

Science Advisory Board



FY1992 Staff Director's Annual Report -- "Getting Results"

This report is a Staff summary of activities for the U.S. Environmental Protection Agency's Science Advisory Board for Fiscal Year 1992, with projections for Fiscal Year 1993. This report has not been reviewed by the Board or the Agency and should not be construed as representing the views of either organization.



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FOREWORD

Four years ago the subtitle of this report was "Making a Difference". That descriptor is even more apt today, given the demonstrable impact of SAB activities on the Agency's agenda, its practice, and its prospects. This impact has been especially visible in the way in which Administrator Reilly has moved aggressively to implement the recommendations of the SAB's seminal report, Reducing Risk. As a consequence, the Agency's budget bears the imprint of the report; the Agency's research agenda has been reformulated; and the Agency's risk management thrusts reflect many of the innovations suggested by the Board.

Three years ago this report was subtitled "Taking Stock/Reaching Out". During FY92 our reach has been extended even further. As examples, last fall Dr. Alan Bromley, Science Advisor to the President and Director of the White House Office of Science and Technology Policy, was the featured speaker at the SAB's Annual Membership meeting. This year US Senator Daniel Patrick Moynihan introduced legislation that would have the SAB develop an expanded form of the Reducing Risk report on a biannual basis. At hearings on the bill this September, SAB Chair Raymond C. Loehr provided testimony on the proposed legislation and received many

favorable comments about the contributions of the Board. Further afield from Washington, the Mayor of Columbus, OH, in consultation with the SAB, has established his own technical advisory group, modeled after the EPA's Science Advisory Board.

Two years ago this report was subtitled "Working Smarter". During FY92 we have initiated the "total quality management" (TQM) philosophy through a productive Staff retreat. Focused group efforts to resolve particular problems and to address more completely the needs of our customers (i.e., the SAB members, the Agency, and the public) have helped us both to work smarter and to improve our product.

Last year this report was subtitled "Making Progress", chronicling significant developments within the Committees and within the SAB Staff. This progress has continued apace in FY92 with improvements office hardware, additional Staff developments, and increased attention to quality operations.

I trust that the contents of this year's report will validate the accuracy of its subtitle "Getting Results." The raw numbers provide the broad framework which is given substance in the text that follows:

The number of functioning committees increased by 25% (from 8 to 10).

The number of members increased by 33% (from 60 to 80).

The number of reports sent to the Administrator increased by 150% (from 22 to 55).

Getting these results in FY92 is a testimony to energy, creativity, and dedication of the SAB members, its consultants, and its Staff. We are proud to have played this role in the protection of public health and the environment.

Donald G. Barnes, PhD.
Staff Director
December, 1992

ABSTRACT

This seventh Annual Report of the Staff Director of the Science Advisory Board (SAB) provides background information on the Board: its origins, authorities, and function. The roster of the SAB's Members and Consultants, meetings of SAB committees, and abstracts of the reports submitted to the EPA Administrator during FY92 are included in the report.

A number of the Board's activities are highlighted for special attention:

- a. The EMAP review (report in preparation), and the continuing activity re implementation of Reducing Risk
- b. The reassessment of the Environmental Tobacco Smoke draft risk assessment
- c. Reviews of the Revised Radon Risk Estimates and Associated Uncertainties. the National Survey for Radon in Schools, the Citizen's Guide to Radon, the Homebuyer's/Seller's Guide to Radon. and the Correlation of Short-Term and Long-Term Tests for Radon.
- d. An "experimental" review of a site-specific issue, the Idaho Radionuclide Study Review (was helpful to the Region X office in determining its response to this problem).
- e. Completion of the report on a draft risk assessment for formaldehyde. This issue generated considerable public interest, and elicited major involvement by the public, with participation in the discussions by several public interest groups, industry associations, and individual members of the public.
- f. Establishment of an Environmental Economics Advisory Committee (EEAC) at the request of the EPA Administrator in response to a recommendation in the Science Advisory Board's Reducing Risk report, and a Clean Air Act Compliance Analysis Council (CAACAC) per the mandate of the 1990 Clean Air Act Amendments.

The emphasis given to "Getting Results" during FY92 has resulted in considerable gains in productivity. We increased the number of functioning committees by 25% (from 8 to 10), increased the number of SAB Members by 33% (from 60 to 80), and increased

the number of reports sent to the Administrator by 150% (from 22 to 55).

FY93 should see a continuation of the trend toward getting results and working more effectively with both the Agency and with the public. This will result, in part, from continued implementation of the recommendations of previous management and self-initiated studies, as well as the adoption

and implementation of the concepts embodied in "Total Quality Management (TQM)" as all SAB Staff begin to apply the lessons learned from formal TQM training. All of these efforts will stand the SAB in good stead as it continues to confront a growing number of requests for advice/review on increasingly complex and contentious issues in protecting public health and the environment.

**THE SCIENCE ADVISORY BOARD:
GETTING RESULTS**

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1. EXECUTIVE SUMMARY

1.1 Introduction to the Report

This purpose of this report is to:

- a. Provide a succinct introduction to the Science Advisory Board (SAB);
- b. Provide a summary of the SAB activities for Fiscal Year 1992 (FY92).
- c. Offer a near-term projection of future SAB activities.

Section 2 is a brief introduction to the Report. Section 3 provides background information on the SAB, its organization, history, membership, and procedures, including specific examples of the way the SAB is getting results. Section 4 contains summaries of the activities of each of the SAB Committees during FY92. Examples of the ways that the SAB Staff Office are getting results are included. Section 5 contains some projections for FY93.

The Report also includes a number of specialized appendices: charters, organizational charts, leadership information, membership lists, guidelines on service on the SAB, lists of meetings,

abstracts of FY92 report, and information about the SAB Staff.

1.2 Introduction to the Board

The purpose of the Board is to provide qualified, independent technical advice to the Administrator of EPA on scientific, engineering, and economic underpinnings of Agency positions (See charters in Appendix A). The SAB often functions as a peer review panel, assessing the technical rationales underlying current or proposed Agency positions. In recent years, however, it has initiated a number of activities on its own; e.g., the study of leachability of hazardous wastes and a commentary on the relative risks of radon in drinking water vs radon gas in homes.

The SAB was formally chartered in 1978 by the Environmental Research, Development, and Demonstration Authorization Act, although its roots extend back to the birth of EPA in 1970 and beyond. The Board is a Federal Advisory Committee, complying with the Federal Advisory Committee Act, and is composed of non-governmental scientists and engineers appointed by the EPA Administrator. The 80 members of the Board (see Appendix B) are appointed by the Administrator and conduct their

business through ten Committees, coordinated through an Executive Committee (See the organizational chart in Appendix C and Staff support and committee leadership in Appendix E). The members of the Board are some of the most qualified scientists, engineers, and economists in the country, as evidenced by the credentials of the FY92 Committee Chairs (See Table II). The work of the Board is supported by over 300 consultants to the Board (see Appendix B), who are also non-governmental scientists, engineers, and economists appointed by the SAB Staff Director. Technical experts employed by the Federal Government who have special skill or knowledge in particular areas participate as Liaison Members on several Committees, as needed.

The SAB is supported by a Staff Office of 17 persons and an FY92 budget of some \$1.7 million. These resources enabled the Board to conduct 48 meetings and issue 26 full reports and 29 short reports (generally less than 10 pages, including Letter Reports and Commentaries) and six Notifications of Consultations (See Tables III and IV).

The SAB carries out projects at the request of the Agency, at the request of Congress, and on its own volition. In recent years, the number of requests for SAB action have been 3-5 times the

number that the Board can address. Therefore, the Board has adopted criteria for use in establishing priorities among the various requests, determining the degree to which such requests:

- a. Impact overall environmental protection
- b. Address novel scientific problems or principles
- c. Integrate science into Agency actions in new ways
- d. Influence long-term technological development
- e. Respond to emergencies
- f. Deal with problems that transcend federal agency or other organizational boundaries.
- g. Strengthen the Agency's basic capabilities
- h. Serve Congressional and other leadership interests

The reports produced by the SAB have a positive impact on many aspects of the Agency's operations and policies, to wit:

- a. The rigor of the Agency's technical positions
- b. The specific areas to which the Agency allocates resources for scientific and technical activities
- c. The directions taken by emerging science policy
- d. The directions taken by the Agency's planning
- e. The directions and form of public debate of scientific, engineering, and economic issues

Of particular note, in terms of the Board's "getting results" and affecting major aspects of EPA's operations in FY92, were

- a. The Agency's risk assessment of environmental tobacco smoke ("passive smoking" or "ETS").
- b. The Ecological Monitoring and Assessment Program (EMAP) and Ecological Indicators Program.
- c. The Agency's risk assessment of the carcinogenic effects of electromagnetic fields (EMF).

With all of these activities, attention and impacts, the Board has maintained a broad base of support both within and outside the Agency. In particular, the current Administrator and Deputy Administrator have been strong supporters of the SAB.

1.3 Review of FY92 Activities

During FY92, the ten SAB Standing Committees conducted 47 public meetings and one closed meeting, all of which were announced in the Federal Register. In addition, two conference calls were held for planning, writing, and administrative purposes. A wide variety of topics were covered: from the health effects of specific chemicals techniques for assessing risks at Superfund sites; from aspects of the Agency's research program to various reports to Congress. Appendices F and G contain a full listing of FY92 SAB meetings and reports (with abstracts), respectively.

In addition to its traditional activities of holding SAB meetings and producing reports, the Board and the SAB Staff took steps to develop ways of "getting results" by rebuilding the infrastructure that enables the Board to do its work. These include the following:

- a. Continued implementation of the recommendations of the Mission and Functioning report that was received in October, 1989.
 - b. Additional acquisitions, per the recommendations of the 1989 Management and Organization report, of modern computers and related systems, including upgrading the Local Area Network (LAN), an image and character scanning system, and additional laptop computers and printers for use at meetings.
 - c. Continued the use of Annual Meetings of the SAB to involve Members in determining the Board's long-range view that provides direction for the Staff.
 - d. Continued development of formal procedures for setting the agenda for the SAB, involving many of the Board's constituencies, including the Executive Committee, the Administrator's Office, the Assistant Administrators, Regional Administrators, and the EPA program offices--much of the activity coordinated through the SAB Consultative Group.
 - e. Attendance at formal training on Total Quality Management (TQM) for the entire SAB Staff.
 - f. Hiring additional staff.
- The Board itself underwent a significant restructuring in FY92. The new Environmental Economics Advisory Committee (EEAC)--requested by the Administrator in his response to the SAB's Reducing Risk report--became operational, investigating a number of important issues of how economic analysis is applied to environmental problems. In addition, the Clean Air Act Compliance Analysis Council (CAACAC) (see Section 812 of the Clean Air Act Amendments of 1990) became a distinct entity under the administrative umbrella of the Science Advisory Board; cf., CASAC. The start-up phases of both these groups attracted considerable attention from the Board, the Agency, the Congress, and the public.

1.4 Projections and Conclusions

FY93 should be an exciting and busy time for the SAB. There will be several activities associated with completing tasks started in FY92, as well as a range of on-going efforts related to the FY90 Reducing Risk project.

The FY93 agenda-building exercise, although not yet completed, has surfaced many important issues, some of which will generate considerable public interest; e.g., reviews of health risk assessment guidelines for cancer and non-cancer effects, review of the Agency's reassessment of the risks posed by "dioxin," assessing radon research needs, and an examination of leachability phenomena and impacts on groundwater. In addition, as in the past, FY93 is likely to bring a number of important topics that cannot be anticipated at this time.

The Staff Office joined the Agency-wide movement to practicing

the principles of Total Quality Management (TQM). The TQM approach calls for organizations to study themselves and their goals and operations. This process began with the Staff Director becoming a Facilitator for the Agency TQM training program, and his subsequent formal training of all staff members at an off-site retreat in March 1992. Careful analysis of the Office's "customers" and "suppliers" and its capability to meet the needs of the Board, the Agency, and the public for accurate, timely, and effective advice on issues of health and environmental protection are already leading to additional improvements in our service to the Board, the Agency, and the public.

2. INTRODUCTION TO THE REPORT

2.1 Purpose of the Report

The Science Advisory Board (SAB) is a legislatively mandated group of non-governmental scientists, engineers, and economists charged with providing independent technical advice on environmental issues to the Administrator of the U.S. Environmental Protection Agency (EPA) and others; e.g., Congressional committees. Generally, the SAB does not get involved in or provide advice on regulatory policy aspects of problems confronting the Agency, since such matters are the

province and responsibility of the EPA Administrator. Additional details of the objectives, responsibilities, composition, and activities of the SAB are included in the charter of the organization (See Appendix A).

Informed observers acknowledge the SAB's remarkable history and its continuing importance in the protection of public health and the environment. However, some people both within and outside of the Agency are hard-pressed to describe the extent of the Board's activities or the detailed nature of its

findings. This is due, in part, to the complex structure of the Board and the aperiodic issuing of its reports. To some, the SAB is viewed as a hurdle which must be cleared on the way to issuing regulations; much like having to defend one's thesis on the way to getting an advanced degree. To others, the SAB is seen as a court of last resort in which competing scientific arguments are objectively and dispassionately evaluated.

For some puzzled observers of the SAB, the biggest problem is simply finding out "What does the SAB do?" A somewhat flippant, but accurate, answer to that question is: "The SAB makes a difference." For example, the SAB makes a difference in the type and conduct of scientific and engineering research at EPA. The SAB makes a difference in the way in which the resulting data are interpreted and used to support regulatory positions. The SAB also makes a difference to SAB members and consultants (M/Cs) and SAB staff by giving them the satisfaction of seeing their information and guidance used appropriately by the Agency to address environmental problems.

This Report is intended to reveal the SAB to a wide audience: to those inside the Agency, to those outside the Agency, to those who understand the

Board, to those who think they understand the Board, and to those who know enough to know that they don't understand the Board. The intent is that each reader gain a broader perspective of the SAB, its activities, and its impact.

Specifically, the purpose of the Staff Director's Annual Report is three-fold:

- a. To provide a succinct introduction to the SAB.
- b. To provide a summary of the SAB activities for FY92.
- c. To offer a near-term projection of future SAB activities.

In short, the Report is designed to provide "a group photograph" of the SAB--its people, its products, and its prospects--in sufficient detail that the interested reader can distinguish the major features and identify paths for investigating the finer details.

2.2 Content of the Report

The Report consists of five principle sections, plus appendices which supplement the discussion in the main sections. Following the Executive Summary (Section 1) and this Introduction (Section 2), Section 3 provides basic background information

on the SAB. Here the reader will find brief discussions on the history of the Board, its organization and membership, and its principal activities and procedures. Specific examples are described that illustrate the way in which the SAB impacts positively on the functions and operations of the Agency.

Section 4 focuses on SAB activities during FY92. This portion of the Report contains descriptions of the activities of each of the Board's Committees during the past year. Specific examples are given of the way in which FY92 was a year of "Getting

Results." In addition, changes in the SAB Staff and operations of the Office are highlighted. Section 5 provides a glimpse into what FY93 holds in store for the Board. Significant topics have already been identified, and some reviews planned; additional issues will arise during the course of the year.

The Appendices contain important information, such as organizational charts, membership lists, abstracts of SAB reports, and the like. These Appendices provide a source of more detailed information about specific aspects of the SAB.

3. INTRODUCTION TO THE BOARD

3.1 SAB Formation, Authority and Function

The SAB was established by Congress to provide independent scientific and engineering advice to the EPA Administrator on the technical basis for EPA regulations. Expressed in terms of the current parlance of the risk assessment/risk management paradigm of decision making (National Research Council, *Managing Risk in the Federal Government*, 1983), the SAB deals with risk assessment (hazard identification, dose-response assessment, exposure assessment and risk characterization)

and only that portion of risk management that deals strictly with the technical issues associated with various control options. Issues of Agency and Administration policy are generally beyond the scope of SAB mandate and involvement.

The SAB, in its present form, was established in 1978 by the Environmental Research, Development, and Demonstration Authorization Act (ERDDAA) (42 U.S.C. 4365). Predecessor bodies date back to the early 1970s. In carrying out the mandate of ERDDAA, the SAB provides "such scientific advice as may be requested by the Administrator, the Committee on Environment and Public Works

of the United States Senate, or the Committees on Science and Technology, Interstate and Foreign Commerce, or Public Works and Transportation of the House of Representatives". Because the Science Advisory Board is a Federal Advisory Committee, it must comply with the Federal Advisory Committee Act (FACA) (5 U.S.C. App. C) and related regulations. Consequently, the Board has an approved charter, which must be renewed biannually, announces its meetings in the *Federal Register*, and provides opportunities for public comment on issues before the Board.

As a practical matter, the function of providing credible technical advice to EPA and Congress antedates ERDDAA and its nascent SAB. The roots of the SAB can be traced back through various predecessor committees within EPA and--prior to the creation of EPA--into other agencies, such as the Department of Health, Education and Welfare. Since 1978, however, the SAB has operated as a Staff Office, reporting directly to the Administrator.

Members of and consultants to the Board constitute a distinguished body of scientist, engineers, and economists who are recognized, non-governmental experts in their respective fields. These individuals are drawn from academia, industry, and environmental communities

throughout the United States and, in some limited cases, other countries (See Appendix B for a listing of Members and Consultants).

Increasingly, the Agency has placed a premium on basing its regulations on a solid technical foundation. Therefore, during the past 14 years the SAB has assumed growing importance and stature. It has become formal practice that many major scientific points associated with environmental problems are reviewed by the SAB. For example, the Clean Air Act (CAA) requires that decisions related to the National Ambient Air Quality Standards (NAAQS) be reviewed by the Clean Air Scientific Advisory Committee (CASAC), which is administratively housed within the SAB.

Generally, the Board functions as a technical peer review panel. The SAB conducts its business in public view and benefits from public input during its deliberations. Through these proceedings Agency positions are subjected to critical examination by leading experts in the field in order to test the currency and technical merit of those positions. At the same time, the SAB recognizes that EPA is sometimes forced to take action to avert an emerging environmental risk before all of the rigors of scientific proof are met. To delay action until the evidence amounts to incontrovertible proof

might court irreversible ecological and health consequences. In such cases, the Agency makes certain assumptions and extrapolations from what is known in order to reach a rational science policy position regarding the need (or lack thereof) for regulatory action. Here, the SAB serves as a council of peers to evaluate the soundness of the technical basis of the science policy position adopted by the Agency.

3.2 SAB Organization and Membership

The SAB Charter (Appendix A) states that "The objective of the Board is to provide advice to EPA's Administrator on the scientific and technical aspects of environmental problems and issues," that "The Board will consist of a body of independent scientists and engineers of sufficient size and diversity to provide the range of expertise required to assess the scientific and technical aspects of environmental issues," and that "No member of the Board shall be a full-time employee of the Federal Government." The Charter requires formation of an Executive Committee and inclusion of the Clean Air Scientific Advisory Committee (see separate charter, also in Appendix A). Otherwise the Board may organize itself as needed to meet its responsibilities.

The Board's Executive Committee serves as the focal point for the coordination of scientific reviews by the Board's standing committees. Appendix C contains a chart of the FY92 SAB organization. The Executive Committee meets four times a year to act on Agency requests for reviews, hear briefings on pertinent issues, initiate actions/reviews by the Board which it feels are appropriate, and approve final reports prior to transmittal to the Administrator. (Reports from CASAC and the new CAACAC are submitted directly to the Administrator, without need for prior Executive Committee approval.)

Five Committees have historically conducted most Science Advisory Board reviews:

- a. Clean Air Scientific Advisory Committee (CASAC)
- b. Ecological Processes and Effects Committee (EPEC)
- c. Environmental Engineering Committee (EEC)
- d. Environmental Health Committee (EHC)
- e. Radiation Advisory Committee (RAC)

In recent years, five additional committees have been added:

- f. Indoor Air Quality/Total Human Exposure Committee (IAQC)
Mandated in the Superfund Amendments and Reauthorization Act in FY86
- g. Research Strategies Advisory Committee (RSAC)
Requested by the Administrator in response to SAB recommendations in FY88
- h. Drinking Water Committee (DWC)
Evolved from the EHC in FY90
- i. Clean Air Act Compliance Analysis Council (CAACAC)
Mandated in the 1990 Clean Air Act Amendments
- j. Environmental Economics Advisory Committee (EEAC)
Requested by the Administrator in response to the Reducing Risk report in FY90

The activities of these committees are supplemented by a variety of subcommittees, as well as by ad hoc subcommittees which are created as required.

The Board has been successful in tapping a continuing vein of top technical talent to fill its leadership positions. Those scientists and engineers who have led the SAB for the past 18 years are listed in Table I. Table II testifies to the caliber of individuals who have served as chairs of SAB Committees in FY92.

Although the number of appointed members is flexible, the FY92 SAB consisted of 80 members, appointed by the Administrator, generally for two year terms, renewable for two more terms in some cases. Service as Committee Chair can lead to an additional four years of continuous service. A formal guideline on membership service was adopted by the Executive Committee in making FY91 and FY92 appointments (See Appendix D). More than 300 additional technical experts, invited by the Staff Director, serve on an "as needed" basis as consultants to the Board on various issues where their expertise is relevant. The number of consultants is also flexible, and their one year terms can be renewed. Consultants are required to meet the same standards of technical expertise as members. The term "Member or Consultants (M/C)" is used throughout this report to refer to these outside technical experts. Appendix B contains a list of the FY92 M/Cs on the Board. Nearly all of them serve as "Special Government Employees (SGEs), subject to all

TABLE I SAB Leadership Over the Past Two Decades

Executive Committee Chairs	Affiliation	Date
Dr. Emil Mrak	University of California	1974-1978
Dr. John Cantlon	Michigan State University	1979-1981
Dr. Earnest Gloyna	University of Texas	1981-1983
Dr. Norton Nelson	New York University	1983-1988
Dr. Raymond Loehr	University of Texas	1988-present

SAB Staff Directors	Date
Dr. Thomas Bath	1975-1977
Dr. Richard Dowd	1978-1981
Dr. Terry Yosie	1981-1988
Dr. Donald Barnes	1988-present

appropriate restrictions, including conflict of interest statutes (18 U.S.C. Sections 202-209)

The SAB Staff consists of 17 EPA employees: a Staff Director, Assistant Staff Director, five technical Designated Federal Officials (DFOs), a Project Coordinator, a Program Assistant, seven Staff Secretaries, and one clerk/typist. There is also a receptionist, who is hired by contract through the AARP.

The duties of the Staff include identifying potential issues for SAB attention, focusing questions for review by the Board, working with the Board to identify and enlist appropriate M/Cs, interfacing between the Board and the Agency and the public, coordinating logistics for reviews, and producing minutes and reports for submission to the Administrator. Appendix E contains information on the Staff support within each of the Committees.

TABLE II FY 1992 SAB Committee Chairs

Executive Committee (EC)

Dr. Raymond Loehr

H.M. Alharthy Centennial Chair and Professor, Civil Eng. at the
University of Texas at Austin.

Member, Nat. Academy of Engineering

Member, Soc. of Env. Tox. and Chemistry

Member, Water Poll. Control Federation

Member, Am. Society of Civil Engineers

Former Chair, SAB Env. Engineering Committee

Clean Air Act Compliance Analysis Council (CAACAC)

Dr. Richard Schmalensee

Dir., Center for Energy and Env. Policy Research, Mass. Institute of Technology

Member, Editorial Board, Journal of Economics and Management Strategy

Member, Board of Directors, Long Island Lighting Company

Associate Editor, Journal of Economic Perspectives

Fellow, Econometric Society

Clean Air Scientific Advisory Committee (CASAC)

Dr. Roger McClellan

President of the Chem. Ind. Inst. of Toxicology

Member, National Institute of Medicine

Member, Am. Veterinary Medical Assoc.

Member, Radiation Research Society

Member, Society of Toxicology

Drinking Water Committee (DWC)

Dr. Verne A. Ray

Asst. Director of Safety Evaluation Department, Pfizer, Inc.

Member, Society of Toxicology

Member, Environmental Mutagen Society

Member, Genetic Toxicology Association

TABLE II (Continued)

Environmental Economics Advisory Committee (EEAC)***Dr. Allen V. Kneese¹***

Sr. Fellow, Quality of the Environment Division, Resources
for the Future

Member, American Academy of Arts and Sciences

Fellow, American Assoc. for the Advancement of Science

Member, American Economic Association

Member, Assoc. of Environmental and Resource Economics

Member, Editorial Board, Journal of Ecological Economics

Dr. V. Kerry Smith¹

University Professor of Economics, North Carolina State University

Member, American Economic Association

Member, Assoc. of Environmental and Resource Economics

Editor, Advances in Applied Macroeconomics

Associate Editor, Journal of Risk and Uncertainty

Associate Editor, Review of Economics and Statistics

Environmental Engineering Committee (EEC)***Mr. Richard Conway***

Senior Corporate Fellow, Union Carbide Corp.

Member, Nat. Academy of Engineering

Diplomate, Am. Acad. of Environ. Eng.

Fellow, Am. Soc. of Civil Engineers

Member, NRC Water Sci. & Technology

Board Affiliate Member, Assoc. of Env. Eng.

Prof. Member, Soc. of Environ. Tox. & Chemistry

Member, Amer. Inst. for Pollution Prevention.

¹ Co-Chairs

TABLE II (Continued)

Ecological Processes and Effects Committee (EPEC)

Dr. Kenneth L. Dickson,

Director, Inst. of App. Sci. and Dept. of Bio. Science.,
University of North Texas

Member, American Fisheries Society

Member, Soc. of Env. Tox. and Chemistry

Member, N. American Benthological Soc.

Member, J. K. G. Silvey Society

Environmental Health Committee (EHC)

Dr. Arthur Upton

Professor and Director, Institute of Environmental Medicine, N. Y. University

Member, American Assoc. for Cancer Research.

Member, Assoc. of Path. and Bacteriologists

Member, American College of Toxicology

Member, American Society for Exp. Path.

