

Noting a host of uncertainties, it recommends that NASA establish a review team of experts to see if the proposed system is technically and economically practicable.

The panel also turned a critical eye on NASA itself, suggesting that in EOS the agency has taken on more than it can handle. It strongly urged that NASA reach out to other federal agencies, pointing out that the Department of Defense, for example, has

expertise in technologies such as optics that makes it a logical partner in EOS.

All of which has cheered many global change scientists. But Washington, among others, is concerned that even if NASA acts on all the panel's suggestions, EOS may still be too big for many researchers to stomach. "I think there is still going to be a problem" drumming up support for it in the scientific community, he says. "One thing we couldn't

do was bring down the cost dramatically. A lot of investigators will think it's still too much. But the scientific community needs to understand that we have to have a comprehensive program to monitor this planet." Washington says the cost of such a program—\$1 billion a year into the next millennium—is the sort of bigness that scientists studying global change will just have to get used to. ■ **RICHARD A. KERR**

## Allocating the Pain in Energy Science

If you were looking for happy faces last week, room 1E-245 in the Department of Energy (DOE) wasn't the place to find them. A panel of physicists, assembled to help DOE's Office of Energy Research (OER) set its research priorities, looked increasingly dismayed as it realized there just isn't enough money to pay for the nine major facilities that DOE hopes to build in the next decade. Panel members issued dire warnings that the United States is underfunding basic research and imperiling its scientific infrastructure, lamented the "vast amount" of "promising" work that can't be funded, and shot jealous, sidelong glances at the huge budget of the Superconducting Super Collider (SSC). But in the end, they bit the bullet and told DOE to downsize plans for the next big fusion machine and put off two major high-energy physics projects.

For nearly a year, the handwriting has been on the wall for the OER budget, which is being squeezed between expensive commitments to long-term projects such as the SSC and other DOE priorities, such as cleanup of the nuclear weapons complex. To cope with this onrushing disaster, newly sworn-in OER director William Happer, Jr. followed a time-honored precedent and convened a 15-member panel of eminent academic, industrial, and federal scientists from the research fields supported by DOE. This panel, chaired by Nobel Prize-winner Charles Townes, was told to set priorities under the assumption that budgets in the four programs funded by OER—high-energy physics, nuclear physics, magnetic fusion, and basic energy sciences—would remain essentially flat. Energy Secretary James Watkins insulated the SSC from this process and told the panel only to set priorities, not to suggest project modifications or stretched-out construction schedules.

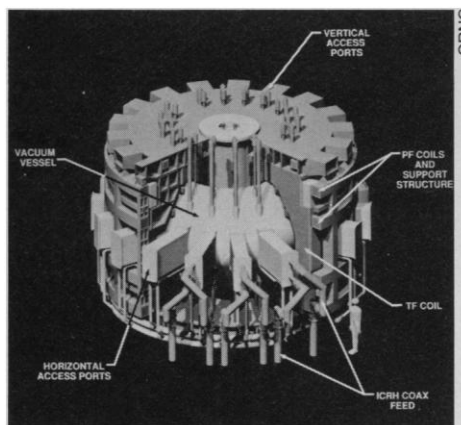
Forced to look elsewhere for savings, the panel set its sights on the Burning Plasma Experiment (BPX), the first major U.S. fusion facility proposed since Princeton's Tokamak Fusion Test Reactor was completed in 1982. Touted last year as a \$1-billion reactor capable of producing at least five times as much energy as it consumes, BPX is the "major issue" for the U.S. magnetic fusion program, said Anne Davies, OER's associate director for fusion energy. But the major issue for the advisory committee was the fact that BPX construction—now estimated at \$1.9 billion—would double the magnetic fusion energy budget by 1996. To prevent that from happening, the committee accepted a plan proposed by panel member Marshall Rosenbluth, a fusion researcher from the University of California at San Diego, to

cancel funding for BPX and consider a smaller, yet-to-be-specified burning plasma experiment instead. The panel also endorsed full funding of U.S. participation in the International Thermonuclear Experimental Reactor (ITER), now a \$1-billion, four-nation program to design a working fusion reactor.

Turning next to the high-energy physics program, the committee agreed to recommend "deferring" funding for two new initiatives: a \$181-million main injector for Fermilab's Tevatron accelerator, and a \$200-million "B factory" proposed by the Stanford Linear Accelerator Laboratory. The idea, says panel member Herman Feshbach, an MIT physicist, is to withhold funding for these projects until DOE's High Energy Physics Advisory Panel (HEPAP) ranks them against the base program. Fermilab may not fare well in that competition. A DOE official who asked not to be named says only: "Certain people were talking about ranking the main injector against the B factory, and they're not certain the main injector would go forward."

The nuclear physics and basic energy sciences program fared somewhat better in the panel's deliberations. Neither program would lose a major facility, although the panel recommended a "go-slow" approach to the Advanced Neutron Source, a \$1.15-billion nuclear structure laboratory still under design. Two other big machines—the Continuous Electron Beam Accelerator Facility (CEBAF) and the Advanced Photon Source—got votes of confidence from the panel. The only potential loser was the \$397-million Relativistic Heavy Ion Collider now under construction at Brookhaven National Laboratory. Without making a clear recommendation, the panel suggested kicking the issue back down to the Nuclear Science Advisory Committee (NSAC), which could weigh full funding of the machine against the severe cuts in the nuclear physics base program that would be necessary to accommodate it.

Although most panel members complained about the difficulty of setting a 5-year course for DOE science programs in a 2-day session, none disputed the need for the exercise. "Before, people in various groups would propose facilities, and the political process would determine which ones got funded," says panel member William Brinkman, an executive research director at Bell Labs. "We have tended to start too many things and then not deliver on them." Happer has already shown that he might be thinking along similar lines: He has asked the panel to remain intact for further consultation. ■ **DAVID P. HAMILTON**



**Candidate for downsizing.** *The BPX.*