R&D Eroding at EPA

The R&D apparatus is weakening as regulatory programs expand, instruments wear out, and long-term research slows

When Howard S. Neufeld left the Environmental Protection Agency's Corvallis, Oregon, research laboratory after 22 months, his postdoctoral research was unfinished. Equipment failures foiled his efforts to replicate experiments on ozone's effect on slash pine, a tree harvested by the southern timber industry. Breakdowns in the laboratory's 22-year-old plant-growth chambers and trouble with rickety computers, he says, ate up 25% of his time.

Neufeld's experience is not uncommon. Around the country the productivity of EPA researchers is taxed by needless glitches in experiments. Agency scientists often have to patch together old mass spectrometers, gas chromatographs, and other instruments because there is little money to replace worn out machinery. But equipment troubles are just part of the problems that beset EPA's research program.

Demands on agency researchers are growing, while staff additions and budget resources lag. Morale is slipping as facilities decline and long-term research increasingly is put off so that current regulatory needs can be addressed. This ongoing erosion in EPA's research program, especially research performed by the agency itself, alarms some congressional leaders. "The lack of solid scientific evidence has led to delays and has forced policy makers to make judgments in the face of substantial scientific uncertainty," says James H. Scheuer (D–NY), chairman of the House subcommittee on natural resources, agriculture research, and environment.

The primary purpose of the research program is to support the agency's regulation of air and water quality, pesticides, radiation, toxic substances, and hazardous waste disposal. This role is generally defined as consisting of three functions: performing applied research for near-term problem solving, providing states with technical advice, and conducting basic research, which may or may not address a current need. Support for research, however, has not expanded with EPA's growing regulatory activities in areas such as toxic chemicals, hazardous wastes, and the effects of atmospheric pollutants.

For example, funding of exploratory grants, a key vehicle for long-term research, has declined steadily from $22 million in 1981 to a proposed $8 million in FY 1988. The number of competitive grants funded by EPA between 1981 and 1986 fell from 131 to 59. Bernard D. Goldstein, a professor at the Robert Woods Johnson Medical School in New Jersey, and a former assistant administrator of research at EPA, says the agency "needs at least $20 million to make [the program] viable."

EPA's proposed $353-million research and development budget for fiscal year 1988 looks impressive to an outsider. But track agency spending from 1980 forward and a different picture emerges. In 1982 former Administrator Anne M. Gorsuch sent the R&D program on a roller coaster ride. By 1983 R&D spending had plunged to $221 million. Not until this year did research funding match the 1981 budget of $342 million—and inflation has eroded much of that purchasing power.

Although total spending now approximates outlays at the beginning of the decade, the overall depth of the agency's research effort has diminished. Since 1980, the research work force has shrunk by almost 500 to 1844. Research conducted at universities and by private contractors also trails historic levels. The one segment of the program that is responsible for pushing up the R&D budget is Superfund research, which is financed separately through the Superfund trust fund. In real terms, says Scheuer, the FY 1988 research program is 26% below the 1981 budget of $342 million.

Thus, it is not surprising that laboratories such as EPA's facility in Athens, Georgia, find it difficult to meet the agency's deadlines. Rosemarie C. Russo, director of the laboratory, says her staff is working "fast and furiously" on fate and transport analyses of some 3000 chemical compounds connected with industrial and municipal waste water. But she worries about the lack of backup staff to carry on research that relies heavily on mass spectrometry, a technology for identifying chemical substances in ground water and other media. "We are understaffed to handle the amount of work we have to," complains Russo.

These analyses are critical to EPA's Office of Solid Waste and Emergency Response, which is struggling to meet congressional deadlines restricting the land disposal of hazardous wastes (*Science*, 9 January, p. 156). Congress also has charged EPA with implementing the Superfund Amendments and Reauthorization Act of 1986 and the Safe Drinking Water Amendment Act. These laws combined with problems such as radon emissions in homes, the threat to the environment posed by depletion of stratospheric ozone, and global warming have further burdened EPA's research apparatus.

