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SCIENCE ADVISORY BOARD
FY1999 ANNUAL STAFF REPORT

New Wineskins for New Wine

This report is an SAB Staff summary of activities of the U.S. Environmental Protection Agency's Science Advisory Board for Fiscal Year 1999, with projections for Fiscal Year 2000. This report has not been reviewed by the Board or the Agency, and should not be construed as representing the views of either organization.

FOREWORD: New Wineskins for New Wine

Just about two millennia ago, it was reported (Luke 5: 37-38) that new wine stored in old wineskins causes the skins to burst with the resultant loss of both the wine and its container. Roughly 2000 years later, the Science Advisory Board (SAB) has made a similar observation as it relates to environmental decisionmaking, an activity that some have likened to sausage-making (borrowing from Chancellor Bismark's remark on the legislative process), if not to wine-making, *per se.*

In FY 1999, the SAB completed work on the longest and most complex project in its 20+ year history. With the final peer review now completed, the publication of *Environmental Decision Making: Report from the SAB's Integrated Risk Project (IRP)* should occur before the end of the calendar year.

In its report the SAB takes a holistic view of the environmental decisionmaking process. The Board clearly recognizes the import and pact of science in that process, but it takes a broader perspective and highlights the essential role that non-scientific information -- e.g., social values -- plays in appropriately shaping the final decision. Building on concepts articulated in the report of the Commission on Risk Assessment/Risk Management and in recent National Research Council reports, the Board has highlighted the importance of working closely throughout the process with risk managers and "interested and affected parties".

The SAB's report is something less than a "how-to" manual, but it does present a fresh perspective of how science can contribute to the decisionmaking process, from problem formulation to solution evaluation.

In keeping with its own advice to be more integrative, the SAB has worked to mingle a wider range of issues and a wider range of points of view in its other deliberations and operations. Specifically, this report documents that FY 1999 saw

a. A record number of consultants (94) used in SAB reviews.
b. More cross-Board reviews conducted as Subcommittees of the Executive Committee.
c. A 5-year high in the number of SAB reports submitted to the Administrator.
d. The move of the Staff Office to newer, more open, more accessible, and more desirable space in one of the premiere government office buildings in Washington.

All this bodes well for the Board's continuing to have a positive impact on the Agency as a new millennium -- with a new wine -- approaches.

Donald G. Barnes, PhD
SAB Staff Director

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1. EXECUTIVE SUMMARY

1.1 Introduction to the Report

This Annual Report provides a succinct introduction to the Science Advisory Board (SAB); a summary of the SAB activities for Fiscal Year 1999; and offers a near-term projection for 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 resources. Section 4 contains summaries of the activities of each SAB Committee during FY 1999, details the major activities illustrating the SAB providing new wineskins for new wine in transition and notes changes in the SAB Staff Office. Section 5 provides some projections for FY 2000.

This Report also includes several specialized appendices, containing: charters and leadership information for the Committees; membership information; organizational charts; guidelines on service on the SAB; lists of meetings; abstracts of FY 1999 reports; and biographical information about the SAB Staff.

1.2 Introduction to the Board

The purpose of the Board is to provide highly qualified, independent technical advice to the EPA Administrator on the scientific, engineering, and economic underpinnings of Agency positions (see charters in Appendix A). The goal is to make a positive difference in the production and use of science at the Agency. To accomplish this goal the SAB often functions as a peer review panel, assessing the technical rationale underlying current or proposed Agency positions. In recent years it has initiated a number of activities on its own: e.g., a commentary on strategic planning in the Office of Research and Development's engineering program, retrospective studies on the impacts of past reports by the Radiation Committee, and a self-study of the Board.

The SAB was formally chartered in 1978 by the Environmental Research, Development, and Demonstration Authorization Act (ERDDAA), although its roots extend back to the birth of EPA in 1970. The Board is a Federal Advisory Committee and must comply with the Federal Advisory Committee Act (FACA). The Board's membership is composed of non-Federal scientists, engineers and economists appointed by the EPA Administrator. The Guidelines for Service on the SAB are included in Appendix B1. Appendix B2 describes the various ways in which experts are affiliated with the Board. The 105 Members of the Board (see Appendix B3) operate through ten standing Committees, coordinated through an Executive Committee (see the organizational chart in Appendix C and information on Staff Support and Committee Leadership in Appendix D). The Members of the Board are some of the most qualified technical experts in the country, as evidenced by the credentials of the FY 1999 Committee Chairs (see Table II, pg. 10). The work of the Board is supported by some 300 Consultants (see Appendix B4), who are scientists, social 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 Federal Experts, as needed.

The goal is to make a positive difference in the production and use of science at the Agency.

The SAB's operations are supported by a Staff Office of 20 employees and an FY 1999 budget totaling some $2.6 million. These resources enabled the Board to conduct 48 meetings in FY 1999 (of which 14 were public conference calls, 33 were public meetings, and 1 closed meeting) and issue 19 full reports, 29 short reports (generally less than 10 pages), including 4 Letter Reports, 4 Commentaries, 13 Advisories, and 8 Notifications of Consultation (see Tables IV and V).

The SAB carries out projects at the request of the Agency and Congress, as well as on its own initiative. In recent years, the number of requests for SAB action have well exceeded the number that the Board can address. Therefore, the Board has adopted criteria to establish priorities among the

various requests, based on the degree to which such requests:

I. GENERAL CRITERION
   A. Provides an opportunity to make a difference in the production and use of science at EPA.

II. CLIENT-RELATED CRITERIA
   B. Supports major regulatory or risk management initiatives.
   C. Serves leadership interests such as those of the EPA Administrator or Congress.
   D. Supports strategic themes of current interest.

III. SCIENCE-DRIVEN CRITERIA
   A. Involves scientific approaches that are new to the Agency.
   B. Deals with areas of substantial uncertainties.

IV. PROBLEM-DRIVEN CRITERIA
   A. Involves major environmental risks.
   B. Relates to emerging environmental issues.
   C. Exhibits a long-term outlook.

V. ORGANIZATIONAL-RELATED CRITERIA
   A. Serves as a model for future Agency methods.
   B. Requires the commitment of substantial resources to scientific or technological development.
   C. Transcends organizational boundaries, within or outside EPA (includes international boundaries).
   D. Strengthens the Agency's basic capabilities.

With all of these activities, attention and impacts, the Board has maintained a broad base of support both within and outside the Agency.

1.3 Review of FY 1999 Activities

During FY 1999 the SAB's various Committees and subcommittees conducted 48 public meetings that were announced in the Federal Register. This number includes 14 public conference calls. These efforts resulted in 48 reports. A wide variety of topics were covered, from the Agency's efforts to insure quality in its operations to specific computer models developed by the Agency. Appendices E and F provide a full listing of FY 1999 SAB meetings and reports (with abstracts).

The Board took several steps in FY 1999 to develop new wineskins for its new wine.

New View of Environmental Protection: Dr. Genevieve Matanoski of Johns Hopkins University led the Board's effort to produce the Integrated Risk Project. In the report the Board advocates a wider, more comprehensive approach to environmental protection that will encompass both technical inputs to inform the value-laden information and consideration needed for decision-making.

New Role of Social Sciences: The SAB continued to advocate a more active presence of social sciences in its own projects, as well as in the activities of the Agency. For a number of its reviews the SAB intentionally included social scientists on its Panels. The Board began sponsoring an intra-Agency seminar series of prominent social scientists to speak directly with EPA staff to discuss how their discipline can -- and has -- successfully addressed environmental problems. The Board's request for a social scientist to serve as a member of the Executive Committee in FY 2000 has been acted upon favorably.

New Quarters for the SAB Staff Office: The SAB Staff Office is literally "in a new container", having relocated to the renovated Ariel Rios Building at 1200 Pennsylvania Avenue NW in Washington, DC. The new quarters and associated amenities have increased morale and productivity.

New Staff Structure: The SAB is conducting more "cross-Committee" reviews, in response to the Agency's use of new approaches to environmental decision-making. To facilitate these interdisciplinary projects, the SAB has allocated more resources to high-profile, special projects that involve participants from several SAB Committees.

New Relations with FACAs: Working with the Agency's Committee Management Team, the SAB Office is at the forefront of advocating "re-inventing advice at EPA". The intent is to become more strategic in the manner and means by which the Agency seeks and utilizes technical advice from the more than a dozen Federal Advisory Committee Act (FACA) committees chartered to provide advice to the Agency. By assuming a leadership role in coordinating work with other FACAs in the Agency and beyond, the SAB is helping more to bring independent, external scientific advice to bear on the problems facing EPA.

The Board increased its use of the Internet by upgrading its Website by electronic distribution of its monthly newsletter, and by initiation of an internet-based SAB Discussion Database to more effectively and efficiently generate reports.

A retirement and a career move led to the loss of some notable figures in the SAB professional staff. Other losses in the support staff marked transitions. However, these losses were off-set, to some degree, by the addition of a productive and provocative senior Staff member and by the continuing growth and development of other Staff members.

1.4 Projections and Conclusions

More than 70 requests for FY 2000 SAB projects have been received by the start of the fiscal year, meaning the Board is faced with considerable winnowing and prioritizing. Clearly, some high-profile issues will be addressed by the Board in the coming year. In addition, the SAB has some important initiatives of its own; e.g., exploring the role of science in the Agency's new approaches to environmental decision-making.

2. INTRODUCTION TO THE REPORT

2.1 Purpose of the Report

The Science Advisory Board (SAB) is a legislatively mandated group of non-federal government scientists, engineers, and economists charged with providing independent technical advice on environmental issues to the EPA Administrator and others, (e.g., Congressional committees) to help inform their decisions. The purpose of the Board is to make a positive difference in the production and use of science at EPA. Generally, the SAB does not get involved in or provide advice on regulatory or policy aspects of problems confronting the Agency, because such matters are the province and responsibility of the EPA Administrator. Additional details of the objectives, responsibilities, composition, and activities of the SAB and its two separately mandated entities (the CASAC and the Council) and the charter documents of these organizations are found in 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 inside 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?" At its November 1997 strategic retreat, the SAB's Executive Committee (EC) defined the Board's job as making a positive difference in the production and use of science at EPA. For example, the SAB makes a difference in the type and conduct of scientific, engineering and economic research at EPA. The SAB makes a difference in the way that resulting data are interpreted and used to inform regulatory and other decisions. 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 better address environmental problems.

In broad terms, this Report is intended to reveal the SAB to a wide audience: to those both inside and outside the Agency, to those who understand the Board, to those who think they understand the Board, and to those who don't understand the Board. The intent is that each reader gain a broader perspective of the SAB, its activities, and its impact.

More specifically, the purpose of this Annual Report of the Science Advisory Board Staff is three-fold:

a) To provide a succinct introduction to the SAB.
b) To provide a summary of the SAB's activities for FY 1999.
c) To offer a near-term projection of future SAB activities.

The Report is designed to provide the written equivalent of "a group photo" 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 principal sections, plus appendices supplementing 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 positively impacts the functions and operations of the Agency. Section 4 focuses on SAB activities during FY 1999. This portion of the Report contains descriptions of the activities of each of the Board's Committees during the past year. In addition, changes in the SAB Staff

assignments and other changes in the Office are highlighted. Section 5 provides a glimpse into what FY 2000 likely holds in store for the Board.

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 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 issues (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 the 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. Since 1978, however, the SAB has operated as an EPA Staff Office, reporting directly to the Administrator.

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 (Appendix A, 1-3) (which must be renewed every two years), announces its meetings in the *Federal Register*, and provides opportunities for public comment on issues before the Board.

Members of and Consultants to the SAB constitute a distinguished body of scientists, engineers, and economists who are recognized, non-governmental experts in their respective fields. These individuals are drawn from academia, industry, state government, and environmental communities throughout the United States and, in some limited cases, other countries. (See Appendices B3 and B4 for a listing of Members and Consultants, respectively).

The Agency places a premium on basing its regulations on a solid scientific foundation. Consequently, over the past 25 years the SAB has assumed growing importance and stature. It is now formal practice that many major scientific issues associated with environmental problems are reviewed by the SAB. For example, the Clean Air Act Amendments of 1990 (CAAA) require that technical aspects of decisions related to all 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 public proceedings Agency positions are subjected to critical examination by leading experts in various fields in order to test their currency and technical merits. At the same time, the SAB recognizes that EPA is often forced to take a policy 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. In such cases, 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 A1) includes the following statements:

TABLE I SAB Leadership Over the Past Two Decades

Executive Committee Chairs	Affiliation	Dates
Dr. Joan Daisey	Lawrence Berkeley Laboratory	1997-present
Dr. Genevieve Matanoski	Johns Hopkins University	1993-1997
Dr. Raymond Loehr	University of Texas	1988-1993
Dr. Norton Nelson	New York University	1983-1988
Dr. Earnest Gloyna	University of Texas	1981-1983
Dr. John Cantlon	Michigan State University	1979-1981
Dr. Emil Mrak	University of California	1974-1978

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

a) "The objective of the Board is to provide advice to EPA's Administrator on the scientific and technical aspects of environmental problems and issues".

b) "The Board will consist of a body of independent scientists and engineers [and now economists] of sufficient size and diversity to provide the range of expertise required to assess the scientific and technical aspects of environmental issues".

c) "No Member of the Board shall be a full-time employee of the Federal Government."

In addition, the Charter requires formation of an Executive Committee and inclusion of the Clean Air Scientific Advisory Committee and the Advisory Council on Clean Air Compliance Analysis (COUNCIL) (see separate charters, 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 to coordinate the scientific reviews by the Board's standing committees. Appendix C contains a chart of the FY 1999 SAB organization. The Executive Committee meets to act on Agency requests for reviews, to hear briefings on pertinent issues, to initiate actions/reviews by the Board which it feels are appropriate, and to approve final reports prior to transmittal to the Administrator. [Reports from the CASAC and the Council are submitted directly to the Administrator, without need for prior Executive Committee review or approval.]

Five Committees have historically conducted most Science Advisory Board reviews:

a) Clean Air Scientific Advisory Committee (CASAC): Mandated by the 1977 Clean Air Act Amendments
b) Ecological Processes and Effects Committee (EPEC)

c) Environmental Engineering Committee (EEC)
d) Environmental Health Committee (EHC)
e) Radiation Advisory Committee (RAC)

Between 1986 and 1990, five additional committees were added:

a) Integrated Human Exposure Committee (IHEC): Mandated by the Superfund Amendments and Reauthorization Act in FY 1986
b) Research Strategies Advisory Committee (RSAC): Requested by the Administrator in response to the Board's Future Risk report in FY 1988
c) Drinking Water Committee (DWC): Evolved from the EHC in FY 1990
d) Advisory Council on Clean Air Compliance Analysis (Council): Mandated by the 1990 Clean Air Act Amendments
e) Environmental Economics Advisory Committee (EEAC): Requested by the Administrator in response to the Board's *Reducing Risk* report in FY 1990

The Board supplements the activities of these committees by establishing a variety of ad hoc subcommittees as needed.

The Board has continually and successfully recruited top technical talent to fill its leadership positions. Those scientists and engineers who have led the SAB (and predecessor organizations) for the past 24 years are listed in Table I. Table II testifies to the caliber of individuals who served as chairs of SAB Committees in FY 1999.

The number of Members is flexible. In FY 1999 SAB consisted of 105 members appointed by the Administrator for two-year terms, renewable for not more than two additional two-year terms. Service as Committee Chair can lead to as much as an additional four years of continuous service. A formal guideline on Membership service was adopted by the Executive Committee in FY 1993 and has been followed by the Administrator in making appointments (see Appendix B1).

Over 300 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 flexible, and their one-year terms can be renewed indefinitely. Consultants are required to meet the same standards of technical expertise as do the Members. The term "Member and Consultant" (M/C) is used throughout this annual report to refer to these experts. Appendices B3 and B4 contain a list of the FY 1999 SAB Members and Consultants, respectively. Nearly all of them serve as Special Government Employees (SGEs), subject to all relevant Federal requirements, including compliance with the conflict of interest statutes (18 U.S.C. Sections 202-209).

In some few cases, the SAB also accesses experts via the route of Federal Expert and Invited Expert. These categories are described in greater detail in Appendix B2, Types of Affiliation with the SAB.

During FY 1999 the SAB Staff consisted of 23 people: a Staff Director, a Deputy Staff Director, and the Team Leaders of the Committee Operations Staff and the Committee Evaluation and Support Staff; eight scientist/engineers who serve as Designated Federal Officers (DFOs), three administrative staff, five support staff, two interns, and a National Older Worker's Career Center (NOWCC) Office Assistant.

The Staff identifies potential issues for SAB attention, focuses questions for review by the Board, works with the Board to identify and enlist appropriate Members and Consultants, interfaces between the Board and the Agency as well as with the public, coordinates logistics for reviews, and produces minutes and reports for submission to the Administrator.

