



PRESIDENT'S CORNER

The intellectual argument for increased federal funding of university-based environmental research is as strong as it has ever been, but it has not yet succeeded in Congress. This is the message that came to AEEP through our recent meetings in Washington.

On January 15th, I presented a statement on behalf of AEEP to the National Research Council's Committee on Environmental Research. The complete statement, titled: "Environmental Research in the United States: Problems needing Solution and Programs Needing Improvement" appears elsewhere in this newsletter. You are encouraged to read it. Following the presentation, AEEP submitted a letter to the Committee on Environmental Research requesting that the proposed National Institutes of the Environment include an Engineering Directorate.

The AEEP Executive Committee met in Washington on Sunday, January 26th. Among the significant items discussed were:

- Planning for the AEEP Academic Reception to be held on Tuesday, May 26th at 6 p.m. in conjunction with the IAWPRC Water Quality International Conference in Washington: The reception will be similar to those co-sponsored by AEEP and Lewis Publishers at the recent WPCF meetings. We are looking forward to this opportunity for our membership to meet their international colleagues.
- Planning for AEEP Workshops to be held at the 1992 WEF and AWWA Conferences: Aarne Vesilind will do the WEF Workshop on "Ethics" as a component of environmental engineering education. "Membranes" was tentatively selected as the topic of the AWWA Workshop. Watch your mail for details.
- Initial planning for an Environmental Engineering Research Needs Conference to be held in the fall of 1993. Walt Weber has agreed to chair the conference to be held in the Ann Arbor area.
- Progress report on the second edition of the AEEP Software Manual. The committee chaired by Joe DePinto has arranged for initial funding from AWWARF and ASEE to complement the AEEP investment. The committee is also looking into arrangements with publishers.

- Development of a Seventh Edition of the AEEP Roster of Environmental Engineering Graduate Programs. You should begin working on revision of your present program descriptions for timely submission to Gary Amy by June 1st. You will receive more information from Gary in late spring.

- A closer relationship between AEEP and the Universities Council on Water Resources (UCOWR). An AEEP presence is encouraged at the UCOWR Conference on the Clean Water Act to be held July 28-31 at the University of Virginia at Charlottesville.

Following the Executive Committee meeting, the Past President (Bruce Rittmann), Vice President (Paul Bishop), and I visited with the EPA Office of Research and Development and with the Department of Energy, Environmental Restoration and Waste Management people.

At EPA, the Office of Exploratory Research (OER) is well organized to administer university-based environmental engineering and science research. Unfortunately, however, OER does not have much money. The annual EPA Research and Development Budget is about \$400 million of which OER gets about \$35 million. Of this about \$21 million is allocated to exploratory grants, and about \$9 million to the Centers Program. The grants program operates with six scientific review panels which meet once per year to review proposals. Over the past three years, the fate of proposals has been:

Proposals received/year:	about 450
Proposals approved/year:	about 150
New Proposals funded/year:	about 50

The 50 new starts per year at roughly \$140,000/year account for about \$7 million dollars/year. This leaves about \$14 million/year for continuation projects. The OER would like to increase the exploratory grants program to about \$40 million/year, but this does not seem likely to win congressional approval in the near future. The proposed National Institutes of the Environment could help to increase the funding for an exploratory grants program. Thus, it is important that the NIE have an engineering directorate.

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The DOE Environmental Research Program, on the other hand, has considerably more money than EPA's program but does not have an office well designed to deal with individual academic researchers. In addition to \$4.3 billion allocated to environmental restoration at DOE facilities in FY 92, DOE has a \$4.4 billion research and development budget. Within the DOE R&D budget, \$353 million is allocated to biological and environmental research, and \$602 million is allocated to environmental restoration and waste management. Moreover, DOE has developed a comprehensive Environmental Education Program consisting of academic partnerships with university consortia, national interaction with university faculty and graduate students, interactions with community colleges near DOE sites,

and other efforts. To date, three consortia have been formed under the academic partnerships program: one consisting of three South Carolina universities, one consisting of three New Mexico universities, and one consisting of 17 historically black and minority colleges and universities.

Many AEEP members have already been successful in obtaining DOE support for their environmental engineering research and educational programs. In view of DOE's problems, funding levels, and program development, it seems likely that even more of our members will be cultivating DOE support in the future.

C. Robert Baillod, President

ENVIRONMENTAL RESEARCH IN THE UNITED STATES: PROBLEMS NEEDING SOLUTION & PROGRAMS NEEDING IMPROVEMENT

A Statement By

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**Presented to the Forum on the Organization, Management and Support of
Environmental Research in the United States
Committee on Environmental Research, Commission on Life Sciences
National Research Council
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AEEP SPEAKS OUT ON THE NEED FOR ENVIRONMENTAL RESEARCH ¹

The Association of Environmental Engineering Professors (AEEP) is deeply concerned about the lack of commitment to the development of a sound scientific and technological basis for protection of the health and welfare to the American public and the global environment. An adequate scientific and technological basis for environmental protection is achievable only through a sustained and coherent program for nurturing and funding fundamental exploratory research and translating its results into practical solutions to problems.

Exploratory research provides a rational basis for setting national environmental standards as well as for developing new control processes to meet these standards. A recent example of national importance is EPA's regulation of trihalomethanes in drinking water. While toxicologists provided the basic data to suggest regulation of trihalomethanes, environmental engineering research developed economical ways to control trihalomethanes by modifications to existing water treatment processes. As a result, most water utilities have been able to meet the regulations with only moderate cost increases to consumers.