Member, Radiation Research Society

Member, Soc. for Exp. Biology & Medicine

Member, Society for Risk Analysis

Indoor Air Quality/Total Human Exposure Committee (IAQC)

Dr. Morton Lippmann

Professor, Institute of Environmental Medicine, New York Univ.

Director, Aerosol Inhalation Research Laboratory

Member, Am. Conf. of Gov. Ind. Hygienists

Member, Am. Academy of Indust. Hygiene

Member, Am. Industrial Hygiene Assoc.

Member, American Thoracic Society

Member, Am. Assoc. for Aerosol Research

TABLE II (Continued)

Radiation Advisory Committee (RAC)***Dr. Oddvar Nygaard***

Professor of Radiology and Biochemistry, Case-Western Reserve
University

Member, Radiation Research Society

Member, Environmental Mutagen Society

Member, American Chemical Society

Member, Society of Sigma Xi

Research Strategies Advisory Committee (RSAC)***Mr. Alvin Alm***

Director, Senior Vice President, Environmental Technology Group, Science
Applications International Corporation

Member, Nat. Academy of Public Admin.

Member, Board of Directors of Environmental Law Institute

3.3 SAB Activities**3.3.1 Overview**

The types of projects and the range of subjects reviewed by SAB continue to grow. The Board takes on reviews at the request of Congress, the Administrator and program offices, as well as on its own initiative. In general, the trend over time has been for more SAB reviews, addressing more varied subjects, requested by a wider range of individuals and organizations

Most of the outputs of the Board are in the form of full reports. Such

reports are generally the result of the peer review of some Agency document(s) and go into the details of the findings and recommendations, as well as answering specific questions in the Charge to the Board.

Increasingly, the SAB has moved toward using shorter, more timely communications to the Administrator. These communications are of two forms:

a. Letter reports

Similar in origin, content, and purpose to full reports; simply shorter

b. Commentaries

Unsolicited SAB advice about technical issues that the Board feels should be drawn to the Administrators attention

In addition, in recent years the SAB has introduced the "consultation" as a means of conferring—in public session—with the Agency on a technical matter before the Agency has begun work on an issue. The goal of the consultation is to leaven EPA's thinking on an issue by brainstorming a variety of approaches to the problem. There is no attempt or intent to express an SAB consensus or generate an SAB report. The Board simply notifies the Administrator that such a consultation has taken place.

The magnitude of SAB activity has increased dramatically during the past 10 years. Tables III - V and Figure 1 provide summary information on the Board's activities and resources as a whole.

From FY90 to FY91 there was a decrease in the number of meetings and reports. This decline resulted from several factors including an increase in complexity of the Board's review topics, and in the degree of public interest, scrutiny and involvement. Also during this period of increasing workload, several staff members were lost to other worthy activities. In FY92, the large increase in

reports without concurrent increases in funding or meetings has been a result of improved report preparation and processing, an emphasis on reduced turn-around of advice being tendered, and collective total quality management efforts on the part of the SAB Staff.

3.3.2 Criteria for activities

As the volume of requests for SAE involvement has increased, the Board has had to decide how to set its priorities. As a part of the "self-study" initiated in FY89, the Board's Mission and Functioning Committee developed a list of criteria which characterizes the more significant projects of the past and which can guide in the selection of projects in the future:

- a. Impact overall environmental protection; e.g., the EMAP review (EPA-SAB-EPEC-LTR-92-008)
- b. Address novel scientific problems or principles; e.g., the concept of using DNA protein cross-linking as a measure of internal dose of formaldehyde exposure (EPA-SAB-EHC-92-021).
- c. Integrate science into Agency actions in new ways; e.g., review of the technical portions of the

TABLE III SAB Expenses for Fiscal Years 1988-1992

Fiscal Year	Compensation		Total	Travel Expenses	Other Expenses	TOTAL
	Staff	M/C				
1988	\$550K	\$460	\$1,010K	\$280K	\$80K	\$1,370
1989	710	450	1,160	270	140	1,570
1990	750	390	1,140	210	320	1,670
1991	778	459	1,237	329	162	1,728
1992	894	413	1,307	298	54	1,659

NB In FY 1990 there was considerable contract support for the development and production of *Reducing Risk* with consequent reduction in the need for SAB funds devoted to compensation and travel.

TABLE IV SAB Activities and Resources, Fiscal Years 1980-1992

	Committee Meetings			Report Totals			Staff FTEs	Operating Costs ^f
	Open ^a	Closed ^a	Other ^b	Full ^c	Ltr ^d	Total ^e		
1980	42	1	0			13	81	15.8
1981	12	1	0			10	72	13.2
1982	20	0	0			10	37	10.5
1983	38	1	0			11	44	9.1
1984	29	1	0			17	48	14.1
1985	60	1	0			41	60	14.0
1986	61	1	0			28	59	14.1
1987	57	1	0			36	74	14.1
1988	58	1	0			43	74	13.2
1989	67	1	0			38	61	14.9
1990	60	1	5	26 ^g	7	33	55	16.0
1991	47	1	7	16	6	22	62	16.6
1992	47	1	2	26	35	61	80	16.5

a Meetings announced in the Federal Register, per the Federal Advisory Committee Act.

b Writing, planning, and administrative sessions do not normally require notice in the Federal Register. Some include conference calls. Data on such sessions prior to 1990 are not available.

c A full report on a topic is a more extensive discussion of the subject, e.g., greater than 10 pages. Separate data on full vs. letter reports are not available prior to 1990.

d A letter report is a more focused discussion of a topic. Included in this category are Letter Reports, and Commentaries to the Administrator on issues of concern to the SAB.

e Appendix G contains a list of all FY92 reports and abstracts.

f Operating costs in thousands (\$000), rounded to nearest \$50K.

g Includes three separate volumes of appendices to the *Reducing Risk* report.

TABLE V SAB Activities by Committee for Fiscal Years 1988-1992

<u>Committee</u>	<u>Fiscal Year</u>	<u># Meetings¹</u>			<u># Reports²</u>		
		<u>F.R.</u>	<u>Other</u>	<u>Total</u>	<u>Full</u>	<u>Ltr</u>	<u>Total</u>
EC	1988			4			0
	1989			4			0
	1990	4	0	4	0	0	0
	1991	4	1	5	1	0	1
	1992	5	0	5	0	0	0
EC/ Ad hoc	1988			26 ³			7
	1989			20			5
	1990	18	6	24 ⁴	7	0	7
	1991	0	0	0	0	0	0
	1992	0	0	0	0	1	1
CAACAC	1992	1	0	1	0	1	1
CASAC	1988			2			0
	1989			8			6
	1990	1	0	1	1	2	3
	1991	1	0	1	2	0	2
	1992	3	0	3	0	4	4
DWC	1990	4	0	4	3	2	5
	1991	8	0	8	2	0	2
	1992	5	0	5	4	8	12
EEAC	1992	2	0	2	0	1	1
EEC	1988			5			5
	1989			11			3
	1990	8	0	8	4	0	4
	1991	7	1	8	2	1	3
	1992	7	1	8	3	4	7

TABLE V SAB Activities by Committee for Fiscal Years 1988-1992 (Continued)

Committee	Fiscal Year	# Meetings ¹			# Reports ²		
		F.R.	Other	Total	Full	Ltr	Total
EHC	1988			9			19
	1989			9			13
	1990	3	0	3	5	0	5
	1991	4	0	4	3	4	7
	1992	2	0	2	2	1	3
EPEC	1988			3			4
	1989			7			3
	1990	6	0	6	3	0	3
	1991	10	0	10	4	0	4
	1992	9	1	10	8	3	11
IAQC	1988			1			0
	1989			2			1
	1990	0	0	0	0	1	1
	1991	2	0	2	1	0	1
	1992	3	0	3	2	2	4
RAC	1988			9			8
	1989			2			3
	1990	12	0	12	0	1	1
	1991	8	2	10	0	1	1
	1992	7	0	7	4	10	14
RSAC	1989			4			4
	1990	2	0	2	3	0	3
	1991	3	0	1	2	0	1
	1992	4	0	4	3	0	3

Where

EC Executive Committee
 CAACAC Clean Air Act Compliance Analysis Council
 CASAC Clean Air Scientific Advisory Committee
 DWC Drinking Water Committee
 EEAC Environmental Economics Advisory Committee
 EEC Environmental Engineering Committee
 EHC Environmental Health Committee
 EPEC Ecological Processes and Effects Committee
 IAQC Indoor Air Quality/Total Human Exposure Committee

RAC Radiation Advisory Committee

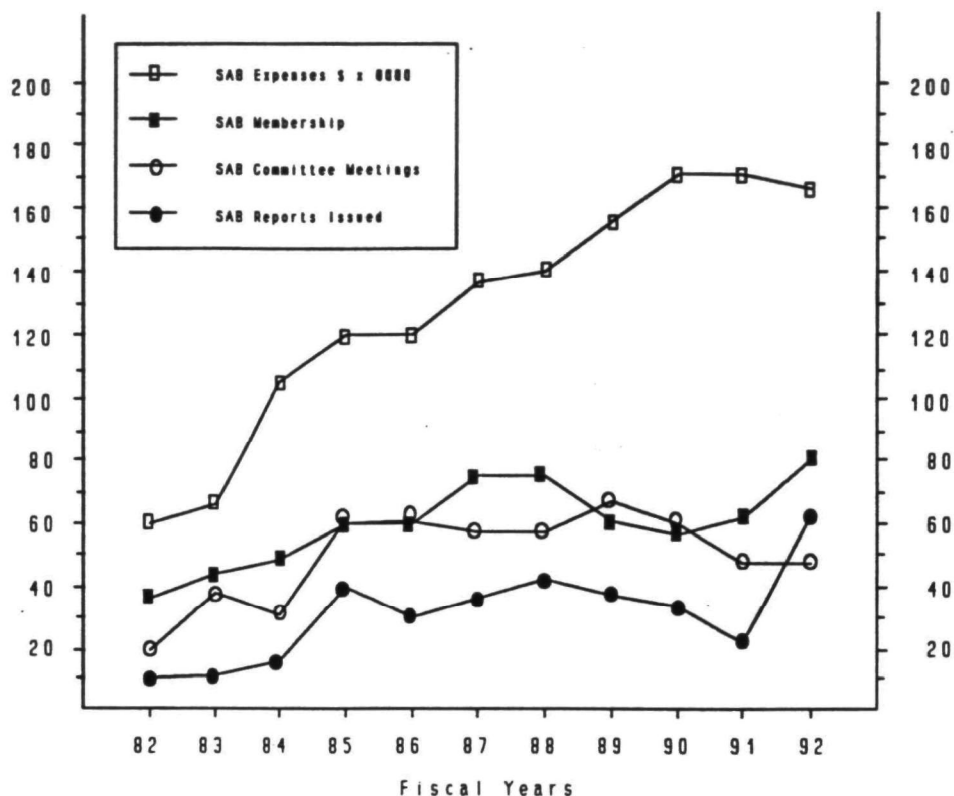
RSAC Research Strategies Advisory Committee

¹ For FY 90 and later indicates meeting requiring notice in Federal Register and those not req. notice.

² In 1990 and later, reports are entered as Full reports, or Letter reports (which include commentaries and notification of consultations).

³ Includes meetings of the Research Strategies Committee

⁴ Includes 22 meetings of the Relative Risk Reduction Strategies Committee (RRRSC)

Figure 1 SAB Resources and Outputs, Fiscal Years 1988-1992

"Homebuyer's and Seller's Guide to Radon (EPA-SAB-RAC-LTR-92-010).

d. Influence long-term technological development; e.g., leachability issues (EPA-SAB-EEC-92-003)

e. Respond to emergencies; (None in FY92)

f. Deal with problems that transcend federal agency or other organizational boundaries; e.g., review of evaluation of dredged material proposed for ocean disposal (EPA-SAB-EPEC-92-014)

g. Strengthen the Agency's basic capabilities; e.g., the review of the exposure assessment guidelines (EPA-SAB-IAQC-92-015)

- h. Serve Congressional and other leadership interests; e.g., testimony before a Congressional committee a review of the President's FY 93 budget proposal for EPA's research program (EPA-SAB-RSAC-92-017)

3.3.3 Impacts of activities

Each SAB activity has a unique set of consequences which can affect subsequent activity by the Agency, and, by extension, the rest of society. The listing below provides examples of the impacts of some of these activities during FY92.

- a. Impacts on the rigor of the Agency's technical positions

The SAB completed its report on a draft risk assessment for formaldehyde (EPA-SAB-EHC-92-021), based on a its FY 91 review. This issue generated considerable public interest, and elicited major involvement by the public, with participation in the discussions by several public interest groups, industry associations, and individual members of the public. Interest was particularly high in the scientific community because of the Agency's use of DNA protein cross-linking (DPX) in its assess-

ment. After prolonged discussion, the SAB determined that the use of DPX held promise for the future, but that the technique could be endorsed only as a measure of exposure at this time. The Committee also recommended that the Agency pursue further work on DPX as a marker of adverse effect, and look more carefully at existing epidemiological data on formaldehyde exposure to get a better understanding of the effects of joint particulate/formaldehyde exposure.

- b. Impacts on expenditures of funds

The SAB reviewed the *Correlation of Short-Term and Long-Term Tests for Radon* (EPA-SAB-RAC-92-008) and reminded the Agency that long-term measurements of radon more closely reflect exposure than do short-term measurements and that reliance on long-term measurements will reduce the likelihood of homeowner's mitigating where mitigation is not needed, or failing to mitigate where mitigation would significantly reduce cancer risk.

c. Impacts on emerging science policy

The SAB commented on the *Status of EPA Radionuclide Models* (EPA-SAB-RAC-COM-001), reminding the Agency that quantitative uncertainty analysis is important and will become increasingly important to the scientific credibility of the Agency's products.

d. Impacts on Agency planning

The SAB established an Environmental Economics Advisory Committee (EEAC) at the request of the EPA Administrator in response to a recommendation in the Science Advisory Board's "Reducing Risk" report). The EEAC reviewed EPA's effort on a pilot application of environmental accounting---the *Cheasapeake* report. In its commentary report (EPA-SAB-EEAC-COM-92-010) on this topic, the Committee advised EPA that research in this general area should be continued as a means of learning more about environmental accounting, but that it should not serve as a template for a series of such studies in other geographic areas. The EEAC felt that methodology has not yet been sufficiently developed to serve as a guide for

future efforts. Rather, it should continue to be used to stimulate further thought about fundamental conceptual and measurement issues which only percolate to the surface in the context of specific studies.

e. Impacts on the public debate of scientific and engineering issues

Through a series of reports over the past decade, public attention has been drawn to the issue of the possible association between cancer and electromagnetic fields (EMF). Various groups have studied and analyzed the situation--from states and foreign governments to the Office of the President's Science Advisor. The popular press has carried stories on the controversy, amid calls for more research, if not more regulation. Although epidemiological studies suggest a weak association between cancer and EMF, the results are not altogether clear and the possible mechanisms of action are even less clear.

The RAC conducted an extensive review of the issue, holding four public meetings over the course of nearly a year. The meetings were some of the most

heavily attended in the Board's history. The SAB's reports (EPA-SAB-RAC-92-013 and EPA-SAB-RAC-LTR-92-009) on the matter should be useful steps in moving towards a resolution of the technical issues involved.

3.3.4 Responses and reactions to SAB Activities

Since 1984, the Board has formally requested written Agency responses to SAB reviews. The majority of the responses indicate that the Agency has acted positively on the advice given by the Board. In many instances, the Agency initiated action on the basis of the advice rendered at the public meetings, prior to receipt of the formal report from the Board. In some cases the Agency and the Board "agree to disagree".

Support for the SAB both inside and outside the Agency remains strong. The Administrator and Deputy Administrator have made it a practice to attend Executive Committee meetings to discuss topics of mutual interest. Several Assistant Administrators also made presentations and requests at meetings of the Executive Committee in FY92. The greater number of EPA requests for SAB reviews speaks to the Agency's commitment to the SAB. However, resource constraints continue to limit the extent to

which the Board can respond fully to the needs of the Agency.

Outside the Agency, mention of the meetings and reports of the SAB appear in the trade press on a regular basis and in the public press on selected topics; e.g., environmental tobacco smoke, the national ambient air quality standard for ozone and other photochemical oxidants, and carcinogenicity of electromagnetic fields. SAB members, as recognized experts, are sought out by representatives of the media for comments on various environmental problems.

Congressional interest also continues. This year's ETS review again drew close scrutiny from certain offices on Capitol Hill. In addition, the Subcommittee on Natural Resources, Agriculture Research and Environment, which oversees the EPA's research programs, regularly invites members of the SAB's ORD Budget Review Subcommittee to testify at its hearings. The Chair has commented favorably on the Board and on the utility of its report on the magnitude and distribution of the ORD budget.

This year US Senator Daniel Patrick Moynihan introduced legislation that would have the SAB develop an expanded form of the Reducing Risk report on a biannual basis. At hearings on the bill in

September, 1992, SAB Chair Raymond C. Loehr provided testimony on the proposed legislation and received many favorable comments about the contributions of the Board.

SAB reports and commentaries also contributed to Congressional directives in the FY93 appropriations bill for the Agency. Specifically, EPA is required to conduct multi-media risk assessments and comparative cost/benefit studies for radon gas. In addition, the Agency must complete a study of the cost/benefits of drinking water regulations by mid-summer of 1993. The former reports must be submitted to the SAB for review prior to submission to the Congress; the latter report is likely to go to the Board also.

3.4 Examples of the SAB's "Getting Results"

3.4.1 Environmental Tobacco Smoke (ETS)

The Science Advisory Board's (SAB) Indoor Air and Total Human Exposure Committee (IAQC) met in public session on July 21-22, 1992 in Arlington, Virginia to review the draft EPA document *Respiratory Health Effects of Passive Smoking: Lung Cancer and Other Disorders* (EPA/600/6-90/006B May 1992 SAB Review Draft). At this public meet-

ing, the Committee received presentations from Agency staff concerning the draft document, and public comments from 15 individuals representing themselves or various groups with an interest in this matter, including the R. J. Reynolds Company, the Tobacco Institute, Action on Smoking and Health, the Coalition on Smoking On Health, and the Centers for Disease Control. The Committee also received written comments from 27 individuals or groups. Since the Agency did not initiate a formal public comment period, the SAB was the sole recipient of formal public comments under the provisions of the Federal Advisory Committee Act. Copies of all written comments were provided to the Committee prior to the public meeting, as well as to Agency staff for their consideration in revising the draft document.

This constitutes the second review conducted by this committee on this issue. This draft document is a revision of an earlier EPA draft report formerly titled, *Health Effects of Passive Smoking: Assessment of Lung Cancer in Adults and Respiratory Disorders in Children*, which the Committee reviewed on December 4 and 5, 1990. The Committee's earlier findings (*An SAB Report: Review of Draft Environmental Tobacco Smoke Health Effects Document*, EPA-SAB-IAQC-91-007, April 1991) concurred with EPA's conclusions that ETS should be

designated a Group A or known human carcinogen, but suggested that the conclusions on respiratory disorders in children could be made stronger. The SAB report also suggested several areas in which the health risk assessment could be improved, and offered to provide additional advice on a revised document.

EPA's draft document has been significantly revised from the 1990 draft, and is quite different in size as well as format. The current draft is about 600 pages in length, compared to the 350 of the earlier draft. The increased size is the result of several changes, including: a new Chapter (3) on physical/chemical components and assessing exposure to ETS; a new Chapter (4) on the relationship of active smoking and lung cancer; an expanded Appendix (A) which includes a review of all the pertinent ETS lung cancer studies in non-smoking women; a rewrite of the non-cancer respiratory disorders Chapter (7) to include approximately thirty more studies than did the 1990 draft; and a new quantitative risk assessment chapter (8) on non-cancer respiratory effects.

As a result of the SAB's earlier review, two appendices from EPA initial draft were dropped in the revision. These dealt mostly with lung deposition modelling and active to passive smoking dose-response modelling. As the SAB

suggested in its earlier report, some of the material from these appendices was extracted and included in Chapters 3 and 4 of the revised draft.

3.4.2 Radionuclides in Drinking Water

In FY 1993 the Radiation Advisory Committee (RAC) reviewed a series of EPA reports on the risks associated with radionuclides in drinking water. This activity was a follow-up to an earlier SAB review in 1987. After providing technical comments (EPA-SAB-RAC-92-009) on the Agency's document, the RAC went on to issue a commentary (EPA-SAB-RAC-COM-92-007) on the comparative risks the Agency had addressed in the radon levels in drinking water versus the radon levels in homeowner's basements [The Administrator had encouraged the Board to make such comparison, in the spirit of the SAB's 1990 *Reducing Risk* report.] In the Board's view, the Agency (following the mandates of Congress in the Safe Drinking Water Act) seemed bent on controlling much lower radon risks in the case of drinking water than the risks existing in basements that are below the Agency's recommended "action level" for radon in homes. The Board wanted to call this incongruity to the Administrator's attention.

Although there were logical reasons--based in Congressional legislation--for this disparity, the Board was simply pointing out that the differences did not rest on a firm technical foundation. In a wave of publicity and letters that followed on the issue, the SAB reports were often cited as support for rethinking the Agency's and Congress's position. In the end, the Congress required EPA to conduct a multi-media risk assessment and cost study to more clearly lay out the costs and benefits of controlling radon in different media. Congress has also mandated that the SAB provide a reaction to the reports when they are forwarded to the Hill in July of 1993.

Getting these kinds of results, this quickly, from the public, the Congress, and the Agency should be helpful to all of us.

3.4.3 Leachability

Over the past decade, the SAB's Environmental Engineering Committee (EEC) has reviewed a number of EPA issues involving leachability phenomena and noted several problems relating to this release term which were common to a variety of Agency regulatory programs. The Committee believed that these common problems would best be called to

the Agency's attention through a general review of leachability processes. Therefore, nearly two years ago the EEC launched a self-initiated study aimed at providing information on leachability, examining current practices, recommending specific actions for leachability test development, and providing insights on the application of tests and computer models to the assessment of leachability in the real world

The Committee has conducted a series of information and fact-finding public meetings, including an SAB-sponsored Leachability Workshop with international participation. This year the SAB got results--in the form of a substantive report (EPA-SAB-EEC-92-003) containing recommendations for both test methods and the development and user of computer models.

The EEC has continued to encourage the Agency to follow up on the SAB's recommendations on leachability. During this past fiscal year, the EEC conducted a broad distribution of this report, as well as follow-up activities with the affected program offices within the Agency. In the spirit of continuing cooperation, the Agency's Office of Solid Waste (OSW) asked for a consultation on oily waste issues.

4. REVIEW OF FY92 ACTIVITIES

4.1 Introduction

Even more than last year, FY92 was a busy and varied year for the Science Advisory Board. The number of meetings held and the number of issues addressed during the year continued at a high level. The Board again examined several new topics whose ramifications for Agency planning, policy and practice are far-reaching. The SAB Staff maintained its commitment to quality service to the Board, the Agency, and the public while undertaking various actions to assess and enhance its own institutional health.

This section of the FY92 Annual Report consists of a brief overview of SAB Committee activities, a presentation of the ways in which the SAB is "Getting Results," and staff changes in the Science Advisory Board Office. Additional details and summaries are found in the appendices.

4.2 Overview of SAB Activities

In FY92, the various Committees and Subcommittees of the SAB conducted 48 public meetings and 2 public conference calls and issued 26 full reports and 29 letter-size reports (generally

under 10 pages) and six notifications of consultations. Some of these reports reflected culmination of work initiated in the previous fiscal year, just as some of the FY92 meetings will result in FY93 reports.

The SAB was involved in some way with nearly every program office of the Agency. The SAB both responded to requests for reviews from the Agency and took the initiative in delving into new areas and new approaches, providing the kind of technical advice that makes a difference in the Agency's operations.

FY92 also saw the Third Annual Meeting of the Science Advisory Board, held in October 1991. Featured at the meeting was an address by Dr. C. Allen Bromley, Science Advisor to the President and Director of the Office of Science Technology Policy in the White House.

The activities of the individual Committees are summarized in the sections below. More details are available in the Appendices; specifically, Appendix F contains a list of all SAB meetings and Appendix G contains a list of all FY92 SAB reports, together with their abstracts.

4.2.1 Executive Committee (EC)

The EC met four times during FY92 to conduct its business of overseeing activities of the Board and reviewing Committee reports for transmittal to the Administrator. (The separately chartered CASAC and CAACAC submit their reports directly to the Administrator, with information copies being supplied to the EC.) The EC also held an Annual Meeting in conjunction with its first meeting of the year. During this year, the EC has continued to take a much larger role in the planning and prioritizing of the Board's activities and in the review of its Committee-prepared reports. This has helped to provide consistency in SAB products, and worked toward broadening the Board's activities.

In addition, the EC prepared a commentary on Anticipatory Research (EPA-SAB-EC-COM-92-006).

4.2.2 Clean Air Act Compliance Analysis Council (CAACAC)

The CAACAC is a statutory advisory group (See the Clean Air Act Amendments of 1990) was formed under the administrative umbrella of the SAB. Like CASAC, it reports directly to the Administrator and has a separate charter. The Council and the EEAC have comple-

mentary responsibilities and some overlap in membership.

The CAACAC conducted one meeting during FY 92, its first year of operation, and released one report:

Review of the Agency's workplan for producing the mandated retrospective study of impacts of the Clean Air Act
(EPA-SAB-CAACAC-LTR-92-019)

4.2.3 Clean Air Scientific Advisory Committee (CASAC)

CASAC primarily reviews documents relating to National Ambient Air Quality Standards (NAAQS). By law these standards are to be re-evaluated by EPA every 5 years. In practice, however, the process often takes longer. CASAC does not set the review schedule; rather, it is responsive to Agency time tables.

During FY92, the CASAC held three meetings and produced three reports:

- a. Review of the Agency's Air Quality Criteria for Carbon Monoxide: Assessment of Scientific and Technical Information
(EPA-SAB-CASAC-LTR-92-016)

- b. Review of the Agency's Air Quality Criteria for Oxides of Nitrogen
(EPA-SAB-CASAC-LTR-92-017)

- c. Commentary on the Ozone National Ambient Air Quality Standard
(EPA-SAB-CASAC-COM-92-009)

The Committee also conducted a consultation on approaches to prioritizing the 189 hazardous air pollutants that are listed in the 1990 Clean Air Act Amendments.