TABLE II FY 1999 SAB Committee Chairs

Executive Committee (EC)

Dr. Joan Daisey

Head, Center for Atmospheric and Biospheric Effects Technology, Lawrence Berkeley Laboratory
Member, American Chemical Society
Member, American Association for Aerosol Research
Member, Air Pollution Control Association
Member, International Society of Exposure Analysis
Member, Editorial Review Board Aerosol Science and Technology

Advisory Council on Clean Air Compliance Analysis (Council)

Dr. Maureen Cropper

Principal Economist, Research Department, The World Bank
Past President, Association of Environmental and Resource Economists
Professor of Economics, University of Maryland
Member, Visiting Committee, Cornell Center for the Environment

Clean Air Scientific Advisory Committee (CASAC)

Dr. Joe Mauderly

Vice President and Director of External Affairs, Lovelace Respiratory Research Institute
Research Professor of Medicine and Pharmacy, University of New Mexico
Member, American Thoracic Society
Member, Society of Toxicology
Member, American Physiological Society
Member, American Association for the Advancement of Sciences
Member, American Veterinary Medical Association
Member, Editorial Board of Experimental Lung Research
Member, Editorial Board of Inhalation Toxicology

Drinking Water Committee (DWC)

Dr. Richard Bull

Senior Staff Scientist, Pacific Northwest National Laboratory, managed by Battelle
Member, American Association for the Advancement of Science
Member, Sigma Xi
Member, American Society for Pharmacology and Experimental Therapeutics
Member, Society of Toxicology
Member, American Association for Cancer Research
Member, American Water Works Association
Member, International Society for the Study of Xenobiotics
Member, Editorial Board of Toxicology
Member, Editorial Board of the Journal of Toxicology and Environmental Health
Member, National Research Council Committee Spacecraft Maximum Contaminant Limits
Member, Science Advisory Panel for Santa Anna River Water Quality and Health Study
Member, Bromide Expert Panel for the CAL-FED Program on the Sacramento River Delta

TABLE II FY 1999 SAB Committee Chairs (Continued)

Environmental Economics Advisory Committee (EEAC)

Dr. Robert Stavins

Albert Pratt Professor of Business and Government, and Faculty Chair, Environment and Natural Resources Program, John F. Kennedy School of Government, Harvard University
University Fellow, Resources for the Future
Member, Board of Directors, Association of Environmental and Resource Economists
Member, Board of Academic Advisors, AEI-Brookings Joint Center for Regulatory Studies
Member, Editorial Council, Journal of Environmental Economics and Management
Member, Board of Editors, Resource and Energy Economics
Member, Advisory Board, Environmental Economics Abstracts
Member, Advisory Board, Environmental Law and Policy Abstracts
Member, Editorial Board, Economic Issues
Contributing Editor, Environment

Environmental Engineering Committee (EEC)

Dr. Hilary Inyang

University Professor and Director, Center for Environmental Engineering, Science, and Technology, University of Massachusetts, Lowell, DuPont Young Professor
National Research Council Young Investigator (1996)
Fellow, Geological Society of London
Member, American Society of Civil Engineers
Member, American Chemical Society, Associate Editor, *Journal of Environmental Engineering*, American Society of Civil Engineers; International Journal of Surface Mining and Reclamation
Editorial Board Member, Journal of Soil Contamination; Waste Management and Research; Environmental Monitoring and Assessments; Resources Conservation and Recycling

Ecological Processes and Effects Committee (EPEC)

Dr. Terry Young

Senior Consulting Scientist, Environmental Defense Fund, Oakland, CA
Member, Advisory Committee to the University California Salinity/Drainage Program
Expert Testimony for EDF before U.S. House of Representatives Subcommittees, California State Water Resources Control Board, and California Regional Water Quality Control Board

Environmental Health Committee (EHC)

Dr. Mark Utell

Acting Chairman, Department of Medicine, University of Rochester School of Medicine, Rochester, New York
Diplomate of the American Board of Internal Medicine,
Diplomate of the American Board of Internal Medicine, Pulmonary Diseases Sub-specialty
Fellow, American Association for the Advancement of Science
Fellow, American College of Chest Physicians
Fellow, American College of Physicians
Associate Editor, Environmental Research
Editorial Board: Annals of Internal Medicine, Journal of Aerosol Medicine, Inhalation Toxicology, Environmental Health Perspectives and Journal of Environmental Medicine

TABLE II FY 1999 SAB Committee Chairs (Continued)

Integrated Human Exposure Committee (IHEC)
Dr. Henry Anderson
Chief Medical Officer, Wisconsin Division of Public Health
Certified in Preventive Medicine, American Board of Preventative Medicine
Certified Specialist in Occupational and Environmental Medicine, American Board of Preventative Medicine
Fellow, American College of Epidemiology
Member, American Public Health Association
Member, American College of Epidemiology
Member, American Medical Association
Member, Council of State and Territorial Epidemiologists
Member, Editorial Board, Health and Environment Digest
Member, Editorial Board, Cancer Prevention International
Associate Editor, American Journal of Industrial Medicine
Co-Editor, Wisconsin Medical Journal of Industrial Medicine

Radiation Advisory Committee (RAC)
Dr. Stephen Brown
Director, Risks of Radiation and Chemical Compounds (R2C2)
Member, American Association for the Advancement of Science
Member, Chemical Health and Safety Section, American Chemical Society
Member, International Society of Exposure Analysis
Member, National Academy of Engineering/National Academy of Sciences
Member, Society for Risk Analysis (President, National Capital Area Chapter)

Research Strategies Advisory Committee (RSAC)
Dr. W. Randall Seeker
Senior Vice President, GE Energy and Environmental Research Corporation
Member, American Institute of Chemical Engineers
Member, American Society of Mechanical Engineers
Member, Combustion Institute

3.3 SAB Activities Section

3.3.1 Overview

The types of projects, as well as the range of subject matter, reviewed by the SAB continue to grow. The Board takes on reviews at the request of Congress, the Administrator, and EPA's various 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.

Historically, most of the outputs of the Board are in the form of full reports. Such reports present the findings of peer reviews of nearly-completed Agency projects and contain considerable detail about the findings and recommendations of the Board. They are generally structured as responses to a formal Charge to the Board. The Charge is a set of specific questions, negotiated by the Agency and the SAB that guide, but do not constrain, the review.

In recent years the SAB has worked with the Agency to produce quicker feedback and more timely advice that is focused at the front-end of the Agency's involvement with an issue. First, it developed the "Consultation" as a means of conferring in public session with the Agency on a technical matter, before the Agency has begun substantive work on that issue. The goal is to leaven EPA's thinking by brainstorming a variety of approaches to the problem very early in the development process.

There is no attempt or intent to express an SAB consensus or to generate a formal SAB position. The Board, via a brief letter, simply notifies the Administrator that a Consultation has taken place.

Second, the Board introduced the "Advisory" as a means of providing, via a formal SAB consensus report, critical input on technical issues during the Agency's position development process. In most instances, the topic of the Advisory will later be the subject of an SAB report, once the Agency has completed its work.

Third, the "Commentary" is a short communication that provides unsolicited SAB advice about a technical issue the Board feels should be drawn to the Administrator's attention.

Fourth, letter reports are similar in origin, content, and purpose to full reports. They are simply shorter; thereby generally resulting in more rapid advice to the Agency.

Tables III and IV display the SAB's operating expenses, staffing, meeting activity, and report production for the past five fiscal years (1995-1999). The increase in total costs over the years reflects an increase in the number of Board Members, increases in Federal pay and allowances, and general increases in the cost of airline travel, hotel and meeting accommodations.

Table V details meeting activity and report preparation by Committee.

TABLE III SAB Expenses[1] ($K) for Fiscal Years 1995-1999

Fiscal Year	Compensation Staff	M/C	Total	Travel	Other Expenses	TOTAL
1995	1186	650	1,836	358	166	2,360
1996	1045	392	1,437	242	88	1,768
1997	1170	555	1,725	282	212	2,219
1998	1250	600	1,850	285	281	2,416
1999[1]	1318	630	1,948	308	298	2,554

[1] Estimated

TABLE IV SAB Activities and Staffing, Fiscal Years 1995-1999

	Committee Activities[a]				Committee Reports			Staffing	
	Public[b] Meeting	Public[c] Teleconf	Closed[d] Meeting	Total	Full[e]	Short[f]	Total[g]	Members	Federal Staff[h]
1995	44	5[i]	1	50	27	13	40	98	17.0
1996	28	9	0	37	3	17	20	98	16.7
1997	34	21	1	56	11	18	29	97	17.6
1998	42	8	1	51	11	10	21	102	19.7
1999	33	14	1	48	19	29	48	105	19.7

[a] Federal Advisory Committee Act (FACA) meetings announced in the *Federal Register*.
SAB staff and Members meet occasionally to prepare draft materials or to plan for public meetings. Such meetings are exempt from FACA requirements and are, therefore, not reflected in this table.
[b] Public meetings held face-to-face
[c] Public teleconference meetings
[d] Closed meetings, with approval of the EPA Administrator
[e] A full report on a topic is a more extensive discussion of the subject, e.g., greater than 10 pages.
[f] A short report is a more focused discussion of a topic. Included in this category are Letter Reports, Advisories, and Commentaries to the Administrator on issues of concern to the SAB.
[g] Appendix F contains a list of all FY 1999 reports and abstracts.
[h] Measured in Full Time Equivalents (One FTE equals one employee working one year)
[i] Includes one public hearing

TABLE V SAB Activities by Committee for Fiscal Years 1995-1999

Committee	Fiscal Year	Committee Activities[1] Mtgs.	Teleconf.	Total	Number of Reports[2] Full	Short	Total
EC	1995	6	2	8	1	2	3
	1996	3	2	5	1	2	3
	1997	3	3	6	0	4	4
	1998	3	5	8	0	0	0
	1999	3	6	9	0	0	0
EC/ ad hoc Subcom.	1995	4	1	5	4	0	4
	1996	10	11	21	0	0	0
	1997	17	10	27	2	0	2
	1998	8	0	8	2	0	2
	1999	9	1	10	6	4	10
COUNCIL	1995	13	1	4	1	1	2
	1996	2	1	3	1	1	2
	1997	1	6	7	0	3	3
	1998	3	0	3	0	2	2
	1999	4	2	6	0	3	3
CASAC	1995	5	0	5	0	3	3
	1996	5	1	6	0	8	8
	1997	1	0	1	0	1	1
	1998	3	0	3	0	1	1
	1999	3	1	4	1	8	9
DWC	1995	3	0	3	2	2	4
	1996	2	1	3	0	2	2
	1997	1	1	2	1	1	2
	1998	2	0	2	0	1	1
	1999	2	0	2	1	1	2

TABLE V SAB Activities by Committee for Fiscal Years 1995-1999 (continued)

Committee	Fiscal Year	Committee Activities[1] Mtgs.	Teleconf.	Total	Number of Reports[2] Full	Short	Total
EPEC	1995	5	0	5	3	3	6
	1996	3	1	4	0	0	0
	1997	2	0	2	2	5	7
	1998	2	1	3	2	1	3
	1999	2	1	3	1	0	1
EEAC	1995	1	0	1	0	0	0
	1996	0	0	0	0	0	0
	1997	0	0	0	0	0	0
	1998	2	0	2	0	1	1
	1999	2	1	3	1	1	2
EEC	1995	7	0	7	6	1	7
	1996	2	1	3	1	0	1
	1997	3	0	3	3	1	4
	1998	6	0	6	4	1	5
	1999	4	1	5	1	5	6
EHC	1995	1	0	1	1	1	2
	1996	1	0	1	0	0	0
	1997	1	0	1	2	1	3
	1998	3	0	3	1	0	1
	1999	0	0	0	4	0	4
IHEC	1995	2	0	2	1	0	1
	1996	1	0	1	0	1	1
	1997	2	0	2	0	1	1
	1998	2	0	2	1	1	2
	1999	1	0	1	1	3	4

TABLE V SAB Activities by Committee for Fiscal Years 1995-1999 (Continued)

Committee	Fiscal Year	Committee Activities[1] Mtgs.	Teleconf.	Total	Number of Reports[2] Full	Short	Total
RAC	1995	5	1	6	4	0	4
	1996	2	4	6	0	2	2
	1997	4	1	5	1	0	1
	1998	6	2	8	0	1	1
	1999	2	1	3	2	4	6
RSAC	1995	3	0	3	1	1	2
	1996	0	2	2	0	1	1
	1997	0	0	0	0	0	0
	1998	3	0	3	1	1	2
	1999	2	0	2	1	0	1

EC	Executive Committee
COUNCIL	Advisory Council on Clean Air Compliance Analysis
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
IHEC	Integrated Human Exposure Committee
RAC	Radiation Advisory Committee
RSAC	Research Strategies Advisory Committee

[1] Indicates meetings and public teleconferences requiring notice in the Federal Register.
[2] Reports are entered as Full Reports or Short Reports (which includes Letter Reports, Commentaries, and Advisories).

3.3.2 Reports That Meet SAB Criteria

In the face of more requests than current resources can address, the Board has had to be selective about its choice of projects. Increasingly, the SAB Staff has interacted formally with different parts of the Agency to determine EPA's priorities. For example, the majority of requests from the Agency now originate from an Assistant Administrator's office to help insure the request is a high priority. In addition, the SAB Staff has sought the advice and counsel of groups that cut across program offices in the Agency; e.g., the Science Policy Council.

SAB priorities have generally been guided by a set of criteria that were originally generated in a "self-study" in 1989 and updated at a Strategic Planning Retreat of the Executive Committee in 1997. The current criteria are listed below, together with examples of the FY 1999 reports that reflect those criteria.

I. GENERAL CRITERION

A. Provides an opportunity to make a difference in the Agency's operations

Although not quite complete, the ***Report from the Integrated Risk Project***, was initiated at the request of the Administrator, has been peer-reviewed and will be submitted formally before the end of the year. It holds the promise of significantly changing the way the Agency has traditionally done its business.

II. CLIENT-RELATED CRITERIA

A. Supports major regulatory or risk management initiatives.

"CASAC Review of the Draft Diesel Health Assessment Document"
EPA-SAB-CASAC-99-001

This review provided important critical comments that will help to insure that any eventual regulation in this important area will be based on sound science.

B. Serves leadership interests such as those of the EPA Administrator or Congress.

"Review of the FY 2000 Presidential Science and Technology Budget Request for EPA"
EPA-SAB-RSAC-99-012

This review was a significant step in helping the Agency and the Congress to gain a fuller assessment and appreciation of the science that is done throughout the Agency, not only in ORD.

C. Supports strategic themes of current interest

"Data Suitability Assessment"
EPA-SAB-EC–99-010

During FY 1999 the Agency established a new Assistant Administrator-ship to deal with information. This review helped focus fundamental concerns about data quality, which lies at the heart of information.

III. SCIENCE-DRIVEN CRITERIA

A. Involves scientific approaches that are new to the Agency.

"Review of the National Center for Environmental Assessment's Comparative Risk Framework Methodology"
EPA-SAB-DWC-99-016

The Board was able to provide important advice to the Agency on an innovative method for comparing the risks posed by disinfection by-products from the treatment of drinking water and the risks posed by the microorganisms.

B. Deals with areas of substantial uncertainties.

"Estimating Uncertainties in Radiogenic Cancer Risks"
EPA-SAB-RAC-99-008

This review examines a range of sources of uncertainty associated with the estimate of cancer risks posed by some of the more unequivocal and potent carcinogenic agents the Agency addresses.

IV. PROBLEM-DRIVEN CRITERIA

A. Involves major environmental risks.

"Review of the Agency's Airborne Particulate Matter Research Agenda"
EPA-SAB-CASAC-LTR-99-004

The health impacts of PM are a matter of considerable impact and controversy. The SAB provided critical review of the Agency's research plan in a manner that was coordinated with PM activities of the National Research Council.

"Technical Review of the Proposed TSCA Section 403 Regulation: Identification of Dangerous Levels of Lead"
EPA-SAB-EHC-99-003

Lead pollution is a documented health problem, especially for children. The SAB provided advice to the Agency on methods for assessing the risks of levels of this pollutant.

B. Relates to emerging environmental issues.

"Commentary on the Environmental Impacts of Natural Hazards: The Need for Agency Action"
EPA-SAB-EEC-COM-99-004

The SAB called the Agency's attention to the major -- and often unaddressed -- environmental impacts posed by the increasing number and severity of natural hazards, such as hurricanes and earthquakes.

C. Exhibits a long-term outlook.

"Commentary on the Importance of Reinstating the pollution Abatement & Control Expenditures (PACE) Survey"
EPA-SAB-EEAC-COM-99-001

The SAB urged the Agency to continue funding the Survey which provides an important longitudinal record of the costs of environmental protection over time. This information is of fundamental importance in determining the costs and benefits of various environmental management approaches.

V. ORGANIZATIONAL-RELATED CRITERIA

A. Serves as a model for future Agency methods

"Review of the Disproportionate Impact Methodologies"
EPA-SAB-IHEC-99-007

The SAB provided review of and guidance on Agency attempts to quantify the differential impacts of environmental pollution on different segments of a population in a specific geographic region. Such methods are important in dealing with Environmental Justice issues.

"Review of the Index of Watershed Indicators (IWI)"
EPA-SAB-EPEC-99-014

The IWI is an attempt to provide an overview of the conditions of watersheds across the country in a Web-based system that is accessible to everyone. The SAB provided important advice on the strengths and weaknesses of the current status of the project.

"CAAA Section 812 Prospective Study: Advisories on Assessments of Human and Ecological Effects and on Modeling and Emissions"
EPA-SAB-COUNCIL-99-012 and 013

These two reports are members of a series of SAB reports that have provided guidance to the Agency as it develops ground-breaking approaches to assessing the costs and benefits of environmental regulations for air, that can form the basis of similar approaches in other media.

