

THE UNIVERSITY OF TEXAS AT AUSTIN

COLLEGE OF ENGINEERING



February 10, 1983

Mrs. Anne Gorsuch  
Administrator  
Environmental Protection Agency  
Washington, D.C. 20460

Dear Mrs. Gorsuch:

The Executive Committee of the Science Advisory Board (SAB) has completed its mandated review of Research Outlook 1983 at a public meeting held on January 5-6, 1983. A Subcommittee of the Board reviewed a preliminary draft of the Research Outlook document on November 29, 1982, and submitted its report to the Executive Committee. Many of the changes suggested by the Subcommittee were incorporated in the final draft of Research Outlook 1983. The Science Advisory Board's comments on the Outlook reflect concerns of both the Subcommittee and the Executive Committee on research issues that need higher priority or further clarification.

In general, the SAB believes that the Office of Research and Development (ORD) has made progress in improving the quality and the usefulness of this year's Outlook. In contrast to last year's document, Research Outlook 1983 is made more readable and more substantive in content. The Committee members were pleased that the draft Outlook had been sent to over 60 extramural peer reviewers and that ORD is responding to all comments in writing. The issue-oriented structure of Research Outlook 1983 is an improvement over formats used in previous years and should help ORD to maintain continuity from one year's document to the next. The emphasis, throughout the document, on the verification of models is important. ORD is to be commended for attempting to make the Research Outlook a useful document which will be closely tied to the development of the Agency's research priorities and strategies.

There are some major remaining problems which are common to the document and the research program, however. They include the following:

- o The Science Advisory Board has a great sense of uneasiness concerning the Agency's commitment to its investigator-initiated Peer Review Grants Program. This program is the only EPA effort that supports researcher-initiated studies that are not intended to serve short-term regulatory

information requirements. The grants program is compatible both with the Agency's research and development mission and with the scientific community's definition of exploratory research. The Agency's declining budgetary support for the program and its recommendation that the management of the program be transferred to the National Science Foundation will further handicap EPA's ability to attract high quality engineers and scientists to carry out environmental research. Both the Administration and the Congress should increase budgetary support for the grants program and ensure that its management is retained within EPA.

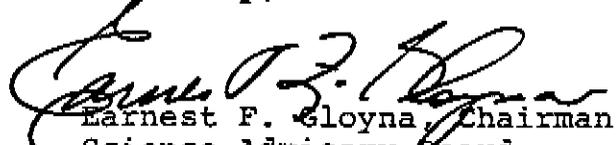
- o Research Outlook 1983 makes too many unrealistic promises with respect to both research projects and milestones for their completion. Many of these activities, such as the development by 1985 of assessment methodologies for human heritable effects from chemical exposure, could not possibly be completed in the timeframes given, even if unlimited funds were available. A summary of the milestones from the previous year's document with a list of accomplishments and a statement as to why some milestones were not accomplished would be a useful addition and would provide the reader with a broader view of the Agency's research performance.
- o The document lacks a clear, concise executive summary to briefly outline the major scientific issues addressed and the priorities defined.
- o A two-tiered approach should be used in formulating the five-year research plan. First, there should be a list of research needs for national environmental protection, which are independent of budget considerations. Second, ORD should identify the research needs that are tied in with EPA's mandate and then set research priorities which will receive budgetary support.
- o The research priorities in each chapter should be more clearly defined, and the process used to establish the research priorities should be discussed. In addition, information should be provided on the allocation of resources. For example, the percentage of resources devoted to new activities vs. continuing activities should be clarified. The amount of funds expended for grants and contracts should also be presented.
- o The Research Outlook 1983 is supposed to be a five-year research plan, yet there is little indication as to what types of research will be going on in the years beyond 1985, because of the often short-term nature of the research activities listed in the Outlook.

- o Some critical issues not directly addressed within the document include (1) extrapolations from high dose to low dose and short-term to long-term; (2) animal-to-man and species-to-species extrapolation; and (3) intermittent and fluctuating exposures versus lifetime, constant exposures.
- o Further information on how data from industry, academia, other Federal agencies, and organizations such as the Health Effects Institute are being used should be incorporated into each chapter.
- o It would be helpful to append to the Outlook a list of the individuals who prepared each chapter and a list of the document's reviewers.

As you know, this is a transition year from the procedures used during the review of the previous year's Outlook. In the review of the 1983 Outlook, an SAB Subcommittee commented on a preliminary draft followed by Executive Committee review of the final document. In the spring of 1983, the Subcommittee will begin advising the Office of Research and Development on its planning of research priorities and strategies. This early SAB input will assist ORD in the preparation of Research Outlook 1984 and will result in further improvements to both the document and the research program in general.

Attached to this letter are major chapter-by-chapter comments and the rosters of the Executive Committee and the Research Outlook Subcommittee. The Science Advisory Board appreciates the opportunity to comment on Research Outlook 1983 and hopes that its advice will prove useful to you and the Congress in the development of the research budget.

