state & society

Congressmen Conlan and Bauman attack NSF peer review

The battle lines were drawn in the Congressional hearing room: Congressmen John Conlan (R-Ariz.) and Robert Bauman (R.-Md.) were challenging the National Science Foundation's secrecy and the effectiveness of its peer-review system, and NSF's top management, including director H. Guyford Stever were defending a grant review procedure that they feel is working well.

The July hearings on NSF peer review before the House Subcommittee on Science, Research and Technology (headed by James Symington, D-Mo.) were called for several reasons. First, the NSF authorization bill for FY 1976 was tied up in House–Senate conference, with the House version having an amendment (introduced by Bauman) that would allow Congressional veto of NSF grants. The amendment grew out of increasing concern over the possibility of wasteful federal spending—several NSF grants have been labeled irrelevant and subjected to ridicule, particularly several in the social sciences. Second, peer-review documents have been closed to outside scrutiny, and in the interest of open government, the Subcommittee wished to examine whether NSF should open up its procedures, and if so, how much.

CONLAN

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Conlan sparked the drive to open the peer-review process in his opening-day testimony. He noted, "... under NSF's current management practices, they have a completely arbitrary system that is closed and unaccountable to the scientific community and to the Congress ... Their selection of peer reviewers is not subject to *any* review." His proposal: to open up the system entirely. "This means that the reviews [verbatim] and reviewer's names must be available to principal investigators [grant applicants] and to the Congress," he said.

Until recently, it was NSF policy not to release the names of reviewers to anyone outside NSF and to provide only paraphrases of reviews on request to the grant applicant as justification for the Foundation's decision. NSF officials felt that reviews solicited under an implied promise of confidentiality would be more candid and therefore more useful. Only paraphrases were supplied because, it was felt, a grant applicant might be able to figure out who wrote a given review by its style alone. In recognition of the possible abuse of paraphrased reviews, however, the National Science Board (which sets the policy for NSF) issued new guidelines in June: The grant applicant will be able

continued on page 78

ERDA's national energy plan sets priorities

The Energy Research and Development Administration has put forth a national energy plan in which coal, nuclear power, conservation and enhanced oil and gas recovery figure prominently among short-term objectives. The agency has also asked the Administration for an additional $131 million in energy R&D money to provide an extra boost to those technologies it feels are most important. At present, ERDA says, more than 75% of US energy use is based on the limited resources of oil and gas; a move toward more abundant energy sources is urgently needed.

The plan appears as volume one of *A National Plan for Energy Research, Development and Demonstration* (volume two, to be released, will contain information on program implementation) and contains an energy blueprint for three periods in the future: the short term (until the early 1980's), the middle term (early 1980's to 2000) and the long term (after 2000).

To make the plan work, ERDA perceives the need for five major changes in the nature and scope of the research, development and demonstration program. There should be

- Emphasis on overcoming technical problems that have inhibited the development of coal and light-water reactors as major energy sources.
- an immediate focus on energy conservation, the primary targets being automobiles, buildings and industrial processes.
- an acceleration of the commercial capability to extract gaseous and liquid fuels from coal and shale. This is a priority item for the middle term and beyond.
- an inclusion of the solar-electric approach among the "inexhaustible" resource technologies to be given high priority, especially for the long term.
- increased attention to underused new technologies that can be rapidly developed—solar heating and cooling, and geothermal power. This is another avenue to relieve middle term shortages.

Along with solar-electric energy for the long term, the plan gives highest

priority to breeder reactors and fusion as nearly unlimited energy sources. The use of breeder reactors alone, ERDA estimates, would provide energy for 1780 years at the rate used in 1974. This compares with 164 years for coal, 15 years for domestic oil and 14 years for domestic gas (even with advanced recovery for oil and gas). Fusion and solar energy reservoirs are essentially unlimited. However, ERDA notes, "Concentration on only one or a few technological avenues is not likely to solve the energy problems ... All the national energy technology goals must be pursued together."

Energy amendment. The addition of $131 million to the ERDA energy R&D budget brings the total, including the original Presidential request to nearly $2 billion. The most generous increases have been requested for R&D in advanced-energy systems (up 83% to a total of $44 million) and conservation (78% more for a $73 million total). Both solar ($89 million) and geothermal energy ($32 million) R&D requests are about one-third higher than in the original ERDA budget. The fission-reactor program, on the other hand, has been reduced by $54 million, largely because of delays in the liquid-metal fast breeder-reactor program. The nuclear-fuel-cycle research request, however, is up by $42 million.