B. Requires the commitment of substantial resources to scientific or technological development.

"Advisory on the PM2.5 Monitoring Program"
EPA-SAB-CASAC-ADV-99-002

The SAB critically reviewed Agency plans to implement a large-scale, multi-million dollar monitoring program for small diameter particulate matter.

C. Transcends organizational boundaries, within or outside EPA (includes international boundaries).

"Advisory on 'White Paper on the Nature and Scope of Issues on Adoption of Model Use Acceptability Criteria"
EPA-SAB-EC-ADV-99-011

The SAB provided advice to the Agency and the larger scientific community on how to go evaluating the appropriateness of the growing number of computer models being used to simulate processes in the natural environment.

D. Strengthens the Agency's basic capabilities.

"Advisory on the Charter for the Council on Regulatory Environmental Modeling (CREM)"
EPA-SAB-EC-99-009

The SAB reviewed the Agency's plans to establish an important new cross-Agency group to coordinate work on environmental computer models.

3.3.3 Responses and Reactions to SAB Activities

Since 1984 the SAB has formally requested written Agency responses to reports generated by the Board. The majority of those responses indicate that the Agency has acted positively on the advice given by the

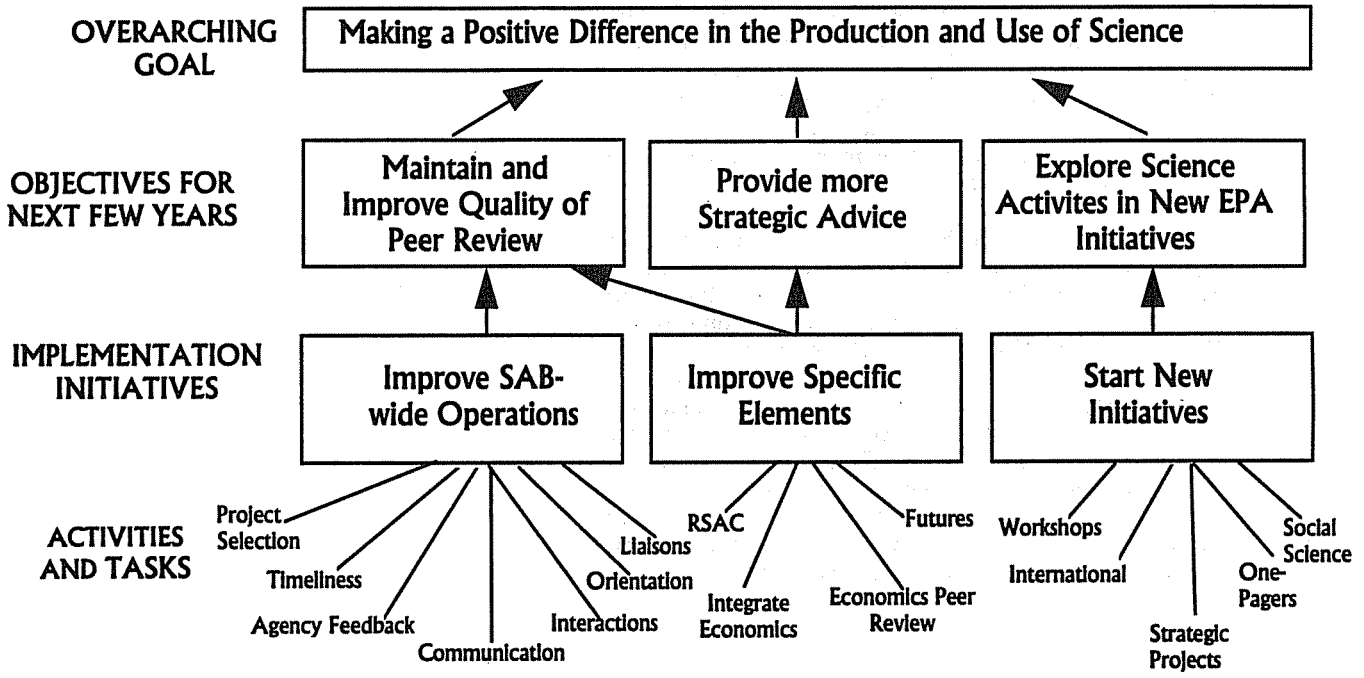
Board. In many instances, the Agency has initiated action on the basis of the advice rendered at the public SAB meetings and/or in public SAB draft reports, prior to the actual receipt (via the Administrator) of the formal reports themselves. In some other cases, upon reviewing the reports, the Agency has formally disagreed with the Board.

In FY 2000, the SAB Staff will undertake an analysis of the responses from the Agency to quantify more accurately the quantity and quality of those responses. In the absence of a critical review of Agency-generated responses by objective, technically trained personnel in the Administrator's Office, it is possible that the quality of responses may have changed over the past few years.

Support for the SAB both inside and outside the Agency has been strong over the years. In FY 1999, the Acting Deputy Administrator (Mr. Peter Robertson) made it a practice to attend face-to-face meetings of the SAB Executive Committee (EC) in order to discuss topics of mutual interest. Several Assistant Administrators also made presentations at EC meetings in FY 1999. The large number of Agency requests for SAB assistance (over 70 for FY 2000) speaks to the EPA's commitment to critical outside peer review, in general, and to the SAB, in particular. However resource constraints continue to limit the extent to which the Board can respond fully to the needs of the Agency.

4. REVIEW OF FY 1999 ACTIVITIES

Figure 1: SAB Strategic Plan



4.1 Introduction: Update on the Strategic Plan

In November 1997, the SAB Executive Committee held a Strategic Planning Retreat, during which they devised a Strategic Plan that was intended to guide the work of the Board for the next several years. The Plan is summarized in Figure 1.

This section of the report contains a brief update on the Plan: progress made and impact achieved.

The overarching goal of the Board for the next several years is "To make a Positive Difference in the Production and Use of Science at EPA". In order to accomplish this goal, the Board adopted three main objectives:

1. Maintain and improve the quality of peer review.
   This objective has been "the meat and potatoes" of SAB activities for many years. As noted below in this Section, in FY 1999 SAB Committees continued to make contributions in this area, which in the past has been characterized as "examining the soundness of the technical underpinnings of EPA positions".

2. Provide more strategic advice.
   The quintessential example of this type of activity was the work done on the Integrated Risk Project (IRP); see Section 4.3.1. In addition, individual Committees worked to provide "the longview advice" by gleaning lessons from the past (EEC's Retrospective Review of its past 10 years; EPA-SAB-EEC-COM-00-001), and by looking forward in a number of different consultations, commentaries, and liaison meetings with Agency leadership.

3. Explore science activities in new EPA initiatives
   The prime example of this type of activity is the work of a small subgroup of the EC, headed by Dr. M. Granger Morgan, who have been charged with

recommending how science might be better integrated into the new approaches.

The Strategic Plan called for initiatives at three levels to help implement the Plan:

a. Improved SAB-wide Operations, including
1) Project Selection
The Board received more than 50 requests from the Agency in FY 1999 and took action on more than three dozen of them.
2) Improved timeliness
While improving its overall timeliness of reports, the Board fell short of its goal of 50% of the reports being completed within four months of the meeting.
3) Enhanced Agency feedback
The Board received somewhat more feedback than in earlier year, but it has not yet consistently applied a systematic process for gathering such information.
4) Better orientation for members
The Board directed the Staff to develop a Handbook for New Members by early FY 2000.
5) Increased interactions outside and inside the Committee.
The Board held EC Subcommittee reviews where members from several SAB committees worked outside the traditional SAB structure. The Board also engaged Dr. William Paschier from the Netherlands Health Council on the Data from Testing Human Subjects review and interacted with the
6) Liaison meetings between EC members and Agency management.
The Board conducted one such session in FY 2000.

b. Improved Specific Elements
1) More strategic use of RSAC
The RSAC broadened its activities to include the entire range of science activities in the Agency, not just those in ORD. The Agency has been responsive in working with RSAC to gain a broader view of science at the Agency.
2) Greater integration of economic considerations
More economists were involved with reviews by different Committees in FY 1999.
3) More and more strategic activity by EEAC and the Council
The EEAC undertook a solid agenda of activities this year, including review of the precedent-setting Economic Assessment Guidelines. The Council continued with its significant contributions to the innovative assessments of costs and benefits of the Clean Air Act.
4) Futures
There was some limited activity by the Board in this area in FY 1999. However, the ORD is beginning to take actions in this area that will soon appear in materials brought to SAB committees (e.g., RSAC) for view.

c. New Initiatives
1) Workshops
The EC discussed possible workshops in two areas; the role of science in the Agency's new approaches to environmental protection and the Agency's approach to estimating the risks and benefits of Hazardous Air Pollutants (HAPs).
2) International
The Board reached out to the Health Council of the Netherlands to involve its Vice President in a SAB/SAP major review.
3) Strategic projects
The EC Subgroup on New Approaches announced a series of encounters with Agency risk managers in FY 2000 that will examine the role of science in the changing landscape of activities within the Agency.
4) One-page summaries
The Board continued to experiment with its succinct "Synopsis" series of summaries of selected SAB reports.
5) Social science
The Board increased the participation of social scientists in its activities and initiated a seminar series in the Agency to highlight the role and contribution of social science in environmental decision making.

In short, considerable progress has been made on a broad front in carrying out the Strategic Plan of the Board. This progress is even more evident in the details of activities of the individual Committees, as described below. At the same time, there is still considerable work to be done in achieving the vision formulated by the Board in FY 1998.

4.2 Overview of SAB Activities

The subsections below contain highlights of the activities of each of the SAB Committees, as well as a listing of the Members for each of the Committees for FY 1999. Clearly, not all of the activities of the Committees can be

captured in this way, but the descriptions will give the reader a broad view of what has been going on, including basic statistical information about the number of meetings and reports for each group.

4.2.1 Executive Committee (EC)

EC Members

Joan Daisey, Chair
Henry Anderson
Stephen Brown
Richard Bull
Maureen Cropper
Hilary Inyang
Morton Lippmann
Alan Maki
Joe Mauderly
Genevieve Matanoski, Past Chair
M. Granger Morgan
W. Randall Seeker
Ellen Silbergeld
Robert Stavins
Mark Utell
Terry Young

LIAISON
Costel Denson, BOSC Chair
Gene McConnell, SAP Chair
Routt Reigert, CHPAC Chair

The Executive Committee acted on its own recommendation at the November 1997 Strategic Planning Retreat that more SAB activities should involve members from different SAB Committees. As a result, over the course of the year eight different EC subcommittees formed/met to address cross-cutting issues. Three of them functioned as joint committees of the SAB and the FIFRA Scientific Advisory Panel (SAP):

a) Cancer Risk Assessment Guidelines Subcommittee
Co-Chairs: Dr. Mark Utell, EHC Chair
Dr. Gene McConnell, SAP Chair
DFO: Mr. Samuel Rondberg

b) Data from the Testing of Human Subjects Subcommittee
Co-Chairs: Dr. Mark Utell, EHC Chair
Dr. Gene McConnell, SAP Chair
DFO: Mr. Samuel Rondberg

c) Endocrine Disruptors Subcommittee
Co-Chairs: Dr. Joan Daisey, EC Chair
Dr. Gene McConnell, SAP Chair
DFO: Mr. Samuel Rondberg

d) IRP Peer Review Subcommittee
Chair: Dr. M. Granger Morgan
DFO: Dr. John R. Fowle III

e) Models Subcommittee
Chair: Dr. Ishwar Murarka
DFO: Dr. John R. Fowle III

f) Scientific and Technological Achievement Awards Subcommittee
Chair: Dr. C. Herb Ward
DFO: Mr. A. Robert Flaak

g) Secondary Data Use Subcommittee
Chair: Dr. Morton Lippmann
DFO: Dr. Anne Barton

h) Water Ingestion Estimates Subcommittee
Co-Chairs: Dr. Henry Anderson, IHEC Chair
Dr. Richard Bull, DWC Chair
DFO: Mr. Thomas Miller

The EC also made greater use of publicly accessible conference call meetings in FY 1999 in order to conserve resources, including wear-and-tear on members, and produce its reports more quickly.

	Face-to-Face Mtgs.	Conf. Call Mtgs.
EC	3	6
EC Subcommittees	9	1
	12	7

TOTAL: 19

In addition to the public meetings and their associated reports, the EC remained active in working on the Integrated Risk Project, the results of which are featured elsewhere in this report.

In carrying out its work for the FY 1999, the EC and its Subcommittees used 45 SAB Members, 62 Consultants, and six Federal Experts.

In FY 1999, the EC and its Subcommittees produced six reports and three Advisories and conducted one consultation:

REPORTS

a) Review of the Agency's Data Suitability Assessment Procedures
EPA-SAB-EC-99-010

b) Review of the D-CORMIX Model
EPA-SAB-EC-99-011

c) Review of the EPA's Proposed Environmental Endocrine Disruptor Screening Program
EPA-SAB-EC-99-013

d) Review of Revised Sections of the Proposed Guidelines for Carcinogen Risk Assessment
EPA-SAB-EC-99-015

e) Recommendations on the 1998 STAA Nominations
EPA-SAB-EC-99-017

f) Review of the SAB Report "Integrated Environmental Decision-Making in the Twenty-First Century
EPA-SAB-EC-99-018

ADVISORIES

a) Advisory on TRIM.FaTE Module of the Total Risk Integrated Methodology (TRIM)
EPA-SAB-EC-ADV-99-003

b) Advisory on the Charter for the Council on Regulatory Environmental Monitoring (CREM)
EPA-SAB-EC-ADV-99-009

c) Advisory on 'White Paper on the Nature and Scope of Issues on Adoption of Model Use Acceptability Criteria'
EPA-SAB-EC-ADV-99-011

CONSULTATION

a) Consultation on plans for developing an Agency-wide science strategy
EPA-SAB-EC-CON-99-008

4.2.2 Advisory Council on Clean Air Compliance Analysis (COUNCIL)

COUNCIL Members

Maureen Cropper, Chair	**Jane Hall**
Gardner Brown	**Lester Lave**
A. Myrick Freeman	**Charles Kolstad**
Don Fullerton	**Paul Lioy**
Lawrence Goulder	**Paulette Middleton**

The Council has its origin in the requirements of Section 812 of the Clean Act Amendments of 1990. That section mandated that a Council be established to provide independent advice on technical and economic aspects of analyses and reports that the Agency prepares concerning the impacts of the Clean Air Act on the public health, economy, and the environment of the United States.

The Agency is currently developing the first prospective analysis, which projects the costs and benefits of implementation of the Clean Air Act Amendments (CAAA) over the period 1990-2010. This study is due to Congress by August 30, 1999. It will be the first of many prospective studies, which are required by law to be submitted to Congress every two years.

The Council has two standing subcommittees: the Air Quality Modeling Subcommittee (AQMS), which reviews air quality models and emissions estimates; and the Health and Ecological Effects Subcommittee (HEES), which reviews health and ecological issues associated with the Clean Air Act Amendments.

During FY 1999, the Council and its subcommittees conducted four meetings and two teleconferences. The Council drafted a Letter Advisory reviewing the draft Prospective Study and submitted three Advisories from its subcommittees to the Administrator.

The Committee used thirteen consultants in FY 1999.

The Committee issued three advisories in FY 1999.

ADVISORIES:

a) CAAA (1990) Section 812 Prospective Study; Health & Ecological Effects Initial Studies,
EPA-SAB-COUNCIL-ADV-99-005

b) The Clean Air Act Amendments (CAAA) Section 812 Prospective Study of Costs and Benefits (1999): Advisory by the Health and Ecological Effects Subcommittee on Initial Assessments of Health and Ecological Effects; Part 1, and
EPA-SAB-COUNCIL-ADV-99-012

c) The Clean Air Act Amendments (CAAA) Section 812 Prospective Study of Costs and Benefits (1999): Advisory by the Air Quality Models Subcommittee on Modeling and Emissions.
EPA-SAB-COUNCIL-ADV-99-013

4.2.3 Clean Air Scientific Advisory Committee (CASAC)

CASAC Members

Joe Mauderly, Chair	**Arthur Upton**
John Elston	**Sverre Vedal**
Philip Hopke	**Warren White**
Eva Pell	

The Clean Air Scientific Advisory Committee (CASAC) held four meetings (including one teleconference) during FY 1999. Two meetings were conducted by full CASAC Panels. The first took place in November 1998 and covered a peer review of the Agency's draft Ozone Research Needs document, and a consultation on the Carbon Monoxide Staff Paper schedule. The second full meeting took place in June 1999 and focused on a peer review of the Carbon Monoxide Criteria Document, a peer review of the draft Particulate Matter Research Strategy, and a consultation on the revised draft Diesel Health Assessment.

A third meeting was conducted in November 1998 by the CASAC Technical Subcommittee for Fine Particle Monitoring. This subcommittee is working with the Agency and the National Academy of Sciences on review of components of the Agency's fine particle monitoring program. This Subcommittee also held a teleconference in July 1999 to obtain updates on the Agency's program.

The Committee used thirteen consultants during FY 1999.

