Bob Simmons

From: Hutch Neilson
Sent: Wednesday, November 28, 2007 5:32 PM
To: Michael R. Kalish; Subrahmanya Ramakrishnan; Paul Goranson
Cc: Charles L. Neumeyer; Michael C. Zarnstorff; Phil Heitzenroeder; Arthur W. Brooks; Thomas G. Brown; Ronald L. Strykowsky; Bob Simmons
Subject: Re: Trim Coil requirements

Mike, Raki, and Paul,

Here is guidance regarding the time phasing of trim coil requirements.

Day 1:
The coils shall be designed to meet the full performance requirements (kA-turns, response time, voltage standoff, etc.), previously documented.

The full set of trim coils shall be installed.

Provide leads for each coil, connecting the coil terminals to an interface at the cryostat boundary. They too shall be consistent with the full performance requirements.

For power supplies, provide the minimum to satisfy our CD-4 requirement: namely to test each coil to 1 kA-turn with a temporary power supply connection. The coils can be tested one at a time. It is assumed we will temporarily reconnect the Day-1 OH supply to the trim coils for this purpose, so we do not need a dedicated trim coil power supply on Day 1.

Upgrade configuration.
Show a practical concept for a dedicated trim coil power supply system compatible with full performance requirements, with independent control over each coil current. Take advantage of existing C-site supplies as appropriate. The solution should provide the flexibility to implement the upgrade in a staged manner, based on the needs of the research program.

Let me know if there are any questions.

I hope this is reasonable and sufficient; let me know if not.

Hutch

On Nov 27, 2007, at 6:02 PM, Charles L. Neumeyer wrote:

> Recall that, until you calculate the mutual coupling effects with the PF, you really can't be confident about the voltage requirement.
>
> ----- Original Message -----
> From: Michael R. Kalish
> To: Subrahmanya Ramakrishnan
> Cc: Charles L. Neumeyer; Michael C. Zarnstorff; Phil Heitzenroeder; Arthur W. Brooks; Thomas G. Brown; Hutch Neilson
> Sent: Tue Nov 27 15:24:02 2007
> Subject: RE: Trim Coil requirements
>
> Thanks Raki,
>
> I will consider the voltage to ground requirement for the coil then to be a maximum

of 1KV to allow for the possibility that the required response time may be 20 ms. The coils insulation will be chosen to handle an acceptance test high pot of 4.5KV plus 50% margin. Please note that Raki is implying that the response time with the existing power supply (500V?)is not likely to be faster than between 25ms to 30ms. By designing the coil such that we can apply a higher voltage we allow for the possibility of upgrading the power supply if a faster response time is required. I believe there is only one power supply in the proposed design so the cost of upgrading the power supply to greater than 500V is likely to cost less than 100K? (Raki correct me if I'm wrong).

Mike

Michael Kalish
Princeton Plasma Physics Laboratory
PO Box 451 Princeton, NJ 08543
Phone: (609) 243-2277
Fax: (609) 243-3248

You can visit the home page of the
Princeton Plasma Physics Laboratory at
http://www.pppl.gov

>-----Original Message-----
>From: Subrahmanya Ramakrishnan
>Sent: Tuesday, November 27, 2007 9:37 AM
>To: Michael R. Kalish
>Cc: Charles L. Neumeyer; mzarnstorff@pppl.gov; Phil Heitzenroeder; Arthur
>W. Brooks; Thomas G. Brown; Hutch Neilson
>Subject: FW: Trim Coil requirements
>
>Mike
>For the requested response time the circuit applied voltage has to be
>nearly 600V including line drops. The DC link voltage for the H bridges may
>have to be 0 -1000V.
>Hence the coil (of 121 turns) has to be designed such that it shall be
>capable of being hipotted at 3kV to ground.
>Raki
>
>-----Original Message-----
>From: Hutch Neilson
>Sent: Tuesday, November 20, 2007 9:57 PM
>To: Michael R. Kalish
>Cc: Michael C. Zarnstorff; Phil Heitzenroeder; Subrahmanya Ramakrishnan;
>Arthur W. Brooks; Thomas G. Brown
>Subject: Trim Coil requirements
>
>Mike,
>
>Following up on the recent peer review, here is the requested
>guidance regarding trim coil requirements:
>
>1. Response time / voltage: zero to 20 kA-turn in 20 ms.
>(Strawman) Please advise on the voltage and force implications
>before going too far with this.
>2. Dimensional accuracy: Fabrication tolerance: ±1/4 in.;
>Positioning tolerance: ±1/2 in. Record as-built dimensions.
>3. Midplane coils: examine the feasibility of adding two coils
>straddling the midplane at the C-C joints. One coil on each side of
>the joint.
>
>Hutch