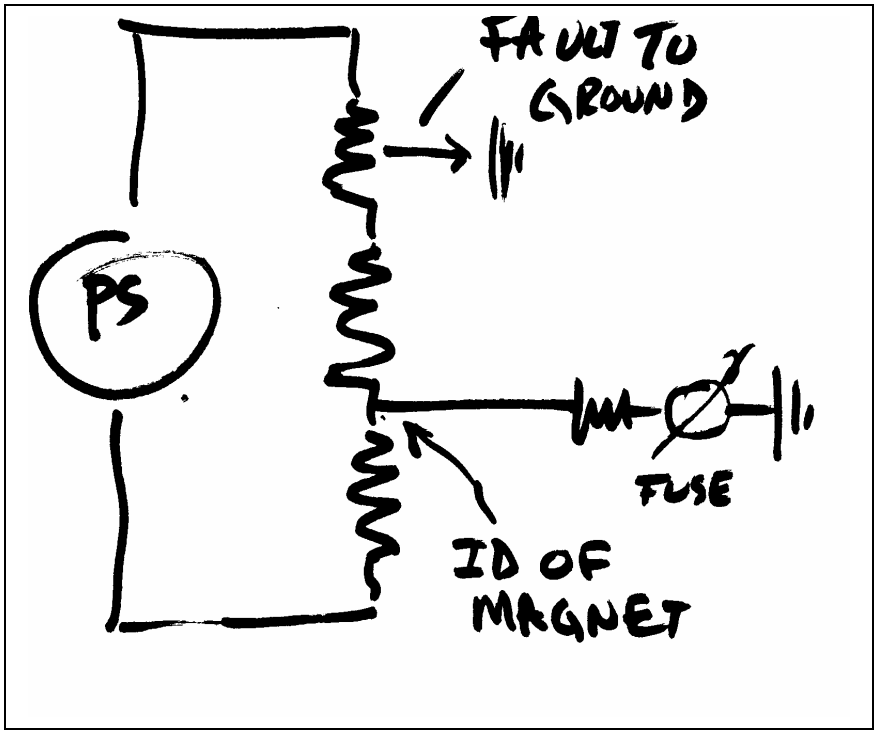

300v 80K start, 8.96T
4500
4000
3500
3000
2500
2000
1500
1000
500
0
0
2
4
6
8
10
12
14
Volt
Cur
Field*100
Temp
Time in Seconds

Bore As-Builts





Email to Adrian:



The 100 volt 310 amp, .65T Room Temperature shot would be useful for temperature measurement and field calibration. What we will really need is an 80K current scenario. With 250 amps and 80K the voltage is about 10 v and you would have a few minutes before you lose even a fraction of a degree. This would be enough to settle the inductive effects and get a good reading on the voltage drops of each segment and thus the temperature of each segment. Between 80 and 85K, the resistivity changes from 2.2016e-9 to 2.5304e-9 Ohm-Meter. The voltage will be proportional to the resistivity. That is about a 15% change. I am guessing a 5% variation in current might be OK - you might have to average the voltage drops to get the 5K resolution. A 5K difference in the start temp produces almost a 20K difference in end temperature. That is probably OK but marginal.

In our power supply, I am told that they can use a high resistance in the analog control system which will over damp the control, and should allow a stable low current. This will slow the rise time - maybe a problem for the 15T shot. Gary Dekow, our power engineer is talking about using a rheostat to allow controls of both high and low current. We will see if this is needed with our supplies.

We also are going to center tap the magnet - grounding the terminal connected to the inner layer of segment 1, and grounding the vessels. This minimizes the voltage across the ground plane where mechanical damage to the coil is most likely - where the magnet bears against the spline tube. This is possible because our power supply "floats" i.e. the negative lead does not have to be at ground potential. The center tap also is used for a ground fault detection. I think we will want this configuration at CERN. The center tap does not require a large cable.