Sincerely,

  
Earnest F. Gloyna, Chairman  
Science Advisory Board

Enclosures

cc: Dr. John W. Hernandez, Jr.  
Dr. Courtney Riordan  
Dr. Terry F. Yosie

### Chapter 1: Hazardous Wastes

- The Outlook should discuss hazardous air pollutants and the significance of their relationship to hazardous wastes, because the budgets for the two differ greatly.
- EPA's thinking regarding the magnitude of risk from non-volatile hazardous wastes compared to volatile hazardous wastes is unclear. What is the Agency's assessment of the comparative risks between these classes of compounds and what are the major research needs associated with the evaluation of such risks?

### Chapter 2: Water Quality

- The issue of site-specific water quality criteria should be given more emphasis as a research priority. The assumptions used to derive site-specific criteria should be tested and viewed as research issues. For example, the assumption that bioassays on species from a spectrum of families covering different trophic levels will give reliable water quality levels of a toxin needs further testing.
- Groundwater quality has not been addressed. Some guidance should also be given on whether surface water criteria are in any way applicable to groundwater.
- One of the major problems with using the fish community as an indicator of biological integrity is that too much reliance is placed on single species data. More field validation work is needed to improve the basic data base for better understanding of toxicological responses to chemicals.

### Chapter 3: Drinking Water

- The research priorities identified and discussed are, for the most part, appropriate. A more complete rationale for supporting the program using carbon and ozone to remove organic wastes is needed since this is not a new research field.
- In the discussion of the chemical causation of tumors (page 3-4), acknowledgment should be made that tumor promoters are often tissue or organ specific. Therefore, the results obtained using rat and mouse initiation-promotion techniques may not be applicable to the ability of a chemical to act as a promoter in other tissues. In addition, enzymatic changes in cells have not been clearly linked to cancer, and the document should clarify this point.

- There seems to be a disproportionate focus on cancer as an endpoint of toxicity from exposure to drinking water contaminants. Other toxic endpoints may be as serious as cancer, if not more so, and should be studied.
- The geophysical monitoring project does not have a clear focus. Multi-aquifer wells and their impact on water supplies and movement are important issues. Airborne techniques, such as flying magnetometers, to locate abandoned wells may work in rural areas, but will not work as well in urban areas.

#### Chapter 4: Toxic Substances and Pesticides

- The emphasis on verification of models in several places in this chapter is commendable.
- A number of sweeping research goals are identified on page 4-10. These include such issues as development and validation of a short-term, cost-effective methodology for identifying the teratogenic potential of chemicals in order to support or eliminate the need for extensive animal tests by 1985. It is not clear how this research goal will be achieved.
- The document states on page 4-11 that the Structure/Activity Relationships (SAR) approach "may be used to produce rapid, inexpensive, scientifically acceptable data to evaluate the biological effects of pesticides and other chemicals to improve risk assessment." Such a statement overemphasizes the usefulness of SAR at this time and is another example of an unrealistic statement of the Agency's research capability.

#### Chapter 5: Air

- The discussion of such key research issues as high dose to low dose extrapolations and animal-to-man and species-to-species extrapolations is very general, and the reader is unable to ascertain what specific data bases are to be obtained. More emphasis is also needed on the validation of animal models.
- The Science Advisory Board has, in the past year, reviewed a number of ORD Health Assessment Documents for hazardous pollutants. Many of these pollutants are candidates for regulation under section 112 of the Clean Air Act. It is disconcerting to note that, given the significant research gaps that remain in our understanding of such pollutants, EPA's research program is so meager.

- It is unfortunate that the monitoring of non-ozone oxidants is not discussed adequately. While it is true that ozone is the major component of gaseous oxidants, other oxidizing agents should be measured to better characterize and evaluate their impacts on public health and welfare.
  
- Support of an epidemiological research program for criteria pollutants is a key part of EPA's research mission, yet the Agency has virtually chosen to abandon this field. As a result, EPA's health effects research program is unbalanced and deficient. It is probably unrealistic to expect that EPA will develop an in-house capability for epidemiological research. However, cost-efficient alternatives to an in-house program already exist. Examples include EPA's partial sponsorship of the Harvard Six Cities studies and support of the University of Pittsburgh's Epidemiological Center of Excellence. Another way of obtaining good epidemiological research is through the development of well defined and well managed cooperative agreements between extramural contractors and EPA. ORD should also support a small in-house scientific group to (1) establish needs for epidemiological data in consultation with the Agency's Office of Air Quality Planning and Standards (OAQPS); (2) prepare and issue requests for research applications addressed to EPA's need for population response data; and (3) arrange for appropriate peer review of the research applications received.