A secondary benefit of university-based exploratory environmental research is the production of doctoral graduates in environmental engineering and science. These young men and women will provide the vision and technological solu-

tions needed to sustain the nation's health, welfare and prosperity through the twenty-first century.

THE RESEARCH AGENDA: THE MOST IMPORTANT PROBLEMS NEEDING SOLUTIONS

Several organizations, including the U.S. Environmental Protection Agency, have set forth research agenda. The particular agenda presented here is drawn from several sources^{2,3,4} and highlights both fundamental and applied research directed at problem solutions.

Non-Trivial Pollution Prevention

The term "Pollution Prevention" has recently evolved to include waste minimization, source reduction and some aspects of material reuse. It is particularly attractive as it implies problem solution through problem elimination. To be sure, there have been some major instances of pollution prevention through minor process and material changes. However, as we move into the second generation of pollution prevention efforts, we find more tough, non-trivial problems to be solved. Most polluting waste streams cannot be "wished away". We need a major effort to develop new industrial processing technologies, separation technologies, and material reclamation technologies upon which pollution prevention of the 21st century will be based.

Pollution Control Technology

The optimal control of personal, municipal and industrial emissions to the air, water and land environment will be based on a combination of pollution prevention and pollutant control technology. We should strive to eliminate the pollutants that are difficult to destroy, and to destroy the pollutants that are difficult to eliminate. It follows that we should increase our efforts to improve current technologies for separation and destruction of pollutants. Technologies based on novel adsorbents, photo-reactive catalysts, and combinations of adsorbents with biological agents are worthy of additional research.

Fate and Transport of Pollutants

A recurring theme on every organization's research agenda is the intermedia transport and transformation of pollutants. This has implications for global-scale biogeochemical cycles. We recognize that toxic substance discharged into the atmosphere are deposited hundred or even thousands of miles away, either on the land or in the water. We need reliable models to predict the transport routes and fates of pollutants. These models should be based on sound physical and chemical principles and should be verified and calibrated. Such models will provide a basis for rational decisions on pollutant regulation and source control.

Multi-Disciplinary, Multi-Media Research

Environmental research by its very nature involves many disciplines and environmental media. We have physical, chemical and biological processes occurring in air, water, and soil. It follows that the best environmental research will be a product of team efforts involving a spectrum of scientific and engineering disciplines. This requires research support that is big enough and sustained enough to foster truly interdisciplinary teams. The large academic research center organized around a general theme can bring a good mix of disciplines together. Federal sponsorship of such centers should be encouraged.

Groundwater Contamination

The nation's groundwater is threatened by contamination from buried wastes and leaking tanks. We need to better understand the rate and extent of migration of pollutants in order to locate monitoring stations and to take reasonable and timely remedial action. Complex mathematical models are used to describe the physical, chemical and biological processes taking place in the soil-water system. Many sub-parts of these models cannot yet be used with confidence because the basic concepts are not well understood. Little is known about assimilation of wastes by soil, especially as a result of microbial degradation processes and sorption on soil particles. These natural processes retard the spread of contaminants, and more knowledge about them could provide insight into strategies of remedial action.

Methodology for Establishing Human and Environmental Risks

Human and environmental risk assessment is central to the setting of pollutant exposure standards. Better data and methodology are needed to reduce the uncertainty inherent in this process.

Adequate and Realistic Basis for Placement and Storage of Immobilized Pollutants and Residuals

Everything must go somewhere. We need fundamental exploratory research to evaluate the alternatives for storage of residual immobilized pollutants.

PROGRAMS NEEDING IMPROVEMENT: PROBLEMS WITH THE FUNDING, STRUCTURE AND ORGANIZATION OF ENVIRONMENTAL RESEARCH IN THE UNITED STATES

In recent years, environmental protection has attracted a large constituency whose preferences have been reflected in protective environmental quality standards. Environmental research, on the other hand, has a broad and diffuse constituency without appreciable political influence. This lies at the heart of the problem with environmental research. The political constituency has neither been sufficiently concerned nor sufficiently united to build an adequate governmental infrastructure for environmental research. There has not been adequate long term funding for environmental research.

The diffuse constituency problem is magnified further if one considers the diffuse nature of the federal environmental research establishment. Environmental research is spread over several federal agencies. EPA, DOD, DOE, and others all sponsor substantial environmental research programs.

Would establishment of a National Institutes of the Environment (NIE) for centralized federal funding of environmental research help this situation? It would certainly help. Too often research is viewed as peripheral by mission oriented agencies such as EPA and DOE. Establishment of the NIE would represent a significant step forward for environmental research. It would ensure the development and continuation of an adequate exploratory environmental research program.

Moreover, one of the greatest problems in the environmental engineering area is the shortage of qualified engineers. It is estimated that only about 1,000 to 2,000 environmental engineers are graduated each year to fill about 5,000 openings. If the NIE were to have education of the environmental work force as part of its mission statement, it could have a major impact on the quality and availability of the environmental work force.

In conclusion, the Association of Environmental Engineering Professors believes that the federal environmental research program ought to be more adequate and coherent, especially at the exploratory research level. We believe that the proposed National Institutes of the Environment can play a vital role in attaining this goal.

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