Advisory Board's subpanel on nuclear power, warns that Congress and industry must be careful in tinkering with the remains of the civilian research budget. "The main point of our panel findings so far is that we must resolve the problems for light-water reactors—both institutional and technical." Otherwise, says Landis, who also serves as senior vice president of Stone and Webster Engineering Corporation, "there is no sense spending one dime on advanced reactors."

The budgetary upheaval touches a broad range of nuclear research activities, including the department's atomic vapor laser isotope separation (AVLIS) program for enriching uranium. The agency proposes to wind down research activities aimed at producing the next generation of enrichment equipment to enable the United States to stay competitive with foreign suppliers. DOE wants private industry to commercialize the technology, but industry officials are skeptical. "There is not going to be someone that will come forward with $850 million on additional research on a process they are not sure will work," says EEI's Mills.

Laboratory operations such as those at Oak Ridge National Laboratory also would be hard hit. Fred R. Mynatt, director of nuclear and engineering technologies at ORNL, says 270 people working in fuel reprocessing and in liquid metal and gas-cooled reactor research will be laid off in 1987. Similarly, John E. Nolan, director of the Hanford Engineering Development Laboratory, says 240 jobs will be lost due to the decline in civilian nuclear research.

The militarization of DOE's nuclear program, says ANEC's Price, runs deeper than just shifts in research budgets. He contends that DOD should be bearing $30 million in charges for operating, construction, and equipment expenses of research facilities that now are part of a $121.8-million charge in the civilian nuclear R&D budget.

The intermingling of civilian and military nuclear research programs and budgets, says Price, must be stopped. Defense activities should be placed in a separate budget function, so the Congress is not misled about the actual level of civilian nuclear research and the costs of military programs. But the prospects for getting restitution for facilities operating costs or core nuclear research programs this year appears slim, industry officials concede. Says one Senate Appropriations Committee staffer, "The possibility of raising any one level more than a trifle is near impossible. This is an election year and there are less than 80 [working] days left for Congress." Faced with this uncertainty, industry lobbyists in Washington are pursuing a strategy of damage control for 1987. ■

MARK CRAWFORD

Briefing:

Biotech Firm Gets Another Black Eye Over Experiment

Advanced Genetic Sciences (AGS), the small California company that wants to conduct what would be the first field test of a genetically modified microbe, has shot itself in the foot again. The *Washington Post* disclosed recently that the company injected the bacteria into trees located outside on the rooftop of its Oakland laboratory without the knowledge or approval of the Environmental Protection Agency. News of the tests has brought more woes to AGS, EPA, and the industry as a whole as they grapple to develop a regulatory process governing the environmental release of biotech products.

Although the altered organisms, *Pseudomonas syringae* and *P. fluorescens*, are generally regarded by scientists and regulators as innocuous, Jeremy Rifkin, an author and activist, seized upon the disclosure of the tree tests as evidence that government regulations in biotechnology are inadequate, and that AGS and the industry cannot be trusted. The news prompted a federal judge to postpone a decision in a suit brought by Rifkin related to the AGS proposed experiment. In addition, a House subcommittee scheduled a hearing on the tests for 4 March.

The publicity about the tree tests is another blow to AGS, whose public image has taken a beating lately. In December, the company finally won permission from EPA and state authorities to field-test the bacteria, modified to prevent frost formation, on a one-tenth-acre strawberry patch in Monterey County. But community protests against the test erupted because, by AGS's own admission, the company failed to educate the local residents about the experiment (*Science*, 14 February, p. 667).

It was EPA that requested the tree tests in order to determine the potential of the modified bacteria to cause disease in several species. But the agency thought the tests would be conducted indoors. According to John Bedbrook, head of research at AGS, the trees were tested outside because they were too large to fit in the company's greenhouse. Bedbrook asserts that the experiment was contained because the altered bacteria were confined to a syringe and then injected into the bark of the trees. He says that no bacteria escaped. Steven Schatzow, head of the pesticides program at EPA, says, however, that the company violated agency rules and simply should have used smaller trees that would have fit in the greenhouse.