Although Lee Thomas supports the agency's research program, as EPA administrator his options are limited. The Office of Management and Budget will not allow him to expand the agency's budget. And he finds it difficult to shift funds away from burdensome regulatory programs to R&D. Congress is aware of the research program's needs. But except for restoring some of the reductions imposed by Gorsuch, there has not been a concerted effort to expand funding across the research program. "EPA does not have a strong, vociferous constituency," observes John Neuhold, chairman of the EPA Science Advisory Board's panel on research and development.

As a result, EPA laboratories often must scrounge for dollars to buy equipment and to do research. Donald J. Ehreth, deputy assistant administrator for the Office of Research and Development, has tried to help laboratories acquire major pieces of equipment by sequestering a small portion of the equipment budget in recent years. Even so, last year Russo's laboratory had to settle for a used Vax computer that seems to break down too frequently. Scientists there also need to replace a 13-year-old high-resolution mass spectrometer and a 15-year-old infrared spectrometer.

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Most of EPA's research budget funds work done outside the agency by contractors, university grants, and cooperative agreements. Since 1980 this segment of the R&D budget has experienced the widest swings. Part of the reduction in spending during the decade is attributed to the winding down of research efforts in areas of waste water treatment and noise abatement. Other program cuts, such as energy related R&D, resulted from efforts to reduce spending.

The remaining one-third of the budget falls under "salaries and expenses." This pool of money not only pays the salaries of EPA's in-house research staff, but is supposed to fund purchases of scientific equipment, lab-

oratory maintenance and support, internal research, and other expenses.

A quick look at the history of the salaries and expenses budget reveals why many EPA laboratories are under stress. Since 1980, that budget has hovered around $100 million. Even with the reduction in research staff, salaries consume a greater share of the account than ever before—about 80% in 1988 versus 59% in 1980. After salaries, rent, and utilities are accounted for, Goldstein notes, not much is left to support actual in-house research needs such as equipment, supplies, and travel. In 1988, that support is thought to be under $17 million, and perhaps as little as $5 million.

The pressure on EPA's equipment and internal research accounts could be eased somewhat if the agency had the flexibility to reprogram funds from contract research to the salaries and expense budget. Scheuer's subcommittee sought to empower the agency to do this in the FY 1988 authorization bill. The idea was rejected by the House and Senate Appropriations committees early this month, allegedly because of concern that the Office of Management and Budget could cite the practice as a sign that the contract research program had excess funds.

For now most of EPA's 14 laboratories are getting by. They have learned to leverage available research and equipment budgets by pooling funds for related work on problems such as hazardous waste disposal and Superfund cleanups; to utilize equipment at neighboring universities; and to interpret regulations so that equipment or supplies can be charged off to contractor research and Superfund accounts.

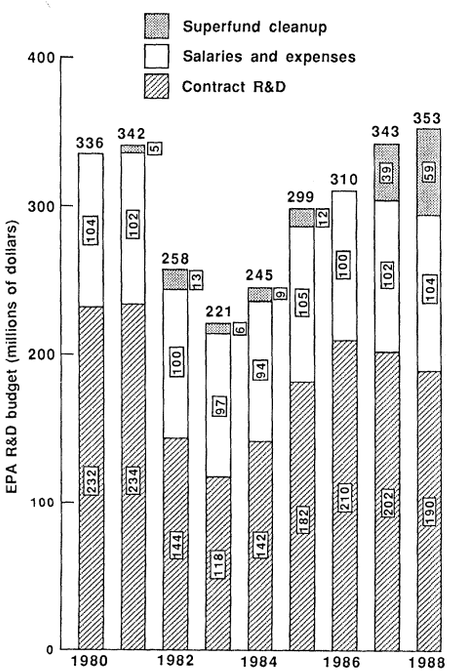
But this ingenuity has a price. "We are spending a horrendous amount of time on bureaucracy rather than on science," says Thomas Murphy, director of the Corvallis laboratory. "To me, that is not productive." Some laboratory directors worry that their top scientists could tire of the hassles, quit, and leave them in a jam. Thomas W. Devine, of EPA's Office of Solid Waste and Emergency Response, says the agency can respond to turnover by transferring personnel from another laboratory if necessary. He concedes, however, that some research and regulatory programs could suffer for a while.

