Minutes of the Meeting of the
Fusion Energy Sciences Advisory Committee

July 31-August 1, 2003
Washingtonian Marriott, Gaithersburg, Maryland

Committee Members Present:
Richard D. Hazeltine (Chair) – University of Texas at Austin
Charles C. Baker-University of California, San Diego
Ricardo Betti – Rochester University
Jill P. Dahlburg – General Atomics
Jeffrey P. Freidburg – Massachusetts Institute of Technology
Martin J. Greenwald – 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
Gerald A. Navratil – Columbia University
Cynthia K. Phillips – Princeton Plasma Physics Laboratory
Ned R. Sauthoff – Princeton Plasma Physics Laboratory
John Sheffield – Oak Ridge National Laboratory/University of Tennessee
Ronald Stambaugh – General Atomics
Ed Thomas, Jr. – Auburn University

Committee Members Absent:
Joseph A. Johnson, III – Florida A&M University
Marshall Rosenbluth – General Atomics

Ex-Officio Members Present:
Rene Raffray (American Nuclear Society) – University of California, San Diego
Ned R. Sauthoff (Institute of Electrical and Electronics Engineers) – Princeton Plasma Physics Laboratory

Ex-Officio Members Absent:
Michael Mauel – American Physical Society

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. Dept. of Energy

1. Call to Order and Opening Remarks

The Chair opened the meeting at 9:00 AM, introduced two new members, Rene Raffray from American Nuclear Society, and Ronald Stambaugh from General Atomics, and introduced the first speaker.

2. OFES Perspective (A. Davies)

Dr. A. Davies presented an update on 2004 budget status. The 20 year facility plan is not ready to be released. Dr. R. Orbach led the senior U.S. delegation to ITER negotiations. The U.S. working level group came back from Tokyo last night. All are invited to next meeting in Holland in September; contact N. Sauthoff or C. Baker to become involved. There is a vacancy in OFES with R. McKnight's retirement

last month, and we have restructured because of ITER progress. National Research Council's two recent reports are important to the program; expect they will lead to developing a roadmap for high density physics with NASA and NSF. New PART rating tool – we use to grade ourselves and then OMB rates us and it affects budget. Internal milestone system on quarterly report basis to Deputy Secretary, OFES recently had caution rating that affected Office of Science's rating. Dr. A. Davies introduced the three new FESAC charges. Questions to Dr. A. Davies focused on the process for committee of visitors and PART assessment. Dr. A. Davies introduced Dr. Peter Rosen, the new science advisor to Dr. R. Orbach (previously director of high energy physics). Chairman Hazeltine introduced a 5-minute movie that was created to show legislators what the Office of Science does.

3. Report from the Non-Electric Applications Panel (K. McCarthy)

Dr. A. Davies was followed by Kathryn McCarthy who reviewed the FESAC charge, list of panel members, process, and evaluation criteria. The panel took a broader view of the charge, because there were few that met the needs of the charge. Four categories discussed in detail were near-term applications, transmutation, hydrogen production and space propulsion.

4. Discussion

The committee then discussed Dr. K. McCarthy's presentation, and suggested changes that will be later reviewed by the committee. Chairman Hazeltine listed leaders of current charge panels – workforce panel XX with Hazeltine; R. Linford chair of IFE with assistance of J. Dahlburg and R. Betti. Chairman Hazeltine read the draft letter and committee discussed the language. G. Navratil agreed that the right way to balance the letter was to highlight the quote from the report about prioritization. Dr. A. Davies added that production of hydrogen is one of the fusion goals. Committee agreed to rewrite sentence and show again to the committee later in the day.

5. IFE/Fast Ignition/HEDP (M. Campbell)

M. Campbell presented on Fast Ignition-High Intensity, that is attractive because higher gains at lower energies, as well as more flexibility in compression, brightness, and tolerances. FI is one of the applications of ultra-fast ultra-intense lasers. Interest in HEDP and applications is growing outside of the fusion community and short pulse lasers are proliferating around the world. The photons, electrons, and ions from UUL can be used to heat and diagnose HEDP plasmas. FI may allow longer wavelength laser implosion systems, which improves efficiency and reduces aperture damage. The OFES Concept Exploration activity in FI has been successful. Old lasers can be rededicated to new purpose instead of going offline. He recommends that the U.S. should work with Japan's experience.

