

**Minutes of the Meeting of the  
Fusion Energy Sciences Advisory Committee**

**July 19, 2005  
Washingtonian Marriott, Gaithersburg, Maryland**

**Committee Members Present:**

Richard D. Hazeltine (Chair) – University of Texas at Austin  
Charles C. Baker – Sandia National Laboratories  
Ricardo Betti – Rochester University  
Jill P. Dahlburg – General Atomics  
Jeffrey P. Freidburg – Massachusetts Institute of Technology  
Martin J. Greenwald – Massachusetts Institute of Technology  
Joseph A. Johnson, III – Florida A&M University  
Rulon Linford – University of California  
Kathryn McCarthy – Idaho National Laboratory  
Gerald A. Navratil – Columbia University  
Ned R. Sauthoff – Princeton Plasma Physics Laboratory  
John Sheffield – University of Tennessee  
Ronald Stambaugh – General Atomics  
Ed Thomas, Jr. – Auburn University

**Committee Members Absent:**

Joseph J. Hoagland – Public Power Institute, Tennessee Valley Authority  
George J. Morales – University of California, Los Angeles  
Cynthia K. Phillips – Princeton Plasma Physics Laboratory

**Ex-Officio Members Present:**

Dr. S. I. Abdel-Khalik  
Dr. John W. Steadman  
Dr. Jill Dahlburg

**Ex-Officio Members Absent:**

**Designated Federal Officer Present:**

N. Anne Davies (Associate Director, Office of Fusion Energy Sciences) – U.S. Department of Energy

Others Present: Raymond Orbach (Director, Office of Science) – U.S. Department of Energy; Office of Science: Marvin Singer, Adam Rosenberg, Al Opdenaker, Shahida Afzal, Tom Vanek, Todd Harding; Michelle Rathbun, TMS; Steve Dean, FPA; Kazuo Fujiki, JAERI Washington Office; Joel Parriott, OMB; Rob Dimeo, NIST; L. Perry, self; Audrey Leath, AIP; James Graber, self; John Willis, retired

**1. Call to Order and Opening Remarks (R. Hazeltine)**

The Chair opened the meeting, welcomed the new member, and introduced the first speaker.

**2. OFES Perspective (A. Davies)**

Dr. A. Davies introduced Adam Rosenberg, new to the OFES staff. She commented that the ITER site was selected June 28<sup>th</sup> in Moscow, and will be in Cadarache, France. The House and Senate have approved their own 06 budget plans and will now go to conference. ITER activities have zoomed since

site selection, with working groups and policy meetings scheduled around the world this Fall (except for the U.S.). India is interested in joining the ITER projects. There are five ITER tasks for the U.S. in 2005. Ray Fonck is the new U.S. Burning Plasma Organization leader (BPO). Dr. Davies then listed current OFES solicitations. Group discussed ITER money and possible changes Congress may make. Several members are frustrated with the government process.

### **3. Report from the Facilities Panel and Discussion (J. Dahlburg)**

Dr. A. Davies was followed by Jill Dahlburg who introduced the panel and described the 70 page report document and 90 page appendix. The panel started with input from the three major facilities (text in appendix), then met at the Naval Research Lab on June 13-17, 2005. Steve Sabbagh spoke on macroscopic, followed by Jim Van Dam on multiscale transport physics. Dennis Whyte spoke to plasma boundary interface. Steve Knowlton spoke to waves and energetic particle research. John Sheffield spoke on fusion energy science and Steve Allen spoke on contributions to the international community. Dr. Dahlburg summarized the panel report that all facilities are unique and valuable and they have added value in collaboration between facilities. Losing only five years of research is losing a big jump in knowledge. If facilities are closed, it would compromise U.S. effectiveness in international projects and limit U.S. leadership.

The FESAC committee then discussed the report findings, including how the panel decided on U.S. leadership, the level of emphasis on energy goals and whether education and training received due consideration. Dr. Baker said the panel did a good job of balancing modesty with showing strengths. FESAC members agreed that the three major tokamak facilities were effectively using their complementary strengths to perform vital research.

### **4. Report on the Status of the Burning Plasma Physics Organization and Discussion (R. Fonck)**

Dr. Hazeltine introduced Ray Fonck to present the new community-based research organization on burning plasma physics, BPO. Burning plasma physics activities are not new, but there is an increased interest in coherence, community ownership and advocacy, and assisting ITER science. Dr. Fonck discussed the BPO group structure and meeting schedule. The committee expressed concern with overlapping groups and suggested that BPO interact with the ITER central team this year.

### **5. Report on the Status of the ITER Program (N. Sauthoff)**

Ned Sauthoff presented the status of the ITER project, where activities are focusing on reducing costs and risks in the areas of research and development design, fabrication and management. R&D work continues on magnets, blanket/shield modules, diagnostics designs, ion cyclotron system, ECH&CD, and test blanket modules. U.S. ITER team is working on management activities including finalizing roles, working on scope, collaborating to save costs, and prioritizing R&D to address key areas of risk. FESAC members asked questions about arriving at cost estimate of 1.22 billion from the lower risk/cost of 1.4 billion. The ITER team is discussing a control room offsite that would allow for remote participation.

### **6. DOE Perspective (R. Orbach)**

Dr. Orbach announced that it was a moving experience when the ITER site was selected and thanked Tom Vanek and Todd Harding for their committee work. The U.S. kept out of the discussions between the E.U. and Japan, but will be involved in the selection of personnel by consensus – each party will have one key person and the central team will move to Cadarache. ITER agreement meetings begin in September and hope the U.S. government agrees on a plan this year. The funding structure is still consistent, but we will need to review cost contingency now that we have site.

The members discussed the tension of money going to 10 year ITER construction in place of current research, although it could be seen as an opportunity to reorient research and the greater goal is more important than a single facility's viability. They said that there should be greater public awareness of fusion research. Closing facilities would save small amounts of money to use for ITER, but have large consequences.

## **7. Public Comments**

The committee next heard public comments by Steve Dean who is concerned that ITER funding will have dire effects on other parts of the U.S. fusion research program. The fusion community should be aware of the severe cuts in recent years; he predicts that one tokamak will be shut down next year and he urged FESAC to make a stand today.

## **8. Preparation of the Letter Transmitting the Facilities Panel Report to DOE**

Dr. Hazeltine then led discussion on FESAC response to the facilities panel report. The four actions include accepting factual changes from members to Jill in next two weeks, making superlatives more modest, saying more about potential foreign contributions, and adding mention of two facilities and energy independence. The members agreed to submit the revised version to Ray Orbach's office.

Dr. Davies thanked Dr. Hazeltine for his leadership as FESAC chair. The meeting was then adjourned at 5:00 p.m.