4.2.4 Drinking Water Committee (DWC)

The DWC held five Committee meetings and issued 12 reports during FY92. Seven of them dealt with Agency criteria documents (CD) on specific pollutants:

- a. Review of the Agency's CD on Chlorinated Acids
(EPA-SAB-DWC-92-002)

- b. Review of the Agency's CD on Chlorine Dioxide
(EPA-SAB-DWC-LTR-92-012)

- c. Review of the Agency's CD on Cryptosporidium
(EPA-SAB-DWC-LTR-92-011)

- d. Review of the Agency's CD on Cyanogen Chloride
(EPA-SAB-DWC-LTR-92-002)

- e. Review of the Agency's CD on Nitrate/Nitrite
(EPA-SAB-DWC-LTR-92-001)

- f. Review of the Agency's CD on Ozonation Disinfection and Its By-Products
(EPA-SAB-DWC-LTR-92-014)

- g. Review of the Agency's CD on Trihalomethanes
(EPA-SAB-DWC-92-011)

Three reports deal with research programs and a computer model:

- h. Review of the Agency's Corrosion Research Program
(EPA-SAB-DWC-92-010)

- i. Review of the Agency's Arsenic Research Plan
(EPA-SAB-DWC-92-018)

- j. Review of the Agency's Viral Transport Model (VIRALT)
(EPA-SAB-DWC-LTR-92-013)

The DWC also issued two commentaries:

- k. Commentary on Disinfection By-Products
(EPA-SAB-DWC-COM-92-008)

- I. Commentary on Microbial Risk Model
(EPA-SAB-DWC-COM-92-04)

In addition, the DWC conducted public meetings which will result in transmittals to the Administrator in FY93 on the following topics:

- a. The Health Effects Research Laboratory Drinking Water Research Program
- b. The Chlorine and Chloramines Criteria Documents

4.2.5 Ecological Processes and Effects Committee (EPEC)

In FY92 EPEC held nine Committee and Subcommittee meetings, generating 10 reports. The Committee reviewed a wide variety of topics, and conducted one consultation. A Subcommittee also reviewed the Agency's concepts for developing ecological risk assessment guidelines.

EPEC has established five themes which it will cover in long term reviews: Ecorisk, EMAP, Environmental Quality Criteria, Global Climate Change, Habitat and Biodiversity.

The following reports were developed during this year:

Ecorisk Theme

- a. Review of EPA's Ecorisk Assessment Research Program
(EPA-SAB-EPEC-92-006)
- b. Review of Ecorisk Guideline Approach
(EPA-SAB-EPEC-92-023)

EMAP Theme

- c. Review of the EMAP Program Plan
(EPA-SAB-EPEC-LTR-92-008)

Environmental Quality Criteria Theme

- d. Review of Research on Expert Systems to Predict Fate and Effects of Chemicals
(EPA-SAB-EPEC-92-004)
- e. Review of Guidance for Disposal of Dredged Materials
(EPA-SAB-EPEC-92-014)
- f. Review of the final Alaskan Bioremediation Project
(EPA-SAB-EPEC-LTR-92-015)
- g. Review of Dioxin Ecotox Research
(EPA-SAB-EPEC-92-024)

Global Climate Change Theme

No reports in FY92

Habitat and Biodiversity Theme

h. Evaluation of the National Estuary
Program Monitoring Guidance
(EPA-SAB-EPEC-92-005)

i. Review of EPA's Wetlands Re-
search Program
(EPA-SAB-EPEC-92-007)

j. Review of Habitat Assessment Re-
search
(EPA-SAB-EPEC-92-025)

The Committee also conducted a consultation dealing with the Habitat and Biodiversity theme.

In addition, the Committee completed work on two reports in FY92 that will be reviewed by the Executive Committee at their first meeting in FY93:

Review of Development Process for
Sediment Criteria

Review of Guidance for the Great
Lakes Water Quality Initiative

**4.2.6 Environmental Economics
Advisory Committee (EEAC)**

The Committee was created during FY91 at the request from the Administrator who was responding to a recommendation in the Board's *Reducing Risk* report.

During FY92, its first year of operation, the Committee conducted two meetings and released one commentary:

Commentary on the Agency's
Cheasapeake Report
(EPA-SAB-EEAC-COM-92-010)

The Cheasapeake Report is the Agency's first attempt to explore new approaches to economic accounting of environmental resources, a recommendation contained in the Reducing Risk report.

In addition, the EEAC has discussed in public session a controversial notion that regulations imposed to promote specific health benefits could have unintended negative general health consequences. The Committee is preparing a commentary on this issue for release in FY93.

4.2.7 Environmental Engineering Committee (EEC)

The EEC conducted eight meetings of the full Committee and various subcommittees, covering 11 topics. In addition to the five reports and commentaries described below, the Committee conducted three consultations on oily waste issues, on the Superfund Groundwater Strategic Plan, and on dense non-aqueous phase liquids (DNAPL's).

- a. Recommendations and Rationale for Analysis of Contaminant Release by the Environmental Engineering Committee
(EPA-SAB-EEC-92-003)
- b. Review of ORD's research program in Constructed Wetlands for Wastewater Treatment
(EPA-SAB-EEC-LTR-92-006)
- c. Review of ORD's Draft Pollution Prevention Research Strategic Plan
(EPA-SAB-EEC-LTR-92-007)
- d. Review of the Office of Solid Waste and Emergency Response (OSWER), Chemical Emergency Preparedness and Prevention Office (CEPPO) Issues on Crite-

ria for Explosives and Flammables for SARA Title III
(EPA-SAB-EEC-92-020)

- e. Review of ORD's Bioremediation Research Program Strategy
(EPA-SAB-EEC-92-026)

The Committee also generated a report that will be reviewed by the Executive Committee at their first meeting in FY93:

Review of the Office of Solid Waste and Emergency Response (OSWER), Chemical Emergency Preparedness and Prevention Office (CEPPO) Draft Hydrogen Fluoride Study: Report to Congress

In addition, the EEC held public meetings on two issues that will result in FY93 reports:

- a. Review of ORD's Indoor Air Engineering Research and Development Program.
- b. Review of ORD's Underground Storage Tank (UST) Research Program

**4.2.8 Environmental Health
Committee (EHC)**

The EHC conducted two Committee meetings and released two reports during FY 92.

- a. Review of Agency approaches to assessing complex mixtures
(EPA-SAB-EHC-92-001)

- b. Review of Agency's Risk Assessment of Formaldehyde
(EPA-SAB-EHC-92-021), described in greater detail in Section 3.3.3.

The Committee also conducted a consultation on the Agency's approach to determining populations-at-risk at Superfund sites.

In addition, the EHC held public meetings on two issues that will give rise to reports in FY93:

- a. Dermal Exposure Assessment
- b. Superfund Health Risk Assessment Guidance (RAG)

**4.2.9 Indoor Air Quality/Total Human
Exposure Committee (IAQC)**

The Committee held three meetings and issued three reports during FY92.

- a. Review of the Exposure Assessment Guidelines
(EPA-SAB-IAQC-92-015)

- b. Review of the Uptake Biokinetic Model for Lead
(EPA-SAB-IAQC-92-016)

- c. Commentary on Asbestos Research
(EPA-SAB-IAQC-COM-92-005)

The Committee also conducted a consultation on National Human Exposure Assessment Survey (NHEXAS), which will be the subject of a formal review in FY93.

In addition, the IAQC completed work on three reports that will be reviewed by the Executive Committee at their first meeting in FY93:

- a. Review of the Agency's risk assessment of Environmental Tobacco Smoke (ETS)
- b. Review of Risk Assessment Forum (RAF) Guidelines on Exposures to Volatile Organics from Shower Water
- c. Review of RAF Guidance on Exposures to Gasoline Vapors in Buildings

The ETS review is a follow-up to an earlier review (see FY91 Annual Report). The interest and involvement of the public, the Congress, and the news media during the second review remained high, thereby providing the SAB with a broad platform for the SAB to provide its advice.

4.2.10 Radiation Advisory Committee (RAC)

In FY92 the RAC advised the Administrator on a variety of radiation-related issues including electric and magnetic fields, indoor radon, radiation risks, radionuclides in drinking water, and the disposal of radioactive wastes. The Committee took a special interest in environmental transport modeling for radionuclides, uncertainty analysis, and harmonizing chemical and radiation risk reduction strategies.

During the year the RAC finalized 14 reports and conducted seven public Committee and Subcommittee meetings. The reports were focused primarily on radon and electromagnetic field issues:

Radon

- a. Review of the Agency's Revised Radon Risk Estimates and Associated Uncertainties
(EPA-SAB-RAC-LTR-92-003)

- b. Review of the draft revised Citizen's Guide to Radon
(EPA-SAB-RAC-LTR-92-005)
- c. Review of the Agency's examination of the correlation between short-term and long-term tests for radon
(EPA-SAB-RAC-92-008)
- d. Review of the Agency's 1990 Draft Drinking Water Criteria Documents for gross beta, radon, radium and uranium
(EPA-SAB-RAC-92-009)
- e. Review of the Agency's Homebuyer's-Seller's Guide to Radon
(EPA-SAB-RAC-LTR-92-010)
- f. Review of the Agency's design of the national radon survey
(EPA-SAB-RAC-92-012)

EMF

- g. Review of the Agency's *Research Strategy for Electric and Magnetic Fields: Research Needs and Priorities*
(EPA-SAB-RAC-LTR-92-009)

- h. Review of the Agency's *Evaluation of the Potential Carcinogenicity of Electromagnetic Fields*
(EPA-SAB-RAC-92-013)

- m. Commentary/closure letter on the proposed regulation for radionuclides in drinking water and supporting documentation
(EPA-SAB-RAC-COM-92-003)

Other

- i. Review of the Agency's Idaho Radionuclide Study
(EPA-SAB-RAC-LTR-92-004)

- n. Commentary on Harmonizing Chemical and Radiation Risks
(EPA-SAB-RAC-COM-92-007)

- j. Review of the Agency's suggested guidelines for the disposal of drinking water treatment wastes containing Naturally Occurring Radioactive Materials (NORM)
(EPA-SAB-RAC-LTR-92-018)

The Committee has also completed work on a report that will be reviewed by the Executive Committee at its first meeting in FY93:

Review of the Agency's estimate of Radiogenic Cancer Risks

The Committee also issued four commentaries that have had a significant impact on the Agency, the public, and the Congress.

In addition, the RAC held public meetings on the following topics that should result in formal reports of commentaries in FY93:

- k. Commentary on transport models for radionuclides in the environment
(EPA-SAB-RAC-COM-001)

- a. The Agency's estimates of risks associated with potential release of carbon-14 (CO₂) from high-level radioactive waste disposal

- l. Commentary on residual radioactivity and contaminated sites
(EPA-SAB-RAC-COM-92-002)

- b. Improvements to uncertainty analysis using commonly available methods
c. The Superfund approach to dealing with radioactivity

4.2.11 Research Strategies Advisory Committee (RSAC)

During FY 92, the RSAC held four Committee and Subcommittee meetings, releasing the following three reports:

- a. Review of the President's FY93 Budget Request for the EPA Office of Research and Development
(EPA-SAB-RSAC-92-017)
- b. Recommendations for Scientific and Technical Achievement Awards (STAA)
(EPA-SAB-RSAC-92-019)
- c. Review of 14 Strategic ORD Research Issues for FY94
(EPA-SAB-RSAC-92-022)

In addition, the Committee completed work on a report that will be addressed by the Executive Committee in early FY93:

Review of the EPA draft "Stimulating Environmental Progress: A Social Science Research Agenda"

The ORD Budget Review and the STAA review are both annual events for the SAB. The former has been routinely requested by Congress for the past several years. The latter is an opportunity to review the more than 100 published

technical articles by EPA scientists and engineers and to make recommendations for professional recognition and cash awards from ORD.

4.3 Getting Results in the SAB Staff Office

During FY89 the SAB was subject to internal and external studies: through a self-study by Board Members (the "Mission and Function" study) and through a management analysis of the operation of the Staff Office by management experts from EPA's Office of Management and Organization (M&O). These two studies were formally presented to the SAB in early FY90. During that year, the SAB Staff followed-up on many of the recommendations of the two groups. The FY90 SAB Staff Director's Report summarized the important recommendations and progress to date. In sum, the reports urged the Board and the Staff Office to "work smarter" to achieve the goals of the SAB. The Staff believes that they are now "getting results", as evidenced by the above outputs of the Board and descriptions of the accomplishments that follow.

4.3.1 Computer Systems

In FY92 the Staff Office activated its Local Area Network (LAN), linking the two parts of the Office that are separated

by eight blocks of traffic, tourists, and occasional turmoil. The system is connected to the main EPA "backbone" system, providing access to all the other LAN's within the Agency across the country. The LAN provides the capability to efficiently share wordprocessing files, rapidly transfer information (including spreadsheet, graphics and databases), and electronically exchange internal messages through the LAN Mail system.

The acquisition of additional portable computers in FY93 has enhanced the ability of Committees to generate reports, minutes, etc. expeditiously.

With increased fax quality and scanner capability, there is increased flexibility and efficiency in the Staff Office. For example, it is possible to convert printed pages, even telefaxes, into an electronic format for merging with wordprocessing files.

An electronic file storage system has been obtained that will be used in FY93 to convert many of the Staff Office paper files into an electronic format, thereby reclaiming people-usable space in the often-too-cozy quarters.

In FY92 arrangements were made to place SAB documents (reports, Federal Register notices, agendas, etc.)

on a publicly accessible "800 number" computer bulletin board. The system should be activated in early FY93.

4.3.2 Total Quality Management (TQM)

Like the rest of EPA, the SAB has embarked on a journey of self-improvement through quality enhancements. The Staff was trained in the techniques of TQM at a three-day retreat in March, 1992. Several "Quality Action Teams" are currently addressing a variety of problem areas; e.g., strategic assault on office files, expedient reservation of SAB meeting space, and equitable award system for Staff.

4.3.3 Structural Changes and Resource Support

The Staff Office is exploring a new structure that will consolidate primarily administrative operations in five-person unit. The intention is to seek increased efficiencies through focused attention to administrative matters.

Three of the Office's Staff Secretaries have been promoted to higher levels in recognition of the qualitatively different work they perform from the standard secretarial operations.

The added economics work of EEAC and CAACAC are being supported by resources supplied by the Office of Air and Radiation and by the Office of Policy Planning and Evaluation.

During FY92 the SAB was asked to provide assistance in addressing a technical issue at a Superfund site in Ohio. The Office of Solid Waste and Emergency Response will contribute resources to fund this activity under the auspices of the Executive Committee. Steps are being taken to obtain additional DFO and secretarial support.

4.3.4 Administrative/Operational Changes

We are continuing to actively prepare standard procedures, setting-up document control procedures, creating mailing systems, and highlighting training for all staff on administration and computer systems. We are refining our standard format for SAB reports and other advisory documents to reflect newly available computer equipment and software. We published a brochure on the SAB in FY92, which is undergoing a re-print for further distribution in early FY93.

During FY92 and the transition into FY93, we are actively applying the guidance contained in Appendix D on Membership Terms. The application of

these guidelines have resulted in the FY93 renewal of 31 positions of individuals who have served less than a full tour of duty with the Board, 27 replacements of individuals whose tours have ended this year, and the creation of 6 new positions. This total of 64 positions with some change does not reflect the full Board membership, since a number of other Members are currently in the middle of a two-year term.

In early FY92, we received a request from an outside group who wished to transcribe an SAB meeting. In the view of the SAB Staff, the Chair and the Agency Staff, the issues were not such that they desired a transcript of the meeting. However, a client of this outside group who was unable to attend the meeting, wished a verbatim record of portions of the meeting. Pending further advice from the legal counsel and the Executive Committee, the outside group was permitted to pay for and arrange to transcribe the meeting. As a result of this, the Executive Committee discussed this issue at a meeting later in the year and agreed to allow outside groups to transcribe meetings under certain circumstances. A formal policy is being developed.

There is a great deal of interest on the part of both the public and the Agency concerning the issue of conflict of

interest (COI). Particularly when contentious issues are discussed, the audience at a meeting is often curious as to the established point of view or previous pronouncements made by those sitting on an SAB Committee. In order to clarify procedures for public disclosure of potential conflicts of interest, the SAB Staff has prepared guidelines which documents the procedures that are followed by Committee Members and Consultants at SAB meetings. This procedure is voluntary and members and consultants are not obligated to reveal confidential information that is contained in their Form 3120-1 (Appendix H).

4.4 SAB Staff in Transition

Ms. Frances Dolby took over responsibilities as Staff Secretary for the Indoor Air Quality and Total Human Exposure Committee, while retaining the same position for the Drinking Water Committee. In these roles she supports Assistant Staff Director **Bob Flaak** in his capacity as Acting DFO for both IAQC and DWC. **Carolyn Osborne** had been Staff Secretary to IAQC before being promoted to Program Assistant last year.

Dr. Ed Bender was nominated for and received a prestigious internship sponsored by the Department of Commerce. For much of FY93 he will be a part of a select group (less than a dozen)

who will participate in weekly seminars in an informal setting with governmental luminaries; e.g., **Dr. Bromley**, the President's Science Advisor. **Dr. Bender** had essentially carte blanche to conduct his internship wherever he desired in the government. He selected an exciting opportunity in the Department of Energy.

Ms. Stephanie Sanzone joined the Staff to serve, initially, as DFO to EPEC during the "sabbatical" of **Ed Bender**. The birth of her first child delayed her arrival until December, 1992. An oceanographer by training, **Ms. Sanzone** previously worked in the Agency's Wetlands Program.

Ms. Barbara Spencer-Pulliam joined the SAB Fairchild Office Staff as Receptionist at the beginning of the year. As a retired school teacher and ex-Dept of Defense employee, she brought a wide range of experiences to the Staff Office, through a hiring arrangement with the American Association of Retired Persons. She left the Staff at the end of the year to accept another position in the Agency EPA which held the prospect of a permanent position. She leaves us with good memories and good advice.

Ms. Darlene Sewell is now known as **Ms. Darlene Sewell-Oliver**, following her wedding, at which she was attended

by her SAB Staff co-worker LaShae Cardenas.

Mr. Roger Hildebeltel joined the SAB Staff on a short term rotational assignment from the Department of the Interior (DOI), as a part of a Senior Executive Service-related rotational program. Working with the SAB Staff, he explored the SAB process and its relation to the Agency, as model for what might work at DOI.

Ms. Kahlll Posey, Stay-in-School student at the Fairchild Office, resigned to continue her studies.

Mr. Rasheed Tahir became the new stay-in-school student at the Fairchild office. He is majoring in pre-law at Bowie State University.

Ms. Janice Jones joined the Fairchild Office as the Staff Secretary for CASAC and RSAC, supporting Randy Bond. Her experience includes work in the private sector, as well as a previous stint at EPA as secretary to then-Assistant Administrator for ORD, Dr. Bernard Goldstein.

Biographical sketches of the SAB staff are located in Appendix I.

5. CONCLUSIONS AND PROJECTIONS

FY92 was one of the most productive years in the history of the SAB. Not only were a record number of reports issued, but the backlog of reports was essentially eliminated. The announced quality goal for FY93 is to transmit reports to the Administrator no later than six months following the final public meeting on the issue.

FY93 promises to be a time of continuing evolutionary change for the SAB. Recent years have seen more Board activity "at the interface" between risk assessment and risk management. The release of Future Risk in 1988,

Reducing Risk in 1990, and an increasing number of commentaries has moved the SAB beyond its traditional role of "peer reviewer of last resort". These initiatives have been received with considerable enthusiasm by top Agency management. Administrator Reilly and Deputy Administrator Habicht have actively encouraged the SAB to, in the words of CASAC Chair Roger McClellan, "answer the essay question"; i.e., How important is this issue and why? For example, partly as a result of these unsolicited efforts, the Agency is:

- a. Paying additional attention to microbial contamination of drinking water
- b. Examining the costs/benefits of regulating different chemicals in drinking water
- c. Investigating the effectiveness and accuracy of communication methods for radon
- d. Rethinking its conceptually different approaches to assessing chemical vs. radiation risks.

The coming year will cast into even sharper relief the growing gap between what the SAB is asked (and would like) to and the legitimate resource constraints that exist. Consequently, a more conscious effort will be made to involve the Executive Committee, the Administrator, and the Agency in the establishing priorities for the SAB agenda. The recently formed Council of Science Advisors within the Agency will work as an Agency-wide "consultative group" to the SAB Staff Director.

It is the intention of the SAB in the coming year to explore further interaction with other advisory groups. For example, initial contacts in FY92 have resulted in a member of the SAB serving as a liaison to the Administrator's Environmental Financial Advisory Board (EFAB), who are charged with advising him on problems associated with the regulated communities' ability to raise money to comply with environmental regulations. Further, issues such as the significance of lead levels at Superfund sites suggest interaction with advisory groups at the Agency for Toxic Substances and Disease Registry, the DHHS unit charged with advising EPA on health issues at such sites.

The SAB Staff anticipates a busy year, augmented by new faces but constrained the same limitations affecting the rest of the Agency. Our intention is to be in a position to welcome FY94 with as much satisfaction and enthusiasm as we welcome FY93.

APPENDIX A

**Charters of the Science Advisory Board
Clean Air Scientific Advisory Board
Clean Air Act Compliance Analysis Council**

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
ADVISORY COMMITTEE CHARTER**

SCIENCE ADVISORY BOARD

1. **PURPOSE AND AUTHORITY.** This Charter is reissued to renew the Science Advisory Board in accordance with the requirements of the Federal Advisory Committee Act, 5 U.S.C. App. 11 SS 9(c). The former Science Advisory Board, administratively established by the Administrator of EPA on January 11, 1974, was terminated in 1978 when the Congress created the statutorily mandated Science Advisory Board by the Environmental Research, Development, and Demonstration Authorization Act (ERDDAA) of 1978, 42 U.S.C. 4365. The Science Advisory Board charter was renewed October 31, 1979; November 19, 1981; November 3, 1983; October 25, 1985; November 6, 1987; and November 8, 1989.

2. **SCOPE OF ACTIVITY.** The activities of the Board will include analyzing problems, conducting meetings, presenting findings, making recommendations, and other activities necessary for the attainment of the Board's objectives. Ad hoc panels may be established to carry out these special activities in which consultants of special expertise may be used who are not members of the Board.

3. **OBJECTIVES AND RESPONSIBILITIES.** The objective of the Board is to provide independent advice to EPA's Administrator on the scientific and technical aspects of environmental problems and issues. While the Board reports to the Administrator, it may also be requested to provide advice to the U. S. Senate Committee on Environment and Public Works or the U. S. House Committees on Science and Technology, Energy and Commerce, or Public Works and Transportation. The Board will review scientific issues, provide independent scientific and technical advice on EPA's major programs, and perform special assignments as requested by Agency officials and as required by the Environmental Research, Development, and Demonstration Authorization Act of 1978 and the Clean Air Act Amendments of 1977. Responsibilities include the following:

Reviewing and advising on the adequacy and scientific basis of any proposed criteria document, standard, limitation, or regulation under the Clean Air Act, the Federal Water Pollution Control Act, the Resource Conservation and Recovery Act, the Noise Control Act, the Toxic Substances Control Act, the Safe Drinking Water Act, the Comprehensive Environmental Response, Compensation, and Liability Act, or any other authority of the Administrator;

Reviewing and advising on the scientific and technical adequacy of Agency programs, guidelines, methodologies, protocols, and tests;

Recommending, as appropriate, new or revised scientific criteria or standards for protection of human health and the environment;

Through the Clean Air Scientific Advisory Committee, providing the technical review and advice required under the Clean Air Act, as amended in 1990;

Reviewing and advising on new information needs and the quality of Agency plans and programs for research, development and demonstration;

Advising on the relative importance of various natural and anthropogenic pollution sources;

As appropriate, consulting and coordinating with the Scientific Advisory Panel established by the Administrator pursuant to section 21 (b) of the Federal Insecticide, Fungicide and Rodenticide Act, as amended; and

Consulting and coordinating with other Agency advisory groups, as requested by the Administrator.

4. **COMPOSITION.** The Board will consist of a body of independent scientists and engineers of sufficient size and diversity to provide the range of expertise required to assess the scientific and technical aspects of environmental issues. The Board will be organized into an executive committee and several specialized committees, all members of which shall be drawn from the Board.

The Board is authorized to constitute such specialized committees and ad hoc investigative panels and subcommittees as the Administrator and the Board find necessary to carry out its responsibilities. The Administrator will review the need for such specialized committees and investigative panels at least once a year to decide which should be continued. These committees and panels will report through the Executive Committee.

The Administrator also shall appoint a Clean Air Scientific Advisory Committee of the Board to provide the scientific review and advice required by the Clean Air Act Amendments of 1990. This group, established by separate charter, will be an integral part of the Board, and its members will also be members of the Science Advisory Board.

5. **MEMBERSHIP AND MEETINGS.** The Administrator appoints individuals to serve on the Science Advisory Board for two year terms and appoints from the membership a

Chair of the Board. The Chair of the Board serves as Chair of the Executive Committee. Chairs of standing committees or ad hoc specialized subcommittees serve as members of the Executive Committee during the life of the specialized subcommittee. Each member of the Board shall be qualified by education, training, and experience to evaluate scientific and technical information on matters referred to the Board. No member of the Board shall be a full-time employee of the Federal Government. Most members will serve as special Government employee's.

There will be approximately 50-60 meetings of the specialized committees per year. A full-time salaried officer or employee of the Agency will be present at all meetings and is authorized to adjourn any such meeting whenever this official determines it to be in the public interest.

Support for the Board's activities will be provided by the Office of the Administrator, EPA. The estimated total annual operating cost will be approximately \$1,689,000 and the estimated Federal permanent staff support will be 14.6 workyears.

