15T shot

7200 amps was programmed into the power supply. Based on Bob Weggels (and P.Titus) calculations, this should be 15T

~7500 amps was reached by the power supply as reported by the power supply instrumentation. Based on the calculated magnet constant this would be 15.625T

Based on gauss meter and small power supply current shunt, the magnet constant is:

\[ \frac{0.16T}{79A} = 0.0020253 \text{T/A} \]

7200amps would be 14.58T
7500amps would be 15.19T
I went through the data for run 1060330008 to find peak current and field for the "15 T" pulse. 

There are two possible measurements for the magnet current. The first is the shunt resistor mounted in the bus work, the second is the sum of zero flux transducer measurements from the six magnet convertors. 

At 15.5s into the run the peak reading from the bus shunt was 7555A, while the peak reading from the sum of individual convertor measurements was 7495 A. The corresponding field at 15.1T. 

Dividing the measured peak field by shunt current yields a magnet constant value of 0.001999 T/A, while is close to the value that I cited in my earlier message today. There is a slight mismatch in values due to the data smoothing procedure, however, based on measured results this error is reasonable small. 

- Phil 

At 7555 Amps, and using the calculated magnet constant of 15T/7200amps the field reached, in this pulse, would be 15.74T

At 01:29 PM 4/6/2006, you wrote:
>Thanks. I guess no one can claim we didn't get to 15T. What was the >voltage? If I run my simulation with 695v and an 80K start, I can get to 7500 amps and 15.7 T with a 150K end temp. It is supposed to be 120 to 130K. I don't have the rampdown modeled, so it could be higher. Chen-Yu measured 190K on the CERNOX after the 15T shot and I thought we >had damaged the CERNOX, but Chen-Yu checked them this morning and they appear to have survived.

-Peter
Post-Pulse Temperatures argue for the higher current. Why doesn’t the simulation with the actual voltage trace reproduce the higher current?

– We are checking data

Among other improvements, we need a better field measurement. We are investigating a flux loop and integrating the dB/dt as measured by the voltage.
BNL Magnet Cool-down History, 3/27/06 - 3/28/06

Resistance as a Function of Temperature

Resistance as a Function of Time

BNL Magnet Cool-down History, 3/27/06 - 3/28/06

Temperature, [K]

0 50 100 150 200 250 300

Time, [minute]

Temperature, [K]

Temperature, degrees K

0 50 100 150 200 250 300 350

Resistance (Ohm)

0 0.05 0.1 0.15 0.2 0.25

Seg1

Seg2

Seg3

Resistance, [Ohm]

0.0E+00 1.0E-02 2.0E-02 3.0E-02 4.0E-02 5.0E-02 6.0E-02 7.0E-02 8.0E-02 9.0E-02

Time, [Minute]

0 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300 310 320 330 340 350 360 370 380 390 400 410 420 430 440 450 460 470 480 490 500 510 520 530 540 550 560 570 580 590 600 610 620 630 640 650 660 670 680 690 700 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000 1010 1020

Inner winding

Intermediate winding

Outer winding