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

March 4, 2003

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

Dear Professor Casten:

With this letter the National Science Foundation (NSF) and Department of Energy (DOE) request that the Nuclear Science Advisory Committee (NSAC) provide guidance beyond its recommendations in the most recent Long Range Plan with respect to three specific issues of interest to the agencies.

(1) NSAC is asked to do an assessment of how the present NSF and DOE educational investments relevant to nuclear science are being made and to identify key strategies for preparing future generations of nuclear physicists and chemists.

Education of young scientists is integral to any vision of the future of the scientific field and the nation's nuclear-related activities. It is an important responsibility for both agencies. A substantial fraction of the agencies' research funds is used for support of students at the undergraduate and graduate levels and junior scientists at the postdoctoral level. It is important that these investments be made in an optimal way. Your assessment should take into account such factors as: the necessary qualifications and skills of nuclear scientists and their roles in the public and private sectors; the annual number of Ph.D. degrees presently awarded; the number projected as needed in the future to maintain a world-leadership role in fundamental research and also to meet the nation's needs in applied areas such as nuclear medicine and national security; and the present and projected demographics of nuclear scientists, including the participation of women and under-represented minorities.

Your report should document the status and effectiveness of the present educational activities, articulate the projected need for trained nuclear scientists, identify strategies for meeting these needs, and recommend possible improvements or changes in NSF and DOE practices. Your report should also identify ways in which the nuclear science community can leverage its capabilities to address areas of national need regarding K-12 education and public outreach. We request that an interim report be submitted by September 2003 and a written report responsive to this charge be provided by November 2003.

(2) NSAC is asked to review and evaluate current NSF and DOE supported efforts in nuclear theory and identify strategic plans to ensure a strong U.S. nuclear theory program under various funding scenarios.

Among the opportunities and priorities identified in the 2002 NSAC Long Range Plan is an enhanced effort in nuclear theory and a large-scale computing initiative. Further guidance is requested at this time of how available resources might be targeted to ensure that the needed theoretical underpinnings are developed to realize the scientific opportunities identified by the community.

Your report should document your evaluation of the present national program in theoretical nuclear physics and its effectiveness in achieving results in the science areas highlighted in the recent 2002 Long Range Plan. It should identify the scientific needs and compelling opportunities for nuclear theory in the coming decade in the context of the present national nuclear theory effort, and what the priorities should be to meet these needs, including the development of a diverse highly trained technological workforce.

For both the DOE and NSF programs your report should provide advice on an optimum nuclear theory program under funding scenarios of i) a constant level effort at the FY2004 Nuclear Physics Congressional Requests and ii) with the increases recommended in the recent NSAC long range plan. For these funding scenarios the priorities, impacts and benefits of the various activities should be clearly articulated in the framework of a strategic plan. Your assessment should take into account the differences in the programs of the two agencies, as well as the unique roles of university investigators, the DOE national laboratories, and the Institute for Nuclear Theory. We request that an interim report be submitted by September 2003 and a written report responsive to this charge be provided by November 2003.
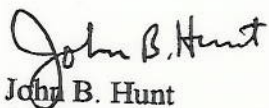
(3) NSAC is requested to review and evaluate the current and proposed scientific capabilities for fundamental nuclear physics with neutrons and make recommendations of priorities consistent with projected resources.

The recent NSAC Long-Range Plan identified and recommended pursuit of promising new initiatives in fundamental physics with neutrons. Further guidance is requested at this time in the implementation of this recommendation. It is important that the available resources are directed to optimize investments by NSF and DOE for a strong national research program in this scientific area for the coming decade.
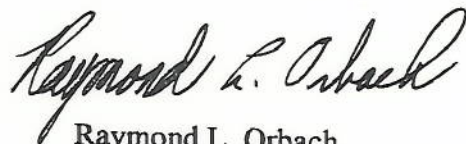
Your report should identify the most compelling scientific opportunities, and the infrastructure and effort required to address them. Your assessment should be placed in the context of scientific efforts and capabilities in the United States and elsewhere. It should establish priorities for these opportunities with constant level of effort at the FY 2004 DOE Nuclear Physics Congressional Request level, and recommend priorities for further investment with additional funds beyond this level. In dealing with the proposed activities at the various funding levels, guidance regarding the appropriate mix of facility operations, research, investments in instrumentation and R&D to optimally exploit these opportunities should be provided. We request that an interim report be submitted by June 1, 2003 and a written report responsive to this charge be provided by September 2003.

Thank you very much in advance for your efforts on these important issues.

Sincerely,

John B. Hunt
Acting Assistant Director
Directorate for Mathematical and Physical Sciences
National Science Foundation

Raymond L. Orbach
Director
Office of Science
Department of Energy