

8 April 1999

Dr. John Stringer  
EPRI  
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Palo Alto CA 94304

Dear John,

The Basic Energy Sciences Advisory Committee has been asked by Dr. Martha Krebs to help in assessing the scientific impact of and the Nation's need for the electron beam microcharacterization centers operated by the Basic Energy Sciences program. To this end she has asked us to assemble an expert balanced panel to present a report to BESAC at its summer meeting in 1999, and I am delighted that you have accepted the task of convening and chairing it.

The four centers to be considered in this review are the Electron Microscopy Center for Materials Research at Argonne National Laboratory; the National Center for Electron Microscopy at Lawrence Berkeley National Laboratory; the Center for Microanalysis of Materials at the University of Illinois Frederick Seitz Materials Research Laboratory; and the Shared Research Equipment Program at Oak Ridge National Laboratory. As part of the panel's work, it would be desirable to visit each of the four centers, and meet with the members of the management, staff, and user communities. Prior to those visits, it would be desirable to convene a meeting at which each of the centers could present an overview of their individual contributions to the panel.

We would specifically like the panel to address the following issues and questions:

1. What has been the scientific and technological impact of the microcharacterization centers during the past decade, and what is it expected to be during the coming decade? In particular, what scientific studies are enabled by the centers that could not otherwise be done?
2. What are the user groups served by each of the centers? How do they differ? What is the user demand at each of the centers, and how is it expected to change?
3. What special needs do each of the centers serve, and how do the centers complement one another?
4. What is the vision of each center? Are the visions appropriate? How do the visions complement one another? Is there anything missing in the set of visions for the future?
5. How does the use of electron beams for characterizing materials complement the use of photons and neutrons?
6. What are the opportunities for improving the techniques to maintain the facilities at the forefront?

The centers differ from Basic Energy Sciences major user facilities such as the synchrotron radiation light sources or the neutron sources in that they do not have distinct

“operating budgets”; they are supported as part the Materials Science Division research budget. Furthermore, each of them can be regarded as a suite of instruments aimed at using electron beams to characterize materials with high resolution, both structurally and chemically. The fifth charge above addresses the ways in which the information that can be developed using electron beam instruments complements that that can be derived using the photon or neutron beams available at the major user facilities.

The electron beam microcharacterization centers have a large user base, and the combination of their suites of leading-edge instruments and the highly-talented scientific staff available to the users makes them of considerable value to the study of the structure and behavior of materials. Recent improvements in techniques, and in particular the ability to characterize materials at a resolution approaching 0.1 nm, can be expected to increase this value still further in the near future. In this context, it is important that your panel assesses the degree to which the user community at each center is being served.

The differences in the aims and objectives of these four centers are probably greater than is the case for the four synchrotron light centers, for example; and I suggest that your panel take this into account in your assessment.

It is probably best for your panel to be balanced between members familiar with the electron beam microcharacterization techniques and members familiar with the scientific areas that the centers support or enable.

Once again, I am grateful for your help, and I look forward to your panel’s report.

Sincerely,

/s/ by

Geraldine Richmond

Chair, Basic Energy Sciences Advisory Committee