Subject: RE: Data for ITRVQ graphs of E951 magnets
From: "Ioannis Marneris" <marneris@bnl.gov>
Date: Tue, 15 Jan 2002 09:49:29 -0500
To: "'Robert J. Weggel'" <weggel@bnl.gov>, <mcdonald@puphed.princeton.edu>, <gallardo@bnl.gov>
CC: <mikei@bnl.gov>, <titus@psfc.mit.edu>, <kirk@bnl.gov>, <palmer@bnl.gov>

Hi bob,

Attached I have a math cad file for case3. I am changing the magnet resistance from 16 to 39mOhms linearly in 18 sec.
If we assume a fixed resistance of 19.3mOhms as you mentioned you are correct. However my concern is the resistance changes and in my graph the current does not get to 7200A for the first 25 sec.

Ioannis

-----Original Message-----
From: Robert J. Weggel [mailto:weggel@bnl.gov]
Sent: Tuesday, January 15, 2002 12:12 AM
To: marneris@bnl.gov ; mcdonald@puphed.princeton.edu ; gallardo@bnl.gov
Cc: mikei@bnl.gov ; titus@psfc.mit.edu ; kirk@bnl.gov ; palmer@bnl.gov
Subject: Data for ITRVQ graphs of E951 magnets

Dear Ioannis et al.,
The attached file, E951base.out, is output from the Fortran program that
generated the data for the graphs with names beginning with ITRVQ. The output, and the analysis in the following sentences, should convince you that Case 3, precooled to 30 K, can indeed reach 7200 A in ~15 s. From the column labeled MILLIOHMS one can calculate that Case 3 has a resistance that averages 259.74/15 = 17.3 milliohms over the first 15 s. To this value one must add any lead resistance, which I estimate as 2 milliohms, for a total of 19.3 milliohms. If this value remained fixed over that time, the current predicted at 15 s would be (300 V/0.0193 ohms) {1 - exp [-(15 s)(.0193 ohms)/0.435 H]} = 15531 A [1 - exp(-0.666)] = 15531 A (0.486) = 7549 A. To reproduce the actual value of current, 7200 A, requires a total resistance of 22.4 milliohms, hence an average magnet resistance of 20.3 milliohms--a value that is plausible, is it not?
Bob W.