

# **Minutes of the Meeting of the Fusion Energy Sciences Advisory Committee (FESAC)**

**November 17 and 18, 2003  
Rockville, MD**

## **Committee Members Present:**

Richard D. Hazeltine (Chair) – University of Texas at Austin  
Charles C. Baker (Vice-Chair) – University of California, San Diego  
Ricardo Betti – Rochester University  
Jill P. Dahlburg – Naval Research Laboratory  
Martin J. Greenwald – Massachusetts Institute of Technology  
Joseph A. Johnson, III – Florida A&M University  
Gerald A. Navratil – Columbia University  
Cynthia K. Phillips – Princeton Plasma Physics Laboratory  
John Sheffield – University of Tennessee  
Ned R. Sauthoff – Princeton Plasma Physics Laboratory  
Ronald Stambaugh – General Atomics  
Ed Thomas, Jr. – Auburn University

## **Committee Members Absent:**

Jeffrey P. Freidberg – Massachusetts Institute of Technology  
Joseph J. Hoagland – Public Power Institute, Tennessee Valley Authority  
Rulon Linford – University of California  
Kathryn McCarthy – Idaho National Engineering and Environmental Laboratory  
George J. Morales – University of California, Los Angeles

## **Ex-Officio Members Present:**

Ned R. Sauthoff (Institute of Electrical and Electronics Engineers) – Princeton Plasma Physics Laboratory

## **Ex-Officio Members Absent:**

Michael Mauel (American Physical Society) – Columbia University  
Rene Raffray (American Nuclear Society) – University of California, San Diego  
David Hammer (American Physical Society) – Cornell University

## **Designated Federal Officer Present:**

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

## **Others Present:**

Patrick Looney (Office of Science and Technology Policy)  
John Ahearne (Sigma Xi)

## **Monday, November 17, 2003**

### **1. Call to Order**

The chair, Richard Hazeltine, called the meeting to order at 9:00 a.m. on Monday, November 17, 2003.

### **2. Memorial to Marshall Rosenbluth**

FESAC shared remembrances of Marshall Rosenbluth and noted gratefully the importance of his contributions to the committee and to the fusion program in general. Members recounted incidents illustrating Marshall's wit and thoughtfulness.

### **3. Office of Fusion Energy Sciences Update**

Anne Davies presented an update on the fusion energy sciences program. After describing the budget increases in the final appropriations bill, Davies reported on the release of DOE's Facilities report. The report can be found at [http://www.sc.doe.gov/Sub/Facilities\\_for\\_future/facilities\\_future.htm](http://www.sc.doe.gov/Sub/Facilities_for_future/facilities_future.htm). Davies reviewed the report of the NRC's Burning Plasma Assessment Panel. She stated that the panel's interim report last year was a key element in the US decision to rejoin the ITER negotiations.

### **4. Perspective of the Office of Science and Technology Policy (Patrick Looney)**

Patrick Looney, Assistant Director for Physical Sciences and Engineering at OSTP, presented the OSTP perspective on recent developments in the fusion program. He praised the NRC report and stressed the importance of the charge on program priorities. He cautioned the committee to avoid taking positions that may be perceived by the administration as a refusal to set priorities, and stated his opinion that an excessive emphasis on program balance engendered such negative perceptions. He also advised the committee against recommending budget scenarios, and encouraged it to conduct its work on program priorities at a deliberate pace.

### **5. Presentation of the NRC Report "Burning plasma - bringing a Star to Earth"**

John Ahearne, co-chair of NRC panel on burning plasma, presented that panel's report. He explained that the panel decided it was important to describe ITER as "the top priority" of the program rather than "a top priority," as the latter description would have carried little force. In response to questions by Navratil concerning the report's criticism of the separation of the program into a base program and a burning plasma program, Ahearne explained that the separation implies a desire for dichotomy that he finds unhelpful.

### **6. Discussion of Response to NRC Report.**

FESAC next discussed the report from the National Research Council (NRC) on the need and context for a burning plasma experiment. All FESAC members agreed with the principal conclusions of the NRC report, which recommends participation in ITER by the US fusion program. In the letter to Ray Orbach expressing this agreement, FESAC explicitly echoed the NRC statement that ITER should be the top priority of the program.

