U.S. Department of Energy and the National Science Foundation

February 18, 2004

Professor Richard F. Casten
Chairman
DOE/NSF Nuclear Science Advisory Committee
Wright Nuclear Structure Laboratory
Yale University
New Haven, CT 06520

Dear Professor Casten:

The recent 2002 Long Range Plan (LRP) developed by the Nuclear Science Advisory Committee (NSAC) provided a set of recommendations for exploiting opportunities for research both within the United States and elsewhere. Further guidance is requested from the NSAC by the Department of Energy (DOE) at this time beyond these recommendations in the LRP in the area of heavy-ion nuclear physics. Effective use of the Relativistic Heavy Ion Collider (RHIC) and investments in new capabilities and initiatives at RHIC and elsewhere were identified as the means to exploit the potential scientific opportunities of this subprogram. The limitations on the implementation of this guidance, imposed by projected funding, make it timely for an updated assessment of the scientific priorities in this area, especially in light of new results obtained at RHIC. It is important that the available resources are directed to optimize DOE efforts, in coordination with the Nuclear Physics program at the National Science Foundation (NSF), for a strong national research program in this scientific area in the coming decade.

The NSAC is asked to examine current and proposed U.S. efforts in heavy-ion nuclear physics and identify what scientific opportunities should be pursued, in the context of U.S. and international capabilities and available resources, to ensure an optimized national research program. In your examination of these facilities and research activities, please respond to the following questions:

> What scientific opportunities should be addressed and what facility and instrumentation capabilities should be used and developed, including those supported by NSF and outside the United States, in order to maintain a strong scientific program in the coming decade?
>
> What opportunities can be pursued with funding at the FY 2005 Budget Request level ($158.9 million) and an assumed constant level of effort into the out years? What is the appropriate mix of facility operations, research, computer support, investments in instrumentation and accelerator capabilities, and detector and accelerator R&D that will be needed to optimally exploit these opportunities?

What are the priorities of the scientific opportunities that could be pursued with additional funds beyond this constant level of effort?

Your perspective should primarily focus on the 5-year period FY 2006-2010. The impacts and benefits of pursuing these prioritized activities, as well as the impact of not being able to pursue an activity, should be clearly articulated. The resulting plans should be consistent with a set of research milestones recently established for the heavy-ion subprogram and validated by NSAC, unless it can be demonstrated that new information would suggest that these milestones should be amended. We request that an interim report be submitted by July 31, 2004, and a written report responsive to this charge be provided by September 30, 2004.

Thank you very much in advance for your efforts in addressing this important issue.

Sincerely,

Raymond L. Orbach
Director
Office of Science

Michael S. Turner
Assistant Director
Directorate for Mathematical
and Physical Sciences

cc:
Bradley D. Keister, NSF