



Department of Energy

Washington, DC 20585

December 18, 2002

Dr. Margaret Wright
Computer Science Department
Courant Institute of Mathematical Sciences
New York University
251 Mercer Street
New York, NY 10012

Dear Dr. Wright:

For more than a half-century the Department of Energy's Office of Science has envisioned, designed, constructed and operated many of the premiere scientific research facilities in the world. More than 17,000 researchers and their students from universities, other government agencies, private industry and from abroad use Office of Science facilities each year—and this number is growing. For example, the light sources built and operated by DOE now serve more than three times the total number of users, and twenty times as many users from the life sciences, as they did in 1990.

Creating these facilities for the benefit of science is at the core of our mission and is part of our unique contribution to our Nation's scientific strength. It is important that we continue to do what we do best: build facilities that create institutional capacity for strengthening multidisciplinary science, provide world class research tools that attract the best minds, create new capabilities for exploring the frontiers of the natural and physical sciences, and stimulate scientific discovery through computer simulation of complex systems.

To this end, I am asking all the Office of Science's advisory committees to join me in taking a new look at our scientific horizon, and to discuss with me what new or upgraded facilities will best serve our purposes over a timeframe of the next twenty years. More specifically, I charge the committees to establish a subcommittee to:

- A. Consider what new or upgraded facilities in your discipline will be necessary to position the Office of Advanced Scientific Computing Research at the forefront of scientific discovery. Please start by reviewing the attached list of facilities, assembled by Dr. Edward Oliver and his team, subtracting or adding as you feel appropriate, with prudence as to cost and timeframe. For this exercise please consider only facilities/upgrades requiring a minimum investment of \$50 million.



B. Provide me with a report that discusses each of these facilities in terms of two criteria:

1. The *importance of the science* that the facility would support. Please consider, for example: the extent to which the proposed facility would answer the most important scientific questions; whether there are other ways or other facilities that would be able to answer these questions; whether the facility would contribute to many or few areas of research; whether construction of the facility will create new synergies within a field or among fields of research; and what level of demand exists within the scientific community for the facility. In your report please categorize the facilities in three tiers, such as "absolutely central," "important," and "don't know enough yet," according to the potential importance of their contribution. Please do not rank order the facilities.
2. The *readiness* of the facility for construction. Please think about questions such as: whether the concept of the facility has been formally studied in any way; the level of confidence that the technical challenges involved in building the facility can be met; the sufficiency of R&D performed to-date to assure technical feasibility of the facility; and the extent to which the cost to build and operate the facility is understood. Group the facilities into three tiers according to their readiness, using categories such as "ready to initiate construction," "significant scientific/engineering challenges to resolve before initiating construction," and "mission and technical requirements not yet fully defined."

Many additional criteria, such as expected funding levels, are important when considering a possible portfolio of future facilities, however for the moment I ask that you focus your thoughts on the two criteria discussed above.

I look forward to hearing your findings and discussing these with you in the future. I would appreciate at least a preliminary report by March, 2003.

Sincerely,



Dr. Raymond L. Orbach
Director
Office of Science