



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



March 14, 2005

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

Dear Professor Casten:

In 2002, the Nuclear Science Advisory Committee (NSAC) completed work on a Long Range Plan for nuclear science for the decade. This plan recommended, with highest priority, the exploitation of the opportunities for scientific discoveries made possible by recent investments – especially at the new facilities, the Relativistic Heavy Ion Collider (RHIC), Continuous Electron Beam Facility (CEBAF) and National Superconducting Cyclotron Laboratory (NSCL). Funding above the FY 2001 constant-effort level (+15%) was identified as needed to effectively utilize the program's facilities and mount strong university and theory programs. In addition, the plan recommended the development of new research capabilities that required funding above this funding level. These included construction of a world-class Rare Isotope Accelerator (RIA) facility, construction of the world's deepest underground laboratory and the upgrade of CEBAF to 12 GeV.

Since the issuance of the Long Range Plan, the resources needed to implement the recommended program have not been identified by the agencies. In the FY 2002-2005 period, funding for the Department of Energy (DOE) Nuclear Physics program has been at a near constant-effort level. The FY 2006 President's Budget Request for Nuclear Physics of \$370.4 million is an 8.4% reduction from FY 2005 Appropriations (\$404.8 million). At this funding level, the Nuclear Physics user facilities will operate at ~65% of optimum operations and there will be a ~10% reduction in the number of researchers and graduate students supported by the program. This funding level, projected into the outyears, is not sufficient to maintain the scope of the present Nuclear Physics program and, in particular, to continue operations of the program's two major facilities, RHIC and CEBAF, as they are presently conducted. The major initiatives recommended in the Long Range Plan, such as RIA, are not accommodated. In light of these projected budgetary stringencies and their implications for the U.S. Nuclear Physics program, the priorities and recommendations of the 2002 Long Range Plan need to be revisited. A strategic plan on how to implement the highest priority science in the context of available funding and world-wide capabilities needs to be developed.

In FY 2005 the DOE Nuclear Physics program has world-leading research efforts in the major areas of nuclear science. NSAC should examine the existing research capabilities and scientific efforts, assess their role and potential for scientific advancements in the context of international efforts and determine the time and resources (the facilities, researchers, R&D and capital investments) needed to achieve the planned programs. NSAC should then identify and evaluate the scientific opportunities and options that can be pursued at different funding levels for mounting a world-class, productive national nuclear science program.

Your report should provide recommendations on the priorities for an optimized DOE nuclear science program over the next five years (FY 2007-2011), under the following scenarios:

- Flat-flat funding at \$370.4 million, actual dollars
- Constant effort funding (starting with \$370.4 million in FY 2006), inflated dollars
- Funding levels needed to restore research capabilities and scientific programs to mount an optimized program and to address the scientific opportunities identified in the 2002 Long Range Plan in order of their priority.

The report should discuss what scientific opportunities will be addressed, and what facilities and instrumentation capabilities will be used and developed by the DOE Nuclear Physics program, including those supported by the National Science Foundation and outside the United States, in mounting a productive, forefront program at each of the funding scenarios. For each funding scenario, the report should articulate what scientific opportunities and capabilities can and cannot be pursued, the impacts on training nuclear scientists, and how major initiatives such as RIA should be viewed.

NSAC should submit the report by the end of June 2005. We are aware that this is a difficult task. However, the involvement and input of the research community is essential for decisions that would restructure the nuclear physics portfolio in times of fiscal constraint. Your report will provide critical guidance as we go forward.

Sincerely,



Raymond L. Orbach  
Director  
Office of Science



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

cc:

Bradley D. Keister, NSF  
Joseph Dehmer, NSF  
Dennis Kovar, DOE