

Debbie and Pat:

First of all, thanks for having me participate once more as a reviewer of the DOE OE program on power applications of HTSC. I consider participation as one of my national service duties. You may know I was once in line for an IPA to Jimmy Glotfelty, but the earmarks of 2003 trashed the targeted funding.

Also, thanks for having me as the “luncheon speaker.” Unfortunately, I could not come up with any “killer apps” for either mitigation or adaptation, but I will continue to think about it. I now seem to be “popular” in the climate change community, I guess because of the publicity surrounding the SuperGrid vision. My exposure has been “sink or swim.” I knew the issues were confusing, not just how much. When you inject politics, well...

Secondly, let me “review my fellow reviewers.” I will only name those I think positively of, based not just on this review, but many contacts with them over the years.

The best “materials science” questions were asked by Sue Chan from Columbia...I could see the presenter squirm. By all means, keep her on the team.

The best “physics” questions were from Guy Deutscher.

The best “programmatic” questions were posed by John Rowell. Rowell is a product of Bell Labs, and, like me, somewhat of a skeptic and “curmudgeon” of the application spin put out by the various companies (you guess who those are).

What follows below are some “stream of consciousness” observations on the details, defects and opportunities in your program. Please pay particular attention to item (9).

I think the whole idea of the peer review has to be re-thought. Back in 1989, it was a great innovative idea of Jim Daley, but the “big labs” (LANL, ORNL, ANL) have learned how to game the process. (Bob Hawsey and Dean Peterson are not dopes). What bothers me especially is the relative “low quality” of the presentations, not technically, but in terms of “people-to-people” eye contact. I was brought up in the IBM culture of its founder Thomas J. Watson (I had the honor of meeting him face to face in 1952 when he presented me the trophy for winning the IBM Family golf championship. I was 17 and 6’-1” and he was 80 and 6’-7”. He asked me what I wanted to be, and I said, “Sir, I want to be an IBM engineer.” He beamed.). Much later, in IBM management school, we were taught how to make presentations in the IBM tradition. The “Old Man” insisted on no more than three or four bullets per “chart” and no more than 8-to-10 words per bullet. He wanted the eyes of his audience on him and their ears listening to him and not trying to decipher the details of the charts or handouts. It must have worked...it did for me...T. J. Watson was arguably the most successful salesman of the 20<sup>th</sup> century.

-Paul

- 1) Put project funding amounts on first slide.
- 2) Encourage “Presentation Coaching” courses be taken...e.g., by UT-Battelle for ORNL, etc.
- 3) Some speakers/groups present enormous amount of material...the “glaze your eyes over approach.” It is impossible for the reviewers, expert as they may be, to process the material, especially in real time, and even reading them over afterwards. I have worked for some pretty smart high level management types and prepared presentations to them and for them, and would be thrown out of their offices were I to have tried the “overload” method. This is also the view of several other reviewers, including one who spent most of his career in industrial research as did I. I can’t imagine some of the AMSC presentations being given to Greg Yurek...they wouldn’t dare.
- 4) Most important result over the last two years is in isotropic pinning...see (9) below.
- 5) Boost weight of “relevance” or eliminate category altogether on the assumption all projects are relevant or DOE wouldn’t support
- 6) However, what is the “relative weight” of the HTS program to DOE OE goals of “... to modernize the electric grid, enhance security and reliability of the energy infrastructure, and facilitate recovery from disruptions to energy supply?” The OE has some tough decisions coming up in a “zero sum” scenario. I’ve spent my life in superconductivity, but there may other technologies more critical, especially in the short term.
- 7) NIST is “crown jewel” of the OE HTS program...protect it.
- 8) CAPS is important to support for the future of the program (not just for HTSC, but the entire OE agenda), even though they’re below “critical mass” at present.
- 9) In my opinion, the efforts at ORNL (and LANL) were inspired by the results reported at the 2006 PR by BNL, whose sample measurements were then verified independently at ORNL and LANL. This should not go unnoticed and unrewarded. In my BNL review, I suggested DOE OE consider a coordinated “thrust effort” to understand, control and eventually “transfer” the underlying science behind both coherent and non-coherent columnar defects induced by BZO or other compatible perovskites. The principle “competition” to the US efforts comes from the Barcelona Group (Obradors), which recently published a paper in Nature Materials (April, 2007) reporting similar results to ORNL and BNL, but using TFA-MOD synthesis of YBCO with BZO intergrowths and somewhat better values of  $J_c$  vs angle and field (difficult to compare, since Barcelona does not clearly state what  $I_c/cm$  is). How about sponsoring a Barcelona postdoc at BNL or ORNL? Since Spain is a member of NATO, perhaps the AFOSR might assist in this?
- 10) I have the feeling that much of the SR program has “lost its way,” and needs to be restructured to focus on its core expertise...the materials physics of  $J_c$  in films.
- 11) How about a new DOE OE project in concert with BES...computational modeling of the IBAD process, a completely open field?

12) Why does the program always have an NREL component, even though the efforts have been consistently marginal over the years? I've always suspected there is a "congressional interest" here, but what do I know?