6. DURATION. The Board shall be needed on a continuing basis. This charter will be effective until November 8, 1993, at which time the Board charter may be renewed for another two-year period.

7. SUPERSESSSION. The former charter for the Science Advisory Board, signed by the Deputy Administrator on November 8, 1989 is hereby superseded.

October 4, 1991
Agency Approval Date

F. Henry Habicht II
Deputy Administrator

November 8, 1991
Date Filed with Congress

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
ADVISORY COMMITTEE CHARTER**

**CLEAN AIR SCIENTIFIC ADVISORY COMMITTEE
of the Science Advisory Board**

1. **PURPOSE.** This charter is reissued to renew the Clean Air Scientific Advisory Committee of the Science Advisory Board in accordance with the requirements of section 9(c) of the Federal Advisory Committee Act, 5 U.S.C. App. 11 SS 9(c).
2. **AUTHORITY** The Committee was specifically directed by law on August 7, 1977, under section 109 of the Clean Air Act, as amended [ACT], (42 U.S.C. 7409), and the charter was renewed on August 6, 1979; July 22, 1981; August 1, 1983; July 23, 1985;
3. **OBJECTIVE AND SCOPE OF ACTIVITY.** The Committee shall provide independent advice on the scientific and technical aspects of issues related to the criteria for air quality standards, research related to air quality, source of air pollution, and the strategies to attain and maintain air quality standards and to prevent significant deterioration of air quality. The Committee shall hold meetings, perform studies, make necessary site visits, and undertake other activities necessary to meet its responsibilities. The Committee will coordinate its activities with other Committees of the Science Advisory Board and may, as it deems appropriate, utilize the expertise of other committees and members of the Science Advisory Board. Establishment of subcommittees is authorized for any purpose consistent with this charter. The Committee will report to the Administrator of the U.S. Environmental Protection Agency.
4. **FUNCTIONS.** The Committee will review criteria documents for air quality standards and will provide independent scientific advice in response to the Agency's request and, as required by section 109 of the Act shall:

Not later than January 1, 1980, and at five year intervals thereafter, complete a review of the criteria published under section 108 of the Clean Air Act and the national primary and secondary ambient air quality standards and recommend to the Administrator any new national ambient air quality standards or revision of existing criteria and standards as may be appropriate,

Advise the Administrator of areas where additional knowledge is required concerning the adequacy and basis of existing, new, or revised national ambient air quality standards,

Describe the research efforts necessary to provide the required information,

Advise the Administrator on the relative contribution to air pollution concentrations of natural as well as anthropogenic activity, and

Advise the Administrator of any adverse public health, welfare, social, economic, or energy effects which may result from various strategies for attainment and maintenance of such national ambient air quality standards.

5. **COMPOSITION AND MEETINGS.** The Administrator will appoint a Chairperson and six members including at least one member c)f the National Academy of Sciences, one physician, and one person representing State air pollution control agencies for terms up to four years. Members shall be persons who have demonstrated high levels of competence, knowledge, and expertise in the scientific/technical fields relevant to air pollution and air quality issues. Members of the Committee become members of the Science Advisory Board, and the Chairperson of the Committee, or his designee, shall serve as a member of the Executive Committee of the Science Advisory Board. Most members will serve as Special Government Employees. The Committee will meet three to six times per year. A full time salaried officer or employee of the Agency will be present at all meetings and is authorized to adjourn any such meeting whenever this official determines it to be in the public interest. Support shall be provided by EP through the Offices of the Science Advisory Board. The estimated annual operating cost totals approximately \$185,000 and two workyears of staff support.

6. **DURATION.** The Committee will be needed on a continuing basis. This charter will be effective until August 7, 1993, at which time the Committee charter may be renewed for another two-year period.

F. Henry Habicht, II
Deputy Administrator

August 7, 1991
Date Filed with Congress

August 7, 1991
Agency Approval Date

**This document was prepared by the Staff of the Science Advisory Board.
Single copies are available free of charge from:**

**Science Advisory Board,
Office of the Staff Director (A-101),
U.S. Environmental Protection Agency,
401 M Street, SW, Washington, DC 20460.**

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
ADVISORY COMMITTEE CHARTER**

Clean Air Act Compliance Analysis Council

1. **PURPOSE.** This Charter establishes the Council in accordance with requirements of the Federal Advisory Committee Act, 5 U.S.C. App.11 SS 9(c).
2. **AUTHORITY.** The Council was specifically directed under section 812 of the Clean Air Act, as amended on November 15, 1990 (42 U.S.C. 7401 et seq.).
3. **OBJECTIVE AND SCOPE OF ACTIVITY.** The Council shall provide independent advice on technical and economic aspects of analyses and reports which the Agency prepares concerning the impacts of the Clean Air Act on the public health, economy, and the environment of the United States. The Council shall hold meetings, make necessary site visits and undertake other activities, necessary to meet its responsibilities. The Council will coordinate its activities with other committees of the Science Advisory Board and may, as it deems appropriate, utilize the expertise of other committees and members of the Science Advisory Board. Use of consultants and establishment of subcommittees is authorized for any purpose consistent with this charter providing subcommittees report back to the full Council. The Council will report to the Administrator of the U.S. Environmental Protection Agency.
4. **FUNCTIONS.** As required by the Clean Air Act Amendments of 1990, the Council shall:
 - review the data to be used for any analysis required under section 812 and make recommendations on the use of such data,
 - review the methodology used to analyze such data and make recommendations on the use of such methodology, and
 - prior to the issuance of a report to Congress required under section 812, review the findings of such report, and make recommendations concerning the validity and utility of such findings.

At the Agency's request, the Council will:

review other reports and studies prepared by the Agency relating to the benefits

and costs of the Clean Air Act, and

provide advice on areas where additional knowledge is necessary to fully evaluate the impacts of the Clean Air Act and the research efforts necessary to provide such information.

5. COMPOSITION AND MEETINGS. The Council shall consist of at least 9 members, appointed by the Administrator for terms of two years, after consultation with the Secretary of Commerce and the Secretary of Labor. Most members will be appointed as Special Government Employees subject to the conflict-of-interest restrictions. The Administrator shall appoint a chairperson. Members of the Council shall be recognized experts in the fields of economics analysis, the health and environmental effects of air pollution, environmental sciences, or such other fields that the Administrator determines to be appropriate. The chairperson of the Council shall serve as a member of the Executive Committee of the Science Advisory Board. Other members of the Council may be members of the Science Advisory Board and may also serve on its various other committees or study groups. It is expected that the Council will meet two to four times per year. A full time employee of the Agency, who will serve as the Designated Federal Officer, will be present at all meetings and is authorized to adjourn any meeting whenever it is determined to be in the public interest. Support shall be provided by EPA through the offices of the Science Advisory Board. The estimated annual operating cost totals approximately \$150,000 and 1.5 work-years of staff support.

6. DURATION. The Council will be needed on a continuing basis, and may be renewed beyond its initial two-year period following the date of enactment of the Act establishing this Council, as authorized in accordance with section 14 of the Federal Advisory Committee Act.

F. Henry Habicht II
Deputy Administrator

March 31, 1992
Date Filed with Congress

March 13, 1992
Agency Approval Date

APPENDIX B

**SCIENCE ADVISORY BOARD
MEMBERS AND CONSULTANTS FOR FY92**

On the folowing pages, Members of the Board are designated by the letter "M" in the "Status" Column; Consultants are designated by the letter "C."

LAST NAME	F NAME	AFFILIATION	ADDRESS	CITYSTATE	ZIP	PRIMARY	STATUS
Abriola	Linda	University of Michigan	116 Eng 1-A Building	Ann Arbor, MI	48109-2125	EEC	M
Alm	Alvin L	Science Applications International, Inc	1710 Goodridge Drive	McLean, VA	22102	RSAC/EC	M
Auerbach	Stanley	Oak Ridge National Labs	Mail Stop 6038 Bldg	Oak Ridge, TN	37831-6038	RSAC/EPEC	M
Boekstaele	Nancy	University of Maryland	Dept of Agric and Res Economics	College Park, MD	20742	EEAC	M
Doesch	Donald	University of Maryland	Post Office Box 775	Cambridge, MD	21613	EPEC	M
Brown	Stephen	Univ of Calif-Berkeley	19 Earl Warren Hall	Berkeley, CA	94720	RAC	M
Bull	Richard	Washington State Univ /Ph	College of Pharmacy	Pullman, WA	99164-6510	DWC	M
Bunn, Sr	William	Mobil Corporation	202 Carnegie Center	Princeton, NJ	8543	EHC	M
Carlson	Gary P	Purdue University	1334 R E Hene Pharm Bldg	West Lafayette, IN	47907-1334	DWC	M
Carns	Keith E		2360 Simas Ave	Pineole, CA	94564	DWC	M
Carpenter	George F	Michigan Dept of Natural Res	PO Box 30028	Lansing, MI	48909	EEC	M
Cass	Glen R	California Institute of Technology	Mail Code 138-78	Pasadena, CA	91125	CASAC	M
Clifton	Kelly	Univer of Wisconsin Madison	600 Highland Avenue	Madison, WI	53792	RAC	M
Conway	Richard A	Union Carbide Corporation	3200 Kanawha Turnpk	South Charleston, W VA	25303-0361	EEC	M
Cooper	William E	Michigan State University	203 Natural Science	East Lansing, MI	48824	EPEC	M
Crump	Kenneth	Clement Int'l Corp	1201 Gaines St	Ruston, LA	71270	EHC	M
Daisey	Joan M	Lawrence Berkeley Laboratories	One Cyclotron Road	Berkeley, CA	94720	IAQ	M
Deister	Paul F		11215 Wilding Lane	Houston, TX	77024-6308	RSAC/EC	M
Dickson	Kenneth	University of North Texas	GAB Bldg. Rm 471	Denton, TX	76203-3078	EPEC	M
Dudek	Daniel	Env Defense Fund	257 Park Ave South	New York, NY	10010	CAACAC	M
Freeman	A Myrick	Dept. of Economics	Bowdoin College	Brunswick, ME	04011	CAACAC	M
Gallo	Michael	Robert Wood Johnson Med.	676 Hoes Lane	Piscataway, NJ	08854	EHC	M
Harwell	Mark A	University of Miami	4600 Rickenbacker	Miami, FL	33149-1098	EPEC	M
Henderson	Rogene	Lovelace Inhal. Tox Res Inst	POB 5890	Albuquerque, NM	87186	EHC	M
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Marcus	Allan H.	Battelle Memorial Institute	P.O. Box 13758	RTP, NC	27709	DWC	C
Maschwitz	David E.	Minnesota Pollution Control Board	520 N. Lafayette Rd	St. Paul, MN	55155	EPEC	C
Mattison	Donald	University of Pittsburgh	11 Parran Hall, 130	Pittsburgh, PA	15621	RSAC	C
McConnell	Ernest E.		3026 Ethan Lane	Raleigh, NC	27613	DWC	C
McCune	Delbert	Boyce Thompson Institute	Tower Road	Ithaca, NY	14853-1601	CASAC	C
McDowell	Judith M.	Woods Hole Oceanographic		Woods Hole, ME	2543	EPEC	C

McKee	Herbert		8010 Neff St.	Houston, TX	77036	EEC	C
McKinley	Marvin	University of Alabama	255 MIB Box 870203	Tuscaloosa, AL	35487-0203	EEC	C
McMichael	Francis C	Carnegie-Mellon Univ.	5000 Forbes Ave/Por	Pittsburgh, PA	15213	EEC	C
McMurry	Peter H	University of Minnesota	111 Church St. SE	Minneapolis, MN	55455	CASAC	C
Mehlman	Myron A		7 Bouvant Drive	Princeton, NJ	8540	DWC	C
Menzel	Daniel B	Duke University Medical Center		Durham, NC	27710	EHC	C
Mercer	James W	GeoTrans, Incorporated	46050 Manekin Pl	Sterling, Va	22170	EEC	C
Meyer (Represent)	H Robert		5009 Alder Cl.	Fort Collins, CO	80525	RAC	C
Michel	Jacqueline	Research Planning Inc.	Post Office Box 328	Columbia, SC	29202	RAC	C
Miller	David W	Geraghty & Miller, Inc	6800 Jericho Turnpike	Syosset, NY	11791	EEC	C
Miller	Fred	Duke University Medical Center	2024 West Main St	Durham, NC	27705	EHC	C
Molenaar	John V	Air Resource Specialists	1901 Sharp Point Dr	Fort Collins, CO	80525	CASAC	C
Moomaw	William R	Tufts University	School of Law	Medford, MA	20006	CASAC	C
Morey	Rexford	Morey Res Inc	17 Sunland Drive	Hudson, NH	3051	EEC	C
Morgan	M Granger	Carnegie Mellon University	5000 Forbes Ave	Pittsburgh, PA	15213	CASAC	C
Mossman	Brooke T	University of Vermont	Medical Alumni Building	Burlington, VT	05405-0068	EHC	C
Mueller	Peter K	Electric Power Research I	P O Box 10412	Palo Alto,	94303	CASAC	C
Mushak	Paul	University of North Carolina	811 Onslow Street	Durham, NC	27706	CASAC	C
Nakles	David	RETEC, Inc.	3040 William Pittway	Pittsburgh, PA	15238	EEC	C
Napier	Bruce A	Battelle Pacific Northwest	PO 999	Richland, WA	99352	RAC	C
Neal	Robert A	Vanderbilt University	636 Medical Research Bldg	Nashville, TN	37232-0146	EHC	C
Neilsen	David	Nelleen Ground Water Sci-Inc.	4686 Route 605 S	Gelena, OH	43021	EEC	C
Nerode	Anil	Department of Mathematics	Cornell University	Ithaca, NY	14853-7901	RSAC	C
Neuhauser	Edward	Niagara Mohawk Power Corp	300 Erie Blvd., West	Syracuse, NY	13202	EPEC	C
Neuhold	John M.	Utah State University	1254 Island Drive	Logan, UT	84321	EPEC	C
Newell	Gordon		4163 Hubbard Dr	Palo Alto, CA	94306	CASAC	C
Nierenberg	William	Univ. of Calif	Scripps Inst of Oceana	La Jolla, CA	92093-0221	EPEC	C
North	Warner	Decision Focus, Inc.	4884 El Camino Real	Los Alto, CA	94022	EHC	C
O'Connor	Donald	Manhattan College		Bronx, NY	10471	EEC	C
O'Connor	Mary Ellen	University of Tulsa	600 S College Ave.	Tulsa, OK	74104-3198	RAC	C
O'Keefe	Patrick	NY State Department of Health	PO Box 509	Albany, NY	12201-0509	EHC	C
O'Melia	Charles	Johns Hopkins University	34th and Charles St	Baltimore, MD	21218	EEC	C

CONSULTANTS-92

Oberdoerster	Gunter	University of Rochester	Box EHSC	Rochester, NY	14642	EHC	C
Omenn	Gilbert	Univ of Washington/Sch of	SC-30	Seattle, WA	98195	CASAC	C
Oppenheimer	Michael	Environmental Defense Fun	257 Park Ave South	New York, NY	10010	CASAC	C
Orians	Gordon H	University of Washington	Institute for Environ. Studies	Seattle, WA	98195	EPEC	C
Overcash	Michael R	North Carolina State Univ	Box 5035	Raleigh, NC	27695-7906	EEC	C
Page	Albert L	University of California-Riverside	Dept. of Soil & Env	Riverside, CA	92521	EEC	C
Paustenbach	Dennis	McLaren/Hart	1135 Atlantic Ave. Suite 100	Alameda, CA	94501	EHC	C
Pellizzari	Edo D	Research Triangle Institute	POB 12184	RTP, NC	27709	DWC	C
Perera	Frederica	Columbia Univ/School of P	60 New Haven A/B109	New York, NY	10032	EHC	C
Peterson	Richard	University of Wisconsin	425 N Charter St/Ch	Madison, WI	53706	EHC	C
Plaender	Frederic K	University of North Carolina	315 Pittsboro St	Chapel Hill, NC	27599-7400	EPEC	C
Phalen	Robert F	University of California-		Irvine, CA	92717	CASAC	C
Pielke	Roger A	Colorado State University		Fort Collin	80523	CASAC	C
Pierce	Donald	Oregon State Univ	Dept of Statistics	Corvallis, OR	97331-4606	RAC	C
Pla	Grab	Univ of Montreal	POB 6207 Station A	Montreal, Quebec	H3C3T7	EHC	C
Pojasek	Robert	GEI Consultants Inc	1021 Main St	Winchester, MA	1890	EEC	C
Pole	Gerald	NH	9000 Rockville Pike	Bethesda, MD	20892	EEC	C
Prince	Harold	Michigan State Univ	Natural Resources Bldg	East Lansing, MI	48824-1222	EEC	C
Rabinowitz	Michael B		125 2 Ponds Road	Falmouth, MA	2540	CASAC	C
Reinhardt	Charles	Du Pont Company	PO Box 50, Elton R	Newark, DE	19714	EHC	C
Reuhl	Kenneth R	Rutgers University	Dept of Pharmacology	Placataway, NJ	08655-0769	EHC	C
Rockette	Howard	Univ of Pittsburgh	318 Parran Hall	Pittsburgh, PA	15261	IAQ	C
Rodericks	Joseph V.	Environ Corporation	4350 N. Fairfax Dr.	Arlington, VA	22203	RAC	C
Rodier	Patriola	University of Rochester	Box 668	Rochester, NY	14646	EHC	C
Ross	Joan B.	Research Associates in Microbiology		Tucson, AZ	85721	EHC	C
Rowe	Robert D.	RCG/Magier, Bailly, Inc.	1881 9th St., S. 20	Boulder, CO	80306	CASAC	C
Rozman	Karl K	University of Kansas Medical Center	39th & Rainbow Blvd	Kansas City, KS	66103	EHC	C
Russell	Milton	University of Tennessee	318 S. Stadium Hall	Knoxville, TN	37996-0710	CASAC	C
Russell	Liane B.	Oak Ridge National Labora	P.O. Box Y	Oak Ridge, TN	37831	EHC	C
Ryan	Barry	Harvard School of Public Health	677 Huntington Ave	Boston, MA	2115	CASAC	C
Rychman	Devere	REACT	2208 Welech Industrial	St. Louis, MO	63146	EEC	C
Sale	Stephen H.	Texas A&M University		College Station, TX	77843-4466	DWC	C

Sarofim	Adel F	Massachusetts Institute of Technology		Cambridge, MA	2139	EEC	C
Schechter	Harold	Ohio State University	120 W 18th Avenue	Columbus, OH	43210	DWC	C
Schechter	Harold	Ohio State University	120 W 18th Ave	Columbus, OH	43210	DWC	C
Schiager	Keith	University of Utah	100 Orson-Spencer Hall	Salt Lake City, UT	84112	RAC	C
Schnoor	Jerald	University of Iowa	Ctr for Global & Reg Env Rsk	Iowa City, IA	52242	CASAC	C
Schull	William	Univ of Texas	POB 20334	Houston, TX		RAC	C
Schutz	Donald F.	Teledyne Corporation	50 Van Buren Avenue	Westwood, NJ	7675	RAC	C
Sciall	Anthony	Georgetown University Medical School	3800 Reservoir Rd N	Wash, DC	20007-2197	BHC	C
Shugarl	Herman H.	University of Virginia	Clark Hall	Charlottesville, VA	22903	CASAC	C
Shugarl	Lee	Oak Ridge National Labs	MS-6036 POBox 2008	Oak Ridge, TN	37831	EPEC	C
Silbergeld	Ellen	University of Maryland	660 W Redwood St/Ho	Baltimore, MD	21201	BHC	C
Simon	Steven L	University of North Carolina	Dept of Env Sciences	Chapel Hill, NC	27599	RAC	C
Sinclair	Warren		2900 Ascot Lane	Olney MD	20832	RAC	C
Skelly	John	Penn State Univ	212 Bulkhoat Lab	University Park, PA	16802	CASAC	C
Slovic	Paul	Decision Research	1201 Oak Street	Eugene, OR	97401	RSAC	C
Small	Mitchell	Carnegie Mellon Univ.	Schenley Park	Pittsburgh, PA	15213	EEC	C
Smith	William H.	Yale University	370 Prospect Street	New Haven, CT	06511	EPEC	C
Smith	Clifford V	GE Foundation		Fairfield, CT	06431	RAC	C
Speizer	Frank E	Channing Laboratory	180 Longwood Avenue	Boston, MA	2115	CASAC	C
Starr	Thomas B	Environ Corporation	4350 N Fairfax Dr.	Arlington, VA	22203	DWC	C
Stegeman	John	Woods Hole Oceanographic		Woods Hole,	2543	EPEC	C
Stetter	Joseph R.	Transducer Research, Inc	1228 Olympus Drive	Naperville, IL	60540	IAQ	C
Stout	Judy	Dauphin Island Sea Lab	POB 369-370	Dauphin Island, AL	36528	EPEC	C
Strelow	Roger	Bechtel Environmental Institute	50 Beale St/PO Box	San Fransico, CA	94119-3966	RSAC	C
Sunderman	Frederick	University of Connecticut	263 Framington Ave.	Farmington,	6030	BHC	C
Susskind	Charles	University of California		Berkeley, CA	94720	RAC	C
Swenberg	James A.		111 Stoneridge Dr	Chapel Hill, NC	27514	BHC	C
Tarr	Joel	Carnegie Mellon Universit	5000 Forbes Avenue	Pittsburgh, PA	15213	EEC	C
Taub	Frieda B.	Univ of Washington	104 Fisheries Center	Seattle, WA	98195	EPEC	C
Taylor	George E.	Univer. of Nevada Reno/De	PO Box 60220	Reno, NV	89506-0220	CASAC	C
Templeton	William L.	Battelle Pacific Northwest	PO Box 999	Richland, W	99352	RAC	C
Tephly	Thomas R	University of Iowa	Bowen Science Building	Iowa City, Iowa	52242	DWC	C

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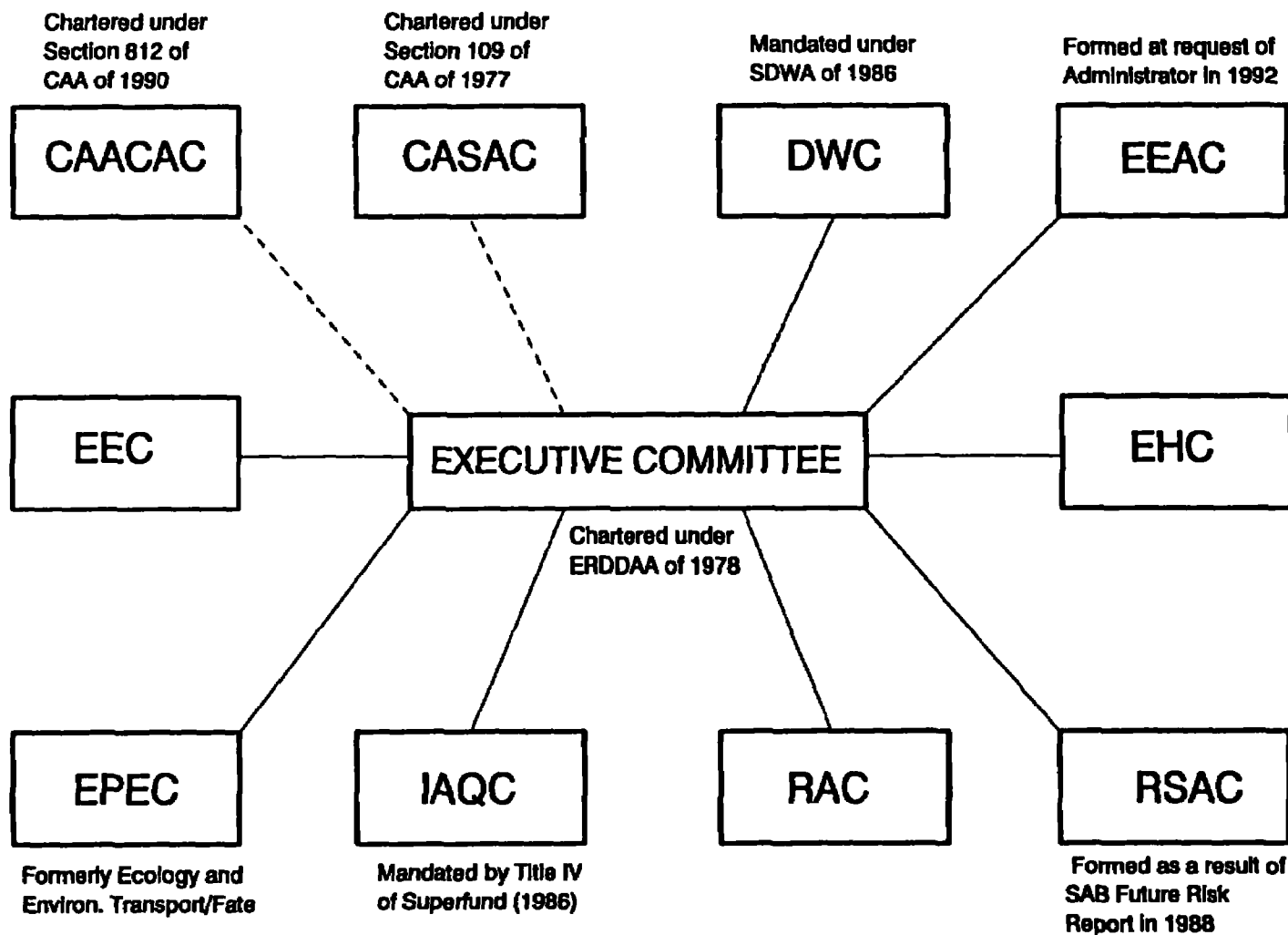
Thomas	Peter	IIT Research Inst	10 W 35th St	Chicago, Ill	60302	EHC	C
Thomas	Duncan C	Univ of Southern California	PMB B201 1420 San P	Los Angeles, CA	90033-9987	RAC	C
Tikuisis	Peter	Defense Civil Inst of Env Medicine	1133 Shepherd Ave	North York, Ontario	M3M3B9	CASAC	C
Till	John E	Radiological Assessments	Route 2, Box 122	Neeses, SC	29107	RAC	C
Travis	Cheryl	University of Tennessee	303 C Austin Bldg	Knoxville, TN	37998-0900	RSAC	C
Trjonis	John C.	Santa Fe Research Corp	11200 Bloomington F	Bloomington, Ill	65438	CASAC	C
Trussell	R Rhodes	James Mong Const. Eng., Inc	300 N. Lake Ave	Pasadena, CA	91101-7009	DWC	C
Turner	William A.		1 Auburn Business P	Auburn, MA	4210	RAC	C
Upton	Arthur C.	NY University Medical Center	550 First Avenue	New York, NY	10016	EHC	C
Velzy	Charles O	Charles R Velzy Associat	355 Main Street	Armonk, NY	10504	EEC	C
Vlachos	Evan C	Colorado State University	Dept. of Sociology	Fort Collins, CO	80523	EEC	C
Von Lindern	Ian	Terragraphics Env Engineering	121 South Jackson	Moscow, ID	83843	CASAC	C
Wade	Dennis E.	Monsanto Company	800 N.Lindbergh Blvd	St. Louis, MO	63167	EEC	C
Waller	William T	Univ. of N Texas	GAB Bldg Rm 471	Denton, TX	76203-3078	EPEC	C
Wallsten	Thomas	University of North Carol	Dept. of Psychology	Chapel Hill, NC	27599-3270	EHC	C
Walton	Barbara	Oak Ridge National Labs	Post Office Box X	Oak Ridge, TN	37831-6038	EPEC	C
Ware	James H	Harvard School of Public	677 Huntington Ave.	Boston, MA	2115	CASAC	C
Weiss	Bernard	Univ of Rochester Medical	Box EHSC	Rochester, NY	14642	EHC	C
Weiss	Scott	Harvard University	180 Longwood Ave.	Boston, MA	2115	IAQ	C
Whicker	Floyd W.	Colorado State Universtly		Fort Collins, CO	80523	RAC	C
White	Warren H.	Washington University	Campus Box 1124	St. Louis, MO	63130-4899	CASAC	C
White	Irvin L.	Battelle Pacific NW Lab	901 D St SW Suite 900	Washington, DC	20024-2115	EPEC	C
Wiersma	G. Bruce	University of Maine	206 Nutting Hall	Orono, MA	04469-0125	EPEC	C
Williams	Robert H.	Center for Energy & Environment	Princeton University	Princeton, NJ	08544-5263	CASAC	C
Wilson	John	NM Inst of Mining and Technology	Geoscience Dept.	Socorro, NM	87801	EEC	C
Wilson	Barry	University of California-		Davis, CA	95616	EHC	C
Wilson	Richard	Harvard University	231 Lyman Lab	Cambridge, MA	2138	RAC	C
Wilson	Bary	Battelle Pacific NW Labs	PO Box 999	Richland, WA	99352	RAC	C
Winner	William	Oregon State University	Weniger Hall 355	Corvallis, OR	97331-6511	CASAC	C
Witschi	Hanspeter	University of California-Davis		Davis, CA	95616	RSAC	C
Working	Peter	Genetech, Inc.	460 Bruno Blvd.	San Francisco, CA	94080	EHC	C
Wyzga	Ronald	Electric Power Research Inst.	3412 Hillview Ave.	Palo Alto, CA	94303	EHC	C

