

Appendix A. Charge Letter

November 9, 2000

Professor Richard D. Hazeltine, Chair
Fusion Energy Sciences Advisory Committee
Institute for Fusion Studies, RLM 11.218
University of Texas at Austin
Austin, TX 78712

Dear Professor Hazeltine:

This letter provides a charge to review a specific element of the Office of Fusion Energy Sciences (OFES) program - the theory and computation program. Since the restructuring of the fusion program in 1996, most elements of the program have been reviewed by the Fusion Energy Sciences Advisory Committee (FESAC). The theory and computation program is the only major element remaining to be evaluated. Recent changes in the OFES review processes for the theory and computing program make this an opportune time to review the theory and computing program.

The Fusion Energy Advisory Committee report *A Restructured Fusion Energy Sciences Program* noted that "theory and modeling, in conjunction with experiment, provide the capability at the core of the scientific research endeavor." The recent draft *Assessment of the Department of Energy's Office of Fusion Energy Sciences Program* prepared by a National Academy of Sciences committee recommended that increasing scientific understanding of fusion relevant plasmas should become a central goal of the fusion program. It also recommended that the program should be open to evolution in terms of content and structure as it continues to strengthen its portfolio of research. Because the National Academy of Sciences committee has already provided a detailed review of the scientific quality of the fusion program, FESAC should focus its effort on reviewing the theory and computation program's overall content, plans, structure, and governance.

In reviewing the theory and computing program, I request that the review address at least the following questions:

1. What is the appropriate role of theory and computation in the OFES program? Is the current balance between theory/computing and the rest of the fusion program reasonable?
2. Is the current structure and balance between the elements of the theory/computing program appropriate? What changes, if any, are needed in program content?
3. Several groups and numerous individual investigators at many institutions carry out theory/computing research. Is the distribution of research among these research performers appropriate? Are there structural changes that would make the program stronger?

4. In many areas of physics “modeling/simulation” studies are now viewed as a third discipline, distinct from both experimental and theoretical studies. How effectively are the modeling/simulation and theory communities working together to support the needs of the rest of the fusion program?
5. How should the modeling/simulation efforts be conducted to increase their contribution to the overall program, considering issues such as code proliferation, legacy codes that are expensive to maintain and difficult to upgrade, introduction of modern computational techniques, and formation and functioning of multi-institutional modeling/simulation teams?

In reviewing program governance, FESAC should consider the following topics: planning and goal setting processes, merit review procedures, and coordination of international collaboration. Specific questions FESAC may wish to consider include:

1. Are the current management practices of the program, such as program planning and merit review, sound?
2. Is the role of various organizations in managing certain elements of the program reasonable (e.g., IFS coordination of the Joint Institute for Fusion Theory {with Japan} or PPPL coordination of the Plasma Science Advanced Computing Initiative)?
3. What management changes would strengthen the program?

Please carry out this review using experts outside of FESAC membership as necessary. Complete this evaluation and provide recommendations for the theory and computing program by May 1, 2001, as this advice will be important for supporting the FY 2002 budget.

I appreciate the time and energy that members of FESAC and FESAC panels have provided to these continuing efforts to evaluate and to improve the OFES program. I am confident that the Committee's findings and recommendations on the theory and computation program will also benefit the OFES program.

Sincerely,

Mildred S. Dresselhaus
Director
Office of Science