Good scientists are attracted to EPA by the opportunity to do exciting research, says Al W. Bourquinn, the recently departed chief of the agency's biotechnology laboratory at Gulf Breeze, Florida. If the current climate of growing workloads, scarce supplies, and aging equipment persists, working at EPA will become less attractive, notes Bourquinn, who reluctantly left the agency after 15 years because "there is no room for advancement."

Representative Claudine Schneider (R–RI), an outspoken member of Scheuer's subcommittee, says there is a growing frustration in Congress over the erosion of EPA's research program. In hearings held in April, EPA was criticized for its plan for next year to halve research on how to mitigate radon buildup in buildings, its failure to report to Congress research plans for indoor air pollution, and for reductions in the exploratory grants program. She notes that although EPA's research budget would rise by $10 million in FY 1988, there would be an equal decline in R&D programs except for efforts supporting the Superfund site cleanups.

The Science Advisory Board is equally critical. In consecutive analyses of the agency's proposed budgets for FY 1987 and FY 1988, it has concluded that the in-house research program is underfunded. Not only are EPA's in-house scientists expected to conduct research, many also must oversee research performed by assorted commercial and university contractors. But without strong in-house capability, says the board, the Office of Research and Development can not manage its contract research budget.

The board also says EPA must conduct more long-term research. This is needed, says Neuhold, to help the agency foresee future scientific and regulatory issues. Richard M. Dowd, a consultant, who served as acting director of the research office in 1980 and 1981, agrees. The agency, he says, must have a research program "that does more than just solve the problems of the day."



R&D budget. *Funding for research to support Superfund cleanup sites would increase $20 million in fiscal year 1988, while "salary and expense" money for in-house research and contract R&D funds decline.*

At this point more is needed than just money. The Science Advisory Board, Dowd, and others believe the agency also needs a new road map. The board wants EPA to define for the Office of Management and Budget and Congress its scientific staffing needs in the context of its aging work force, workload, current mix of scientific skills, and the agency's goal of establishing a risk-based decision-making apparatus.

"I think there is a real interest on the part of people who are concerned that we take a strong look at how to decide research priorities," says Dowd, who notes that "an infusion of money often does not make things more efficient." There is both concern and confusion in the Senate Appropriations Committee about EPA's R&D program. Says one committee aide, "EPA has an internal set of [research] priorities that nobody really understands too well."

The need to redirect facets of the research and development program is recognized by Thomas. In February, the agency released a multivolume report, *Unfinished Business: A Comparative Assessment of Environmental Problems*. Prepared by agency scientists at Thomas's direction, it has helped focus attention on the agency's research program and reflects pressures within the agency to set an environmental agenda for the 1990s.

The Science Advisory Board appears ready to keep pressure on the agency to "articulate a core research agenda" that will withstand scrutiny by the scientific community. It has established a new panel, tentatively dubbed the research strategy subcommittee, under the leadership of Alvin L. Alm, deputy administrator of EPA between 1983 and 1985. The group is expected to examine the challenges facing the agency and outline research priorities for the 1990s.

Congress, too, appears to be focused on the next decade. Hearings being planned in the House and Senate are aimed at laying the groundwork to set EPA's research program on a new course. Scheuer's subcommittee, for example, has written language into the FY 1988 House budget authorization bill that stipulates that EPA's mandate includes a responsibility to conduct broad-based, long-term environmental research.

As for Congress providing the agency with significant new research dollars, Schneider says Congress's "hands are tied" for the immediate future. Indeed, things may not improve much, she says, until "we wake up the American people." For even when the budgetary climate moderates, adds Schneider, winning new support for R&D at EPA will not be easy. ■

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