The Committee issued one full report, three letter reports, one advisory and four consultations in FY 1999:

FULL REPORT:

a) CASAC Review of the draft Diesel Health Assessment Document
EPA-SAB-CASAC-99-001

LETTER REPORT:

a) Review of the Ozone Research Needs Document
EPA-SAB-CASAC-LTR-99-001

b) CASAC Review of the Draft Document Air Quality Criteria for Carbon Monoxide
EPA-SAB-CASAC-LTR-99-003

c) CASAC Review of the Draft Document Airborne Particulate Matter: Research Strategy
EPA-SAB-CASAC-LTR-99-004

ADVISORY:

a) CASAC Advisory on the PM2.5 Monitoring Program
EPA-SAB-CASAC-ADV-99-002

CONSULTATIONS:

a) Notification of a Consultation on the Development Schedule for the Carbon Monoxide Staff Paper
EPA-SAB-CASAC-CON-99-001

b) Notification of a Consultation on the Diesel Health Assessment
EPA-SAB-CASAC-CON-99-005

c) Notification of a Consultation on the Estimation of Carbon Monoxide Exposures and Associated Carboxyhemoglobin Levels in Denver Residents using pNEM/CO
EPA-SAB-CASAC-CON-99-006

d) Notification of a Consultation on the PM 2.5 Chemical Speciation Network and Supersites Plans
EPA-SAB-CASAC-CON-99-007

4.2.4 Drinking Water Committee (DWC)

DWC Members

Richard Bull, Chair	**L.D. McMullen**
David Baker	**Christine Moe**
Mary Davis	**Charles O'Melia**
Yvonne Dragan	**Gary Toranzos**
John Evans	**Rhodes Trussell**
Anna Fan-Cheuk	**Marylynn Yates**

The Committee held two meetings during FY 1999, one of which was scheduled so as to permit members to attend the EPA Office of Research and Development's "1998 Drinking Water Progress Review Workshop for the 1995/1998 Science to Achieve Results (STAR) Grants," giving the DWC members an in depth understanding of this important component of the overall EPA drinking water research program.

The Committee used seven consultants during FY 1999.

The Committee issued one report during FY 1999:
FULL REPORT:

a) An SAB Report on the National Center for Environmental Assessment's Comparative Risk Framework Methodology,
EPA-SAB-DWC-99-016

4.2.5 Ecological Processes and Effects Committee (EPEC)

EPEC Members

Dr. Terry Young, Chair	**Mark Harwell**
Miguel Acevedo	**Carol Johnston**
William J. Adams	**Paul Montagna**
Lisa Alvarez-Cohen	**Charles Pittinger**
Steven Bartell	**Leslie Real**
Kenneth Cummins	**Frieda Taub**

The Ecological Processes and Effects Committee (EPEC) is the primary committee responsible for reviews and advice relating to ecological issues, including environmental monitoring and assessment, ecological risk assessment, and ecological criteria. Traditionally, the Committee has sought to elevate the Agency's attention to non-chemical stressors (e.g., habitat issues, physical alterations of ecosystems, and introduced species) and to raise the visibility of ecological risks in an Agency often preoccupied with human health concerns.

EPEC held three meetings in FY 1999. In October 1998, the Committee reviewed the Office of Water's Index of Watershed Indicators (IWI), a GIS-based set of indicators intended to provide information on the health and vulnerability of the nation's watersheds. IWI is a high priority information initiative in OW featured on the office's much-visited web site. In a previous advisory, the Committee had recommended that additional indicators be included in the IWI to better represent the health of terrestrial components of watersheds. In this second review of the IWI, the Committee evaluated progress to date, and provided additional recommendations for improving the information that is conveyed by the integrated index. The Committee applauded early Agency efforts on the IWI, but recommended strengthening the scientific basis of IWI by developing a conceptual model, re-examining the integration algorithm, and adding additional indicators.

In January 1999, the Ecological Risk Subcommittee met to brief the Agency's Office of the Chief Financial Officer (OCFO) on the ecological risk ranking procedure developed by the ERS as part of the SAB's Integrated Risk Project, and to discuss possible applications of the method to the ranking of GPRA subobjectives. The meeting was a followup to an earlier discussion held by the Strategic Ranking Criteria Subcommittee (an ad hoc subcommittee of the Executive Committee) on the application of IRP results to the OCFO task of ranking subobjectives.

The Committee met again in April 1999 to review proposals from the Office of Water to revise the procedures for deriving aquatic life criteria to protect aquatic organisms from metals toxicity and for deriving sediment quality guidelines to protect benthic organisms from metals toxicity. The Committee's report on the integrated approach to metals will be released in FY 2000. A third topic at the meeting was discussion of the Agency's proposed approach to developing consistent Ecological Soil Screening Levels (Eco-SSL) for protection of terrestrial organisms, including wildlife, at Superfund sites. The Committee plans to produce an advisory on the Eco-SSL process early in FY 2000.

The committee used three consultants in FY 1999.

4.2.6 Environmental Economics Advisory Committee (EEAC)

EEAC Members

Robert Stavins, Chair	**Myrick Freeman**
Nancy Bockstael	**Dale Jorgenson**
Dallas Burtraw	**Paul Joskow**
Trudy Cameron	**Catherine Kling**
Maureen Cropper	**Jason Shogren**
Herman Daly	**Hilary Sigman**

In FY 1999, the Environmental Economics Advisory Committee (EEAC) met three times (twice in face-to-face meetings and one time via telephone conference call). Its Commentary (see below) resulted in Agency support for an important cross-Government data collection exercise. Its Report (see below) addressed a seminal Agency guidance document on economic analysis.

During its second meeting, the Committee also had a guest speaker, Dr. Mark Mazur, Chief Economist and Advisor to the Secretary at the U.S. Department of Energy. This continued the Committee's custom of inviting and interacting with notable persons in the field of environmental economics and public policy development.

The Committee used one consultant during FY 1999.

The Committee issued one report and one commentary during FY 1999:

FULL REPORT:

a) An SAB Report on the EPA Guidelines for Preparing Economic Analyses, EPA-SAB-EEAC-99-020

COMMENTARY:

a) A SAB Commentary on the Importance of Reinstating the Pollution Abatement and Control Expenditures (PACE) Survey
EPA-SAB-EEAC-COM-99-001

4.2.7 Environmental Engineering Committee (EEC)

EEC Members

Hilary Inyang, Chair	**Domenico Grasso**
Ed Berkey	**JoAnn Lighty**
Calvin Chien	**John Maney**
Terry Foecke	**Michael McFarland**
Nina French	**Lynne Preslo**

The EEC and two subcommittees held four face-to-face meetings and one conference call in FY 1999. The Committee addressed a range of issues including: review of Research Plans for Wet Weather Flows and Urban Infrastructure, the advantages and disadvantages of various approaches for the development of cleanup goals at waste sites, attributes of successful technical reviews, waste leachability, environmental impacts of natural hazards, measures of environmental technology performance, the need for research on risk reduction options for particulate matter 2.5($PM_{2.5}$), overcoming barriers to waste utilization, and uses of social science to address barriers to implementation of pollution prevention. Six of these activities are self-initiated and were developed in response to the Executive Committee's Strategic Retreat.

During FY 1999, the EEC used fourteen consultants.

The EEC issued one full report, one letter report, three commentaries and one consultation during the year:

FULL REPORT:

a) Review of 1996 Risk Management Plan for Wet Weather Flows and the 1997 Urban Infrastructure Research Plan
EPA-SAB-EEC-99-019

LETTER REPORT:

a) Science Advisory Board Review of the Implementation of the Agency-Wide Quality System
EPA-SAB-EEC-LTR-99-002

COMMENTARIES:

a) Commentary on Waste Leachability: The Need for Review of Current Agency Procedures
EPA-SAB-EEC-COM-99-002

b) Commentary on the Environmental Impacts of Natural Hazards: The Need for Agency Action
EPA-SAB-EEC-99-COM-003

c) Commentary on the Need for Research on Risk Reduction Options for Particulate Matter 2.5
EPA-SAB-EEC-99-COM-004

CONSULTATION:

a) Notification of a Consultation on the Advantages and Disadvantages of Average or "Not to Exceed" Concentrations in the Development of Cleanup Goals at Waste Sites
EPA-SAB-EEC-CON-99-003

4.2.8 Environmental Health Committee (EHC)

EHC Members

Mark Utell, Chair	**Abby Li**
Cynthia Bearer	**Michele Medinsky**
John Doull	**Fredrica Perera**
David Hoel	**Roy Shore**
Grace LeMasters	**Lauren Zeise**

The Environmental Health Committee (EHC) shares responsibilities for health effects reviews with several committees of the Board (DWC, IHEC, RAC, and CASAC). The principal focus for EHC has been issues related to development and use of guidelines for health risk assessments. The EHC has continued to maintain a close relationship with the other SAB health-related Committees, and with the Scientific Advisory Panel (SAP) of the Office of Pesticides, often holding joint meetings and sharing members for reviews.

The EHC, *per se*, did not meet during FY 1999. However, the Chair, and many of the Members were involved in several reviews as part of two Subcommittee of the Executive Committee. Eight of the ten EHC Members (including the Chair) participated in the Cancer Guidelines Review Subcommittee Committee meeting on January 20-21, 1999. On July 27-28, 1999, the Chair and three Members participated in a meeting of the Cancer Risk Assessment Guidelines Review Subcommittee on the application of the risk assessment guidelines to children. Details on both of these meetings are provided in the discussion of Executive Committee activities.

The EHC did not use any consultants in FY 1999.

The EHC issued four reports in FY 1999:

FULL REPORTS:

a) An SAB Report: Review of the RfC Methods Case Studies
EPA-SAB-EHC-99-002

b) An SAB Report: Review of the Health Risk Assessment of 1,3-Butadiene
EPA-SAB-EHC-99-003

c) An SAB Report: Technical Review of the proposed TSCA Section 403 Regulation
EPA-SAB-EHC-99-004

d) An SAB Report: Development of the Acute Reference Exposure
EPA-SAB-EHC-99-005

4.2.9 Integrated Human Exposure Committee (IHEC)

IHEC Members

Henry Anderson, Chair	**Kai-Shen Liu**
Annette Guiseppi-Elie	**Thomas Mckone**
Robert Harley	**Jerome Nriagu**
Michael Jayjock	**Barbara Petersen**
Lovell Jones	**David Wallinga**
Michael Lebowitz	**Charles Weschler**

The IHEC addresses many of the exposure assessment issues that come before the Board.

The IHEC used one consultant in FY 1999.

The Committee met once (March 9-10, 1999) during FY 1999.

The IHEC issued four reports in FY 1999:

FULL REPORT:

a) An SAB Report: Review of Disproportionate Impact Methodologies
EPA-SAB-IHEC-99-007

ADVISORIES:

a) An SAB Advisory: The National Human Exposure Assessment Survey (NHEXAS) Pilot Studies
EPA-SAB-IHEC-ADV-99-004

b) An SAB Report: Advisory on Energy Cost and Indoor Air Quality Performance of Ventilation Systems and Controls
EPA-SAB-IHEC-ADV-99-007

c) An SAB Report: Advisory on The Building Assessment Survey Evaluation (BASE) Study Proposed Data Analyses
EPA-SAB-IHEC-ADV-99-008

4.2.10 Radiation Advisory Committee (RAC)

RAC Members

Stephen Brown, Chair	**Jill Lipoti**
William Bair	**Janet Johnson**
Vickie Bier	**Ellen Mangione**
Thomas Gesell	**John Poston**
Donald Langmuir	**Genevieve Roessler**

In FY 1999, the RAC and its subcommittees held three public meetings. One was a public teleconference. The committee addressed four major topics: a) review of uncertainty in radiogenic cancer risk, b) review of Federal Guidance Report Number 13 - Part 1, which provides for estimation of health risks to the public from low-level environmental exposure to radionuclides, c) an advisory on modeling of radionuclide releases from disposal of low activity mixed waste, and d) an advisory on a proposed EPA methodology for assessing risks from indoor radon based on BEIR VI: white paper, as well as consultations on e) radon risk and f) Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM).

In FY 1999, RAC used eight consultants, one representative, and three members as liaisons from two other standing committees.

The RAC issued two reports, two advisories, and two notification of consultations:

REPORTS:

a) An SAB Report: Review of the Office of Radiation and Indoor Air October, 1997 Draft Document 'Estimating Radiogenic Cancer Risks

Draft Addendum: Uncertainty Analysis, October, 1977'
EPA-SAB-RAC-99-008

b) An SAB Report: Review of the Health Risks from Low-Level Exposure to Radionuclides, Federal Guidance Report No. 13 - Part 1, Interim Version (FGR 13-Part 1)
EPA-SAB-RAC-99-009

ADVISORIES:

a) Advisory on Modeling of Radionuclide Releases from Disposal of Low Activity Mixed Waste (LAMW)
EPA-SAB-RAC-ADV-99-006

b) Advisory on Proposed EPA Methodology for Assessing Risks from Indoor Radon (Based on BEIR VI: White Paper)
EPA-SAB-RAC-ADV-99-010

CONSULTATIONS:

a) Notification of a Consultation on Approaches to Calculating Radon Risks
EPA-SAB-RAC-CON-99-002, and

b) Notification of a Consultation on Technologically Enhanced Naturally-Occurring Radioactive Materials (TENORM)
EPA-SAB-RAC-CON-99-004

4.2.11 Research Strategies Advisory Committee (RSAC)

RSAC Members

W. Randall Seeker, Chair	**Genevieve Matanoski**
William Adams	**Paulette Middleton**
Stephen Brown	**Maria Morandi**
Theodora Colburn	**Ishwar Murarka**
Philip Hopke	**William Smith**
Alan Maki	

The Research Strategies Advisory Committee (RSAC) held two meetings during FY 1999. The March 3-4, 1999 meeting was the Committee's annual review of the Presidential Budget Request for ORD. As a result of last year's discussions between the RSAC Chair, the Deputy Administrator and other senior EPA management, RSAC's review of the budget was expanded to include the entire Science and Technology (S&T) budget at EPA. The Committee will continue to offer guidance and advice on the overall Agency strategic research planning efforts as well as its overall research budget. As is customary, the RSAC Chair testified at the House of Representatives budget hearings following the budget review.

The second meeting was held September 23-24 to be briefed on the planning for the EPA's FY 2001 Science & Technology Budget submission and on the Agency's Science Strategic Plan. The main focus of the meeting was to conduct a peer review of the Agency's peer review process. Planning of a joint RSAC/ORD Board of Scientific Counselors (BOSC) review of the Science To Achieve Results (STAR) Program was also discussed.

The Committee used no consultants in FY 1999.
The Committee issued one report during FY 1999:

a) An SAB Report: Review of the FY 2000 Presidential Science and Technology Budget Request for the Environmental Protection Agency
EPA-SAB-RSAC-99-012

4.3 Examples of Transitions

4.3.1 Integrated Risk Project (IRP): The SAB's Call for a New View of Environmental Protection

In FY 1999 the SAB all but completed work on the longest, most complex, and more far-ranging project it has ever undertaken. Originally conceived as an updating of "Reducing Risk", its 1990 report that gave increased credibility to the concept of comparative risk, the IRP evolved into a broad examination of the way in which environmental protection decisions are made. In so doing, the Board consciously moved beyond the bound of traditional "science" and explored new territory, using new people and new structures and generating new results.

In early 1996, in response to a request from Deputy Administrator Fred Hansen and the Senate Appropriations Committee, the SAB embarked on a journey to investigate the various components of regulatory decision-making, including health and ecological risks, cost/benefit analysis, risk reduction strategies, incorporation of public values, and evaluation of regulatory efforts. To address this multi-faceted problem, that crossed beyond the risk assessment/risk management boundary that has guided their work in the past, the Board engaged the resources of more than 50 experts -- from the traditional sciences and economics and from theorists and ethicists. The effort was divided into five different Subcommittees, led by a steering committee, whose Chair was Dr. Genevieve Matanoski, Chair of the SAB Executive Committee. The results of their work will be in the form of a succinct, "punchy" overview document, a series of working chapters/papers, and at least one separate report.

4.3.2 The New Role of Social Scientists and SAB's Activity to Welcome their Participation

At its November 1997 Strategic Planning Retreat, the Executive Committee committed the Board to become more involved with the disciplines of the non-economic social sciences. As a result a conscious effort has been made to involve more social scientists as Consultants in SAB reviews that have aspects that lend themselves to this type of technical analysis.

In FY 1999, the Board utilized seven non-economic social scientists on three different Panels. Four ethics-oriented social scientists participate on the Data from the Testing of Human Subjects Panel and two non-economic social scientist were participants on the IRP Peer Review Panel. In addition, one EEC Panel had a social scientist specializing on interaction in organizations.

Two particular efforts stand out as examples of how and where social sciences contributed to the work of the Board. First, the Values Subcommittee of the IRP involved social scientists in fields ranging from communications to ethics in considering how ecological effects should be evaluated. Second, the Data from the Testing of Human Subjects Subcommittee (DTHSS) included bioethicists in their deliberations.

The OSAB also initiated the "SAB Social Science Seminar Series", with the goal of bringing accomplished social scientists to the Agency to present the results of their work that illustrates how the social sciences can impact the kind of problems faced by the Agency. The series also uses Agency managers as "responders" to the presentations as a means of engaging the operational arm of the Agency in confronting how social sciences can/will help the organization carry out its mission. Dr. Gary Machlis of Idaho State University was the first invited speaker. He discussed the impact of social sciences on the National Park Service.