ERDA notes that this plan represents a first step in a continuing effort to map future strategies. The legislation that established the agency, in fact, requires periodic updates of the energy blueprint; the first is due in January 1976. Public comment will be included in future publications.

Although volume one of *A National Plan for Energy Research, Development and Demonstration* (ERDA-48) may no longer be available (try the Office for Planning and Analysis, ERDA, Washington, D.C. 20545), volume two (Implementation) will be available from the ERDA Technical Information Center, Box 62, Oak Ridge, Tenn. 37830. —RAS

Net R&D funding will decline 3% in 1975

Even with expected budget increases, research and development spending for 1975 (in constant dollars) is projected to be down from 1974 levels. So says the National Science Foundation in their report, *National Patterns of R&D Resources, Funds and Manpower in the United States 1953–1975.* R&D spending is likely to be close to $34.3 billion in 1975, a 7% current value increase over 1974, but this represents a 3% decline in purchasing power.

Basic research is projected to climb an estimated 2% between 1974 and 1975 and applied research and development are expected to grow 7% and 8%, respectively. But the constant-dollar value will actually decrease in each of the areas, the most drastic drop being 8% for basic research.

The Federal government will spend an estimated $18.2 billion for all R&D in 1975 (53% of the total), a 7% increase over 1974. Industry R&D funding in 1975 is expected to total close to $15 billion, also a 7% increase over 1974. Basic research, representing only 12% of R&D spending, is performed mostly by colleges, universities and Federally Funded Research and Development Centers; over half of applied research (55%) is done by industry. Applied research in all sectors is expected to reach $8 billion in 1975.

Employment of R&D scientists and engineers has risen at an average annual rate of 4.1% for the last 20 years, resulting in 528 000 full-time equivalent professionals in 1974, a 1% increase from 1973. This is the second straight year of increased employment after three years of decline that started in 1969. Seventy percent of these professionals worked for private industrial firms, which in January 1974 accounted for 363 100 scientists and engineers.

IAEA advises on peaceful nuclear-explosion benefits

An intergovernmental advisory group on nuclear explosions for peaceful purposes has been established by the board of governors of the International Atomic Energy Agency. The group will help non-nuclear weapon states to realize the benefits of nuclear explosions. IAEA has had this technology under review since 1968 and has developed procedures to expedite the use of nuclear energy.

Membership on the intergovernmental advisory group is open to any IAEA member state.

Practical applications of space systems urged

Large sums of money have been spent on space technology, and the National Research Council feels that the formation of a national space applications council is important to encourage future applications here on Earth. Specifically, the proposed council would operate as an interagency group with representatives from state and local governments, and advise the President and the Congress. It would serve to direct policies affecting non-military space applications, set priorities for meeting user needs, provide for exchanges between users and providers of space technology, and encourage non-federal investment in the application of space systems.

The recommendations are included in a NASA funded study, *Practical Applications of Space Systems,* which has just been released by NRC. It addresses its recommendations to federal agencies, Congress and private industry.

It is estimated that $250 million may be spent during the next ten years to collect land-use information (weather, mining, water resources) in the US. Aircraft and satellites might provide much of the information faster and more cheaply.

Copies of the report are available without charge from the Space Applications Board, National Research Council, 2101 Constitution Ave, N.W., Washington, D.C. 20418.

NSF peer review

continued from page 77

to request the verbatim reviews of his proposal for those reviews solicited by NSF after 1 January 1976. A second NSB directive will require the Foundation to publish by division the names of all reviewers used each year.

These new guidelines do not go as far as Conlan would like. He notes that no one outside NSF could check who wrote which review and whether there is an unusual relationship among any grant seeker, reviewer or NSF employee. He also noted that several NSF reviewers he has managed to contact were *not* under the impression that their reviews were confidential.

NSF view. Stever is certainly not one to underestimate the problems of a system that, in 1974, took action on 21 000 proposals, involving 117 000 reviews. "None of us claim total perfection in the process." However, he continued, "Our review [of the peer-review process] has given us considerable confidence in the system that is presently being employed and we hope that on reflection the Subcommittee will find that, in general, the system is working reasonably well."

He feels that much of the discontent over peer review has resulted from the current squeeze on basic research, the funding of which, he notes, is virtually a federal monopoly. What is happening is that the quality of rejected proposals had improved significantly. "It is natural," Stever said, "that respected scientists sometimes become more concerned about the fairness of the competition when they see their own proposals, or good proposals from some of their colleagues, turned aside."

In an effort to streamline grant review procedures and to reaffirm NSF's crucial role in guiding basic research, a major reorganization has taken place. (See box.) Now there are three basic-

continued on page 80