

October 21, 2004

Professor Richard D. Hazeltine, Chair
Fusion Energy Sciences Advisory Committee
Institute for Fusion Studies, RLM 11.218
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Dear Professor Hazeltine:

Thank you for the Fusion Energy Sciences Advisory Committee report "Fusion in the Era of Burning Plasma Studies: Workforce Planning for 2004 to 2014," which was prepared in response to Dr. Orbach's charge of July 9, 2003 to your Committee. The FESAC Workforce panel, chaired by Professor Edward Thomas, provided an enlightening and thought provoking report. We would like to respond to you on the challenges and recommendations highlighted in that report. Our synthesis of the panel's recommendations is that the main ingredients for developing and maintaining a qualified, sufficiently large workforce are a challenging research program and a healthy, stable budget. We know that fusion provides challenging research opportunities. We will continue to work toward achieving a healthy, stable budget.

A detailed response to the recommendations is enclosed. We welcome further dialogue with FESAC on addressing this critical issue of workforce development.

Sincerely,

(SIGNED)

N. Anne Davies
Associate Director
for Fusion Energy Sciences
Office of Science

Enclosure

OFES Response to Recommendations of the FESAC Panel on Fusion Workforce Development

There were five short-term and two long-term recommendations.

Short-term 1: Perform an expanded, comprehensive assessment of the fusion workforce at the national laboratories with the goal of developing a five to ten year hiring plan.

OFES Response: Our understanding is that $>1/3$ of the current workforce will be age 65 or older by the year 2014. The anticipated retirements will result in a loss of critical expertise. OFES, as part of a yearly staffing survey, can request information to help identify what particular skills will be lost through anticipated retirements. Our ability to influence hiring at a laboratory, where the fusion budget is a small fraction of the lab's overall budget, is small. However, we can work with our laboratory fusion programs to identify new hires needed to replace the lost skills. One of the suggestions under this recommendation was to develop a laboratory "Young Scientist" program. OFES currently participates in the Office of Science/Presidential Early Career Scientist and Engineer Award program. Successful fusion-relevant nominees from DOE laboratories are provided \$50,000/year for five years by OFES.

Short-term 2: Make full use of existing large experiments by including students and faculty from smaller institutions.

OFES Response: While we do have examples of smaller institutions engaged in work with the major facilities, we recognize that this is difficult to get started. To the extent that funds allow, we will encourage the major facilities to create opportunities for researchers and students from smaller institutions. Shared support of sabbaticals by the major facilities would be one approach to establishing the direct personal contact that is necessary for longer term engagement.

Short-term 3: Periodically review graduate and postdoctoral fellowship programs as well as the junior faculty program so that they are competitive and meet current needs.

OFES Response: In keeping with the recommendation to meet current needs, OFES increased the number of graduate (by 20%) and postdoctoral (by 25%) Fellowship awards, beginning with the FY04 awards process. In addition, the panel that reviews the Fellowship applications is routinely asked to evaluate the competitiveness of the OFES Fellowship program as compared with other Fellowship programs at NSF and NIH, with university graduate student stipends, and with university and national laboratory postdoctoral salaries. Based on the higher quality and increased number of applicants for the Fusion Fellowships, we believe that the OFES Fellowship program competes favorably with other Fellowship programs and sources of employment.

It is unlikely that we will increase the duration or value of the junior faculty awards in the near term. Our judgment is that a more critical issue is to find ways to ease the transition from junior faculty grants to full participation in the normal grant process.

Part of this recommendation includes follow up on graduate and postdoctoral Fellows to see if they remain in fusion, and on Junior Faculty Award recipients to learn if they have received tenure and how many students they're training. ORISE, which administers the Fellowship programs for OFES, will be able to assist in gathering data on the students and postdoctoral fellows. The OFES already has data on Junior Faculty who have received tenure and can request data on their students. However, because many of the Junior Faculty Awards are in the area of basic plasma physics rather than fusion, these data will not be as relevant to a fusion-specific workforce.

Short-term 4: Develop programs in coordination with professional societies that enhance the visibility of fusion researchers.

OFES Response: OFES supports several such programs - the APS-DPP Distinguished Lecturer Program and Teachers Day and the Plasma Science Expo at the annual APS-DPP meeting. We can discuss other opportunities with the APS, ANS, and IEEE and determine an appropriate action in response to this suggestion. One aspect that we have discussed with the APS/DPP is to make the Distinguished Lecturer appointment more clearly recognized as an honor.

Short-term 5: Create a national laboratory funded professorship similar to the existing NIF professorship.

OFES Response: This is an intriguing alternative that warrants further study. Such an initiative could combine some of the positive attributes of both the existing junior faculty programs and the university collaborations on the major experiments.

Long-term 1: Support and enhance existing outreach programs at all levels – K-12, undergraduate, and to underrepresented groups.

OFES Response: OFES supports many outreach programs including the one referred to in the report as the "Office of Science teachers program," which is PPPL's Plasma Camp. The organizations that administer the various outreach programs for OFES make every effort to encourage applications from women and underrepresented groups. We have previously considered the feasibility of supporting scholarships such as the Robert A. Ellis Scholarship in Physics and the Katherine Weimer Award for women in plasma science. However, government procurement rules do not allow us to limit research applications by race, gender, or creed. We are instead making every effort to institute research partnerships between established scientists and new fusion researchers from diverse populations.

Long-term 2: Expand support of new, fusion-relevant, university-class experimental, theory, and computational research programs, with a particular emphasis on experimental programs.

OFES Response: It would be difficult, within the current budget constraints, to fully respond to the intent of this suggestion. We do note that it is the purpose of the Junior Faculty Development Program, the NSF/DOE Partnership, the ICC program, and the other OFES Program Solicitations to invite new players to fusion research.

Several years ago we broadened the scope of the Innovative Concepts Solicitations to include experiments targeted at resolving key scientific issues for confining fusion plasma. This scope change was intended to make it easier for smaller scale university programs to play a role in the fusion energy science research effort.

At the end of the “Long term suggestions” section, the panel recommends that OFES encourage and facilitate interactions between fusion researchers and professionals in other fusion-relevant fields and plasma physics disciplines. In response, we expect that the newly formed Fusion Science Centers will be a positive step in this direction.