CONSULTANTS-92

Zagraniski	Rebecca	New Jersey Department of	CN 360	Trenton, NJ	8625	EEC	C
Zimmerman	R Enc	Esco Incorporated	7629 Greenbay Rd -	Wilmette, Ill	80091	EEC	C

APPENDIX C
SCIENCE ADVISORY BOARD
ORGANIZATONAL CHART

U.S. Environmental Protection Agency Science Advisory Board



All Committees (Except CAACAC and CASAC which report directly) report to the Administrator through the Executive Committee

APPENDIX D

GUIDELINES ON SERVICE ON THE SCIENCE ADVISORY BOARD

Background

The Science Advisory Board (SAB) was established in 1974 by the Administrator and in 1978 given a Congressional mandate to provide an independent source of scientific and engineering advice to the EPA Administrator on the scientific and technical underpinnings of Agency positions.

The SAB consists of approximately 80 members, who are appointed by the Administrator. These members serve on specific standing committees. The Chairs of the Committees also serve as members of the Executive Committee, which oversees all of the activities of the Board.

In many of its activities, the members of the Board are supplemented by the use of consultants, who are appointed by the SAB Staff Director after conferring with the Chair of the Executive Committee and the Chair of the Committee on which the consultant is to serve. Also, on occasion, Panels will be supplemented by "liaison members" from other governmental agencies. These people are invited by the Staff Director to participate in an ad hoc manner in order to bring their particular expertise to bear on a matter before the Board.

Both the Executive Committee and the permanent Committees may choose to conduct issue-specific business through Subcommittees that are chaired by SAB members. Reports from Subcommittees are reviewed by the respective permanent Committees. The Executive Committee reviews all reports, independent of their origin, prior to formal transmission to the Administrator. The sole exception is reports from the Clean Air Scientific Advisory Committee, which is a separately chartered FACA committee.

Criteria for Selection of Members and Consultants

The SAB is chartered as a Federal Advisory Committee, subject to the rules and regulations of the Federal Advisory Committee Act (FACA) (Public Law 92-463).

The charter provides guidance and restrictions on selection of SAB members. The four most significant of which are:

- a. Members must be qualified by education, training and experience to evaluate scientific and technical information on matters referred to the Board.
- b. The composition of Board committees, subcommittees and panels must be "balanced", representing a range of legitimate technical opinion on the matter.
- c. No member of the Board may be a full-time government employee.
- d. Members are subject to conflict-of-interest regulations.

The scientific and technical quality and the credibility of those selected is paramount and is the balance of technical opinion achieved. Secondary factors considered include the geographic, ethnic, sex, and academic/private sector makeup of committees. Other factors that contribute to, but do not determine, the selection include demonstrated ability to work well in a committee process, write well, and complete assignments punctually.

Nominations for membership/consultantship on the Board are accepted at any time. On a biannual basis, the SAB Staff Office publishes a notice in the Federal Register formally soliciting the names of candidates for SAB activities.

Terms of Appointment

Members serve at the pleasure and by appointment of the Administrator. In order to provide suitable terms of service and to insure the infusion of new talent, the following guidelines are generally followed:

Members are appointed for two-year terms which may be renewed for two additional consecutive terms. Chairs of the standing committees are also appointed for two-year terms which may be renewed for an additional term. If a member is appointed as Chair, this term of service (2-4 years) is added to whatever term of service he/she may accrue as a member. For example,

<u>Years as member</u>	<u>Followed by years as Chair</u>	<u>Followed by years as member</u>	<u>Total years</u>
2	0	0	2
2	2 or 4	0 or 2	4-6
4	2 or 4	0	6-8
6	2 or 4	0	8-10

Reappointment as a member is possible after a two-year hiatus from the SAB, during which time the individual may be called upon to serve as a consultant for a specific issue.

Since consultants are appointed to provide the necessary expertise for specific issues, their terms of appointment are for one year, renewable annually. Their formal appointments may be continued beyond completion of a given project so that their expertise can be quickly assessed in future with a minimum of paperwork.

In general, interagency liaisons participate for the term of issue resolution only.

Member and Consultant Selection Process

Members are appointed by the Administrator based on nominations forwarded by the SAB Staff Director and the Chair of the Executive Committee. These nominations in turn are based on recommendations made by the Designated Federal Official (DFO--the member of the SAB Staff with principal responsibility for servicing standing Committees) and the Chairs of the standing Committees. The DFO has the responsibility for developing a list of candidates, utilizing all credible sources, including members of the SAB, other DFO's, EPA staff, staff at the National Academy of Sciences\National Research Council, trade groups, environmental groups, professional organizations, scientific societies, regulated industries, and the informed public.

An ad hoc Membership Subcommittee of the Executive Committee has been established to assist in the selection process. This group is consulted about possible names and used as a "sounding board" when decisions are being made about appointments. The Membership Subcommittee's principal role is to maintain the integrity of the process and to probe the extent to which objective selection criteria and procedures are being followed. They also raise questions about adherence to the

Statement of Intent on Women and Minorities, adopted by the Executive Committee in 1990.

Consultants are appointed by the Staff Director following much the same procedure as for members with the exception that consultants are appointed to address a specific issue. This is addressed in more detail in the following section.

Panel Selection Process

In general, once the Board and the Agency have agreed upon a topic for SAB review, the subject is assigned to one of the standing Committees. The Committee Chair and the DFO have primary responsibility for forming a review Panel (the Committee or Subcommittee, as the case may be.) The Panel will contain some or all members of the Committee. In many instances, consultants may also be added to the Panel in order to obtain specialized expertise on the particular issue under discussion.

A key aspect in the Panel selection process is the "charge", the mutually agreed upon description of what the Agency would like the review to accomplish and/or what the SAB expects to focus upon. The most helpful charge is one that prescribes specific areas/questions that need attention and/or answers. At a minimum, the elements of the charge should be sufficiently precise that the SAB can determine what additional consultant expertise is needed to conduct the most helpful review.

Often the DFO will begin by soliciting ideas about potential members from the Agency staff who are intimately acquainted with the issue and will often be aware of the most informed people. A conscious effort is made to avoid selecting individuals who have had a substantive hand in the development of the document to be reviewed. At the same time, experience has shown the utility of having some representation from individuals/groups who may have been involved in prior review of the issue or the document. The goal is to minimize the appearance or practice of an individual's reviewing his/her own work, while at the same time, maintaining an historical link to earlier deliberations surrounding the document/issue. Once the Agency staff has suggested nominees and provided background information on the individuals, their direct role in the panel selection process is complete. Agency staff, the requesting office, and others, may be consulted at a later stage for information about nominees received from other sources.

The goal is to gather a balanced group of experts who can provide an independent assessment of the technical matters before the Board. Discrete inquiries about the nominees are made with a number of different sources. This might include, for example, making inquiries with editors of newsletters, professional colleagues, and experts who are on "the other side" of the issue. As time and resources permit and controversy demands, names of nominees will be investigated via computer search of their publications and pronouncements in public meetings.

Of course, a determining factor is often the availability of the individual to participate in the public review. However, in the case of multiple-meeting reviews, the SAB will enlist the assistance of a particularly skilled consultant who cannot attend all meetings, but who is willing to do additional homework and/or participate via conference call.

In some cases, the Panel Chair consults with key members of the Panel for their advice before completing the empaneling process. The final selections for consultants are compiled by the DFO in conjunction with the Chair of the Panel and are submitted to the SAB Staff Director for discussion and appointment.

Conflict-of-Interest and Public Disclosure

The intent of FACA is to construct a panel of knowledgeable individuals who are free of conflicts-of-interest. In this regard, each Panel member must complete a confidential financial information form that is reviewed by the Deputy Ethics Officer to determine whether there are any obvious conflicts-of-interest. Legal conflict-of-interests generally arise in connection with "particular party matters".

In general, the SAB (in contrast with the FIFRA Scientific Advisory Panel (SAP)) does not get involved in "particular party matters"; hence, legal conflicts-of-interest are rare on the SAB. However, technical conflicts-of-interest can arise, particularly for participants from academic institutions, in connection with Panel recommendations for additional research studies. In most such cases, the DFO's work with the Panel members to apply for waivers from the conflict-of-interest concerns on this matter. The requests for waivers are evaluated on a case-by-case basis by EPA's Office of the General Council. (The Agency generally determines that the benefits to the country derived from these experts' recommendations for additional research, outweigh any technical conflict-of-interest that might be involved.)

However, the Board is also concerned about "apparent conflicts-of-interest". Consequently, consultants to the Panel are generally selected from the "broad middle" spectrum of opinion on the technical issue under discussion. Experience has shown that achieving balance through equal representation of extreme views reduces the chance of achieving a workable consensus--pro or con--that the Agency needs to move forward.

The "public disclosure" process is a mechanism aimed resolving the apparent conflicts-of-interest issues. This procedure involves an oral statement (sometimes Panel members supplement this with a written document) that lays out the individual's connection with the issue under discussion; e.g., his/her area of expertise, length of experience with the issue, sources of research grants, previous appearance in public forms where he/she might have expressed an opinion, etc. This recitation of prior and/or continuing contacts on the issue assists the public, the Agency, and fellow Panel members in assessing the background from which particular individual's comments spring, so that those comments can be evaluated accordingly. Public disclosure is a standard part of all SAB Panel meetings.

Conclusion

These Guidelines are intended to assist the SAB in adhering to the mandates and spirit of the Federal Advisory Committee Act. By following these Guidelines the Board should be well-positioned to provide technically-sound, independent, balanced advice to the Agency. At the same time, they provide assurance that there will be adequate participation by and renewal with well-qualified experts from the various communities served by the Board.

Prepared: Oct 14, 1991
Revised: Nov 26, 1991

APPENDIX E

STAFF SUPPORT AND COMMITTEE LEADERSHIP IN FY92

Many of the following positions were filled by two people during the year as changes in personnel or staff alignments were made. Where two persons occupied a position during the year, both are listed. The latter name is the incumbent at the close of FY92.

STAFF DIRECTOR'S OFFICE:

Staff Director:	Dr. Donald G. Barnes
Project Coordinator:	Ms. Joanna Foellmer
Secretary to the Staff Director:	Ms. Darlene Sewell
Clerk Typist:	Ms. Lori Gross
Stay-in-School	Ms. LaShae Cardenas

Executive Committee

Chair:	Dr. Raymond C. Loehr
Designated Federal Official:	Dr. Donald G. Barnes
Staff Secretary:	Ms. Darlene Sewell

FAIRCHILD STAFF OFFICE:

Assistant Staff Director:	Mr. A. Robert Flaak
Program Assistant:	Ms. Carolyn Osborne
Receptionist:	Mrs. Barbara Spencer-Pulliam
Stay-in-School:	Ms. Kahlil Posey/Mr. R. Tahir

Clean Air Act Compliance Analysis Council

Co-Chair:	Dr. Allan Kneese
Co-Chair:	Dr. Kerry Smith
Designated Federal Official:	Mr. Samuel Rondberg
Staff Secretary:	Ms. Mary Winston

Clean Air Scientific Advisory Committee

Chair: Dr. Roger McClellan
Designated Federal Official: Mr. Randy Bond
Staff Secretary: Ms. Janice Jones

Drinking Water Committee

Chair: Dr. Verne Ray
Designated Federal Official: Mr. Robert Flaak
Staff Secretary: Ms. Frances Dolby

Ecological Processes and Effects Committee

Chair: Dr. Kenneth Dickson
Designated Federal Official: Dr. Edward Bender
Staff Secretary: Ms. Marcy Jolly

Environmental Economics Advisory Committee

Chair: Dr. Richard Schmalensee
Designated Federal Official: Mr. Samuel Rondberg
Staff Secretary: Ms. Mary Winston

Environmental Engineering Committee

Chair: Mr. Richard Conway
Designated Federal Official: Dr. Jack Kooyoomjian
Staff Secretary: Ms. Diana Pozun

Environmental Health Committee

Chair: Dr. Arthur Upton
Designated Federal Official: Mr. Samuel Rondberg
Staff Secretary: Ms. Mary Winston

Indoor Air Quality/Total Human Exposure Committee

Chair:	Dr. Morton Lippmann
Designated Federal Official:	Mr. Robert Flaak
Staff Secretary:	Ms. Carolyn Osborne/Ms. Frances Dolby

Radiation Advisory Committee

Chair:	Dr. Oddvar Nygaard
Designated Federal Official:	Mrs. Kathleen Conway
Staff Secretary:	Ms. Dorothy Clark

Research Strategies Advisory Committee

Chair:	Mr. Alvin Alm
Designated Federal Official:	Mr. Randy Bond
Staff Secretary:	Ms. Janice Jones

APPENDIX F - SAB MEETINGS FOR FY92**Key to Committees of the Science Advisory Board**

CAACAC	Clean Air Act Compliance Analysis Council
CASAC	Clean Air Scientific Advisory Committee
DWC	Drinking Water Committee
EC	Executive Committee
EEAC	Environmental Economics Advisory Committee
EEC	Environmental Engineering Committee
EHC	Environmental Health Committee
EPEC	Ecological Processes and Effects Committee
IAQC	Indoor Air Quality and Total Human Exposure Committee
RAC	Radiation Advisory Committee
RSAC	Research Strategies Advisory Committee

Dates	Issues/Projects	Committee
Oct 29-30	Quarterly Meeting	EC
Oct 28	Air Toxics Prioritizing	CASAC
Oct 30	Annual Membership Meeting	EC
Oct 31 - Nov 1	Planning for FY92	DWC
Oct 31 - Nov 1	Planning for FY92 Pollution Prevention Report Explosives & Flammables Report Constructed Wetlands Report Oily Waste Consultation	EEC

Oct 31 - Nov 1	Planning for FY92 Global Climate Research Mesocosms Briefing Great Lakes Dep Briefing Biomarkers Briefing Habitat Briefing NRC EMAP Update Highlights of recent reviews	EPEC
Nov 7-8	Planning for FY92 Biokinetic Uptake Model for Lead	IAQC
Nov 21-22	Planning for FY92 EMF Research Report Radon in Drinking Water Commentary	RAC
Dec 4-5	EMAP: Integration & Assessment	EPEC
Dec 17-19	Drinking Water Research at HERL	DWC
Jan 7-8	Quarterly Meeting	EC
Jan 22	Social Science Research	RSAC
Feb 10-12	Home B&S Guide Radiation Risk Assess. Method I Chemical vs. Radiation risk	RAC
Feb 11-12	Ozone by-products Chlorine dioxide Cryptosporidium	DWC
Feb 12	ORD Budget Planning	RSAC
Feb 10-11	Bioremediation Research	EEC

Feb 18-20	Great Lakes WQC Antidegradation	EPEC
Feb 24-25	Asbestos Briefing Gasoline Vapors Guidance Showering and VOC's Guidance NHEXAS Consultation	IAQC
Feb 28	ORD Planning issues	RSAC
Mar 2-3	Awards - STAA (CLOSED)	RSAC
Mar 4-5	Planning	EEC
Mar 5	Carbon Monoxide Staff Paper	CASAC
Mar 19-20	"Dioxin" Eco Research	EPEC
Mar 26-27	Eco Risk Assessment Framework	EPEC
Apr 7-8	"Dioxin" Briefing Superfund Risk Assess. Guidance Populations at Risk Consultation	EHC
Apr 13-14	Gt Lakes WQI Chloramines Chlorine	DWC
Apr 14	CAAA Section 812 Report to Congress	CAACAC
Apr 15	"Chesapeake"	EEAC
Apr 16-17	Quarterly Meeting	EC
Apr 27-28	Oxides of Nitrogen	CASAC
Apr 30 - May 1	Habitat/Biodiversity	EPEC

May 21-22	Radon RA Methodology--II DW NORM---I Briefings	RAC
Jun 1-2	Alaska Bioremediation	EPEC
Jun 1-2	Committee Report Revisions	DWC
Jun 10-11	Sediment Criteria	EPEC
Jun 16-17	C-14 & High Level Waste	RAC
Jun 18-19	Planning/Review	EPEC
Jun 29-30	UST Research	EEC
Jul 7-8	Planning Meeting HF Report to Congress	EEC
Jul 9	DNAPL Consultation	EEC
Jul 14-15	Review Draft Cheasapeake report; OPPE briefing on "health-health" and review future topics	EEAC
Jul 20-21	Indoor Air Research	EEC
Jul 27-28	Quarterly Meeting	EC
Jul 21-22	Environ. Tobacco Smoke II	IAQC
Aug 3-4	CO2/HLW -- II	RAC
Aug 4-5	Uncertainty Analysis Planning Finalize Radiogenic Changes to DW/NORM	RAC

Aug 17-18	Dermal Exposure	EHC
Sep 9-10	CO2/HLW -- III	RAC

Total: 47 Open Meetings; 1 Closed Meeting

APPENDIX G**SCIENCE ADVISORY BOARD FY92 REPORT ABSTRACTS*****EPA-SAB-EHC-92-001 Review of ORD's Draft Strategy for Health Effects Research on Exposure to Complex Mixtures***

The Environmental Health Committee (EHC) reviewed an ORD's draft strategy document for conducting research on the health risks of exposure to complex chemical mixtures. Such mixtures are not only pervasive in the environment, but also represent the dominant mode of chemical exposure for the U.S. population. The Committee found that a basis for a major expansion of current efforts is not cogently presented in the document. The coupling between the research program, which is not described in specifics, and the Agency's thrust toward risk reduction, remains vague. The EHC views validation and improvement of the methods applied to the risk estimation of mixtures as a primary objective of ORD programs in this area. Current translations into risk assessment and regulatory decisions rely upon the additive model (the assumption that algebraic summation of dose is the most reasonable default position). The proposed research expansion emphasizes what is called the bottom-up approach, defined as the identification of mixture components, followed by a study of their joint actions and how these might be modified by various biological mechanisms. A relative ranking of the priorities for such a program, or, at least, the means by which priorities will be established, needs to be devised by ORD. The Committee also sees tests of interactions at low doses as a top priority, recognizing that such tests may yet have to be developed. Studies of interactions require exploration of the entire dose-response function. If such research then fails to detect a significant problem at these low exposure levels, the issue of inflated toxicity due to interactions might be assigned a lower ranking in EPA's list of priorities for risk reduction. Instead, more efficient techniques for determining the comparative potencies of truly complex mixtures should receive greater emphasis. The comparative costs and time requirements of bottom-up and top-down approaches, including bioassay-directed fractionation for the latter, should be calculated for each mixture to be tested. Complex mixture issues transcend EPA's purview and also involve the Food and Drug Administration, the Department of Energy, the Department of Agriculture, the National Institutes of Health, and others. Generic problems should be shared with the other agencies.

EPA-SAB-DWC-92-002 *Review of the Office of Drinking Water Health Criteria Document on Chlorinated Acids/Alcohols/Aldehydes/Ketones*

The Toxicology/Clinical Subcommittee of the Drinking Water Committee met April 4-5, 1991 in Washington, DC to review issues relating to the Office of Drinking Water's preliminary draft Health Criteria Document on Chlorinated Acids/Alcohols/Aldehydes/Ketones. The Subcommittee answered specific questions posed by the Office of Drinking Water, and obtained informational briefings from the Office of Research and Development (ORD), in particular the Health Effects Research Laboratory (HERL), concerning specific ongoing or anticipated research efforts to provide answers for some of the questions regarding the toxicity of these disinfection by-products and to fill in data gaps. In reviewing the preliminary draft document presented by the Agency, the Subcommittee concluded the following: 1) with a few exceptions the studies selected for non-carcinogenic risk assessment were appropriate and justified; 2) the approach being taken on evaluating the possibility of a threshold for the carcinogenicity of dichloroacetic acid in mice is correct but is limited and should be expanded to include both rat and mechanistic studies; 3) the tumor potency of chloral hydrate in mice may be similar to that of dichloroacetic acid but further studies are needed as well as an evaluation of any epidemiological studies that may have been done on this formerly widely used medication; 4) no recommendation can be made at the present time regarding whether the MCLG for DCA should be made on the basis of its carcinogenicity or neurotoxicity, but we recognize the importance of the latter and strongly urge EPA to continue research in this area; and 5) that there was insufficient information to make a judgment concerning what relative source contribution should be applied to the risk assessment of these chemicals. The Committee recommends that the document be separated into two or three individual documents. As currently structured, it is very difficult to follow. The compounds with the most information, dichloroacetic acid, trichloroacetic acid, and trichloroacetaldehyde, tend to become lost in minimal discussions of the ketones and alcohols.

EPA-SAB-EEC-92-003 *Leachability Phenomena - Recommendations & Rationale for Analysis of Contaminant Release*

The Leachability Subcommittee (LS) of the Environmental Engineering Committee (EEC) conducted a self-initiated study on the topic of leachability phenomena, providing recommendations and rationale for analysis of contaminant release. The recommendations are: 1) A variety of contaminant release tests and test conditions

which incorporate adequate understanding of the important parameters that affect leaching should be developed and used to assess the potential release of contaminants from sources of concern; 2) Prior to developing or applying any leaching tests or models, the controlling mechanisms must be defined and understood; 3) A consistent, replicable and easily applied, physical, hydrologic, and geochemical representation should be developed for the waste management scenario of concern; 4) Leach test conditions (stresses) appropriate to the situations being evaluated should be used for assessing long-term contaminant release potential; 5) Laboratory leach tests should be field-validated, and release test accuracy and precision established before tests are broadly applied; 6) More and improved leach models should be developed and used to complement laboratory tests; 7) To facilitate the evaluation of risk implications of environmental releases, the Agency should coordinate the development of leach tests and the development of models in which the release terms are used; 8) The Agency should establish an inter-office, inter-disciplinary task group, including ORD to help implement these recommendations and devise an Agency-wide protocol for evaluating release scenarios, tests, procedures, and their applications; and 9) Core research on contaminant release and transport within the waste matrix is needed.

EPA-SAB-EPEC-92-004 Evaluation of EPA's Research on Expert Systems to Predict the Fate & Effects of Chemicals

A Subcommittee of the Ecological Processes and Effects Committee reviewed research in progress on "Expert Systems for Predicting the Environmental Fate and Effects of Chemicals". Three research programs were reviewed. SPARC is an expert system for estimating chemical and physical reactivity. CRAMS predicts reactivity parameters of organic chemicals from spectroscopic data. The QSAR has several expert systems within it, but for this review, the Subcommittee concentrated on the "Single Integrated Language for Chemicals" and the plans for predicting mechanisms of toxic action from chemical structure. The Subcommittee supports the continued development and vigorous testing of each system. The SPARC and QSAR systems were considered state-of-the-art. CRAMS is more preliminary and shows promise particularly in the area of predicting metabolites. EPA was cautioned on the premature designation of these as "expert" systems. Other comments and suggestions are offered in the report.