6. Burning Plasma Physics Program (N. Sauthoff)

Dr. N. Sauthoff, the U.S. coordinator, next outlined the timeframe for the Burning Plasma Program, ITER, and FIRE. The plan is to continue ITER and FIRE, assess ITER in July 2004, and then start burning plasma research operations. He presented the four areas of major FIRE activities and there will be a FIRE validation review in the Fall. The current schedule for ITER is to begin construction in 2006 and complete in 2014. Dr. N. Sauthoff discussed the main issues for the ITER working groups, the tasks for the U.S., and ITER-related activities.

7. Report from the Burning Plasma PAC (S. Prager)

S. Prager, chair of the planning committee, reported on the BPPAC task to prioritize considerations. Activities to date include identifying interest in procurement packages, ranking six criteria for interests

and plans to assess management structures. Criteria were U.S. research positioning (high), ITER-value per dollar (high), relative strength or leverage of U.S. contribution to ITER (high/medium), contribution to U.S. fusion program (medium), enhancement of fusion-relevant capacity of U.S. industry (medium/low), and development of U.S. fusion workforce (low). S. Prager reviewed the feedback, which will be considered and re-circulated to a larger community.

8. Solicitation for Fusion Science Centers (J. Willis)

J. Willis then presented the plan for solicitations for Fusion Science Centers. Letters of intent are due October 15, applications are due December 1, and awards will be announced in May 2004. Committee suggested to add that collaboration can be intra or inter institutions, emphasis is on reaching out beyond fusion community, and will not be limited to existing strong fusion universities.

9. Public Comments

The committee next heard public comments by Dr. A. Hassam, who presented a report on ages of fusion science faculty. Dr. M. Porkolab added that it is a challenge to hire quality professors, and his experience shows that space propulsion is a promising use for fusion. Chairman Hazeltine agreed to circulate the BBPAC plan to the committee, and then showed the non-electric letter revisions. Committee discussed the changes to the letter, agreed, and will be sent when report is revised.

SECOND DAY

10. DOE Perspective (R. Orbach)

Chair reconvened meeting at 9:00 AM and introduced Dr. Raymond Orbach. Dr. R. Orbach then discussed the progress of ITER negotiations. The EU should decide on a site on September 23, the second principals will meet in October to decide the location and budget, and the rest of the protocol will be worked out by January. ITER is important because it is the first large-scale truly international science project with real money. Should ITER not succeed, it will impact more than fusion energy, including Linear accelerator discussions. Dr. Orbach went through the current FESAC charges on workforce development, inertial fusion, and Program Assessment Rating Tool (PART). Questions to Dr. R. Orbach focused on PART, tendency for metrics to make program risk-averse, Senate support for ITER and fusion, and international research.

11. OSTP Perspective (P. Looney)

P. Looney is the Assistant Director for Physical Science and Engineering at OSTP. The intergovernmental policy council is National Science and Technology Council (NSTC). Recent hot areas have been: homeland and national security, and space and aero (after shuttle disaster). Priorities for FY05 are security, nanotech, IT R&D, molecular level life understanding of processes (non-medical), environment and energy. Physical sciences coverage includes aspects of DOE, NASA, NSF, Commerce, and Smithsonian. Issues are facility-driven, with a never ending list of potential facilities, as well as a large number of existing facilities. There is a growing environment for large-scale science program investments and trends indicate need for policy to decide priorities among all the options so can maximize return on large existing investment base of facilities. The danger is saturating the budget with low priority, redundant and or uncoordinated activities. NSTC IWG on the physics of the universe released Quarks to the Cosmos report. Looney discussed the prioritization of recommendations and its steps. IWG's report recommends that ITER is the highest priority for the FES program.

12. Discussion of Program Targets and Indicators (R. Hazeltine)

The committee discussed metrics of projects including leadership, quality and relevance and expert review are the important aspects; expert review is not annual but every 3-5 years. The decision maker is Joel (OMB) and he decides what counts. Joel added that the NSF green rating was based on metrics that will need to be changed. Dr. A. Davies walked through the process of the plan to date and additions to targets and indicators since version sent to FESAC members. OFES need plans by end of August to meet budget and OMB deadlines. OMB found original targets as too defined, and only understood by those in our circle. Committee then clarified the terms goal and measure. C. Baker, vice chair, led the discussion of the text and J. Willis documented the changes. Committee agreed to language and will leave cover letter to chairman. The meeting was then adjourned.