In any event, the experiment, which lasted 4 months, demonstrated that the modified microbes did not cause disease, according to Bedbrook and EPA. Although there have been press reports giving the impression that the trees injected with the modified organisms developed canker, Bedbrook and an EPA official pointed out in interviews that canker developed only in control trees that were injected with a pathogenic strain of the same microbial species. Bedbrook said that at the end of the experiment, the inoculated branches were autoclaved as a precaution.

Rifkin has also charged that the company's greenhouse was inadequate to contain the bacteria and that the windows of the laboratories were open during some of the indoor experiments. Bedbrook says that the company was vigilant. Greenhouse plants, for example, were sprayed or injected with the altered microbes in a Plexiglas container. After they were transferred out of the box, adjacent plants in the greenhouse were monitored to see if the bacteria moved from one plant to another. The tests were negative, Bedbrook says.

News of the tree test came a few days before a scheduled court hearing related to the AGS experiment before the U.S. District Court for the District of Columbia. After EPA approved the experiment last fall, Rifkin asked the court to halt the test, faulting the agency's decision on procedural grounds. But it is doubtful Rifkin can win because he must prove that the agency made an "arbitrary and capricious" decision. The agency spent more than a year reviewing the case and brought in an outside panel of scientists to review the experiment. Judge Thomas Hogan said he intended to rule in the first week in March. ■ MARJORIE SUN

Bloch Pares '86 NSF Grants Across the Board

The National Science Foundation, facing a $34-million budget cut under the Gramm-Rudman-Hollings deficit reduction act, has decided to trim the size of individual grants rather than cut the number of awards it will make in fiscal year 1986.

The decision was outlined in a statement signed by NSF director Erich Bloch on 13 February. The message, however, appears to have been slow to get out. When Bloch mentioned it on 26 February at a meeting of 300 invited guests at a National Academy of Sciences gathering on the federal budget outlook for research, it produced howls from academics. They complained it could

result in salary reductions for the remainder of the year. Indeed, the revisions of new grants and grant renewals, as well as contracts and cooperative agreements, might run as deep as 10 percent of the original commitment in some cases, NSF says.

The decision to reduce the size of awards is part of NSF's effort to cut spending by 4.3 percent in fiscal year 1986, as mandated by Gramm-Rudman. Bloch has chosen to spread the pain across the board to avoid making inequitably large reductions in the size and number of research awards made after 1 March.

NSF's aim, says Sandra Toye, the agency's controller, is to maintain the balance in base programs and to protect young investigators. Bloch said in a 21 February memo to NSF staff that he wanted to avoid "causing undue harm to the research and education communities. . . . We will see that no single category of awards or type of activity carries an undue part of the burden."

A number of programs are to be completely protected from cuts under Gramm-Rudman: mathematics, efforts to increase participation in science by women and minorities, and ocean drilling. Furthermore, NSF specified to universities, colleges, and foundations that "support for students and postdoctoral associates and instrumentation and equipment is to be protected." Toye, however, says that this does not mean institutions are prohibited from reducing these accounts somewhat. Even with the paring of award sizes, the agency says there will be fewer research grants made than would have occurred had Gramm-Rudman not been passed by the Congress. ■

MARK CRAWFORD

Western Countries' Neglect of Clean Coal Research Criticized

Paris.

Western governments have been criticized by the Paris-based International Energy Agency for not spending enough money on research into ways of reducing the environmental damage caused by burning coal to produce electricity.

In a report* on the energy research policies of its 20 member-countries—which include all the major Western industrialized nations apart from France—the agency says that there is still a "substantial disparity" between the declared policy of many governments of giving greatly increased emphasis to environmentally acceptable ways of using coal, and the "relatively modest sums" devoted nationally to developing the appropriate technology.