EPA-SAB-EPEC-92-005 Evaluation of the National Estuary Program Monitoring Guidance Document

This report presents the conclusions and recommendations of the Science Advisory Board following a review of EPA's draft "National Estuary Program: Monitoring Guidance Document". The Board found that the Monitoring Guidance was an important document for estuaries but that it should allow more flexibility among the particular estuaries to select methods and develop approaches and data management systems for their particular needs. The Board also made several specific suggestions for changes to the appendices which contained information on monitoring methods. They were particularly interested that the Agency assure that the monitoring of the NEP be coordinated with the EMAP.

EPA-SAB-EPEC-92-006 Review of EPA's Ecorisk Assessment Research Program

This report presents the conclusions and recommendations of the U.S. Environmental Protection Agency's Science Advisory Board following a review of EPA's Ecological Risk Assessment Research Program. The Subcommittee considered that the Ecorisk research program was fundamental to support the Agency's extensive need in ecological risk assessment; however, they felt that the funding and the scope of the current program were inadequate. They recommended expanded efforts on methodologies for population, community, ecosystem, and landscape level assessments and on quantifying uncertainty of risk estimation. Overall, they recommended that the Agency expand support for this research to cover all of the Agency program offices.

EPA-SAB-EPEC-92-007 Evaluation of EPA's Wetland Research Program

This report presents the conclusions and recommendations of a Subcommittee of EPEC following its review of EPA's Wetlands Research Program. The Subcommittee supported the direction and the priorities of the WRP and recommended that EPA implement the WRP consistent with the strategy document and oral briefings they reviewed. The Subcommittee recommended that the strategy document be revised to clarify and concisely define the program and clarify other issues raised in the review. While the strategy was confusing and failed to explain the strengths of the program, the oral briefings provided important details that illustrate a risk based approach that is supported by the Subcommittee. Program strengths included: 1) its emphasis on

synthesis and integration of wetlands research for the regulatory process; 2) the development of a risk-based framework; 3) the focus on a landscape scale; 4) the characterization of populations of wetlands by function; 5) a comparison of artificial and natural wetland functions; 6) a technology transfer; and 7) the emphasis on wetlands types that are in significant danger of loss. The Subcommittee further recommended that WRP further examine its coordination role with EMAP for the development of indicators. The Subcommittee also recommended that EPA add a research project dealing with coastal seagrass if additional resources can be found.

EPA-SAB-RAC-92-008 *Correlation of Short-term and Long-term Test Results for Indoor Radon*

The Radiation Advisory Committee reviewed the Office of Radiation Program's approach to analyzing the effects of substituting short-term tests for long-term tests in determining the concentration of radon gas in homes. The Committee endorsed the long-term test in the lowest lived-in space as the standard against which other test results should be judged; noted that the lower the radon level, the less accurately informed the homeowner is likely to be by results obtained with currently available test devices; expressed concern about the false positive and negative rates that are likely to result from short-term tests near an assumed action level of 4 pCi/L; and noted that the long-term test, when properly done, provides a more scientifically appropriate basis for mitigation decisions, particularly in the range of radon levels most commonly found in U.S. homes. The Committee observed that improving the test methods and/or improving the means of estimating actual radon exposure could lead to a greater number of correct mitigation decisions.

EPA-SAB-RAC-92-009 *Review of the Office of Drinking Water's Criteria Documents and Related Reports for Uranium, Radon and Man-Made Beta-Gamma Emitters*

The Radiation Advisory Committee registers its concern about the inconsistent approach within the Environmental Protection Agency regarding reducing risks from radon exposures in homes. This letter report: 1) addresses the fragmented and inconsistent approaches to reduce radon risk; and 2) provides closing comments on the revised drinking water criteria documents that support the proposed regulations. This instance illustrates a larger concern that the Agency is not effectively applying the recommendations set forth in the Science Advisory Board report Reducing Risk:

Setting Priorities and Strategies for Environmental Protection. The Committee's conclusions result from reviews of several issues related to airborne radon [Relationship Between Short- and Long-term Correlations for Radon Tests (EPA-SAB--RAC-92-008); Revised Radon Risk Estimates and Associated Uncertainties (EPA-SAB-RAC-LTR-92-003); Draft Citizen's Guide to Radon (EPA-SAB-RAC-LTR-92-005) brought to it by the Agency during the past year-and-a-half and of the criteria documents supporting the proposed regulations for radionuclides in drinking water (Report to the Administrator on a Review of the Office of Drinking Water assessment of Radionuclides in Drinking Water and four Draft Criteria Documents (SAB-RAC-87-035); Review of the Office of Drinking Water's Criteria Documents and Related Reports for Uranium, Radium, Radon, and Manmade Beta-gamma Emitters (EPA-SAB-RAC-92-009)]. In the context of these reviews, the proposed National Primary Drinking Water Regulations for Radionuclides (National Primary Drinking Water Regulations: Radionuclides: Proposed rule. Federal Register, 56:33050-33127, 18 July 1991) appears to regulate waterborne radon at a level that may be 1-2 orders of magnitude below the recommended action level for airborne radon in homes.

EPA-SAB-DWC-92-010 Review of the Drinking Water Research Division's Corrosion Research Program

The Drinking Water Committee (DWC) met in Cincinnati, Ohio on May 9-10, 1991 to review the Environmental Protection Agency's Drinking Water Research Division's (DWRD) Corrosion Research Program. The Committee was asked to review and evaluate the state-of-the-art use of pipe loop tests for the evaluation and optimization of corrosion control treatment methods; and identify and consider the relative severity and scope of the secondary impacts of regulated corrosion control. The Committee's primary recommendations were: 1) that the Drinking Water Research Division continue its research with pipe loop tests to obtain data that can be used to provide a better understanding of corrosion and control procedures; 2) that studies be undertaken to determine whether the concentrations of lead, copper, and other metals that enter water as a result of corrosion are directly related to the measures of corrosion rate that are made using gravimetric and electrochemical methods; 3) that the search for a standard protocol for evaluating corrosivity should be undertaken starting with the simplest test, gravimetric--either with iron or lead test systems, moving on to more complex approaches if this is unsuccessful; 4) that studies be undertaken to determine how lime can be added to meet the goals of the lead/copper

rule, and at the same time, eliminate the operational problems associated with adding it; and 5) that research on the corrosion of brasses and the variety of available solders be undertaken to determine effective control procedures. In summary, the Committee was pleased with the research program that was presented, and urged that EPA accomplish the additional work recommended.

EPA-SAB-DWC-92-011 *Review of the Office of Drinking Water's Health Criteria Document for Trihalomethanes*

The Science Advisory Board's Drinking Water Committee met in Washington, DC on October 25-26, 1990 to review the Office of Drinking Water's document Revised External Draft for the Drinking Water Criteria Document for Trihalomethanes (THM), addressing issues concerning the toxicity of THMs. The 1979 THM regulations were based primarily on tumor formation in mouse liver and rat kidney following chronic exposure to chloroform. Health data were not available on brominated THMs at that time. Some new information has been generated and the revised document addresses the issues related to the Maximum Contaminant Level Goal (MCLG) for THM's. The Committee addressed the selection of the key studies serving as the basis for carcinogenic and non-carcinogenic risk assessments (The Committee concluded that the studies utilized for estimating carcinogenic risks are the best currently available); the effects of the vehicle of administration on the toxicity exhibited by chloroform (The Committee recommended that the hepatic carcinogenicity produced by THMs administered in an oil vehicle be disregarded from making quantitative estimates of risk); the designation of the THMs collectively or individually as epigenetic carcinogens (The Committee found that the data does not support a contention that these compounds can be considered collectively as epigenetic carcinogens. Tribromomethane and bromodichloromethane have demonstrated sufficient activity in several assays to be considered genotoxic whereas the evidence for chlorodibromomethane and trichloromethane is inconclusive for genotoxicity); The consideration of the four predominant THMs as a group or mixture, opposed to using separate assessments for regulations (The Committee recommends that separate MCL values be calculated for each of the THMs, since their carcinogenic properties differ significantly in both quantitative and qualitative terms); Restrictions to using mouse liver tumor data as the basis of quantitative risk assessments (The Committee recommended that mouse liver tumor induction should be utilized in making the weight-of-evidence judgment that chloroform is a carcinogen); the role of the alpha-2u-globulin mechanism in renal tumor induction (Based on published reports it does not appear to play a role in the etiology of

chloroform-induced renal tumors in rats); The use of hepatocellular adenomas and carcinomas as a basis for quantification of carcinogenicity for bromodichloromethane (The Committee found it inappropriate to consider hepatic tumors as the basis for quantification of carcinogenicity for bromodichloromethane and recommends that EPA utilize renal of intestinal tumors); The classification of dibromochloromethane in group C: possible human carcinogen, based on liver tumors in mice (The Committee recommends that the EPA classify dibromochloromethane in group C); The weight-of-evidence classification for bromoform as B2 (The Committee supports the classification of bromoform in the B2 category). The Committee also recommended that a section on human exposure and body burden to chloroform be incorporated into the criteria document.

EPA-SAB-RAC-92-012 Review of the ORP's Design for the National Survey for Radon in Schools

Two designs for a national survey of radon in schools were developed by Research Triangle Institute with the Environmental Protection Agency's Office of Radiation Programs (ORP). The survey designs were submitted to the National Radon Survey Review Subcommittee of the Radiation Advisory Committee for review. The Subcommittee found either design to be statistically valid, but considered Design option II to be the better protocol. However, the Subcommittee strongly urges the EPA to consider long-term radon measurements during occupancy more representative of actual exposure than the two-day weekend charcoal canister measurements planned by the Office of Radiation Programs.

EPA-SAB-RAC-92-013 Review of ORD's Potential Carcinogenicity of Electromagnetic Fields

This review constitutes comments by an Environmental Protection Agency (EPA) appointed subcommittee to review a draft version of EPA's report Evaluation of the Potential Carcinogenicity of Electromagnetic Fields (EPA/600/6-90/005B). The reviewers suggest numerous changes in emphasis, coverage, and wording; comment on some policy considerations; and conclude that the draft report, in effect, will have to be rewritten if all of these suggestions and comments are to be taken into account. The Subcommittee also presented its conclusions on the substantive scientific questions discussed in the EPA report.

EPA-SAB-EPEC-92-014 Review of Testing Manual for Evaluation of Dredged Material Proposed for Ocean Disposal

On April 16-17, 1991 and September 24, 1991, the Sediment Criteria Subcommittee reviewed the "Evaluation of Dredged Materials for Ocean Disposal-Testing Manual". The manual outlines a tiered testing approach for evaluating dredged materials for compliance with the limiting permissible concentration (LPC) as defined by the Ocean Dumping Regulations. The Subcommittee reviewed the adequacy of the bioaccumulation and toxicity testing procedures in the manual and provided recommendations for mandatory tests, selection of test organisms, and the development of a regulatory framework for interpreting the results. The Subcommittee also recommended that EPA revise the guidance to clarify the use of the tiered approach, to elaborate the requirements for evaluation under tier IV of the scheme, define the relationship of Sediment Quality Criteria to the "Green Book", expand guidance on the selection of reference sites, and to address several scientific questions about bioaccumulation and its effects on the organism. The Subcommittee further recommended several editorial changes for clarity and consistency of the definitions, eliminating redundancies, and consolidating the quality assurance requirements for the test results.

EPA-SAB-IAQC-92-015 Review of the Office of Health and Environmental Assessment and the Risk Assessment Forum's Draft Final Guidelines for Exposure Assessment (Dated May 8, 1991)

On September 12-13, 1991, the Indoor Air Quality and Total Human Exposure Committee reviewed the Agency's Draft Final Exposure Assessment Guidelines. This is the latest revision of the Agency's exposure guidelines, the SAB having reviewed and provided advice on earlier versions in 1986 and 1988. The Committee was asked by the Risk Assessment Forum to provide advice on the following issues: 1) is the document scientifically sound and does it represent current thinking in exposure assessment?; 2) are the concepts of exposure and dose presented in Chapter 2 consistent and well characterized?; 3) what are the Committee's views on the concepts and terms used in describing "high end exposure"?; 4) is the presentation in Chapter 6 concerning the role of uncertainty analysis in exposure assessment, the sources of uncertainty, and approaches to characterizing uncertainty correct and scientifically adequate?; and 5) are the approaches described in Chapter 7 relating to communicating the results of exposure assessment well characterized and is the level

of guidance presented sufficient? The Committee found the draft document to be well crafted and complete, scientifically sound, and a major improvement over previous efforts. In addition, the Committee noted that the draft document is consistent in approach and definitions with the 1991 National Academy of Sciences exposure assessment report. The Committee was pleased that the current draft document included new developments in the exposure assessment field that have taken place since 1988. The Committee was also pleased to observe that it provided resolution of most of the general and specific SAB comments provided during its previous reviews. The description and discussion of (high-end) exposure was awkward and not as well done as the rest of the document, as noted previously by the Risk Assessment Forum. In this report, the Science Advisory Board offers an alternate framework for considering (high-end) exposures, that the Committee believes is sounder conceptually and analytically. The Committee also offers specific suggestions to improve the clarity and usefulness of the guidelines.

EPA-SAB-IAQC-92-016 Review of the OSWER Model to Assess Total Lead Exposure and to aid in Developing Soil Lead Cleanup Levels at Residential CERCLA/RCRA Sites

On November 7-8, 1991, the Indoor Air Quality and Total Human Exposure Committee of EPA's Science Advisory Board (SAB) reviewed the Agency's Uptake Biokinetic (UBK) Model for Lead. The Committee found the model to be basically sound, but was concerned that the reliability of the results obtained using it were very much dependent on the selection of the various coefficients used for the variable terms, and of the specification of default values that would be used when suitable site-specific data were not available. The Committee found it unlikely that the user of the model will be guided to the "proper" GSD based on the criteria in the Guidance Manual. This has implications for cleanup recommendations and costs. The Committee suggested that the concept of the use (or non-use) of default values should be discussed more clearly in the Manual. For situations where default values are not appropriate, the Committee advised the Agency to provide guidance on the methods for acquiring measured or sampled data. The Committee recommended that the guidance document for the model include more explicit discussion of the basis for selecting the particular values to be used in a specific application, and of the uncertainties associated with such values and their impact on the overall uncertainty of the resulting model predictions. While refinements in the detailed specifications of the model will be needed, the Committee was convinced that the approach followed in

developing the UBK model was sound, and constitutes a valuable initiative in dealing with program needs in evaluating and controlling human exposures to lead. It can effectively be applied for many current needs even as it continues to undergo refinement for other applications, based upon experience gained in its use. The refinements will not only improve the scientific basis for evaluating and controlling lead, an essential Agency responsibility, but also provide a basis for the use of the model for other toxicants that present similar challenges. Examples could include arsenic, cadmium, and various polycyclic hydrocarbons.

EPA-SAB-RSAC-92-017 Review of the FY 1993 President's Budget Request for Research and Development (R&D) Activities within the U. S. EPA

On February 12, 1992, the Budget Review Subcommittee of the Research Strategies Advisory Committee (RSAC) reviewed the FY 1993 President's Budget Request for Research and Development activities within EPA. The Subcommittee included representatives from each of the Science Advisory Board's standing Committees and focused on the budgetary impacts on both existing and future research endeavors. The Subcommittee concluded that insufficient S&E funds and FTEs pose a serious threat to the continued viability of the EPA research program. Such inadequacies result in three major weaknesses which threaten the core capabilities of the Agency's research efforts: 1) reliance on on-site contracts for continued research effort rather than mere support services; 2) attrition of federal career scientists with a subsequent loss of historical perspective and invaluable experience with the Agency. This situation is compounded by inability to hire due to inadequate Personnel Compensation and Benefits (PC&B) funds, and lack of funds for adequate training and professional development; and 3) Increasing obsolescence/inadequacies of equipment and facilities capabilities. Although the Subcommittee commented that ORD has made tremendous strides in environmental research and has the potential to become the premier environmental research facility, each of the above deficiencies continue to erode such capabilities. Consequently, Administration and the Congress are urged to provide an infusion of resources to abate the decline of EPA's scientific capability.

EPA-SAB-DWC-92-018 *Review of the Office of Research and Development's Arsenic Research Recommendations*

The Drinking Water Committee (DWC) reviewed the document "Arsenic Research Recommendations" produced by EPA's Ad Hoc Arsenic Research Workgroup. The document was first reviewed in three conference calls (January 2, 15 and 25, 1991) by a Subcommittee of the full Committee. This was followed by a Subcommittee meeting on February 7, 1991 and a review by the full Committee on that date in Washington, DC. The Committee was asked to comment on the following: 1) is the framework scientifically sound?; 2) does the framework provide an effective structure for thinking about arsenic research needs as well as for developing, evaluating and prioritizing recommendations?; 3) does the framework provide a practical basis for evaluating arsenic risk as a basis for establishing regulatory policy?; 4) do the recommendations presented address the key questions surrounding the risk assessment of arsenic?; and 5) are they the most appropriate recommendations? The document was developed by the Agency in response to a negotiated settlement of a lawsuit directed at the promulgation of national primary drinking water standards. The settlement allowed EPA the option of pursuing a research program that would address risk assessment issues surrounding arsenic-induced cancer. To be responsive to the lawsuit, the results of the proposed research would have to significantly impact the risk assessment for arsenic within a 3 to 5 years. The Committee concluded that there are research efforts that can be conducted that would have substantial impacts on the risk assessment for arsenic. These recommendations are directed at questions of the mechanism by which arsenic induces cancer and the extent to which human susceptibility to arsenic depends on a limited capacity for detoxification of arsenic. The Committee recommended a series of important research projects that can be conducted that are classified by whether they can be successfully completed in time to satisfy the consent decree. However, it is important to note that this prioritization would be significantly altered if time were not a paramount consideration.

EPA-SAB-RSAC-92-019 *Recommendations on the 1991 EPA Scientific and Technological Achievement Awards Nominations*

The report represents the conclusions and recommendations of the U.S. Environmental Protection Agency's Science Advisory Board regarding the 1991 EPA Scientific and Technological Achievement Awards (STAA) program. The Scientific and Technological Achievement Awards Subcommittee of the Science Advisory Board

reviewed and evaluated the 1991 nominations for the STAA program. The Subcommittee evaluated 114 nominations of scientific papers representing some of the best of the scientific foundation of the EPA regulatory programs. The Subcommittee recommended twenty-nine papers (25% of the nominations) for awards at three levels and also recommended to the Office of Research and Development that thirteen additional papers be recognized with honorable mention. The Subcommittee made no attempt to ensure equality of numbers or proportion of awards across the categories of science and technology or Agency research components. The Subcommittee recommended awards for scientists from nine EPA research laboratories and two program offices. The Subcommittee recommended the Agency develop additional opportunities to reward scientific accomplishments, provide a minimum cash award of \$500.00, and recognize winners in other special ways. The Subcommittee also encouraged the Agency to support the program at the highest levels of management.

EPA-SAB-EEC-92-020 *Review of the Office of Solid Waste and Emergency Response/CEPPO Issues on Criteria for Explosives and Flammable for SARA Title III*

The Explosives and Flammables Criteria Subcommittee (EFCS) of the Environmental Engineering Committee (EEC) reviewed the Agency's explosives and flammables criteria which were developed in response to an August 27, 1990 Advanced Notice of Proposed Rulemaking (ANPRM) (40 CFR Part 355) pursuant to provisions of the 1986 Superfund Amendments and Reauthorization Act (SARA) Title III, Section 302. The EFCS met on May 29 and 30, 1991 and reviewed nine issues raised by over 60 commenters in the ANPRM. The issues examined by the EFCS pertaining to explosives deal with whether explosives (low and/or high explosives) should be listed individually or categorically, setting the appropriate Threshold Planning Quantities (TPQ) for the explosives, examining the appropriate overpressures and tables of distances for explosives, whether fireworks should be listed or excluded, and specific comments in the technical background documents such as the appropriateness of the United Nations (UN) classification schemes, appropriateness of the consequence analyses, and specific objections to use of the Automated Resource for Chemical Hazard Incident Evaluation (ARCHIE) model as a means to evaluate potential exposure scenarios. The issues examined by the EFCS pertaining to flammables deal with whether there are significant hazards posed to the community in quantities less than 10,000 pounds, whether flammables should be listed categorically or individually, whether specific flammable gases and very volatile flammable liquids

should be treated as a special category of flammables, the appropriateness of the consequence analysis for flammables, the appropriate hazard criteria and scenarios to use for modeling, and specific comments in the technical background document for flammables, such as use of the 100-meter fence-line distance and other factors to be used in the analysis.

EPA-SAB-EHC-92-021 *Review of the Office of Toxic Substances' Draft Formaldehyde Risk Assessment Update*

An updated draft formaldehyde risk assessment was presented to the Environmental Health Committee on July 17, 1991, incorporating information that had become available since the 1987 EPA report (Assessment of Health Risks to Garment Workers and Certain Home Residents from Exposure to Formaldehyde). The updated document reviews the evidence bearing on both the cancer and non-cancer effects of inhaled formaldehyde vapor. The Committee found the draft update to be a generally well-written document, but raised issues and provided suggestions on several aspects of the Update. The current report reaffirms the 1987 classification of formaldehyde as a Group B1 (Probable Human) carcinogen. Animal data are unequivocal, demonstrating in rats that formaldehyde is a nasal carcinogen. The epidemiological evidence is currently judged to be less certain than the experimental evidence, primarily because of problems in identifying exposure. Some Committee Members noted, however, the high relative risk estimates for nasal cancer in certain epidemiologic studies and suggestions of a dose-response relationship. As in 1987, a quantitative risk assessment was derived from animal data, but there was increased reliance on a biomarker of formaldehyde exposure (DNA-protein cross-links, or DPX) rather, than on ambient chamber concentration as the source of dose-response information. DPX data from monkeys were obtained to provide a species showing greater correspondence with human breathing patterns than do rats. The resulting upper bound inhalation unit risk (based on the linearized multistage procedure) was calculated as 2.0×10^{-3} per ppm for the rat data and 3.3×10^{-4} per ppm for the monkey data. These values are considerably lower (for both species) than the values based on airborne exposure concentrations as calculated for the 1987 document and generate a variety of questions about the application of DPX measures to risk assessment, except as a measure of exposure. The Committee is concerned (as is EPA) about the absence of DPX data based on chronic exposures, and about the inability to procure information about the correlation between topographical DPX variations in the monkey and possible tumor sites. The Committee recognized the advances in exposure assessment stemming from the

use of DPX measures, but views their application to quantitative risk assessment, except as a measure of exposure, as equivocal. The Committee recommended that the risk estimates based on animal DPX data be compared to those derived from the most appropriate human studies, particularly on those subjects followed in the American Cyanamid Corporation studies (Blair et al, 1986; Marsh, unpublished communication submitted to EPA's Office of Toxic Substances, 1991). In addition, the Committee believes that the joint effects of particulates and formaldehyde warrant more extensive discussion, since particulates may serve as efficient carriers for toxic materials and modify both exposure and pharmacokinetic parameters. Further, the rationale for selecting the monkey model--congruency with human breathing pattern and respiratory system structure--also invokes the possible contribution of exercise because it engenders a shift toward oral breathing. Both rats (which are obligate nose breathers) and monkeys can be induced to exercise, and consequent shifts in respiration patterns could yield useful new information about the applicability of DPX. Non-cancer risk assessment was addressed in detail, but the Committee recommends that some issues be further expanded. These include subclinical effects, potentially sensitive subpopulations, full presentations of data, tolerance development, the contributions of particulates and exercise, and methods for the precise psychophysical measurement of irritant responses.

EPA-SAB-RSAC-92-022 Review of 14 Strategic ORD Research Issues for FY 1994

The Office of Research and Development has implemented a new issue based planning system for environmental research. This approach to R&D planning holds promise for research programs. Each of the 14 "issue strategy" documents (Non-point Source Pollution, Indoor Air Pollution, Health Risk Assessment Methods, Environmental Education and Outreach, Anticipatory Research, Exploratory Grants and Centers, Drinking Water Pollutants and Disinfectants, Terrestrial Systems, Habitat/Biodiversity, Wetlands, Environmental Monitoring and Assessment Program (EMAP), Global Warming Environmental Releases of Biotechnology Products, and Bioremediation) provided a brief description of the topic, future activities in the area, an high/low resource scenarios. The Committee views the process as an excellent start for future planning cycles.

EPA-SAB-EPEC-92-023 Review of the Process and Rationale for Developing Ecological Risk Assessment Guidelines

The Ecorisk Subcommittee met on March 26-27, 1992 to conduct this review. The Subcommittee found that the Ecological Risk Assessment program had developed useful guidance to address important issues and recommended that the Agency increase its efforts to develop issue papers and expanded case studies. The Subcommittee agreed that the current framework should be viewed as evolving and that its focus must go beyond traditional chemical stressors dose-response approach of and it should be revised to effectively include biological stressors. Further, they recommended that the Forum serve as a major coordination point for scientists within the agency and in other Federal Agencies. Coordination is particularly important with EPA programs for EMAP, Geographic Initiatives using ecological criteria, Habitat Protection, and Global Climate Change. The Subcommittee also recommended that RAF activities should also be used to stimulate research on ecological risk assessment methods, assessment techniques, the selection of endpoints and indicators, and assessments of multiple stressors and cumulative impacts. The Framework should also be expanded to include biological stressors, data acquisition and public input to the formulation of the conceptual model.

EPA-SAB-EPEC-92-024 Review of the Rationale for Development of Ambient Aquatic Life Water Quality Criteria for TCDD (Dioxin)

The Subcommittee commended EPA for its innovative and well conceived research plan to support the development of a dioxin water criterion. The Subcommittee endorses the body burden approach and encouraged the Agency to continue and expand research that would validate the assumptions of the approach. The Subcommittee found that the use of the fish, Medaka, was inherently controversial and recommended that EPA consider either a native substitute species or modify the guidelines for developing water quality criteria. The Subcommittee also recommended that EPA add tests to evaluate metabolism of dioxin, develop additional biomarkers, and improve analytical measurements and verify predicted aqueous concentrations to support the development and implementation of the criterion. The Subcommittee found that the TEF approach was promising but recommended further verification before it could be applied to aquatic life and wildlife. Overall, the Subcommittee found that EPA presented several alternatives to conventional testing of chemicals which, if verified by additional research, will provide valuable insights about compounds that

bioaccumulate and depurate slowly. This research may also lead to a new approach for criteria that should be reflected in the national guidelines for developing water quality criteria.

