

-----Original Message-----

From: Chris Jensen [<mailto:ccjensen@fnal.gov>]

Sent: Monday, February 27, 2006 2:34 PM

To: Larsen, Ray S.

Cc: Chris Jensen; Shigeki Fududa; Corvin, W. Clay; Emil Huedem; Tom Lackowski; Adolphsen, Chris; Wilhelm Biaowons; Nikolay Solyak; Jerry Leibfritz; Lutz Lilje; Victor R. Kuchler; Ryuhei Sugahara; Michael Poehler; Lee Hammond; Jean-Luc Baldy; Asiri, Fred; atsushi.enomoto@kek.jp; Aarons, Gerard; Howard Pfeffer; Masami Tanaka; Masami Tanaka; Himel, Thomas M.
Subject: Re: Question & Comments RE: Updates to Support Tunnel Layout - Feb 27, 2006

Ray,

Regarding the FNAL charging supply. I attach a pdf file showing what is included in my definition of a charging supply, namely: contactor, phase controller (operating at 480 VAC), step up transformer, bridge rectifier and smoothing choke. There has to be a separate transformer from the distribution voltage to 480 V. I believe it has already been discussed that this is not the best solution BUT it is the BCD solution.

I have re-examined the size of the charging supply. The original sketch was based on twice the ILC average power. I now believe the supply can be approximately 48" wide x 96" long x 78" high. The main size determination is the rectifier transformer which can be physically rotated and have the bushings moved to fit into this footprint.

Regarding Comment 1: I think there are many issues to consider on the capacitor charging supply over a phase control power supply. Cost and reliability are the main issues. Will a capacitor charger really reduce project cost or improve reliability? I think that is the question to answer and I believe it has to be answered by building (or specifying and buying) and testing a full power supply. We have a data point on using an array of high power capacitor chargers that is relevant in addition to the phase control supply. I think that discussion belongs in a different list than this one.

Chris Jensen

-----Original Message-----

From: Larsen, Ray S.

Sent: Sunday, February 26, 2006 7:31 PM

To: 'Shigeki Fududa'

Cc: Corvin, W. Clay; 'Emil Huedem'; 'Tom Lackowski'; Adolphsen, Chris; 'Wilhelm Biaowons'; 'solyak@fnal.gov'; 'ccjensen@fnal.gov'; 'leibfritz@fnal.gov'; 'Lutz Lilje'; 'Victor R. Kuchler'; 'Ryuhei Sugahara'; 'Michael Poehler'; 'lhammond@fnal.gov'; 'Jean-Luc Baldy'; Asiri, Fred; 'atsushi.enomoto@kek.jp'; Aarons, Gerard; 'Masami Tanaka'; 'Masami Tanaka'; Himel, Thomas M.; Larsen, Ray S.

Subject: Question & Comments RE: Updates to Support Tunnel Layout - Feb 27, 2006

Shigeki - I'm addressing this memo to you as the official Point of Contact for HLRF systems. However because of lack of time before the Tuesday meeting I am sending this out to the broader distribution for their comments as well.

I was unable to attend last Tuesday's meeting so apologize that I am still catching up on those developments.

We have been working on RF system tunnel size problems with Clay Corvin -- in parallel with others it turns out. I did not see the 5.5m Fermilab layout that was sent around until late last week. As a result of late-week discussions at SLAC I/we have a question and a couple of comments:

Question: I am confused about what FNAL labels as the Charging Supply. Chris Jensen can straighten me out. Is the FNAL Charging Supply in fact a combined distribution step-down transformer and rectifier-charger, that we have been drawing as two separate physical units? Either there is a 34.5KV/480V transformer missing on the FNAL drawing, or the distribution is imbedded with the charger. Which is it?

Comment 1: Note that in the model Clay has drawn we show an off-the-shelf step-down transformer separate from the charger. We (SLAC engineers) think the 150KW charger can be built with commercial switching supplies within a couple of standard racks. If this is possible then the distribution transformer becomes the largest element at about 1.35m wide and everything else is in the shadow of it. This is what Clay's drawings show. We need to know if this is wrong for some reason we don't understand.

Comment 2 on tunnel diameter: Everyone is exercised about nailing down the diameter of the support tunnel. The complicated sub-floor structure shown in the FNAL drawing may be highly objectionable on grounds of difficult access and poor availability (MTTR). It obviously will be considerably more costly than a straight slab pour. The FNAL model achieved a wider floor equivalent to the 6.5 model by raising the floor, cutting headroom and compensating by going to a basement structure. Underfloor systems like this have been built and the maintenance people hate them for good reason. More importantly, people here have pointed out that when costs are figured, the 5.5m tunnel constructed in this way may well be MORE expensive than the 6.5 m tunnel with a simple slab floor

and all utilities openly accessible. Therefore, the least expensive (and most available) tunnel way well NOT be the smallest possible tunnel.

Any Bangalore decision has to be tempered with this reality. We seem to have general agreement that the present BCD of 4.5(?) can't work. To me 5.5 looks like a real push and hasn't been developed enough to answer --or even raise-- all the questions and issues. Neither has the 6.5 for that matter. Personally I would prefer 6.5m as a safer choice for the BCD for technical, not cost reasons; and then a parallel study of the 5.5 as an ACD to see if (a) it really will result in lower costs, and (b) the accessibility objections can be overcome.

Ray