The Staff Office is exploring the possibility of working with a social scientist intern in the Agency to facilitate some of these new activities and to consider additional ways in which the Board can capitalize on the increasing interaction with social scientists and the staff has recommended that a social scientist be appointed to the Executive Committee in FY 2000.

4.3.3 New Quarters for the SAB Staff Office

In FY 1999, the SAB Staff office moved from Waterside Mall in SW Washington to the Ariel Rios Building in NW Washington. The building is a complete refurbishing of a historical structure that originally housed the U.S. Post Office. Located on the sixth of seven floors, the new quarters are well-adapted to service the changing needs of the office. Among the features that hold promise for improving what we do and how we do it are the following:

a) Fresh, pleasant, open office spaces
b) A building of considerable architectural interest
c) "Ergonomically correct" furniture
d) Increased number and size of meeting rooms
e) Co-location of computer support
f) "Next-door-neighbor" location to the group that coordinates the work of all FACA Committees.
g) An interesting and inviting neighborhood -- We'd love to show you around!

4.3.4 Changes in Staffing Structure to Accommodate New Cross-Committee Efforts

In FY 1999 the staff structure of the DFOs in the Office was changed to accommodate the Board's new thrusts. The duties of two DFOs were shifted to emphasize "special projects" -- activities that operate outside of the structure of the ten formal, standing committees of the Board. We now have an increased capability to respond to the Executive Committee's decision to pursue more activities that involve broader, more inter-disciplinary, and call for more cross-Committee participation.

4.3.5 New Relations with Other Advisory Committees

In FY 1999, the SAB was actively involved with the Office of Cooperative Environmental Management (OCEM) in developing suggestions for the Administrator on "reinventing advice at EPA". The number of Federal Advisory Committee Act (FACA) committees and their combined expenses have risen remarkably over the past 15 years. More than $10M is currently expended on more than two dozen FACA committees. OCEM, as the parent organization for Committee Management of all FACA groups, is charged with reviewing and improving the entire FACA process. Building on the SAB experience and resulting ideas, OCEM is developing proposals to take a more strategic approach to obtaining and using outside advice at EPA. The result should be closer cooperation between FACAs, together with enhanced effectiveness and efficiency. A report, with associated proposals, will go to the Administrator in FY 2000.

The SAB reached across the Atlantic to involve the Vice President of the Health Council of The Netherlands (an advisory group akin to the SAB) in a review on data obtained from the testing of human subjects. This action served to bring a European's expertise and perspective expertise to bear on the new type of science/trans-science problems that are increasingly

involving the SAB. The activity provided an opportunity for cross-pollination of ideas on substance and process.

The Board continued its productive relationships with the FIFRA Scientific Advisory Panel (SAP). The SAP Chair was an active presence at EC meetings, and a number of reviews were conducted utilizing members from both SAB and SAP. Similarly, the ORD Board of Scientific Counselors (BOSC) continued its fruitful relationship with the Board, with BOSC Chair participation in EC meetings and the initiation of a joint review of the ORD Science To Achieve Results (STAR) program that will be completed in FY 2000.

The Chair of the Children's Health Protection Advisory Committee (CHPAC) accepted an invitation to sit with the SAB EC in the same capacity as the chairs of SAP and BOSC.

An FY 1999 publication by the Canadian Council of Science and Technology Advisors ["Science Advice for Government Effectiveness (SAGE)"] will be pursued more fully in FY 2000 as the SAB pursues new interactions with a wider group of FACA committees inside and outside the Agency.

4.4 Staff Office Operations

The Staff Office continues to find ways to improve its services in a climate of constrained resources. Communication is a continuing point of emphasis: with SAB Members/Consultants, with the Agency, and with the public. FY 1999 marked the fourth year of the primarily electronic distribution of the monthly SAB newsletter, "HAPPENINGS at the Science Advisory Board". The newsletter has transitioned from snail-mail to e-mail to a website version that is easily accessible to everyone via the SAB's Website.

During FY 1999 the SAB Website (www.epa.gov/sab) was enhanced. Net surfers can view/download:

a) SAB reports since FY 1994
b) The SAB calendar for the next two months
c) The projected SAB calendar for the next six months
d) Agendas of upcoming meetings, together with the draft reports that will be discussed at the meetings
e) Minutes of recent meetings
f) Project requests that have been received from the Agency
g) Federal Register notices of SAB activities
h) Quarterly summaries of activities of each of the SAB Committees
i) "Bon Mots" from recent editions of HAPPENINGS.

The connection to the Web has dramatically affected the way business is done in the Office. Rather than photocopying and mailing requested copies of SAB reports--which continue to be done, as needed--the Staff can simply refer people to the Web. As the public becomes more aware of the presence, utility, and convenience of the Website, the number of incoming requests will decrease, at the same time that the number of individuals serviced--more rapidly than was previously possible--will increase.

In the fall of FY 1999, the entire Staff went on a Retreat under the supervision of personnel development experts from the Agency's Office of Human Resources and Organizational Services. The two-day event resulted in the celebration of a number of issues and the airing of a number of others. The intent is to followup this meeting with a one-day session this fall.

As noted above, in FY 1999 the SAB Staff Office moved to a new location in the Ariel Rios Building, located at 1200 Pennsylvania Avenue. For the first time in 20 years the entire office, including the Staff Director, are co-located in a pleasant, productive, attractively-appointed office overlooking a quiet courtyard in the midst of a bustling, comparatively upscale neighborhood. Combined with the new computer equipment that has now arrived, FY 2000 promises to be a very productive year.

4.5 SAB Staff in Transition

Ms. Anne Barton, who served for three years as Special Assistant to the Staff Director, retired from Federal service to pursue other of her many interests. Even in her absence, her contributions to the Strategic Planning Retreat (FY 1998) and her DFOing of EC Subcommittees continue to illuminate our way.

Ms. Roslyn Edson, who served effectively as the DFO for the EHC and IHEC during her two years with us, has taken a position in the EPA Office of Civil Rights, where she brings her training as an occupational health scientist to bear on a whole range of additional problems. We are both amazed and

appreciative of her contributions to our office and the Board during her sojourn with us.

Mr. Jason Hotten completed his work with us as a student intern. He is now completing his degree in English at the University of Maryland Eastern Shore campus.

Ms. Nichole Hinds joined the office as a student intern, while she works on her Bachelor of Science degree in Environmental Engineering at the University of Maryland.

Ms. Karen Martin, who came to us as part of the prestigious EPA Internship Program, completed a successful rotational assignment to Region IV, Atlanta, with the Planning and Analysis Branch.

Mr. Tom Miller and Ms. Stephanie Sanzone received promotions to the GS-15 level in recognition of their work with individual Committees and in Special Projects; e.g., the Integrated risk Project (IRP).

Dr. Angela Nugent joined the Staff on an extended detail to act as DFO for the Council and carry out special assignments for the Staff Director. In the latter category, she has been active in pressing forward with the Board's exploration of the use of science in Agency's "new approaches" to environmental decision-making and in initiating the SAB Social Science Seminar Series. In addition, she has been instrumental in helping the office design and use new computer techniques.

5.0 PROJECTIONS AND CONCLUSIONS

At the end of FY 1999, the SAB had received roughly 70 requests for projects for the millennial fiscal year. While some of them were carry-overs from the previous fiscal year, the majority of them related to new projects. In addition to the formal Agency requests, the SAB Committees themselves have ideas about some special projects that they would like to pursue. (The Executive Committee has given guidance that a Committee should devote about 20% of its effort to these "self-initiated" projects.) The net result is that once again the number of requests will exceed the Board's capacity to respond to them all. However, careful consideration of EPA Goals and application of the Board's criteria, should lead to a nourishing selection.

Among the projects that are strong candidates for review by the SAB in FY 2000 are the following:

a) Particulate Matter Criteria Document and related work
b) 2,3,7,8-TCDD (Dioxin) Re-assessment
c) Radon Risk Assessment
d) Cancer Risk Assessment for Chloroform
e) Costs and Benefits of the Clean Air Act Amendments
f) EcoRisk Report Card
g) Economics Analysis and Children
h) Multi-Agency Laboratory Analytical Protocols (MARLAP) Manual
i) Enhanced Surface Water Treatment Rule
j) Data from the Testing of Human Subjects

Among the special projects that may well be pursued include the following:

a) Workshops on the Role of Science in the Agency's New Approaches to Environmental Protection
b) Assistance in Implementing the Results of the Integrated Risk Project

In addition to the meat-and-potatoes activities of the Board, FY 2000 promises additional change, such as the following:

1. Increased interaction with other advisory groups.

Having taken some initial steps in working with advisory groups in the Netherlands and Canada, the Board is likely to seek additional means of broadening its experience base. Also, a more structured system has evolved to help guide the interaction between SAB and SAP that should make that relationship more productive. Further, a closer working relationship with the office that coordinates all FACA activities in the EPA (the Office of Cooperative Environmental Management) holds the promise of the advisory community's making a bigger, more coordinated impact on the Agency.

2. A new Web-based system

We are just beginning to use a new system that allows individual members to contribute more effectively to the preparation of SAB reports, during the drafting process. Such a system holds the promise of shortening the length of time it takes for the Board to complete its report and providing greater access and "buy in" by the members during the drafting process.

3. Utilization of new quarters

The new facilities should enhance our operations. In addition to the positive benefits derived from nicer surroundings, the increased availability of conference room space should result in less staff and Member/Consultant time and hassle in setting up meetings and getting to them. Increased computer capability should also increase our effectiveness.

We look forward to FY 2000 with enthusiasm and anticipation that the new wineskins will be appropriate for the Agency's new wine and new millennium.

APPENDIX A
CHARTERS

A1. Charter of the Science Advisory Board
A2. Charter of the Clean Air Scientific Advisory Committee
A3. Charter of the Advisory Council on Clean Air Compliance Analysis

APPENDIX A1

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 (FACA), 5 U.S.C. App. 2 § 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; November 8, 1989, November 8, 1991, November 8, 1993, and November 8, 1995.

2. **SCOPE OF ACTIVITY**. The activities of the Board will include analyzing problems, conducting meetings, reviewing the technical basis of Agency positions, 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 utilizing consultants (i.e., technical experts) who are not members of the Board.

3. **OBJECTIVES AND RESPONSIBILITIES**. The objective of the Board is to provide independent advice and peer review 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 U. S. Senate Committees and Subcommittees and U.S. House Committees and Subcommittees, as appropriate. 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, the Clean Air Act Amendments of 1977, and the Clean Air Act Amendments of 1990. 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 Clean Water Act, the Resource Conservation and Recovery 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, documents, 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 and the Advisory Council on Clean Air Compliance Analysis, providing the technical review and advice required under the Clean Air Act, as amended in 1977 and 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 Federal advisory groups, as appropriate, to conduct the business of the Board.

4. **COMPOSITION**. The Board will consist of a body of independent scientists, engineers, and economists of sufficient number 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 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 subcommittees 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 1977 and 1990. The Administrator also shall appoint an Advisory Council on Clean Air Compliance Analysis of the Board to provide the scientific review and advice required by the Clean Air Act Amendments of 1977 and 1990. These groups, established by separate charters, will be an integral part of the Board, and their 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. Most members will serve as special Government employees.
There will be approximately 50-60 meetings of the specialized committees per year.

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 $1,638,500 and the estimated Federal permanent Staff support will be 15.9 work years.

6. **DURATION**. The Board shall be needed on a continuing basis. This charter will be effective until November 8,1999, at which time the Board charter may be renewed for another two-year period.

November 3, 1997
Agency Approval Date

November 7, 1997
Date Filed with Congress

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APPENDIX A2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY ADVISORY COMMITTEE CHARTER

CLEAN AIR SCIENTIFIC ADVISORY COMMITTEE of the Science Advisory Board

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY CHARTER

CLEAN AIR SCIENTIFIC ADVISORY COMMITTEE

1. **Committee's Official Designation (Title):**

Clean Air Scientific Advisory Committee

2. **Authority:**

This charter renews the Clean Air Scientific Advisory Committee (CASAC) in accordance with the provisions of the Federal Advisory Committee Act (FACA), 5 U.S.C. App. § 9 (c). CASAC is in the public interest and supports EPA in performing its duties and responsibilities. CASAC was specifically directed by law on August 7, 1977 under § 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; August 5, 1987; August 7, 1989; August 7, 1991; September 30, 1993, August 7, 1995, and August 7, 1997.

3. **Objectives and Scope of Activities:**

CASAC will provide advice, information and recommendations 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 major objectives are to:

a. Not later than January 1, 1980, and at five year intervals thereafter, complete a review of the criteria published under § 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

b. 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

c. Describe the research efforts necessary to provide the required information

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

e. 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

4. Description of Committees Duties:

The duties of CASAC are solely advisory in nature.

5. Official(s) to Whom the Committee Reports:

The Committee will submit advice and recommendations and report to the Administrator of the Environmental Protection Agency.

6. Agency Responsible for Providing the Necessary Support:

EPA will be responsible for financial and administrative support. Within EPA, this support will be provided by the Science Advisory Board, Office of the Administrator.

7. Estimated Annual Operating Costs and Work Years:

The estimated annual operating cost of the CASAC is $260,500 which includes 1.4 work-years of support.

8. Estimated Number and Frequency of Meetings:

The committee expects to meet approximately three (3) to six (6) times a year. Meetings may occur approximately once every two (2) to four (4) months or as needed and approved by the Designated Federal Officer (DFO). EPA may pay travel and per diem expenses when determined necessary and appropriate. A full-time or permanent part-time employee of EPA will be appointed as the DFO. The DFO or a designee will be present at all meetings and each meeting will be conducted in accordance with an agenda approved in advance by the DFO. The DFO is authorized to adjourn any meeting when he or she determines it in the public interest to do so. Among other things, FACA requires open meetings and an opportunity for interested persons to file comments before or after such meetings, or to make statements to the extent that time permits.

9. Duration and Termination:

CASAC will be needed on a continuing basis. This charter will be effective until August 7, 2001, at which time it may be renewed for another two-year period.

10. Member Composition:

CASAC will be composed of seven (7) members. The Administrator will appoint a Chairperson and six members including at least one member of the National Academy of Sciences, one physician, and one person representing State air pollution control agencies. 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. Most members will serve as Special Government Employees (SGE).

11. Subgroups:

EPA may form CASAC subcommittees or workgroups for any purpose consistent with this charter. Such subcommittees or workgroups may not work independently of the chartered committee. Subcommittees or workgroups have no authority to make decisions on behalf of the chartered committee nor can they report directly to the Agency.

July 29, 1999
Agency Approval Date

August 6, 1999
Date Filed with Congress

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APPENDIX A3

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY CHARTER

ADVISORY COUNCIL ON CLEAN AIR COMPLIANCE ANALYSIS (of the Science Advisory Board)

1. **Committee's Official Designation (Title):**

Advisory Council on Clean Air Compliance Analysis (Council)

2. **Authority:**

This charter renews the Advisory Council on Clean Air Compliance Analysis (Council) in accordance with the provisions of the Federal Advisory Committee Act (FACA), 5 U.S.C. App. § 9 (c). The Council is in the public interest and supports the Environmental Protection Agency (EPA) in performing its duties and responsibilities. The Council was specifically directed under § 812 of the Clean Air Act, as amended on November 15, 1990 (42 U.S.C. 7401 *et seq.*).

3. **Objectives and Scope of Activities:**

The Council will provide advice, information and recommendations on technical and economic aspects of analyses and reports which EPA prepares concerning the impacts of the Clean Air Act (CAA) on the public health, economy, and environment of the United States.

The major objectives required of the Council by the Clean Air Act Amendments of November 15, 1990 are:

a. Review data to be used or any analysis required under section 812 and make recommendations on its use.

b. Review the methodology used to analyze such data and make recommendations on the use of such methodology.

c. Prior to the issuance of a report to Congress required under Section 812, review the findings of the report and make recommendations concerning the validity and utility of such findings

At EPA's request, the Council will:

d. Review other reports and studies prepared by EPA relating to the benefits and costs of the CAA.

e. Provide advice on areas where additional knowledge is necessary to fully evaluate the impacts of the CAA and the research efforts necessary to provide such information.

4. **Description of Committees Duties:**

The duties of the Council are solely advisory in nature.

5. Official(s) to Whom the Committee Reports:

The Committee will report to the Administrator of the Environmental Protection Agency. Advice and recommendations will also be submitted to the Administrator of EPA.

6. Agency Responsible for Providing the Necessary Support:

EPA will be responsible for financial and administrative support. Within EPA, this support will be provided by the Science Advisory Board (SAB).

7. Estimated Annual Operating Costs and Work Years:

The estimated annual operating cost of the Council is $201,200 which includes 0.25 work-years of support.

8. Estimated Number and Frequency of Meetings:

The Council expects to meet approximately two (2) to four (4) times a year. Meetings will likely occur approximately once every three (3) to six (6) months, or as needed and approved by the Designated Federal Officer (DFO). EPA may pay travel and per diem expenses when determined necessary and appropriate. A full-time or permanent part-time EPA employee will be appointed as DFO. The DFO or a designee will be present at all meetings, and each meeting will be conducted in accordance with an agenda approved in advance by the DFO. The DFO is authorized to adjourn any meeting when he or she determines it in the public interest to do so. Among other things, FACA requires open meetings and an opportunity for interested persons to file comments before or after such meetings, or to make statements to the extent that time permits.