EPA-SAB-EPEC-92-025 Review of Synoptic National Assessment of Comparative Risks to Biological Diversity and Landscape Types

The Habitat and Biodiversity Subcommittee reviewed this proposal and received briefings on the planned research from scientists with EPA, U.S. Fish and Wildlife Service, U.S. Geological Survey, U.S. Forest Service, and the Nature Conservancy. The Subcommittee supported the concept of the proposal but recommended the plan be revised to extend the schedule and expand the budget and address the recommendations herein. Further the Subcommittee recommended that the project focus on a longer term pilot to demonstrate feasibility, develop better indicators of stress, and compare various types of satellite imagery. They also encouraged further coordination among the participants and within EPA and with NASA. The Subcommittee noted that while the proposal offered many useful opportunities, EPA should be clear that they were only addressing issues of species richness at very coarse scales of resolution. The SAB also recommended that research be conducted to understand the basis for people's perception of the values of biodiversity and habitat.

EPA-SAB-EEC-92-026 Review of the Office of Research and Development's Bioremediation Research Program Strategy

The Bioremediation Research Review Subcommittee (BRRS) of the Environmental Engineering Committee (EEC) reviewed ORD's draft "Bioremediation Research Program Strategy," dated December 1991. The BRRS found that the strategy presented in the draft report, which is driven by actual site conditions and knowledge gaps, to be useful and basically sound in concept. The BRRS commends the Agency on the team approach used to address the topic, but recognized that the authors need to clarify concepts and terminology related to the term, "site-directed approach." The BRRS believes that, while the strategy has many good features, the draft document and the entire bioremediation research program could benefit greatly from a more explicit treatment of the strategic planning process. Additional recommendations are as follows: 1) Bioavailability is a major limiting wide-scale application of bioremediation technologies - there is a need to conduct research to understand the physical-chemical changes that affect bioavailability of chemical pollutants including mixtures in order

to develop more effective bioremediation technologies; 2) there is a need to coordinate with other governmental agencies, as well as with the private sector; 3) the EPA bioremediation strategy needs to recognize other EPA research, as well as an "open windows policy to reach out and keep abreast of new developments in the field; and 4) specific criteria to measure success are needed. A number of other recommendations were made with the aim of improving both the draft strategy document and the Agency's overall bioremediation research program.

FY 1992 SAB LETTER REPORTS***EPA-SAB-DWC-LTR-92-001 Review of the Office of Drinking Water's Revised
Criteria Document on Nitrate/Nitrite***

The Science Advisory Board's Drinking Water Committee (DWC) reviewed the revised Drinking Water Criteria Document for Nitrate and Nitrite on October 15, 1990. The Committee previously reviewed this topic in 1987 (report EPA-SAB-EHC-87-029). Two major issues identified as areas of concern were: 1) the lack of a carcinogenicity classification in the criteria document (the DWC noted that it would like to review the carcinogenicity classification when an assessment is available); and 2) questions concerning the basis of the maximum contaminant level (MCL) of 10 mg/L. The most sensitive exposed group, i.e., infants with gastrointestinal disturbances, may not be protected adequately, because the Walton study, used as a basis for determining the MCL, assumed, but did not verify, that the most sensitive subpopulation of infants, i.e., those with acute diarrhea, had adequate representation. Also the reporting process did not report the incidence of methemoglobinemia, a consequence of nitrate ingestion. In addition, EPA staff indicated their estimate that drinking water contributes 50% of the nitrate intake, but the MCL is based on an assumption of 100% nitrate/nitrite intake from drinking water. Lastly, EPA stated that the National Academy of Sciences 1977 report Water and Health (National Academy of Science, Washington DC, 1977), confirms the value of 10 mg/L, but did not note that this report also states "there is little margin of safety" at this level.

***EPA-SAB-DWC-LTR-92-002 Review of the Office of Drinking Water Issue Paper
on Cyanogen Chloride***

The Drinking Water Committee (DWC) met in Washington, D.C. April 4-5, 1991 to review the Office of Drinking Water issue paper on cyanogen chloride. The Committee recommended that the option of conducting research on the toxicity of ingested CICH be implemented. The Committee also provided a number of other specific comments designed to improve the issue paper.

EPA-SAB-RAC-LTR-92-003***Review of Revised Radon Risk Estimates and Associated Uncertainties***

The Radiation Advisory Committee reviewed the Office of Radiation Programs (ORP) documents supporting the reassessment of radon associated risks to the general population "EPA's National Residential Radon Survey Preliminary Results" and "Proposed Revisions in EPA Estimates of Radon-Risks and Associated Uncertainties." These documents represent an important step forward by the Agency in assessing the health risks of exposure to radon and its decay products, in reviewing and utilizing the recent scientific results and deliberations on issues affecting the dose and risk, and in attempting to quantify the attendant uncertainties. The National Residential Radon Survey is a success story, since it represents the first significant nationwide survey of an indoor air pollutant with a firm statistical basis for its design and implementation. Overall, the Board has found that the methods and analyses used by the Agency for the assessment of radon risk are generally appropriate. The nationwide average of radon concentrations in U.S. homes, based on the National Residential Radon Survey, represents the best available data. The Agency's proposed adjustment of the exposure/dose relationship between miners and the general population, obtained from the recent EPA-sponsored National Research Council report, survey, uncertainty about the equilibrium factor, and uncertainty about the percent of time people spend in their residences.

EPA-SAB-RAC-LTR-92-004***Review of Idaho Radionuclide Study***

The Idaho Radionuclide Study was originally designed to support the rulemaking on the radionuclide National Emission Standard-Hazardous Air Pollutant (NESHAP), not for an explicit evaluation or remediation of individual radiation exposures. However, the study did provide radiation exposure data that has prompted the Agency's consideration of current and past uses of phosphorus slag. Gamma-radiation exposure levels from elemental phosphorus slag can reach 60-65 $\mu\text{R/hr}$ in some areas, which is 4-5 times the background level prevalent in Southeastern Idaho. This level is within the range of background radiation worldwide; however, the radiation exposure levels in this case are increased due to technological activities. Members of the general public can come into contact with the gamma radiation fields associated with past uses of phosphorus slag, and exposure patterns can be highly variable. The Committee suggests that the Agency establish a set of graded decision guidelines based upon technical and economic factors for both short-term and long-

term exposure of the public due to past uses of slag, and make them available for public and SAB review. The Committee suggests that past and current phosphorus slag uses be considered separately, because the cost/risk considerations involved make them distinctly different technical issues for assessment and control, including selection of any action levels.

EPA-SAB-RAC-LTR-92-005***Review of draft revised Citizen's Guide to Radon***

The Radiation Advisory Committee reviewed the August 28, 1991 draft Citizen's Guide. The Committee continues to affirm that a long-term test is the best basis for citizens to determine whether to fix a home; however, for those circumstances where a shorter-term decision is required or appropriate (a high reading, for example) two short-term tests, at a minimum, may be used. A single short-term test is not decisive and that at least two short-term tests are needed before a decision to fix a home is made, if the preferred long-term test is not feasible. An empirical evaluation (field testing) of this draft Citizen's Guide would be valuable because such tests are the best way to determine whether the information is presented in a manner that is likely to be a manner that is likely to be accessible to the intended audience.

EPA-SAB-EEC-LTR-92-006***Research-In-Progress Review of ORD's "Constructed Wetlands for Wastewater Treatment"***

The Constructed Wetlands Subcommittee (CWS) of the Environmental Engineering Committee (EEC) conducted a review of the Agency's research-in-progress on constructed wetlands for wastewater treatment. The CWS noted that, while the Office of Research and Development (ORD) Risk Reduction Engineering Laboratory (RREL) focus on revision of the design manual and its publication is a tangible goal, given the modest funding for the current program, this will only lead to modest improvement of the manual. The CWS further noted that, because the current research is fragmented, significant advancement in system design cannot be expected. The CWS identified areas for additional or expanded research, recommending that ORD improve its overall research strategy and organization to guide priority development and to coordinate activities in the various laboratories, as well as increase funding and staffing in constructed wetland research. In particular, the CWS recommended that the Agency should prioritize and allocate adequate funding and staff support for further growth areas, such as surface flow and open water systems (lagoons) designed for water quality improvement and wildlife habitat value enhancement; integrated systems;

urban storm water treatment; other aspects of non-point source, agriculture, mine drainage, road/highway runoff treatment; and, constructed wetlands as polishing/protection of natural wetlands or surface water bodies. It was noted that, the ORD program needs significant coordination. The CWS recommended sponsorship of a national workshop to refocus Agency priorities and to coordinate with other Federal, as well as State and local agencies and private organizations. Other comments were offered on specific projects.

EPA-SAB-EEC-LTR-92-007***Review of ORD's Draft "Pollution Prevention Research Strategic Plan"***

The Pollution Prevention Subcommittee (PPS) of the Environmental Engineering Committee (EEC) reviewed the Office of Research and Development's (ORD's) Research Strategic Plan for Pollution Prevention. The review examined a draft report entitled, "Pollution Prevention Research Strategic Plan," dated March 1991 and culminated in specific recommendations. The PPS found the Plan, to be an informative assessment of pollution prevention research currently underway at the Agency. However, the PPS believes that the draft document does not contain all the elements commonly contained in a strategic plan, and urged the Agency to redraft the document accordingly. Additionally, the PPS identified inconsistencies in the ranking process and recommended that it would be prudent to revisit and explain the rankings so that they are clearly objective. Pollution prevention research will not eliminate the need for ongoing research in areas that serve to control post-generation pollution. It is proactive by design, and while challenging to develop; more emphasis needs to be given to anticipatory research. The PPS also stressed the need for the Agency to develop means to measure the success of the pollution prevention program. The Plan's emphasis on consumer products is appropriate and reflects a growing recognition of these products as important diffuse sources of pollution and the role of consumer demand in reducing the environmental burdens associated with their production, use and disposal. The PPS recommends that serious consideration be given to incorporating specific social science research activities into the Plan. Encouragement should be given to various objects which facilitate communication and technology transfer. Numerous additional comments are offered and aimed at reinforcing and improving the draft Strategic Plan.

EPA-SAB-EPEC-LTR-92-008 *Review of the EMAP Program Plan and Concepts for Integration and Concepts for Integration and Assessment*

This letter report discussed the significant recommendations of the Environmental Monitoring Subcommittee of EPEC for further improvements to the Program Plan for the Environmental Monitoring and Assessment Program (EMAP). This is the third SAB report evaluating critical aspects of EMAP. The Subcommittee acknowledged the improvements that EMAP had already made in its program document and urged them to provide further clarification of EMAP's role in ecorisk assessment, its design, information management plans, its clients and to publicize its on-going contributions to science and monitoring. The Subcommittee also recommended that EMAP prepare specific documents showing data assessment and integration approaches.

EPA-SAB-RAC-LTR-92-009 *Review of "A Research Strategy for Electric and Magnetic Fields; Research Needs and Priorities"*

The Radiation Advisory Committee's Nonionizing Electric and Magnetic Fields Subcommittee reviewed Review of A Research Strategy for Electric and Magnetic Fields: Research Needs and Priorities (EPA/600/9-91/016A). The June 1991 Research Strategy contains chapters on health effects, biophysical mechanisms, exposure assessment, and control technology. Although the topics identified in the document are relevant to EPA's mission, the Subcommittee notes that a national research agenda should also consider occupational, diagnostic, and therapeutic uses of extremely low frequency fields. The document itself does not specify the breadth of the audience for this research strategy. The document, which is well written and informative, describes both the relevant tissues and EPA's responsibilities. However, the level of detail in the document is insufficient for setting specific research goals and priorities. The EPA document properly focuses on cancer and on exposure-definition issues as priority areas for human health research; however, effects on nervous system and sensory structures should receive more emphasis than indicated in the EPA document because there is evidence of interaction of electric and magnetic fields with neutral tissue cellular and animal studies. The Subcommittee, therefore, recommends that scientific information sufficient to support credible formal risk assessment of exposure to electric and magnetic fields be developed.

EPA-SAB-RAC-LTR-92-010***Review of the draft revised "Homebuyer's and Seller's Guide to Radon"***

The Radiation Advisory Committee reviewed the scientific basis of the real estate testing protocol options proposed in its December 23, 1991 draft revised document, Homebuyer's and Seller's Guide to Radon, an Appendix on non-interference controls (methods to discourage tampering), options for real estate testing protocol, and a national profile of the real estate testing protocol options. The Committee believes that all radon remediation decisions should be based on estimated exposure to individuals. Therefore, the Committee has for some time recommended a year-long integrated radon concentration measurement, taken in the lowest lived-in-space, because this measurement most accurately reflects the annual average radon concentration in a home (exposure also depends on the time an individual spends in a particular area). However, the Committee realizes that the best option is not currently the most realistic option for real estate transactions where decisions may be made in matters of days or weeks. The Committee's recommendations include: 1) encourage longer tests whenever possible; 2) consider alternative approaches, such as long-term testing of the home after the sale has been completed; and 3) research directed toward improving the analysis of both the precision and accuracy of the various measurement methods, testing protocols, and interpretive procedures. These efforts should include more data on day-to-day and season-to-season variability for a variety of radon concentrations. It is also important to investigate how increasing integration time improves the accuracy of short-term test results in comparison to estimating the annual average radon concentration.

EPA-SAB-DWC-LTR-92-011***Review of the Drinking Water Criteria Document for Cryptosporidium***

The Drinking Water Committee (DWC) met on February 11-12, 1992 and reviewed the Drinking Water Criteria Document for Cryptosporidium. Overall, the Committee considered the draft document to be inadequate as a criteria document because: 1) it does not reflect the current state of knowledge; 2) it is superficial in its coverage of information on Cryptosporidium in drinking water and the aquatic environment, especially concerning treatment efficacy; 3) it does not identify the important gaps in scientific knowledge and understanding of Cryptosporidium or its public health significance in drinking water; 4) it does not identify the scientific needs that must be met to go forward with a risk assessment; and 5) it draws no conclusions and makes

no recommendations on future scientific directions to decide if *Cryptosporidium* in drinking water should be regulated and if so, how to regulate it. The Committee recommended a comprehensive revision of the document to include an insightful and critical analysis of the following topics: 1) the organism and its diseases in humans; 2) the sources and occurrence of the organism in water and the role of water in its transmission; 3) the efficacy of water treatment processes for its removal and inactivation; and 4) the risk of drinking water as a source of human exposure, infection and illness.

EPA-SAB-DWC-LTR-92-012 *Review of the Drinking Water Criteria Document for Chlorine Dioxide*

The Drinking Water Committee (DWC) of the Science Advisory Board (SAB) met on February 11-12, 1992 and reviewed the Drinking Water Criteria Document for Chlorine Dioxide. The Committee concluded that: 1) EPA has selected the appropriate studies as the basis of the risk assessments for chlorine dioxide and chlorite; 2) it is appropriate to use an uncertainty factor of 100 for chlorine dioxide and chlorite, instead of the usual 1,000 given the acute nature of the toxic response for these compounds; 3) a combined Maximum Contaminant Level Goal (MCLG) should not be derived for total residual oxidants when chlorine dioxide has been used as the disinfectant? When asked does the SAB agree with the Agency on the proposed decision not to establish an MCLG for chlorate due to data limitations, the Committee responded that they were uncomfortable for both scientific and regulatory reasons to leave a blank in this area and offer no guidance to the water industry. Therefore, the Committee recommended that until such time that there are more data available upon which to establish an MCLG that a Health Advisory (HA) be given. This would certainly give some sense of the possible toxicity of this compound to both the regulated industry and public health officials. In its review and discussion of the document, the Committee also offered a number of concerns and suggestions which need to be addressed in future revisions of the document.

EPA-SAB-DWC-LTR-92-013 *Review of the Viral Transport (VIRALT) Model*

On December 6-7, 1990, the Drinking Water Committee (DWC) of the EPA Science Advisory Board (SAB) reviewed VIRALT, a modular semi-analytical and numerical model for simulating transport and fate of viruses in ground water. The Committee was asked to: 1) make a thorough review of the appropriateness of the

modeling assumptions and suggest possible revisions that might improve the predictive capabilities of the model, and discuss the limitations of the model; and 2) review the validity and utility of the model. The most serious deficiency of the model development is the lack of field validation. Default values for source concentrations, adsorption coefficients and other parameters have been taken from the literature and are not well supported or documented. Furthermore, the assumptions used to develop the model must also be validated. Without these validations, VIRALT cannot be used to identify wells at risk or the disinfection levels required. The target user audience needs to be defined and the documentation revised accordingly. The documentation is not adequate for users with a cursory knowledge of groundwater flow and transport phenomena.

EPA-SAB-DWC-LTR-92-014 Review of the Criteria Document on Ozone and Ozonation By-Products

The Drinking Water Committee (DWC) reviewed progress in developing maximum contaminant levels (MCL's) for ozone and ozonation by-products in drinking water at its February 11-12, 1992 meeting in Washington, DC. The Committee reviewed the June 24, 1991 draft document: Revised Final Draft for the Drinking Water Criteria Document on Ozone and Ozonation By-Products. In general, the draft poorly documents the health effects of ozone by-products, does not bring the reader to any understanding of the critical issues with the ozonation of drinking water, and frequently leaves the real regulatory issues unresolved. The Committee had serious concerns about the rational development of regulations in the drinking water disinfectant area. There is little doubt that scientifically defensible regulations for individual by-products can be developed using current guidelines. However, as long as they are considered individually it appears quite likely that the sum total of such regulations could be irrational. This could present a dilemma to the regulated communities. Some of these alternatives may actually increase the calculated risks from cancer and/or seriously compromise the ability to prevent the spread of waterborne infectious disease. In the Committee's opinion, the solution to this dilemma is to be found in developing the research information that is needed to allow decisions to be made.

EPA-SAB-EPEC-LTR-92-015 *Review of the Alaskan Bioremediation Oil Spill Project*

The Alaskan Bioremediation Tasks Group met on June 1-2, 1992 to complete this review, which builds on the SAB review of the preliminary plan (EPA-SAB-EPEC-89-023). The Task Group commended the Agency for its response to a significant problem and for the work which should lay a foundation for research and planning to improve future emergency responses. The results indicated that the bioremediation technique reduced cleanup time in some instances, but the mechanism for this acceleration was unclear. Further research was recommended for the selection and testing of fertilizers, the underlying mechanisms of bioremediation and the fertilizer application/ beach washing, and assessment techniques that could be applied to other situations. Overall, the Task Group found that these results would be most useful if applied to develop strategies for evaluating the use of bioremediation in future oil spills. Additional efforts were suggested for data interpretation, revisions of the report, chemical measurements of the oil fractions, and the use of mechanistic models.

EPA-SAB-CASAC-LTR-92-016 *Closure Letter on the OAQPS Staff Paper for Carbon Monoxide*

The Clean Air Scientific Advisory Committee (CASAC) met on April 28, 1992, to review the Office of Air and Radiation document: Review of the National Ambient Air Quality Standards for Carbon Monoxide: Assessment of Scientific and Technical Information. The Committee believed that the document provides a scientifically adequate basis for regulatory decisions on carbon monoxide. The staff paper concludes, and the CASAC concurred, that a standard of the present form and with a numerical value similar to that of the present standard is supported by the present scientific data on health effects of exposure to carbon monoxide.

EPA-SAB-CASAC-LTR-92-017 *Comments on the draft "Air Quality Criteria for Oxides of Nitrogen" Developed by the Environmental Criteria and Assessment Office, RTP, NC.*

The Clean Air Scientific Advisory Committee (CASAC) met on April 27-28, 1992 to review the draft document Air Quality Criteria for Oxides of Nitrogen (NOx). The Committee's consensus is that the document is generally well prepared and, with appropriate revision, provides an adequate scientific basis for a regulatory decision on

oxides of nitrogen. The Committee provided detailed comments to further facilitate the development of the revised criteria document.

EPA-SAB-RAC-LTR-92-018 *Review of Drinking Water Treatment Wastes Containing NORM*

The Radiation Advisory Committee reviewed the office of Drinking Water's "Suggested Guidelines for the Disposal of Drinking Water Treatment Wastes Containing Naturally-Occurring Radionuclides" dated July 1990. Guidelines for the disposal of drinking water treatment wastes containing naturally occurring radionuclides are certainly needed because of the potential radiation doses to treatment plant workers and to the public. However, the Guidelines document lacks information needed to fully assess the magnitude of risk from exposure to radioactivity in drinking water treatment wastes. The 1990 "Guidelines" document includes all the relevant treatment technologies but describes them only in general terms. Because the discussion of both the treatment technologies and the waste disposal practices is highly qualitative, the "Guidelines" document is not sufficient by itself for making scientific, engineering or economic choices. The disposal of materials containing naturally-occurring radionuclides is a complex problem which has not been addressed in a systematic way by the Federal government. Although the 1990 "Guidelines" identifies and considers relevant Federal regulations, it is, understandably, somewhat unclear in its recommendations. The "Guidelines" should be revised to make both the scientific and policy rationales clear to the reader. The "Guidelines" do not specify whether the radiation exposures to drinking water treatment plant workers should be considered as occupational exposures or be viewed against the dose limits for the general public. This decision will have considerable bearing on any final guidelines. The Agency should also reevaluate the numerical criteria for the disposal of wastes containing lead-210.

EPA-SAB-CAACAC-LTR-92-019 *Review of OPPE's Workplan for the Retrospective Study of the Impacts of the Clean Air Act*

On April 14, 1992, the Clean Air Act Compliance Analysis Council (CAACAC) met in Arlington, Virginia and reviewed the Office of Policy, Planning, and Evaluation's (OPPE) workplan for the retrospective impact analysis required by section 812 of the Clean Air Act (CAA) Amendments of 1990. The Council was asked three primary questions: 1) is EPA using an appropriate paradigm for conducting the retrospective

assessment?; 2) within the context of a general equilibrium macroeconomic framework, what is the appropriate way to measure the costs of air regulations?; and 3) what are appropriate techniques for valuing the physical effects estimated in this assessment? In general, based on the information available to it, the Council found that the workplan developed by the OPPE is basically sound. From the perspectives of science development and impact on future legislation, the Council observes that: 1) The value of the retrospective (1970-1990) study of the cost-benefit of the original CAA is two-fold; it both evaluates the efficacy of the CAA provisions and develops procedures for planned prospective studies of the CAA Amendments of 1990 (CAAA). Since resources are limited and the CAA already has been superseded, the latter effort should receive more emphasis. The retrospective study accordingly could be trimmed by making it qualitative (provided that the Congress would approve of this strategy); 2) The first prospective study (due November 15, 1992) on the efficacy of the CAAA provisions should be started as soon as possible to allow proper periodic review by the CAACAC; and 3) The primary goal should be to complete the second prospective study (due November 15, 1994) on time and with minimum scientific uncertainty as to the key standards studied. This will be helpful when reauthorization of the CAAA comes up (perhaps in 1995). The Council also noted that benefits part of the study will depend critically on the assumptions about exposure (and therefore changes in exposure) to environmental risks. The linkage(s) between emissions and/or concentrations and exposures should be very carefully analyzed with respect to "conservative" assumptions that go into the relationship. An alternative approach, which avoids (in theory) the need to make guesses about the emissions-concentrations-exposure linkage would be the use of epidemiological results rather than extrapolations from dose-response functions.

FY 1992 SAB COMMENTARIES**EPA-SAB-RAC-COM-92-001 *Status of EPA Radionuclide Models***

In recent years many Science Advisory Board reports have included constructive criticism of the models, databases, and uncertainty analyses used by the Agency. The Radiation Advisory Committee of the SAB has concerns about the limited progress it has seen in this area, because outmoded or inappropriate models, supported by inadequate data and executed to produce conservative results, can lead to significant overestimates of impact for specific potential hazards. This commentary focuses on three principal topics: 1) models used for predicting radionuclides transport; 2) data sets used as bases for prediction; and 3) lack of uncertainty analysis. Many of the recommendations found in recent Radiation Advisory Committee reports echo those in the August 1984 report of the Science Advisory Board Subcommittee on Risk Assessment for Radionuclides and the SAB generic resolution on modeling (SAB-EEC-89-012). The Committee hopes that by drawing this persistent problem to EPA's attention, specific work, such as development of validated environmental assessment models with integral uncertainty analysis capability, will be emphasized.

EPA-SAB-RAC-COM-92-002 *Commentary on Residual Radioactivity*

Upon the recommendation of its Radiation Advisory Committee, the Science Advisory Board urges the Agency to develop Federal radiation protection guidance specifically for removal or remediation actions for radioactive substances at various locations, including Superfund sites and Federal facilities. No radiation guidance directed to allowable residual radioactivity contamination at such sites currently exists. The technical issues that should be considered in developing guidance should include at least the following: 1) the types and forms of radioactive substances at sites; 2) a consistent protocol for exposure assessment and risk estimation that recognizes both spatial and temporal factors associated with human exposures to radiological contaminants at or from these sites; 3) the degree to which other contaminants and biota may enhance or inhibit the on-site and off-site migration of radionuclides; and 4) consideration of technical approaches for implementation of guidelines through managing radionuclide contaminants, and the effectiveness, costs, and cost/risk balancing for selected remedial actions.

EPA-SAB-RAC-COM-92-003***Reducing Risks from Radon: Drinking Water Criteria Documents***

EPA's Office of Drinking Water developed draft criteria documents and related reports that were the basis for new drinking water standards for uranium, radium, radon and man-made beta-gamma emitting radionuclides during the period November 1989 - July 1990. The Radionuclides in Drinking Water Subcommittee of the Science Advisory Board's Radiation Advisory Committee reviewed these documents during the summer of 1990. The overall quality of the four draft criteria documents submitted to the Subcommittee for its review was not good. Taken as a set, the documents are inconsistent in approach and with Agency practice in the derivation of drinking water criteria for other contaminants. The Subcommittee found that comments from a 1987 review had not been incorporated. Previous SAB recommendations that are directly relevant to these documents were not addressed in the drafts submitted for review. Technical decisions contrary to those recommended by the SAB were presented without justification and without acknowledgement of the existence of the SAB-recommended alternatives. Relevant recommendations of the National Research Council's Committee on the Biological Effects of Ionizing Radiation 1988 and 1990 reports were ignored or selectively adopted without explanation or rationale. Uncertainties associated with 1) selection of particular models, 2) specific parameters used in the models, and 3) the final risk estimates are not adequately addressed in any of the documents.