### **7. General Public Comments**

Steve Dean (FPA) expressed his opinion that the NRC Panel overstepped its charter in recommending that ITER be given the highest priority. He pointed out that the panel's purview did not include many elements of the program such as inertial fusion or innovative concepts. Dean recommended that FESAC withhold approval of the panel's report until other elements in the program were appropriately weighed. He argued that the NRC recommendation made the program vulnerable to a failure of the ITER process.

Rob Goldston (PPPL) commented that the task of the FESAC "science campaigns" panel is difficult. The panel must build on the past, and it must describe and explain a "science program with an energy goal" to the administration and congress. Lastly, it must motivate the broader community to view the fusion community as one that asks deep scientific questions. Successful completion of this program requires that the community be deeply involved.

Adil Hassam (UFA) underlined the NRC's conclusion that the success of the fusion program can be attributed to its science-centered approach. He encouraged the FESAC panel to articulate the key science issues facing the fusion program.

Aladar Stolmar informed the committee of the transmutation events observed at Proton-21 in Kiev, Ukraine, and about the possibility that these were fusion events.

Paul Terry (U. Wisconsin), representing the Transport Task Force (TTF), issued a call for a new initiative with dedicated funding aimed at solving the problem of electron transport.

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### **8. Report on organization and priorities panel**

Charles Baker presented the membership list for the priorities panel and discussed the balance between the various constituencies represented. He told FESAC that the panel intends to meet at different places around the country and to produce first results by June-July. Baker said he has asked panel members Stambaugh and Hawryluk to collect preliminary ideas. In response to questions Baker expressed his view that the priorities panel should regard the ITER priority question as open.

The chair adjourned the meeting at 5:30 p.m.

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**Tuesday, November 18, 2003**

The chair reconvened the meeting at 9:00 a.m. on Tuesday, November 18.

**9. Report from the IFE Review Panel (Dahlburg)**

Jill Dahlburg reported that her panel has addressed a list of topics including the current status of the IFE program, the critical scientific issues, the impact of fast ignition, the contribution of IFE to high energy density physics. The panel met recently at the meeting of the Division of Plasma Physics of the American Physical Society.

**10. Report from the Committee on Manpower (E. Thomas, Auburn)**

Ed Thomas reported on the progress of the committee on manpower. He said that one of the surprising findings of the committee is that the universities having recently hired fusion faculty were generally other than the major fusion centers. The manpower committee found that about 50% of PhDs are retained in the program. Inspection of the age profile suggests that the program will face manpower difficulties when the scientists forming the population peaks reach the age of retirement. The report was followed by a vigorous discussion of the manpower committee's conclusions.

**11. Report from the Committee of Visitors (W. Nevins, LLNL)**

Bill Nevins reported that the committee of visitors had faced a delicate task, this being the first review of its kind for the program. He said that the committee found the OFES's effectiveness in processing the high volume of proposal to be impressive. His committee's preliminary conclusion is that the funding decisions displayed a high degree of consistency with the recommendations of the reviewers. The committee also endorsed the Office's handling of cases where the reviewers were at odds.

The chair adjourned the meeting at 11:30 a.m.

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**APPENDIX: Guest List**

Curtis Bolton—DOE/OFES  
Michael Crisp—DOE/OFES (DOE/SC-55)  
Rostom Dagazian—DOE/OFES  
Steve Dean—FPA  
John Clsrke—PWNL  
Bill Nevins—LNNL  
T.V. George—DOE/OFES  
Rob Goldston—PPPL  
Richard Hawryluk—PPPL  
Ron McKnight—DOE/OFES  
Dale Meade—PPPL  
Erol Oktay—DOE/OFES  
Albert Opdenaker—DOE/OFES  
Don Priester—DOE  
John Sauter—DOE/OFES  
John Willis—DOE/OFES  
Miklos Porkolab—MIT  
Grant Logan—Berkeley  
Arnold Kritz—DOE/OFES  
Ken Tomabecki—self  
Michael Roberts—DOE/OFES  
David Jones—Inside Energy  
Warren Martin—DOE/OFES  
Darlene Markerick—DOE  
James Van Dam—IFS/U. Texas  
Frances Thio—DOE/OFES  
Earl Marmar—MIT  
John Lindl—LLNL