9. Duration and Termination:

The Council will be needed on a continuing basis, and may be renewed upon the expiration of each successive two year period following the date of enactment of the CAA (as amended on November 15, 1990), as authorized in accordance with § 14 of FACA.

10. Member Composition:

The Council will be composed of at least 9 members. Members will be appointed by the Administrator after consultation with the Secretary of Commerce and the Secretary of Labor. Most members will serve as Special Government Employees (SGE), subject to conflict-of-interest restrictions. Members will be selected from among, but are not limited to, recognized experts from the fields of health and environmental effects of air pollution, economics analysis, environmental sciences.

11. Subgroups:

EPA may form Council subcommittees or workgroups for any purpose consistent with this charter. Such subcommittees or workgroups may not work independently of the chartered committee. Subcommittees or workgroups have no authority to make decisions on behalf of the chartered committee nor can they report directly to the Agency.

December 14, 1998
Agency Approval Date

December 17, 1998
Date Filed with Congress

APPENDIX B
MEMBERSHIP

B1. Guidelines for Service on the SAB
B2. Types of Affiliation with the SAB
B3. SAB Members for FY 1999
B4. SAB Consultants for FY 1999

APPENDIX B1
GUIDELINES FOR SERVICE ON THE SCIENCE ADVISORY BOARD

Background

The Science Advisory Board (SAB) was established in 1974 by the Administrator. In 1978 the SAB received a Congressional mandate to serve as an independent source of scientific and engineering advice to the EPA Administrator.

The SAB consists of approximately 100 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 Consultants, who are appointed by the SAB Staff Director after conferring with 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 exceptions are reports from the Clean Air Scientific Advisory Committee and the Advisory Council on Clean Air Compliance Analysis, which are separately chartered Federal Advisory Committees operating within the SAB structure.

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 a paramount consideration. Secondary factors considered include the geographic, ethnic, gender, and academic/private sector balance 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 generally appointed in October 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 one 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,

Years as member	Followed by years as Chair	Followed by year as member	Total years
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.

Consultants are appointed to provide the necessary expertise for specific issues. Their terms of appointment are for one year, beginning at any time, and are 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 DFOs, 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.

On occasion, 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, which was designed to increase the representation of these groups on the Board.

Consultants are appointed by the Staff Director following a similar procedure.

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 full Committee or a 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 begins by soliciting ideas about potential members from the Agency staff who are intimately acquainted with the issue and will therefore are often 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 reviews 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.

Frequently, a determining factor for selection is the availability of the individual to participate in the public review. In the case of multiple-meeting reviews, the SAB may 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, Donald Barnes, to determine whether there are any obvious conflicts-of-interest.

Legal conflict-of-interests generally arise in connection with "particular party matters" (A particular matter is any activity in which an employee participates in an official capacity, where he or other persons have a financial interest, if the direct activity --particular matter-- will have a direct and predictable effect on his own or that person's financial interests.) 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 Committee recommendations for

additional research studies. In most such cases, the DFO's work with the Committee 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 Counsel. (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, Members and 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 more forward.

The "public disclosure" (see Attached) process (a standard part of all SAB Committee meetings) is a mechanism aimed resolving the apparent conflicts-of-interest issues. This procedure involves an oral statement (sometimes Board 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 understand the background from which particular individual's comments spring, so that those comments can be evaluated accordingly.

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
Revised: Oct. 12, 1994
Revised: Nov 12, 1996

ATTACHMENT

ATTACHMENT
Guidelines 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 our their duties as Special Government Employees (SGE's) and are subject to the COI regulations.

Therefore, in order to protect the integrity of the advisory 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 M/C's file, at the time of appointment, OGE Form 450, 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 M/C's with written material; e.g. copies of the Effect of Special Government Employee Status on Applicability of Criminal Conflict of Interest Statutes and Other Ethics Related Provisions, the Standard of Ethical Conduct Synopsis and Ethics Advisories 97-01 and 96-18.

c) Delivering briefings to M/C's on COI issues on a regular basis.

The following is a description of an additional voluntary[1] procedure that is designed to allow both fellow M/Cs and the observing public to learn more about the backgrounds that 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.

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

[1] Note: The disclosure procedure is voluntary, and members/consultants are not obligated to reveal information contained in their Form 450 that would otherwise remain confidential.

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 B2
TYPES OF AFFILIATION WITH THE SAB

1. SAB Members

SAB members are technically qualified individuals who are appointed to the Board by the Deputy Administrator for two-year terms. Members participate fully in their review committees, which are generally conducted in a collegial, consensus-building style. Their names appear as members on relevant rosters and generated reports.

Note that SAB reports are formally endorsed by SAB members by action of the Executive Committee.

2. SAB Consultants

SAB Consultants are technically qualified individuals who are appointed to the Board by the SAB Staff Director for one-year terms. Generally, Consultants are appointed in order to augment the expertise for a particular review and/or for mutual exploration of future membership on the Board. Consultants participate fully in their review panels and committees, which are generally conducted in a collegial, consensus-building style. Their names appear as Consultants on relevant rosters and generated reports.

3. Federal Experts

The SAB charter precludes Federal employees from being members of the Board. However, in some instances, certain Federal experts have technical knowledge and expertise that can add significant value of the work of the SAB.

In order to access that expertise for the benefit of the Board and the Administrator, the SAB staff will work with the Office of the General Counsel to identify appropriate mechanisms for assessing the potential for conflicts of interest.

The SAB Staff Director can invite Federal experts who do not have a real or apparent conflict-of-interest (either personally or through their agencies) to service on an SAB committee for the duration of a particular the review/study. Federal Experts participate fully on the committees, which are generally conducted in a collegial, consensus-building style. Their names appear as Federal Experts on relevant rosters and generated reports.

4. Invited Expert Resource

In some situations, there are individuals (both Federal employees and non-Federal employees) who have expertise and/or knowledge of data that bears on an SAB review but who also have real or perceived COIs that would preclude their participation as Members or Consultants. There people can attend the SAB meeting as Invited Expert Resources. The SAB pays travel expenses, if needed.

For example, the person could be the author of a key study of PCBs when the EHC is reviewing the Agency's reference dose for PCBs. The SAB would fund the travel expenses for the person. This person could be either Federal or non-Federal employee. The intent is to have a source real-time, authoritative feedback available during the SAB discussion of the issue. The person would not be asked to serve as a consultant in this case, due to a professional conflict-of-interest; i.e., he would be placed in the position of reviewing his own work.

Another example would be a researcher who has access to some important data, alternative analysis, etc. at another agency, but that is germane to the SAB review. The person would not be asked to serve as a consultant in this

case because of a real or apparent conflict-of-interest; e.g., works for an organization (private or Federal) that would be so directly impacted by the Agency's position as to cause a M/C from such an organization to ask for a recusal.

Invited Expert Resources have limited participation in SAB reviews. They are available to answer questions of the SAB committee panel, provide invited presentations, and enlighten the discussion with pertinent pieces of information. Their names are listed as Invited Expert Resources on rosters and reports, with an explanatory footnote recording their presence and role at the meeting. They are not a part of the Board's consensus/decision about the report. The intent is to indicate that such experts were available during the meeting, but that they were not a party to the judgment.

APPENDIX B3
SAB MEMBERS FOR FY 1999

LAST NAME	FIRST NAME	COMMITTEE	AFFILIATION	CITY, STATE
Acevedo	Miguel	EPEC	University of North Texas	Denton, TX
Adams	William J.	EPEC/RSAC	Kennecott Utah Copper Corporation	Magna, UT
Alvarez-Cohen	Lisa	EPEC	University of California-Berkeley	Berkeley, CA
Anderson	Henry A.	IHEC	Wisconsin Division of Public Health	Madison, WI
Bair	William	RAC	Consultant	Richland, WA
Baker	David	DWC	Heidelberg College	Tiffin, OH
Bartell	Steven	EPEC	The Cadmus Group, Inc.	Oak Ridge,TN
Bearer	Cynthia	EHC	Case Western Reserve University	Cleveland, OH
Berkey	Edgar	EEC	Concurrent Technologies Corporation	Pittsburgh, PA
Bier	Vicki	RAC	University of Wisconsin	Madison, WI
Bockstael	Nancy E.	EEAC	University of Maryland	College Park, MD
Brown	Gardner M.	COUNCIL	University of Washington	Seattle, WA
Brown	Stephen L.	EC/RAC/RSAC	Risks of Radiation Chemical Compounds	Oakland, CA
Bull	Richard	EC/DWC	Battelle, Pacific Northwest National Lab	Richland, WA
Burtraw	Dennis	EHC/EEAC	Resources for the Future	Washington, DC
Cameron	Trudy	EEAC	University of California	Los Angeles, CA
Chien	Calvin	EEC	DuPont Company	Wilmington, DE
Colborn	Theodora	RSAC	World Wildlife Fund	Washington, DC
Cropper	Maureen L.	EC/COUNCIL/EEAC	The World Bank	Washington, DC
Cummins	Kenneth	EC/EPEC	South Florida Water Mgmt District	Sanibel, FL
Daisey	Joan M.	EC	Lawrence Berkeley National Lab	Berkeley, CA
Daly	Herman	EEAC	University of Maryland	College Park, MD
Davis	Mary	DWC	West Virginia University Health Sci Cntr	Morgantown, WV
Doull	John	EHC	University of Kansas	Kansas City, KS
Dragan	Yvonne	DWC	Ohio State University	Columbus, OH
Elston	John	CASAC	New Jersey Dept of Env Protection	Trenton, NJ
Evans	John	DWC	Harvard School of Public Health	Boston, MA
Fan-Cheuk	Anna	DWC	California Env Protection Agency	Oakland, CA
Foecke	Terry	EEC	Waste Reduction Institute	St. Paul, MN
Freeman	A. Myrick	COUNCIL/EEAC	Bowdoin College	Brunswick, ME
French	Nina Bergen	EEC	SKY+	Oakland, CA
Fullerton	Don	COUNCIL	University of Texas	Austin, TX
Gerba	Charles P.	DWC/RSAC	University of Arizona	Tucson, AZ
Gesell	Thomas F.	RAC	Idaho State University	Pocatello, ID
Goulder	Lawrence	COUNCIL	Stanford University	Stanford, CA
Grasso	Domenico	EEC	University of Connecticut	Storrs, CT

LAST NAME	FIRST NAME	COMMITTEE	AFFILIATION	CITY, STATE
Guiseppi-Elie	Annette	IHEC	Dupont Engineering	Wilmington, DE
Hall	Jane	COUNCIL	California State University	Fullerton, CA
Harley	Robert A.	IHEC	University of California	Berkeley, CA
Harwell	Mark A.	EPEC	University of Miami	Miami, FL
Hoel	David	EHC	Medical University of South Carolina	Charleston, SC
Hopke	Philip	CASAC/RSAC	Clarkson University	Potsdam, NY
Inyang	Hilary	EC/EEC	University of Massachusetts	Lowell, MA
Jayjock	Michael	IHEC	Rohm and Haas Co.	Spring House, PA
Johnson	Janet A.	RAC	Shepherd Miller, Inc.	Fort Collins, CO
Johnston	Carol A.	EPEC	University of Minnesota	Duluth, MN
Jones	Lovell	IHEC	University of Texas	Houston, TX
Jorgenson	Dale	EEAC	Harvard University	Cambridge, MA
Joskow	Paul	EEAC	Massachusetts Institute of Technology	Cambridge, MA
Kling	Catherine	EEAC	Iowa State University	Ames, IA
Kolstad	Charles	COUNCIL	University of California	Santa Barbara, CA
Langmuir	Donald	RAC	Hydrochem Systems Corporation	Golden, CO
Lave	Lester B.	COUNCIL	Carnegie-Mellon University	Pittsburgh, PA
Lebowitz	Michael	IHEC	University of Arizona	Tucson, AZ
Lemasters	Grace	EHC	University of Cincinnati	Cincinnati, OH
Li	Abby	EHC	Monsanto Life Sciences	St. Louis, MO
Lighty	JoAnn S.	EEC	University of Utah	Salt Lake City, UT
Lioy	Paul J.	IHEC/COUNCIL	EOHSI-Robert Wood Johnson Med School	Piscataway, NJ
Lipoti	Jill	RAC	New Jersey Dept of Env Protection	Trenton, NJ
Lippmann	Morton	EC	New York University	Tuxedo, NY
Liu	Kai-Shen	IHEC	California Department of Health Services	Berkeley, CA
Maki	Alan	RSAC	Exxon Company, USA	Houston, TX
Maney	John P.	EEC	Env Measurements Assessment	S. Hamilton, MA
Mangione	Ellen	RAC	Colorado Department of Public Health	Denver, CO
Matanoski	Genevieve	RSAC	Johns Hopkins University	Baltimore, MD
Mauderly	Joe	EC/CASAC	Lovelace Respiratory Research Institute	Albuquerque, NM
McFarland	Michael J.	EEC	Utah State University	River Heights, UT
McKone	Thomas	IHEC	University of California	Berkeley, CA
McMullen	Lee D.	DWC	Des Moines Water Works	Des Moines, IA
Medinsky	Michele	EHC	Consultant	Durham, NC
Middleton	Paulette	COUNCIL/RSAC	RAND Ctr for Env Sciences & Policy	Boulder, CO
Moe	Christine	DWC	University of North Carolina	Chapel Hill, NC
Montagna	Paul	EPEC	University of Texas @ Austin	Port Aransas, TX
Morandi	Maria	RSAC	University of Texas	Houston, TX
Morgan	M. Granger	EC	Carnegie Mellon University	Pittsburgh, PA
Murarka	Ishwar	RSAC	ISH, Inc.	Sunnyvale, CA

LAST NAME	FIRST NAME	COMMITTEE	AFFILIATION	CITY, STATE
Nriagu	Jerome	IHEC	University of Michigan	Ann Arbor, MI
O'Melia	Charles	DWC	Johns Hopkins University	Baltimore, MD
Pell	Eva	CASAC	Penn State University	University Park, PA
Perera	Frederica	EHC	Columbia University	New York, NY
Petersen	Barbara J.	IHEC	Novigen Sciences, Inc.	Washington, DC
Poston	John	RAC	Texas A&M University	College Stn, TX
Preslo	Lynne	EEC	Earth Tech	Long Beach, CA
Real	Leslie A.	EPEC	Emory University	Atlanta, GA
Roessler	Genevieve	RAC	Consultant	Elysian, MN
Schmalensee	Richard	EEAC	Massachusetts Institute of Technology	Cambridge, MA
Seeker	W. Randall	EC/RSAC	General Electric Energy & Env Res Corp.	Irvine, CA
Shogren	Jason	EEAC	University of Wyoming	Laramie, WY
Shore	Roy	EHC	New York University Medical Center	New York, NY
Sigman	Hilary	EEAC	Rutgers University	New Brunswick, NJ
Silbergeld	Ellen	EC	University of Maryland	Baltimore, MD
Smith	William H.	EC/RSAC	Yale University	New Haven, CT
Stavins	Robert	EC/EEAC	Harvard University	Cambridge, MA
Taub	Frieda B.	EPEC	University of Washington	Seattle, WA
Toranzos	Gary	DWC	University of Puerto Rico	San Juan, PR
Trussell	R. Rhodes	DWC	Montgomery Watson Consulting Eng	Pasadena, CA
Upton	Arthur C.	CASAC	UMDNJ-Robert Wood Johnson Med Sch	Piscataway, NJ
Utell	Mark	EC/EHC	University of Rochester Medical Center	Rochester, NY
Vedal	Sverre	CASAC	University of British Columbia	Vancouver, BC CAN
Wallinga	David	IHEC	Natural Resources Defense Council	Washington, DC
Weschler	Charles	IHEC	Telcordia Technologies	Red Bank, NJ
White	Warren H.	CASAC	Washington University	St. Louis, MO
Yates	Marylynn	DWC	University of California	Riverside, CA
Young	Terry F.	EC/EPEC	Environmental Defense Fund	Oakland, CA
Zeise	Lauren	EHC	California Env Protection Agency	Oakland, CA

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APPENDIX B4
SAB CONSULTANTS FOR FY 1999