EPA-SAB-DWC-COM-92-004***Commentary on the Disinfection By-Product Regulatory Analysis Model***

The Drinking Water Committee (DWC) was briefed by EPA Staff on a computer model they are developing to compare microbial risk with chemical risk as part of the Agency's regulatory process for disinfection and disinfection by-product (D/DBP) regulations. The Committee noted that the development of this Model is a worthwhile effort and encouraged its development for use in evaluating the economic and drinking water quality impacts of various regulatory strategies. Because the model is at such a preliminary stage of development, contains so many uncertainties, and is invalidated at this time, the Committee recommended that it not be a part of the upcoming draft D/DBP regulation.

EPA-SAB-IAQC-COM-92-005 *Commentary on the Agency's Asbestos Program*

The Committee was concerned that the scientific basis for EPA's regulatory actions and guidance documents on asbestos have not had the benefit of review by the Science Advisory Board (SAB). The Committee invited representatives of the Office of Research and Development (ORD) and the Program Offices having significant asbestos interests and responsibilities to provide a briefing on their current asbestos-related activities. The briefing was held during the Committee's public meeting in Arlington, Virginia on February 24-25, 1992. Based on these discussions, the Committee was able to come to consensus on some preliminary concerns about the Agency's asbestos program and its capacity to meet its regulatory responsibilities and commitments to reducing future risk in cost-effective ways: 1) the Committee heard no evidence that there is any strategic planning for addressing either important research needs or the implications of past research concerning the importance of fiber dimensions on inhalation hazard; 2) there appears to be little, if any ongoing research on the critical issue of fiber properties affecting toxicity; and 3) there does not seem to be any formal mechanism for coordination on hazard ranking, monitoring methodology, or control technology on an Agency-wide basis. Further, there is no evidence of such coordination between involved Federal agencies.

EPA-SAB-EC-COM-92-006 *Commentary on Anticipatory Research Program*

The Executive Committee of the Science Advisory Board identified a need for the Agency to improve its research efforts to anticipate future environmental problems. They cited the following examples of activities the Agency could undertake in this regard: 1) continue to stress programs that monitor environmental quality (such as EMAP) and human exposure (such as NHEXAS) and develop ways to predict the ecological and health consequences of continued patterns of pollutant loadings; 2) Conduct expert workshops to review emerging basic science information for early indicators of potential environmental problems; 3) Monitor technological trends supported by socioeconomic responses and trends and develop ways to predict their environmental and health consequences. Conduct activities that develop goal-oriented, surprise-oriented, and other scenarios that reveal potential environmental and health problems; 4) to improve early identification of new problems, conduct more basic research in areas we know need to be shored up for EPA to be ready to address emerging environmental quality and health needs; 5) establish a dedicated group within EPA to conduct the above work and to prepare periodic reports on new,

emerging, and escalating ecological, health, and welfare problems caused by environmental stressors. Ways to mitigate such problems should be identified.

EPA-SAB-RAC-COM-92-007 *Commentary on Harmonizing Chemical and Radiation Risk-Reduction Strategies*

The Science Advisory Board's Radiation Advisory Committee call attention to the need for a more coherent policy for making risk-reduction decisions with respect to radiation and chemical exposures. The regulation of radiation risks has developed under a different paradigm than for regulation of chemical risks, and a significant potential exists for EPA decisions on radiation risk reduction to be seen as unjustified by the health physics community, the chemical risk management community, or both. The Science Advisory Board Report, Reducing Risk: Setting Priorities and Strategies for Environmental Protection (EPA-SAB-EC-90-012) clearly enunciates the principle that EPA's priorities should be directed towards reducing the greatest risks first, especially when that can be accomplished economically. The corollary to that principle is that similar risks should be treated similarly, which calls for the harmonization, in so far as is possible, risk-reduction strategies between chemicals and radiation. Harmonization does not necessarily imply identical treatment, but it does imply that any differences in treatment are clearly explained and justified. A resolution to the seeming discrepancy between the radiation paradigm and the chemical paradigm could be achieved in any of several ways: 1) bringing risk-reduction strategies for excess radiation exposures consistently in line with the chemical paradigm; 2) bringing chemical risk-reduction strategies more in line with the radiation paradigm; or 3) achieving harmony between the two systems by modifying both in appropriate ways, explaining residual differences, and placing more emphasis on what can reasonably be achieved. If none of these approaches seems appropriate, the Agency should at least explain why the risks from radiation and chemicals are treated differently under specified conditions and in specified exposure settings.

EPA-SAB-DWC-COM-92-008 *Commentary on Alternative Disinfectant and Disinfectant By-Products*

At a time when rules for the use of alternate disinfectants are being formulated, it is essential that knowledge of disinfectant by-products is being acquired. Currently, however, there is no focussed research program on these issues that involve the whole treatment train. Such research would include both chemical and biological

evaluations of combined treatments as well as disinfection practices that lead to the formation of bromates and chlorates. The absence of such research and the resulting paucity of data could have a detrimental effect on the credibility of a Federal Program that regulates this country's water treatment industry. Clearly, funding priorities for drinking water research and concomitant public health issues have to be reviewed and given higher priority. Such important public health programs deserve a level of supportive research that is commensurate with their impacts on community and state programs across the country.

EPA-SAB-CASAC-COM-92-009 Commentary requesting CASAC's early involvement in Agency's development of position on ozone

CASAC has noted with interest that the Agency is not choosing to revise the NAAQS for ozone and is initiating a new assessment of its health and environmental effects. The Committee would like to offer its assistance in carrying out the review of this assessment in as expeditious a manner as possible. The Committee would like to participate in a briefing on the Agency's plans in this area.

EPA-SAB-EEAC-COM-92-010 Commentary on the Office of Policy, Planning and Evaluation's Study of Environmental Accounting, Cheasapeake

The Science Advisory Board's Environmental Economics Advisory Committee (EEAC) reviewed the EPA Office of Policy, Planning, and Evaluation's (OPPE) study of environmental accounting, Cheasapeake. The Committee met on April 15, 1992 in Arlington VA. The Charge to the EEAC was developed by the OPPE and encompassed six major conceptual issues based on the Cheasapeake study, with each issue including a variety of sub-issues--some highly specific and technical, others more broad and generic in nature. The Committee felt that the issues raised in the Charge were too extensive to be addressed within a single application of environmental accounting, and decided that the most useful course of action would be to frame this report in terms of broad comments on the topic of environmental accounting per se, rather than address the specific considerations raised in the Cheasapeake report and the associated charge. Concerns about the inability of conventional economic accounting systems to reflect accurately natural resource depletion and degradation of environmental quality have led many economists to explore the possibility of implementing accounting systems that "take nature into account." Several approaches

have been proposed and implemented on a case study basis. The Committee felt that EPA should maintain a capability in environmental accounting so the Agency would be able to learn about and contribute to activities at both the United Nations and the U.S. Bureau of Economic Analysis on these issues. While maintaining capability in this area is important, EPA needs to clarify the purposes to be served by environmental accounting. If environmental accounting is envisioned as a tool to measure welfare effects (i.e. the changes in the value of resource stocks or environmental amenities), research needs to address the connection between welfare analysis, which measures social values, and national income accounting, which measures economic activity. In the meantime, it is important to recognize that environmental accounting systems as currently constructed do not provide consistent measures of welfare, and therefore do not provide useful guides to the desirability of various policy changes. Additional research might also compare current approaches with other methods for trying to take nature into account in national income accounting. The Committee also thinks that research in this general area should be continued as a means of learning more about environmental accounting, but that it should not serve as a template for a series of such studies in other geographic areas. The methodology has not yet been sufficiently developed to serve as a guide for future efforts. Rather, it should continue to be used to stimulate further thought about fundamental conceptual and measurement issues which only percolate to the surface in the context of specific studies.

FY 1992 SAB CONSULTATIONS

- EPA-SAB-EEC-CON-92-001** *Notification of a Consultation on OSW's Modeling Approaches, Assumptions, & Data to be Used in the Subsurface Fate and Transport Model(s) for Oily Wastes*
- EPA-SAB-CASAC-CON-92-002** *Notification of a Consultation on Prioritizing the 189 Hazardous Air Pollutants Listed in the 1990 Clean Air Amendments*
- EPA-SAB-IAQC-CON-92-003** *Notification of a Consultation on the Office of Health Research National Human Exposure Assessment Survey*
- EPA-SAB-EHC-CON-92-004** *Notification of a Consultation on the Office of Solid Waste and Emergency Response's draft study on Superfund site Populations at Risk*
- EPA-SAB-EEC-CON-92-005** *Notification of a Consultation on the Review of the Superfund Ground-Water Strategic Plan and Superfund Dense Non-Aqueous Phase Liquids*
- EPA-SAB-EPEC-CON-92-006** *Notification of a Consultation on Plans for the Habitat Cluster*

APPENDIX H

PROCEDURES FOR PUBLIC DISCLOSURE AT SAB MEETINGS

Background

Conflict-of-interest (COI) statutes and regulations are aimed at preventing individuals from (knowingly or unknowingly) bringing inappropriate influence to bear on Agency decisions which might affect the financial interests of those individuals. The SAB contributes to the decision-making process of the Agency by evaluating the technical underpinnings upon which rules and regulations are built. SAB members and consultants (M/Cs) carry out their duties as Special Government Employees (SGE's) and are subject to the COI regulations.

Therefore, in order to protect the integrity of the SAB process itself and the reputations of those involved, procedures have been established to prevent actual COI and minimize the possibility of perceived COI. These procedures include the following:

- a. Having SAB M/C's regularly file EPA Form 3120-1, Confidential Statement of Employment and Financial Interest. This form is a legal requirement and is maintained by the Agency as a confidential document.
- b. Providing SAB M/C's with written material; e.g., "Ethics in a Nutshell" and a copy of Ethics Advisory 92-11.
- c. Delivering briefings to M/C's on COI issues on a regular basis.

The following is a description of an additional voluntary¹ procedure that is designed to allow both fellow SAB M/Cs and the observing public to learn more about the backgrounds that SAB M/C's bring to a discussion of a particular issue. In this way, all parties will gain a broader understanding of "where people are coming from" and provide additional insights to help observers and participants evaluate comments made during the discussion.

¹ Note: The disclosure procedure is voluntary, and members/consultants are not obligated to reveal information contained in their Form 3120-1 that would otherwise remain confidential.

Procedure

When an agenda item is introduced that has the potential for COI--actual or perceived--the Designated Federal Official (DFO) will ask each M/C on the panel to speak for the record on his/her background, experience, and interests that relate to the issue at hand. The following items are examples of the type of material that is appropriate to mention in such a disclosure:

- a. Research conducted on the matter.
- b. Previous pronouncements made on the matter.
- c. Interests of employer in the matter.
- d. A general description of any other financial interests in the matter: e.g., having investments that might be directly affected by the matter.
- e. Other links: e.g., research grants from parties--including EPA--that would be affected by the matter.

The DFO will also publicly refer to any waivers from the COI regulations which have been granted for the purposes of the meeting.

The DFO will assure that the minutes of the meeting reflect that fact such disclosures were made and, if possible, the nature of the disclosures. In addition, the minutes should describe any situations in which, in the opinion of the DFO, an actual or perceived COI existed and how the issue was resolved.

APPENDIX I

BIOGRAPHICAL SKETCHES OF THE SCIENTIFIC STAFF MEMBERS

Staff Director:	Dr. Donald G. Barnes
Assistant Staff Director:	Mr. A. Robert Flaak
Designated Federal Officials:	Dr. Ed Bender Mr. Randall Bond Mrs. Kathleen Conway Dr. K. Jack Kooyoomjian Mr. Samuel Rondberg Ms. Stephanie Sanzone

DR. DONALD G. BARNES

Staff Director and Designated Federal Official for the Executive Committee

DR. DONALD G. BARNES assumed his position as Staff Director in March, 1988. He came to the SAB from nearly ten years' service as Senior Science Advisor to the Assistant Administrator for Pesticides and Toxic Substances. In that role he became involved with a number of controversial issues; e.g., pesticide re-registrations and the implementation of Section 5 of TSCA. His claim to infamy, however, is his long association with "dioxin"; i.e., 2,3,7,8-TCDD. For many years, he served as the Agency's principal technical point of contact on "dioxin" issues; e.g., 2,4,5-T cancellation hearings, Agent Orange resolution, and emissions from municipal waste combustors. His national and international (WHO and NATO) contributions, while not stilling the controversy, have generally not exacerbated it-reason enough, one might say, to justify his receiving two EPA Gold Medals for Superior Service for these activities.

Dr. Barnes has also been active in the area of risk assessment. He was one of the Agency representatives to the Office of Science and Technology Policy-led effort to produce a consensus view of cancer in the Federal government; i.e., Cancer Principles. He was active in the writing of Agency's risk assessment guidelines for cancer and for mixtures. As a member of the EPA Risk Assessment Forum, he joins with other senior scientists in addressing complex risk issues that affect different program offices. As former Coordinator and now Member of the EPA Risk Assessment Council, he is actively involved with the policy review of scientific positions on risk.

Prior to coming to EPA, Dr. Barnes was Associate Professor and Science Division Chair at the innovative St. Andrews Presbyterian College in North Carolina. Today, his teaching itch gets scratched through stints as "risk assessment trainer" in EPA's Training Institute.

His formal education includes a BA (chemistry) from the College of Wooster, a PhD (physical chemistry, with a minor in physics) from Florida State University, and subsequent graduate courses in several health-related areas; i.e., pharmacology, toxicology, immunology and epidemiology. His real world education is provided by Dr. Karen K. Barnes and two college-aged sons.

MR. A. ROBERT FLAAK**Assistant Staff Director**

Designated Federal Official (DFO) for the Indoor Air Quality and Total Human Exposure Committee

Acting Designated Federal Official for the Drinking Water Committee.

MR. A. ROBERT FLAAK is the most experienced of the SAB's Designated Federal Officials, having served for six months as the original Executive Secretary for CASAC 1978-1979 and re-occupying that position from 1984 to 1991. He currently serves as the DFO for the Indoor Air Quality/Total Human Exposure Committee, and, since June 1991, has served as the Acting DFO for the Drinking Water Committee. In January, 1990 he assumed the duties of Acting Assistant SAB Staff Director. He was formally appointed as Assistant Staff Director in February 1991.

In between appointments with the SAB, he served for five years with the U.S. Coast Guard Office of Marine Environment and Systems as Senior Environmental Specialist developing and implementing environmental policy and guidance for the preparation of environmental impact statements for bridge construction throughout the United States and its territories.

Prior to his first tour with the SAB, Mr. Flaak served as Staff Marine Biologist with an engineering consulting company where he assisted in the design and coordination of sampling and data analysis for oceanographic surveys. He has also worked as a consulting marine taxonomist for clients, including the National Oceanic Atmospheric Administration, the du Pont Co., Roy F. Weston Inc., and the University of Delaware's College of Marine Studies. These activities reflect his research interest in phytoplankton ecology, bivalve nutrition, and bivalve and invertebrate mariculture.

Mr. Flaak has graduated from Stuyvesant High School in New York City, the City College of New York (BS in zoology), the University of Delaware (MA in marine studies), and Central Michigan University (MA in public administration). He has taken other graduate level environmental and management courses.

As part of his involvement with the Federal Advisory Committee Process, Mr. Flaak is an Instructor for the General Services Administration Course on Federal Advisory Committee Management. During the past three years, he has helped design

and organize the course, and has taught several hundred Federal workers the proper methods of operating FACA Committees.

His 26 years of military service include three years of active duty with a tour in South Vietnam in 1968-69, and he was called to active duty and served for four months (Jan - May 1991) in Saudi Arabia, Kuwait and Iraq during Operation Desert Storm. He is currently an active US Army Reserve Lieutenant Colonel, serving as the Deputy Chief of Staff-Logistics for a Civil Affairs Command, part of the 1st Special Operations Command. He lives with his wife, Dottie, and their seven-year old son, Chris in Fairfax, Virginia.

DR. EDWARD BENDER**Designated Federal Official for the Ecological Processes and Effects Committee.**

DR. EDWARD S. BENDER is the Designated Federal Official for the Ecological Processes and Effects Committee. He has assisted the Committee to expand its agenda with reviews of several interesting and diverse issues, including sediment criteria, ecological risk assessment research, wetlands, marine monitoring and disease research, and planning for the Environmental Monitoring and Assessment Program.

Prior to joining the SAB, Dr. Bender spent ten years working in EPA's National Pollutant Discharge Elimination System enforcement program as an expert in biological monitoring of effluents. In this position, he helped develop and/or revise the program policies and guidance for self-monitoring by permit holders, compliance inspections and reporting, and civil and administrative penalties. He reviewed over 100 litigation reports that alleged violations of permit conditions and he also provided technical support, including expert testimony in two trials. In one case, the US vs Olin Corp, he helped negotiate the clean-up and restoration of a National Wildlife Refuge that was contaminated with DDT. Prior to his work with EPA, he conducted ecological assessments and research for the Army at ammunition plants, arsenals, and depots throughout the United States. He also joined an expedition to Greenland, where he backpacked through the tundra to band nestlings and to collect from aeries of peregrine falcons.

Dr. Bender received a B.S. from Westminster College, New Wilmington, PA, an M.S. (Zoology) from the University of Florida, Gainesville, FL, and a PhD. from Virginia Polytechnic Institute and State University, Blacksburg, VA. His dissertation research focused on the process of recovery of a stream macroinvertebrate community from chronic DDT contamination.

Dr. Bender and his wife, June, share their interests and labors in horticulture and home improvement projects and in raising their three daughters.

MR. RANDALL BOND

Designated Federal Official: Clean Air Scientific Advisory Committee

Designated Federal Official for the Research Strategies Advisory Committee

MR. RANDALL BOND joined the Science Advisory Board staff in December 1990. Randy started with EPA as a student assistant to the Medical Science Advisor in 1976 while working on his undergraduate degrees in chemistry and biology. After finishing his undergraduate work at George Washington University, he accepted a position with ORD's Office of Research Program Management where he served as Executive Secretary to the newly formed Pesticides Research Committee and the Chemical Testing and Assessment Research Committee. Randy has also served as a participant in the LEGIS (Congressional Fellowship) program, and served as EPA coordinator for animal welfare issues. He has also chaired a number of international committees related to biological environmental specimen banking. His most recent position was in ORD's Office of Health Research where he coordinated pesticides and toxic substances health research issues and served as the Chairman for the committee responsible for planning all TSCA related research and development activities.

MRS. KATHLEEN CONWAY**Designated Federal Official: Radiation Advisory Committee**

MRS. KATHLEEN CONWAY received her BS and MS from Tufts University where she studied biology, public health, and sanitary engineering. Between degrees she wrote for the Hartford Courant. Mrs. Conway was a sanitary engineer for the Massachusetts Department of Public Health and later for the U. S. Environmental Protection Agency's Region I in 1974 where she worked in the wastewater treatment plant operations and maintenance program. During this time she chaired the Boston Section of the Society of Women Engineers.

In 1977 she joined the Office of Research and Development. Her subsequent service as acting Director for two divisions in the Office of Health Research lead to her selection, in 1982, as a participant in the President's Executive Exchange Program. During her exchange year she worked with an occupational health and safety unit at IBM. She served the Science Advisory Board as Deputy Director from 1984 to 1989 when she resigned the position to work part-time.

She continues as Designated Federal Official to the Radiation Advisory Committee. She volunteers with the Society of Women Engineers on the University of California (Davis) SERIES project. SERIES is a science education program developed for use in informal educational settings.

DR. JACK KOOYOOMJIAN

Designated Federal Official for the Environmental Engineering Committee

DR. JACK KOOYOOMJIAN joined the Science Advisory Board (SAB) in July, 1988 as Designated Federal Official of the Environmental Engineering Committee. He brings to his work at the SAB over 23 years of experience with environmental issues, including over 18 years of diverse experience within EPA Headquarters.

In the mid-1970's he worked in the Office of Solid Waste, documenting cases involving the improper disposal of hazardous wastes which contributed to the passage of the landmark legislation known as the Resource Conservation and Recovery Act (RCRA) in 1976. He also gained experience with saturated and unsaturated zone modeling and ground-water model assessment during this time. He has over four years experience in the Office of Water developing guidelines and regulations for industrial wastewater sources. From 1979 through 1988, Jack was very involved with the Superfund's Emergency Response program. He developed the multi-media hazardous substance reportable quantity regulations, and was also responsible for oil and hazardous substance pollution prevention regulations, oil spill reporting, the emergency response data base known as OHMTADS (Oil and Hazardous Materials Technical Assistance Data System), as well as the oil and dispersant testing and registration program (old Subpart H, now Subpart J) of the National Contingency Plan.

Dr. Kooyoomjian received a BS (Mechanical Engineering) from the University of Massachusetts, and a MS (Management Science) and a Ph.D. (Environmental Engineering, with a minor in Economics) from Rensselaer Polytechnic Institute. His academic career included his induction into a number of honorary societies: e.g., Sigma Xi (research), Chi-Epsilon (civil engineering), Omicron Delta Epsilon (economics). His professional activities continue apace. He served as a member of the Board of Control of the Water Pollution Control Federation (WPCF) [now known as the Water Environment Federation (WEF)] from 1986 to 1989, and was a member of its Policy Advisory Committee in 1988/1989. In 1988 he received the Arthur Sidney Bedell Award from WEF for extraordinary personal service in the water pollution control field. He served as Local Arrangements Co-Chair of WEF's 63rd Conference and Exposition, which was held October 6-11, 1990 in Washington, D.C. and hosted nearly 13,000 registrants. He is also active in the Federal Water Quality Association (FWQA), the local member association of WEF, where he has served in numerous capacities, including President.

This year, Jack was invited to participate in a trip to Armenia from April 12 through April 26, 1992. He received an honorary professorship for his work as part of a five-person team from the United States to develop an environmental engineering bachelors program and to outline a master's curricula for the State Engineering University of Armenia (SEUA), which has over 23,000 students, as well as to assist in addressing the newly-independent republic of Armenia's environmental problems.

Closer to home, which he shares with his wife Gerry, and their three daughters, Jennifer (18), Melissa (13) and Jessica (11), Dr. Kooyoomjian is involved in numerous civic activities which focus on development and land-use issues in his area. He received both an EPA Public Service Recognition Award in 1988 and several County Recognition Awards. Most recently he was recognized as a candidate for the Governor's Award for volunteerism for the state of Virginia in 1991, and as a Federal Employee Point-of-Light in May of 1992.

MR. SAMUEL RONDBERG

Designated Federal Official for the Environmental Health Committee

Designated Federal Official for the Environmental Economics Advisory Committee

Designated Federal Official for the Clean Air Act Compliance Analysis Council

MR. SAMUEL RONDBERG retired from the Senior Executive Service (SES) in August, 1988 and re-entered federal service in November 1988, when he joined the SAB staff. During his previous full and fruitful career at EPA, he served as an Office Director and Associate Office Director in EPA's Office of Research Development (ORD) and the Office of Information Resources Management (OIRM).

Before joining EPA in 1974, Mr. Rondberg held research management, analytical, and policy formulation positions with the Department of Transportation and the Veterans Administration's Department of Medicine Surgery. He also served in the U. S. Army for two years, with the rank of Captain. Most of his federal career has been devoted to advancing the use of analytic methodologies to address public policy issues, and to improving the management of federal research activities. At EPA, he has directed particular efforts to the complex problems and issues engendered by operating a research program within the context of a regulatory agency--coordination between legal and scientific "cultures"; maintaining a stable long-term program in the face of urgent and frequently changing needs for short-term support; and maintaining an adequate resource base in the face of competition from regulatory programs struggling to meet court or Congressionally mandated deadlines.

Mr. Rondberg pursued undergraduate (AB, 1959) and graduate studies at Washington University, where he also served as a Teaching Assistant in the Graduate School of Arts and Sciences and as a Public Health Service Fellow and Research Associate in the Medical School. In 1967, he was awarded a National Institute of Public Administration Fellowship in Systematic Analysis at Stanford university and completed a special interdisciplinary curriculum in the Schools of Engineering, Graduate Business, and the Departments of Economics and Computer Science.

Mr. Rondberg has authored publications in clinical psychology, research management, and the applications of electronic systems and telemetry to urban transportation.

Sam is married, the father of one graduate student daughter, and attempts to find time to pursue interests in modern history, the impacts of technology on society and culture, amateur radio, marine aquaria keeping, and antique art (posters and advertising graphics) as a reflection of our social history.

MS. STEPHANIE SANZONE

Designated Federal Official for the Ecological Processes and Effects Committee

MS STEPHANIE SANZONE joined the SAB staff in September 1992, while on maternity leave from the Agency. Beginning in December 1992, she will serve as the Designated Federal Official for the Ecological Processes and Effects Committee.

Stephanie comes to the SAB staff after 4 years with EPA's coastal programs in the Office of Wetlands, Oceans and Watersheds. In her role as coordinator for coastal programs in the Southeast, she provided oversight and assistance to National Estuary Program sites in the development of management plans for estuarine watersheds. Prior to coming to EPA, Ms. Sanzone served as a legislative aide for environment issues in the U.S. Senate and S.C. House of Representatives, and as a coastal resource specialist with the Coastal States Organization in Washington, D.C.

Ms. Sanzone received a B.A. in Biology, with a minor in chemistry, from the University of Virginia, and a M.S. in Marine Science from the University of South Carolina. Her thesis research examined the role of amino acids and hemolymph proteins in a crustacean's response to changing environmental salinity.