#### Chapter 6: Acidic Deposition

- The issue of whether acidic deposition has been increasing receives extensive discussion in the Outlook, but EPA seems reluctant to state its own position except to offer a pious statement that "there is insufficient evidence to state with certainty that the acidity of precipitation is increasing in North America" (page 6-5). The lack of a more definitive position may hamper the development of a clearly defined research strategy.
  
- The relative rates of dry and wet acidic deposition have not been adequately assessed. The need for research in this area should be more extensively discussed in this chapter.
  
- The document should present the supporting evidence for the statement on page 6-4 that there is limited evidence of acidic deposition effects on terrestrial ecosystems.

## Chapter 7: Energy

- A discussion of the relationship between EPA and DOE research activities would enhance the Outlook.
- There should be some discussion of EPA's strategy for identifying pollutants from future synfuels plants. For example, reference could be made to ORD's ongoing development of technical manuals for synfuels processes.

## Chapter 8: Exploratory Research

- It would be useful for this chapter to outline to what extent the exploratory research program is an extension of ongoing research. As described in Research Outlook 1983, the exploratory research does not appear to be oriented toward truly long-term research.
- Criteria should be developed and implemented to evaluate the outcome of research by grantees and the Centers of Excellence to assess whether the objectives of the research have been met in comparison to the intended goals.
- The Outlook should discuss how well the Peer Review Grants Program is functioning and whether the program is improving the quality of EPA's research.
- There should be a statement about the activities of the various Centers of Excellence and a discussion of the degree of success of this program.

## ROSTER FOR EXECUTIVE COMMITTEE

Dr. Earnest F. Gloyna (Chairman)  
 Dean, College of Engineering  
 Cockrell Hall, 10.310  
 University of Texas at Austin  
 Austin, Texas 78712

Dr. Terry F. Yosie  
 Acting Director  
 Science Advisory Board  
 Room 1145W, Waterside Mall  
 Washington, D.C. 20460

Members.

Dr. Herman E. Collier, Jr.  
 President  
 Moravian College  
 Bethelhem, PA 18018

Dr. Sheldon K. Friedlander  
 Parsons Professor of Chemical Engineering  
 Department of Chemical Engineering  
 University of California, Los Angeles  
 Los Angeles, California 90024

Dr. Herschel Griffin  
 San Diego State University  
 Graduate School of Public Health  
 San Diego, California 92182

Dr. Bernard Goldstein  
 Rutgers University Medical School  
 Department of Environmental and  
 Community Medicine  
 Piscataway, New Jersey 08854

Dr. Daniel Harlow  
 Diamond Shamrock Corporation  
 919 - 18th Street, NW  
 Suite 400  
 Wash., D.C. 20006

Dr. Rolf Hartung  
 School of Public Health  
 University of Michigan  
 Ann Arbor, Michigan 48109

Dr. Julius E. Johnson  
 1111 Knollwood Court  
 Midland, Michigan 48640

Dr. Roger O. McClellan  
 Director of Inhalation  
 Toxicology Research Institute  
 Lovelace Biomedical and  
 Environmental Research Institute  
 P.O. Box 5890  
 Albuquerque, New Mexico 87185

Dr. Robert Neal  
 President, CIIT  
 P. O. Box 12137  
 RTP, NC 27709

Dr. John M. Neuhold  
 College of Natural Resources  
 UMC-52  
 Utah State University  
 Logan, Utah 84322

Dr. Gerard A. Rohlich  
 Department of Civil Engineering  
 University of Texas at Austin  
 Austin, Texas 78712

Subcommittee on Research Outlook

Dr. John M. Neuhold (Chairman)  
Department of Wildlife Sciences  
College of Natural Resources  
Utah State University  
Logan, Utah 84322

Dr. Terry F. Yosie  
Acting Director  
Science Advisory Board  
Room 1141W, Waterside Mall  
Washington, D.C. 20460

Members/Consultants

Dr. Edward F. Ferrand  
Assistant Commissioner for  
Science and Technology  
New York City Department of  
Environmental Protection  
51 Astor Place  
New York, New York 10003

Dr. N. Robert Frank  
Institute for Health Policy  
Analysis  
Georgetown University  
2233 Wisconsin Avenue, N.W.  
Suite 324  
Washington, D.C. 20007

Dr. Leonard Greenfield  
8241 S.W. - 204th Street  
Miami, Florida 33189

Dr. Morton Lippmann  
Institute of Environmental  
Medicine  
New York University  
New York, New York 10016

Dr. Francis McMichael  
Department of Civil  
Engineering  
Carnegie-Mellon University  
Pittsburgh, Pennsylvania 15213

Dr. Daniel Menzel  
Professor of Pharmacology  
Experimental Medicine  
103 Jones Building  
P.O. Box 3813  
Duke University Medical Center  
Durham, North Carolina 27710

Ms. Anne M. Wolven  
A.M. Wolven, Inc.  
Suite 118  
175 Wieuca Road  
Atlanta, Georgia 30342