LAST NAME	FIRST NAME	COMMITTEE	AFFILIATION	CITY, STATE
Adams	E. Eric	EC	Massachusetts Institute of Technology	Cambridge, MA
Albertini	Richard	EHC	University of Vermont	Burlington, VT
Alexander	Martin	EPEC	Cornell University	Ithaca, NY
Alexeeff	George	CASAC	California Env Protection Agency	Sacramento, CA
Allen	Herbert	RSAC	University of Delaware	Newark, DE
Anderson	Mary P.	EEC	University of Wisconsin	Madison, WI
Anderson	Yolanda	IHEC	North Carolina Central University	Durham, NC
Ansari	Mohammad	EEC	Oshman Group LLC	Chester, VA
Ayres	Stephen M.	CASAC	Virginia Commonwealth University	Richmond, VA
Bailar	John C.	EHC	University of Chicago	Chicago, IL
Bailey	Paul	IHEC	Mobil Business Resource Corp.	Paulsboro, NJ
Bates	David	RAC	Univ of British Columbia	Vancouver, CAN
Bean	Judy	DWC	University of Miami	Miami, FL
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Beck	Michael	EHC	University of Georgia	Athens, GA
Bedford	Barbara	EPEC	Cornell University	Ithaca, NY
Bellinger	David	EHC	Children's Hospital	Boston, MA
Biddinger	Gregory	EC	Exxon Company, USA	Houston, TX
Bishop	William E.	EPEC	Procter & Gamble Company	Cincinnati, OH
Bloom	Nicolas	EHC	Frontier Geosciences, Inc.	Seattle, WA
Boesch	Donald	EPEC	University of Maryland	Cambridge, MD
Bond	James A.	EHC	Chemical Industry Institute of Toxicology	RTP, NC
Boston	Harry L.	EPEC	Lockheed Martin Energy Systems	Oak Ridge, TN
Bostrom	Anne	RAC	Georgia Institute of Technology	Atlanta, GA
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Brierley	Corale	EPEC	VistaTech Partnership, Ltd.	Highlands Rch,CO
Brown	Halina S.	EHC	Clark University	Worcester, MA
Brown	Linfield	EC	Tufts University	Medford, MA
Buchsbaum	Robert	EPEC	Massachusetts Audubon Society	Wenham, MA
Buist	A. Sonia	CASAC	Oregon Health Sciences University	Portland, OR
Bunn	William	EHC	Navistar International	Chicago, IL
Burbacher	Thomas	EHC	University of Washington	Seattle, WA
Burke	Thomas	EC	Johns Hopkins University	Baltimore, MD
Byus	Craig	RAC	University of California	Riverside, CA
Carlson	Gary P.	EHC	Purdue University	West Lafayette, IN
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Charbeneau	Randall J.	EEC	University of Texas at Austin	Austin, TX

LAST NAME	FIRST NAME	COMMITTEE	AFFILIATION	CITY, STATE
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Clesceri	Lenore	DWC	Rensselaer Polytechnic Institute	Troy, NY
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Colome	Steven	CASAC	Integrated Environmental Services	Irvine, CA
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Cooper	Edwin	RSAC	University of California at Los Angeles	Los Angeles, CA
Cooper	William E.	EPEC	Michigan State University	East Lansing, MI
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Dellinger	John A.	EHC	Metropolitan Chicago Healthcare Council	Chicago, IL
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DiGiulio	Richard	EPEC	Duke University	Durham, NC
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LAST NAME	FIRST NAME	COMMITTEE	AFFILIATION	CITY, STATE
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Fischer	Lawrence	EHC	Michigan State University	East Lansing, MI
Fischhoff	Baruch	CASAC	Carnegie Mellon University	Pittsburgh, PA
Fowler	Bruce	EHC	University of Maryland	Baltimore, MD
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Hartung	Rolf	EPEC	University of Michigan	Ann Arbor, MI
Hattis	Dale	CASAC	Clark University	Worcester, MA
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Kelsey	Karl	EHC	Harvard School of Public Health	Boston, MA
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Kim	Nancy K.	EHC	New York State Department of Health	Albany, NY
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Klaassen	Curtis	DWC	University of Kansas Medical Center	Kansas City, KS
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Laird	Nan M.	RAC	Harvard School of Public Health	Boston, MA
Lamb	James C.	RSAC	Jellinek, Schwartz & Connolly, Inc.	Arlington, VA
Lambert	George	EC	Univ of Medicine & Dentistry of NJ	New Brunswick, NJ
Lanza	Guy	EEC	University of Massachusetts	Amherst, MA
Larntz	Kinley	CASAC	University of Minnesota	Shoreview, MN
Larson	Timothy V.	IHEC	University of Washington	Seattle, WA
Laskin	Debra L.	CASAC	Rutgers University	Piscataway, NJ
Latties	Victor	CASAC	University of Rochester	Rochester, NY
Leaderer	Brian P.	IHEC	Yale University	New Haven, CT
Lederman	Peter	EEC	New Jersey Institute of Technology	Newark, NJ
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Legge	Allan	CASAC	Biosphere Solutions	Calgary, CAN
Lewis	Robert J.	EC	Exxon Biomedical Sciences, Inc.	East Millstone, NJ
Lewis	Steven C.	EHC	Exxon Biomedical Sciences, Inc.	East Millstone, NJ
Lindberg	Steve	EHC	Oak Ridge National Laboratory	Oak Ridge, TN
Little	John C.	IHEC	Virginia Tech	Blacksburg, VA
Loehr	Raymond C.	EC	University of Texas at Austin	Austin, TX
Longo	Lawrence D.	CASAC	Loma Linda University	Loma Linda, CA
Loomis	John B.	EEAC	Colorado State University	Fort Collins, CO
Lue-Hing	Cecil	DWC	Cecil Lue-Hung & Associates Inc.	Chicago, IL
Lung	Wu-Seng	EPEC	University of Virginia	Charlottesville, VA
Lurmann	Frederick	IHEC	Sonoma Technology, Inc.	Santa Rosa, CA
Luthy	Richard G.	EEC	Carnegie-Mellon University	Pittsburgh, PA
MacGregor	Judy	EHC	Toxicology Consulting Services	Rockville, MD
Mack	Thomas M.	EHC	University of Southern California	Los Angeles, CA
MacKay	Donald	EPEC	University of Toronto	Toronto, Ontario
MacLean	Douglas E.	EC/VS	University of Maryland	Baltimore, MD
Mahadevan	Kumar	EPEC	Mote Marine Laboratory	Sarasota, FL
Malone	Thomas	EPEC	Horn Point Environmental Laboratory	Cambridge, MA
Manning	William	CASAC	University of Massachusetts	Amherst, MA
Martin	James	RAC	University of Michigan	Ann Arbor, MI
Marty	Melanie	CASAC	Office of Env Health Hazard Assess	Oakland, CA
McBee	Karen	EPEC	Oklahoma State University	Stillwater, OK
McClellan	Roger O.	RSAC	Chemical Industry Institute of Toxicology	RTP, NC
McConnell	Ernest	EC	ToxPath, Inc.	Raleigh, NC
McCurdy	David E.	RAC	Duke Engineering & Services	Marlborough, MA
McCurdy	Leyla	IHEC	American Lung Association	Washington, DC
McElroy	Anne	EPEC	State University of New York	Stony Brook, NY

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McFeters	Gordon	DWC	Montana State University	Bozeman, MT
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McManus	Terrence	EEC	Intel Corporation	Chandler, AZ
McMurry	Peter	CASAC	University of Minnesota	Minneapolis, MN
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Moomaw	William R	EPEC	Tufts University	Medford, MA
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Nygaard	Oddvar	RAC	Case Western Reserve University	Cleveland, OH
Oberdorster	Gunter	CASAC	University of Rochester	Rochester, NY
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Theis	Thomas	EC	Clarkson University	Potsdam, NY
Thomas	Valerie	IHEC	Princeton University	Princeton, NJ
Tiedje	James M.	EPEC	Michigan State University	East Lansing, MI
Tietenberg	Thomas	COUNCIL	Colby College	Waterville, ME
Tikuisis	Peter	CASAC	Defense Civil Inst of Env. Medicine	Ontario CAN
Toman	Michael	EEC	Resources for the Future	Washington, DC
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Trulear	Michael G.	EEC	ChemTreat, Inc.	Richmond, VA
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Ward	C. Herb	EEC	Rice University	Houston, TX
Watson	James E.	RAC	University of North Carolina	Chapel Hill, NC
Weis	Judith S.	EPEC	Rutgers University	Newark, NJ
Weiss	Bernard	EHC	University of Rochester	Rochester, NY
Whipple	Christopher	RAC	ICF Kaiser	Oakland, CA
White	Ronald	IHEC	American Lung Association	Washington, DC
Wiesner	Mark	EEC	Rice University	Houston, TX
Williams	Marcia	RSAC	Putnam, Hayes & Bartlett, Inc.	Los Angeles, CA
Williams	Philip B.	EPEC	Philip Williams & Associates, Ltd.	San Francisco, CA
Wilson	Richard	RAC	Harvard University	Cambridge, MA
Windom	Herbert L.	EPEC	Skidaway Institute of Oceanography	Savannah, GA
Winner	William	EPEC	Oregon State University	Corvallis, OR
Wolff	George T.	CASAC	General Motors Corporation	Detroit, MI
Wood	Ronald W.	CASAC	New York University Medical Center	New York, NY
Woods	James E.	IHEC	HP-Woods Research Institute	Herndon, VA
Wright	Steven	EC	University of Michigan	Ann Arbor, MI
Wyzga	Ronald	EHC	Electric Power Research Institute	Palo Alto, CA
Yosie	Terry F.	EC	Ruder Finn-Washington	Washington, DC
Zacharewski	Timothy R.	EHC	Michigan State University	East Lansing, MI
Zedler	Joy B.	EPEC	University of Wisconsin	Madison, WI
Zeldin	Melvin	CASAC	South Coast Air Quality Mgmt District	Diamond Bar, CA
Zimmerman	Rae	EC	New York University	New York, NY

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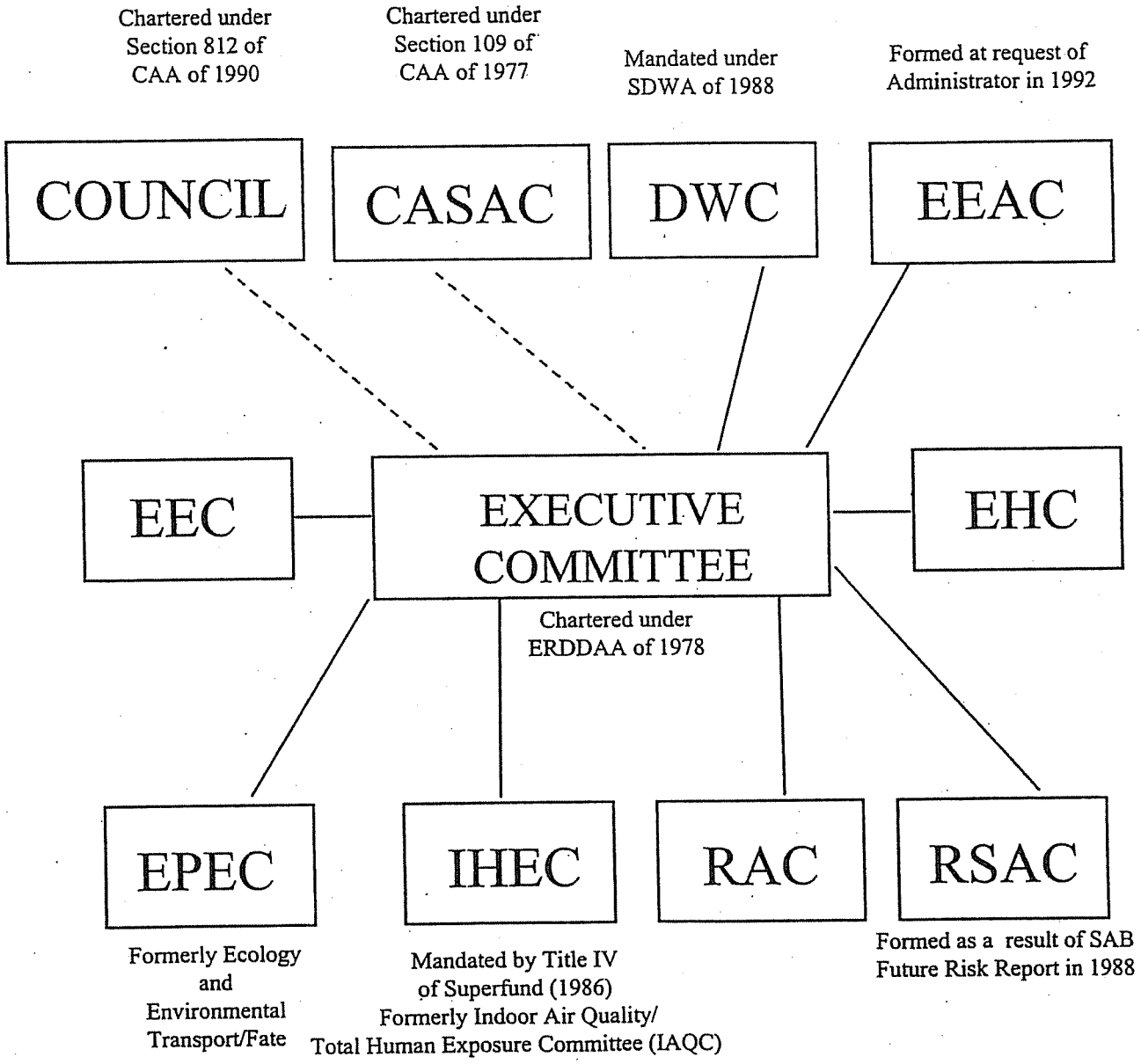
Appendix C Science Advisory Board Organizational Chart

U.S. Environmental Protection Agency
Science Advisory Board



All Committees (except COUNCIL and CASAC which report directly) report to the Administrator through the Executive Committee

Council=Advisory Council on Clean Air Compliance Analysis, 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 & Effects Committee, IHEC=Integrated Human Exposure Committee, RAC=Radiation Advisory Committee, RSAC=Research Strategies Advisory Committee

APPENDIX D
STAFF SUPPORT AND COMMITTEE LEADERSHIP IN FY 1999

Some of the following positions were filled by two people during the year as changes in personnel or staff alignments were made. Where two people occupied a position during the year, both are listed. The latter name is the incumbent at the close of FY 1999.

I - STAFF STRUCTURE

STAFF DIRECTOR'S OFFICE

Staff Director:	Dr. Donald G. Barnes
Special Assistant:	Ms. Anne Barton
	Dr. Angela Nugent
Program Specialist:	Ms. Priscilla Tillery-Gadson
NOWCC Office Assistant:	Ms. Betty Fortune

DEPUTY STAFF DIRECTOR

Deputy Staff Director:	Dr. John R. Fowle III
Program Specialist:	Ms. Priscilla Tillery-Gadson

Committee Evaluation and Support Staff

Team Leader:	Ms. Patricia Thomas
Management Analyst:	Ms. Janice Mercer
Project Coordinator:	Ms. Carolyn Osborne
Management Analyst:	Ms. Vickie Richardson
Student Intern:	Ms. Nicole Hinds

Committee Operations Staff

Team Leader: Mr. A. Robert Flaak
Designated Federal Officers:
- Ms. Kathleen Conway
- Ms. Roslyn Edson
- Dr. K. Jack Kooyoomjian
- Ms. Karen Martin
- Mr. Tom Miller
- Mr. Samuel Rondberg
- Ms. Stephanie Sanzone

Management Assistants

- Ms. Dorothy Clark
- Ms. Wanda Fields
- Ms. Diana Pozun
- Ms. Mary Winston

II - Staff Committee Alignment

Executive Committee

Chair:	Dr. Joan Daisey
Designated Federal Officer:	Dr. Donald G. Barnes
Program Specialist:	Ms. Priscilla Tillery-Gadson

Integrated Risk Steering Subcommittee of the Executive Committee

Chair:	Dr. Joan Daisey
Designated Federal Officers:	Ms. Stephanie Sanzone
	Mr. Tom Miller
Management Assistant:	Ms. Wanda Fields

Advisory Council on Clean Air Compliance Analysis

Chair:	Dr. Maureen Cropper
Designated Federal Officer:	Dr. K. Jack Kooyoomjian
	Dr. Angela Nugent
Management Assistant:	Ms. Diana Pozun

Clean Air Scientific Advisory Committee

Chair:	Dr. Joe Mauderly
Designated Federal Officer:	Mr. A. Robert Flaak
Management Assistant:	Ms. Dorothy Clark
	Ms. Diana Pozun

Drinking Water Committee

Chair:	Dr. Richard Bull
Designated Federal Officer:	Mr. Thomas Miller
Management Assistant:	Ms. Mary Winston
	Ms. Dorothy Clark

Ecological Processes and Effects Committee

Chair:	Dr. Terry Young
Designated Federal Officer:	Ms. Stephanie Sanzone
Staff Secretary:	Ms. Wanda Fields
	Ms. Mary Winston

Environmental Economics Advisory Committee

Chair:	Dr. Robert Stavins
Designated Federal Officer:	Mr. Thomas Miller
Management Assistant:	Ms. Diana Pozun
	Ms. Dorothy Clark

Environmental Engineering Committee

Chair:	Dr. Hilary Inyang
Designated Federal Officer:	Ms. Kathleen Conway
Management Assistant:	Ms. Dorothy Clark
	Ms. Mary Winston

Environmental Health Committee

Chair:	Dr. Mark Utell
Designated Federal Officers:	Ms. Roslyn Edson
	Mr. Samuel Rondberg
Management Assistant:	Ms. Mary Winston
	Ms. Wanda Fields

Integrated Human Exposure Committee

Chair:	Dr. Henry Anderson
Designated Federal Officer:	Ms. Roslyn Edson
	Mr. Samuel Rondberg
Co-Designated Federal Officer:	Dr. Dorothy Canter
	(Disproportionate Impact Review)
Management Assistant:	Ms. Mary Winston
	Ms. Wanda Fields

Radiation Advisory Committee

Chair:	Dr. Stephen Brown
Designated Federal Officer:	Dr. K. Jack Kooyoomjian
Management Assistant:	Ms. Diana Pozun

Research Strategies Advisory Committee

Chair:	Dr. W. Randall Seeker
Designated Federal Officers:	Dr. John R. Fowle III
Management Assistant:	Ms. Dorothy Clark
	Ms. Mary Winston

APPENDIX D
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Some 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 FY 1999.

