

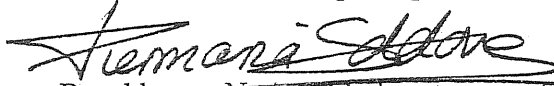


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Director's Office

September 12, 2005

To: Robin Staffin, Department of Energy/Division of High Energy Physics  
Steve Geer, Neutrino Factory and Muon Collider Collaboration Spokesperson  
Robert Palmer, Neutrino Factory and Muon Collider Collaboration Spokesperson

From: Piermaria Oddone, Director, Fermilab,   
and on behalf of, Praveen Chaudhari, Director, Brookhaven National Laboratory, and  
Steven Chu, Director, Lawrence Berkeley National Laboratory

SUBJECT: TRANSMISSION OF THE REPORT OF THE MUON COLLABORATION TECHNICAL  
ADVISORY COMMITTEE MEETING OF APRIL 25-26, 2005 AND  
COMMENTS/RECOMMENDATIONS OF THE MUON COLLIDER OVERSIGHT GROUP.

Attached please find the report from the sixth meeting of the Muon Collaboration Technical Advisory Committee (MUTAC), held at Lawrence Berkeley Laboratory on April 25-26, 2005. The MUTAC report is based on presentations describing the R&D program and plans of the Neutrino Factory and Muon Collider Collaboration (NFMCC, aka "the Collaboration") and accompanying discussions. The report has been reviewed by the Muon Collider Oversight Group (MCOG) who have proposed the following response to the report and its specific recommendations. The Laboratory directors concur in the MCOG response:

"In advance of the 2005 MUTAC meeting the MCOG requested that the NFMCC prepare a new 5-year plan based on the current view of realistic funding levels (which are considerably below past expectations). This plan was presented by the Collaboration and, along with the standard review of activities over the previous year, formed the basis of the meeting. The MUTAC and the MCOG both endorse the plan as an effective path towards determining the feasibility of a muon storage ring based "Neutrino Factory" and note the continued effectiveness of the NFMCC in pursuing a forefront R&D program under very constraining fiscal conditions. The MCOG believes that the Collaboration is operating effectively under the leadership of its two spokespersons and the R&D Project Manager."

"The NFMCC effort is currently focused in three areas: 1) development of hardware that would support a muon ionization cooling experiment, accompanied by significant participation in the effort to mount an international cooling experiment (MICE); 2) targetry development and preparations for an experiment at CERN; and 3) continuing development of design concepts for a Neutrino Factory guided by simulations and cost optimization models. The MUTAC judged that these activities "... are clearly focused on the most important subjects determining the feasibility of a neutrino factory." The overarching R&D goal of the Collaboration is to develop the Neutrino Factory concept, and associated components, to a

level that they could form the basis for a complete conceptual design sometime in the decade of 2011.

“The current funding level for the Collaboration is approximately \$3.6M, down from a high of \$8.0M five years ago. At current funding levels the Collaboration program is close to the edge of viability. MUTAC and MCOG believe that further reduction would endanger international collaborations and would considerably delay the possibility of a Neutrino Factory being developed to the point of constructability anywhere in the world over the next 15-20 years. We note that the Neutrino Factory is one of the very few elementary particle physics accelerator ideas on the horizon, and R&D in support of a complete design will take many years of consistent effort. In response to their own budget constraints the sponsoring laboratories (Brookhaven, Fermilab, and Lawrence Berkeley) have reduced their investment in this program to supplying labor only.”

“The 5-year plan presented by the NFMCC appears well targeted given the financial realities. However it leaves no flexibility and it is the judgment of MCOG that an additional \$400K/year would establish a workable context in which to proceed. We note that the MICE experiment, which would provide the critical ionization cooling measurements has now been approved by the Rutherford Appleton Lab (RAL), who has offered to host, and Phase 1 has been approved by their funding agency PPARC. The U.S. is playing a leading role in this effort both intellectually and in terms of component development.”

“In summary, the MCOG accepts and endorses the MUTAC Report attached here and offers the following specific recommendations:

1. MCOG recommends that the U.S. continue its active participation in the MICE Collaboration: this is the most ambitious program for demonstrating a practical implementation of muon cooling in a full experimental context. MCOG recommends that the NFMCC emphasize critical cooling channel technologies in which the U.S. holds unique expertise as our material contribution to the effort.
2. MCOG strongly supports the NFMCC efforts to carry out the high intensity target tests on a liquid mercury target currently approved at CERN.”
3. MCOG recommends strong participation of the NFMCC within the World Design Study which represents the next iteration of the “Feasibility Study “ series conducted within the U.S. over the last several years.
4. MCOG recommends that DOE consider providing additional funding, at a level of \$0.4M or more per year, to provide important flexibility within the program and increased confidence that technical milestones can be met on a reasonable timescale.

In our judgment, the MUTAC did an excellent job of responding to the difficult charge they were provided. We believe that their report, and the MCOG response, represent very helpful advice in setting the future directions of the Collaboration. We would suggest a joint meeting involving the Collaboration, MCOG, and the DOE/HEP Division in the near future could be helpful in resolving issues relating to the future evolution of the Collaboration.

Cc

S. Aronson, MCOG

S. Holmes, MCOG

J. Siegrist, MCOG

H. Edward, MUTAC Chair

M. Zisman, NFMCC Project Manager