In particular, it points out that research into the use of coal to produce energy receives about the same amount of money as research into renewable energy sources—in each case, about 9 percent of the overall energy research budget of the IEA countries—despite the great difference in the present and short- to medium-term future contributions from these two broad energy options. "Continuation of this situation is bound to erode the credibility of the recent re-endorsement by [IEA] Energy Ministers of a more vigorous drive towards the clean use of coal," the report says.

Overall, the agency notes that the decline in spending on energy research by Western nations that had been occurring since the beginning of the 1980's—caused primarily, but not solely, by reductions in the U.S. energy research budget—appears to have leveled off.

While total spending on energy research by the agency's 20 member-countries fell by 23 percent between 1980 and 1983, it remained virtually constant between 1983 and 1984, leading the agency to the conclusion that "an element of stability can, for the moment, be observed."

Although some countries, in particular the United States, West Germany, and the United Kingdom, continued to reduce spending on energy research between 1983 and 1984 (in each case by about 5 percent in real terms), this was counterbalanced by increases in other countries, in particular Canada, Italy, and Japan.

Italy's record is particularly significant. An increase of 49 percent in its energy research budget placed it for the first time in third place in overall spending after the United States and Japan, and top of the list for government spending on energy research measured as a proportion of gross national product. Italy devotes 80 percent of its energy research to nuclear power, again more than any other IEA country, divided equally between conventional and "advanced" nuclear technologies such as fast breeders and fusion.

According to the IEA, 1984 also saw an end to the decline in spending on research on renewable energy sources, with particularly significant increases occurring in spending on wind energy and solar photovoltaics. Indeed, among IEA members apart from the United States (where spending on renewable sources continued to decline) there was an increase of 13 percent in renewable energy research between 1983 and 1984, compared to a decline of a similar magnitude over the previous 2 years from a peak in 1981.

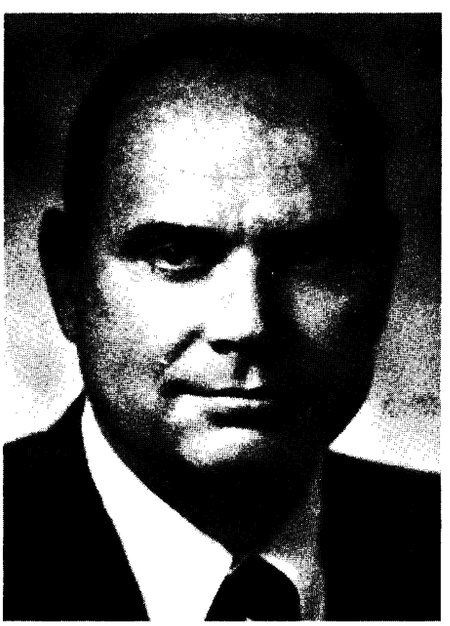
The IEA report is based on answers to a questionnaire distributed to government agencies in its member countries. In general, it says that the influence of broader economic policies on energy research and development "continued to strengthen" in 1984—compared to the previous period in which "the policy emphasis had been almost exclusively on energy security"—with a trend toward the greater use of economic criteria in energy research planning. ■

DAVID DICKSON

**Energy Research, Development and Demonstration in the IEA Countries. 1984 Review of National Programs.*

Comings and Goings

Duane Alexander, 44, has been named director of the National Institute of Child Health and Human Development, after serving as acting head of NICHHD for about a year. Alexander, an M.D., has spent



Duane Alexander

most of his career at NIH, with the exception of a 4-year stint on the staff of the President's Commission for the Protection of Human Subjects of Biomedical and Behavioral Research.

The Engineering College of the University of Missouri at Rolla, has named **Martin C. Jischke** as its new dean. Missouri president Peter Magrath says " . . . I am convinced he can enhance the university's efforts in economic development, assisting Missouri firms, large and small, whose success rests upon advances in engineering, technology, science, and related disciplines."