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Management Assistants

Ms. Dorothy Clark
Ms. Wanda Fields
Ms. Diana Pozun
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Designated Federal Officer:	Dr. Donald G. Barnes
Program Specialist:	Ms. Priscilla Tillery-Gadson

Integrated Risk Steering Subcommittee of the Executive Committee

Chair:	Dr. Joan Daisey
Designated Federal Officers:	Ms. Stephanie Sanzone
	Mr. Tom Miller
Management Assistant:	Ms. Wanda Fields

Advisory Council on Clean Air Compliance Analysis

Chair:	Dr. Maureen Cropper
Designated Federal Officer:	Dr. K. Jack Kooyoomjian
	Dr. Angela Nugent
Management Assistant:	Ms. Diana Pozun

Clean Air Scientific Advisory Committee

Chair:	Dr. Joe Mauderly
Designated Federal Officer:	Mr. A. Robert Flaak
Management Assistant:	Ms. Dorothy Clark
	Ms. Diana Pozun

Drinking Water Committee

Chair:	Dr. Richard Bull
Designated Federal Officer:	Mr. Thomas Miller
Management Assistant:	Ms. Mary Winston
	Ms. Dorothy Clark

Ecological Processes and Effects Committee

Chair:	Dr. Mark Harwell
Designated Federal Officer:	Ms. Stephanie Sanzone
Staff Secretary:	Ms. Wanda Fields
	Ms. Mary Winston

Environmental Economics Advisory Committee

Chair:	Dr. Robert Stavins
Designated Federal Officer:	Mr. Thomas Miller
Management Assistant:	Ms. Diana Pozun
	Ms. Dorothy Clark

Environmental Engineering Committee

Chair:	Dr. Hilary Inyang
Designated Federal Officer:	Ms. Kathleen Conway
Management Assistant:	Ms. Dorothy Clark
	Ms. Mary Winston

Environmental Health Committee

Chair:	Dr. Emil Pfitzer
Co-Chair:	Dr. Mark Utell
Designated Federal Officers:	Ms. Roslyn Edson
	Mr. Samuel Rondberg
Management Assistant:	Ms. Mary Winston
	Ms. Wanda Fields

Integrated Human Exposure Committee

Chair:	Dr. Henry Anderson
Designated Federal Officer:	Ms. Roslyn Edson
	Mr. Samuel Rondberg
Co-Designated Federal Officer:	Dr. Dorothy Canter
	(Disproportionate Impact Review)
	Mr. Samuel Rondberg
Management Assistant:	Ms. Mary Winston
	Ms. Wanda Fields

Radiation Advisory Committee

Chair:	Dr. Stephen Brown
Designated Federal Officer:	Dr. K. Jack Kooyoomjian
Management Assistant:	Ms. Diana Pozun

Research Strategies Advisory Committee

Chair:	Dr. W. Randall Seeker
Designated Federal Officers:	Mr. A. Robert Flaak
	Dr. John R. Fowle III
Management Assistant:	Ms. Dorothy Clark
	Ms. Mary Winston

APPENDIX E - SAB MEETINGS FOR FY 1999

Key to Committees of the Science Advisory Board

COUNCIL	Advisory Council on Clean Air Compliance Analysis
AQMS	Air Quality Modeling Subcommittee
HEES	Health and Ecological Effects Subcommittee
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
IHEC	Integrated Human Exposure Committee
IRP	Integrated Risk Project
RAC	Radiation Advisory Committee
RSAC	Research Strategies Advisory Committee
SAP	Scientific Advisory Panel

Note: Meetings listed in **bold are face to face** meetings, *and italics are teleconference calls.* All meetings in Washington, DC unless otherwise noted.

1st Quarter	Committee	Topic(s)
October 13-15	**EPEC**	**Ecological Report Card and Integrated Watershed Indicators**
October 28-29	**EC**	**Quarterly Meeting**
November 16	**CASAC**	**Ozone NAAQS Research Needs and CO Staff Paper Schedule (RTP, NC)**
November 17-19	**RAC**	**Diffuse Norm Report, Approaches to Calculating Radon Risks, Disposal of Low Activity Mixed Radioactive Waste and URRS Closure by RAC**
November 18	**EEAC**	**Economic Guidelines**
November 30	**CASAC Subc.**	**Fine Particle Monitoring - PM (RTP, NC)**
December 1-3	**EEC**	**Various Issues**
December 10-11	**EC Subc./SAP**	**Use of Human Data**
December 10-11	**DWC**	**Risk Comparison Framework - I**
December 15	*RAC*	*Low Activity Mixed Radioactive Waste*
December 15-16	**EC Subc.**	**Secondary Data Use - II**
2nd Quarter		
January 15	*EC*	*Review Meeting*
January 20-21	**EC Subc.**	**Cancer Guidelines Revisions**
January 26	*EPEC Subc.*	*Eco Risk Subcommittee Working Meeting*
January 27-28	**EC**	**Quarterly Meeting**

February 10	*EEC Subc.*	*Wet Weather Flows*
February 17-18	**DWC**	**Risk Comparison Framework - II (Ft. Mitchell, KY)**
February 23-24	**EC Subc.**	**Models 2000**
February 24	**EEC**	**Various Issues**
February 25-26	**EEC Subc.**	**Wet Weather Flows**
March 3-4	**RSAC**	**Annual Budget Review**
March 8	*EC*	*Review Meeting*
March 9-10	**IHEC**	**Draft Action Plan for Healthy Bldgs/Healthy People II, BASE Intervention Study, NAS Asthma Study and Water Consumption Report**
March 16	**EEC Subc.**	**Development of Clean up Goals at Waste Sites**
March 24-26	**RAC**	**Committee Planning, Biological Effects of Ionizing Radiation(BEIR VI) and Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM)**
March 30-Apr 1	**EC Subc./SAP**	**Endocrine Disruptors**

3rd Quarter

April 6-7	**EPEC**	**Methods for Metals Criteria in Water & Sediments**
April 8	*E C*	*Review Meeting*
April 20	**EEAC**	**Economic Analysis Guidelines - II**
April 20-21	**Council/HEES**	**Prospective Study: Report to Congress**
May 4-5	**Council/AQMS**	**Cost/Benefit CAA: Air Models**
May 27	*EC*	*Review Meeting*
June 3	*Council/AQMS*	*Cost/Benefit CAA: Air Models*
June 9-10	**CASAC**	**Carbon Monoxide NAAQS, PM Research Strategic Document and Diesel Health Assessment**
June 22	*COUNCIL*	*Cost/Benefit CAA*
June 28-29	**Council/HEES**	**Cost/Benefit CAA: Health/Eco Effects - II**
June 30	*EC*	*Review Meeting*

4th Quarter

July 1-2	**EC Subcomm.**	**Peer Review of the IRP Project**
July 8	*EC Subcomm.*	*Water Consumption*
July 13-14	**EC**	**Review Meeting**
July 13-14	**Council**	**Cost/Benefit CAA**
July 19-20	**EC Subcomm.**	**Water Consumption**
July 21-22	**EC Subcomm.**	**Scientific & Technological Achievement Awards**
July 27	*EEAC*	*Economic Analysis Guidelines - IV*
July 27-28	**EC Subcomm.**	**Cancer Guidelines: Children's Issues**
July 29	*CASAC Subcomm.*	*Fine Particle Monitoring/PM - II*

September 23-24	**RSAC**	**Agency Peer Review Program, FY2000 Budget Process/Schedule and BOSC Review of STAR Program**
September 30	*EC*	*Review Meeting*

APPENDIX F
SCIENCE ADVISORY BOARD FY 1999 REPORTS AND ABSTRACTS

F1 List of SAB Reports, Letters, Advisories, Commentaries and Consultations for FY 1999

FULL REPORTS

EPA-SAB-CASAC-99-001	Review of the Draft Diesel Health Assessment Document
EPA-SAB-EHC-99-002	Review of the RfC Methods Case Studies
EPA-SAB-EHC-99-003	Review of the Health Risk Assessment of 1,3-Butadiene
EPA-SAB-EHC-99-004	Technical Review of the Proposed TSCA Section403 Regulation (Identification of Dangerous Levels of Lead)
EPA-SAB-EHC-99-005	Development of the Acute Reference Exposure
EPA-SAB-99-006	FY1998 SAB Annual Report
EPA-SAB-IHEC-99-007	Disproportionate Impact Methodologies
EPA-SAB-RAC-99-008	Estimating Uncertainties in Radiogenic Cancer Risks
EPA-SAB-RAC-99-009	Health Risks from Low-Level Exposure to Radionuclides, Federal Guidance Report No. 13 - Part 1, Interim Version (FGR 13-Part 1)
EPA-SAB-EC-99-010	Data Suitability Assessment
EPA-SAB-EC-99-011	Review of the D-Cormix Model
EPA-SAB-RSAC-99-012	Review of the FY2000 Presidential Science & Technology Budget Request for the EPA
EPA-SAB-EC-99-013	Review of EPA's Proposed Environmental Endocrine Disruptor Screening Program
EPA-SAB-EPEC-99-014	An SAB Report: Review of the Index of Watershed Indicators
EPA-SAB-EC-99-015	Review of Revised Sections of the Proposed Guideline for Carcinogen Risk Assessment
EPA-SAB-DWC-99-016	An SAB Report on the National Center for Environmental Assessment's Comparative Risk Framework Methodology
EPA-SAB-EC-99-017	An SAB Report: Recommendations on the 1998 Scientific and Technological Achievement Award (STAA) Nominations
EPA-SAB-EC-99-018	Review of the SAB Report "Integrated Environmental Decision-Making in the Twenty-First Century"
EPA-SAB-EEC-99-019	Review of the 1996 Risk Management Plan for Wet Weather Flows and the 1997 Urban Infrastructure Research Plan
EPA-SAB-EEAC-99-020	Review of the Economics Analysis Guidelines

LETTER REPORTS

EPA-SAB-CASAC-LTR-99-001	Review of the ORD Ozone Research Needs Document
EPA-SAB-EEC-LTR-99-002	Review of the Implementation of the Agency-Wide Quality System
EPA-SAB-CASAC-LTR-99-003	CASAC Review of the Draft Document Air Quality Criteria for Carbon Monoxide (EPA/600/P-99/045)
EPA-SAB-CASAC-LTR-99-004	CASAC Review of the Draft Document: Airborne Particulate Matter: Research Strategy (EPA/600/R- 99/045)

ADVISORIES

EPA-SAB-DWC-ADV-99-001	National-Level Affordability Criteria and Technologies for Small Systems Under the 1996 Amendments to the Safe Drinking Water Act
EPA-SAB-CASAC-ADV-99-002	Advisory on the PM2.5 Monitoring Program
EPA-SAB-EC-ADV-99-003	TRIM.FaTE Module of the Total Risk Integrated Methodology (TRIM)
EPA-SAB-IHEC-ADV-99-004	National Human Exposure Assessment (NHEXAS) Pilot Studies
EPA-SAB-COUNCIL-ADV-99-005	CAA (1990) Section 812 Prospective Study Health & Ecological Effects Initial Studies
EPA-SAB-RAC-ADV-99-006	Modeling of Radionuclide Releases from Disposal of Low Activity Mixed Waste
EPA-SAB-IHEC-ADV-99-007	Advisory on Defining the Trade-offs Between Instituting Indoor Air Quality and Energy Coils
EPA-SAB-IHEC-ADV-99-008	Building Assessment and Survey Evaluation (BASE) Study Proposed Data Analysis
EPA-SAB-EC-ADV-99-009	Advisory on the Charter for the Council on Regulatory Environmental Modeling (CREM)
EPA-SAB-RAC-ADV-99-010	An SAB Advisory: Assessing Risks from Indoor Radon
EPA-SAB-EC-ADV-99-011	Advisory on the "White Paper on the Nature and Scope of Issues on Adoption of Model use Acceptability Criteria"
EPA-SAB-COUNCIL-ADV-99-012	The Clean Air Act Amendments (CAAA) Section 812 Prospective Study of Costs and Benefits (1999): Advisory by the Health and Ecological Effects Subcommittee on Modeling and Emissions
EPA-SAB-COUNCIL-ADV-99-013	The Clean Air Act Amendments (CAAA) Section 812 Prospective Study of Costs and Benefits (1999): Advisory by the Air Quality Models Subcommittee on Modeling and Emissions

COMMENTARIES

EPA-SAB-EEAC-COM-99-001	Importance of Reinstating the Pollution Abatement and Control Expenditures (PACE) Survey
EPA-SAB-EEC-COM-99-002	Waste Leachability: The Need for Review of Current Agency Procedures
EPA-SAB-EEC-COM-99-003	Environmental Impacts of Natural Hazards: The Need for Agency Action
EPA-SAB-EEC-COM-99-004	Commentary on the Need for Research on Risk Reduction Options for Particulate Matter PM2.5

CONSULTATIONS

EPA-SAB-CASAC-CON-99-001	Consultation on the Development Schedule for the Carbon Monoxide Staff Paper
EPA-SAB-RAC-CON-99-002	Consultation on Approaches to Calculating Radon Risks
EPA-SAB-EEC-CON-99-003	Consultation on the Advantages and Disadvantages of Average or "Not to Exceed" Concentrations in the Development of Cleanup Goals at Waste Sites
EPA-SAB-RAC-CON-99-004	Notification of a Consultation on Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM)
EPA-SAB-CASAC-CON-99-005	Notification of a Consultation on the Diesel Health Assessment
EPA-SAB-CASAC-CON-99-006	Notification of a Consultation on the Estimation of Carbon Monoxide Exposures and Associated Carboxyhemoglobin Levels in Denver Residents Using pNEM/CO (ver. 2.0)
EPA-SAB-CASAC-CON-99-007	Notification of a Consultation on the PM2.5 Chemical Speciation Network & Supersites Plans
EPA-SAB-EC-CON-99-008	Notification of a Consultation on the Agency's Science Strategy

F2 Abstracts of SAB Reports, Advisories, and Commentaries for FY 1999

FULL REPORTS

EPA-SAB-CASAC-99-001 CASAC Review of the Draft Diesel Health Assessment Document

The Clean Air Scientific Advisory Committee (CASAC) of the EPA Science Advisory Board (SAB) reviewed the Agency's *Health Assessment Document for Diesel Emissions*. While acknowledging the difficulty of the task, the CASAC encouraged the Agency to revise the document, which the Committee judged to be not acceptable as a summary of the current knowledge of the health effects of diesel exhaust inhaled in the environment. Consequently, in CASAC's view, it does not serve as an acceptable basis for regulatory decision making, based on adverse health effects. The Committee's main concerns are as follows: a) Some of the information was judged to be considerably out of date. For example, the changes in diesel engines and their emissions that have occurred in the 1990s is not reflected in the document; b) Neither of the two approaches employed by the Agency to use animal data to generate estimates of human risks associated with environmental exposure to diesel exhaust was found to be supported by present knowledge; c) The document fails to distinguish the effects of diesel exhaust, *per se*, from the effects of $PM_{2.5}$ (particulate matter less than 2.5 microns in diameter), of which it is a constituent; and d) The human epidemiological data from occupational exposures present the strongest current evidence for human cancer risk from inhaled diesel exhaust. However, the Agency's document does not effectively address ongoing debates about the existing data. In the end the CASAC could not reach a consensus on whether a quantitative, rather than a qualitative, assessment can be scientifically justified at this time. This marks the second time that the CASAC has reviewed the Agency's health risk assessment of diesel exhaust. In its 1995 review, the Committee identified a number of shortcomings, some of which persist in the current document.

EPA-SAB-EHC-99-002 Review of the RfC Methods Case Studies

The Environmental Health Committee (EHC) reviewed the EPA's Inhalation Reference Concentration (RfC) Methods Case Studies for selected chemicals. The Committee commends the Agency's efforts to demonstrate the application of the dosimetric adjustments and to illustrate the methodology.

The EHC found the concepts and application of the RfC methodology to be articulated clearly in some of the case studies and unclear in others. Similarly, the Committee concurred with the derivation of the RfC in some case studies and had concerns about the derivation in others. The same findings also held for the IRIS Summaries. For some of the case studies, there was a difference in opinion amongst the EHC regarding the clarity of the documents, the derivation of the RfC and/or the comprehensiveness of the summary.

The Committee made several recommendations for improvement: a) improve the clarity of the documents by summarizing some of the data using figures and tables; b) include more recent studies in the RfC case studies; c) incorporate human data into the derivation of the RfC, when available; d) expand the case studies to include a review of the newer models; e) include a statement on children, and whether the RfC is protective of children; f) explain the term susceptible population; g) give reasons for including or excluding available data; h) define scientific terminology used in the documents; i) clarify the calculations; j) make the units consistent; k) provide chemical structures; and l) reassess the application of uncertainty factors in the development of the RfC.

EPA-SAB-EHC-99-003 **Review of the Health Risk Assessment of 1,3 Butadiene**

The Environmental Health Committee (EHC) reviewed the EPA's updated draft health risk assessment of 1,3-Butadiene, which had a cutoff date of January, 1997. A significant amount of new and important information has been developed since then, and the Committee felt that the report should reflect the most current research data.

The majority of the Environmental Health Committee did not support the proposed classification of 1,3-Butadiene as a known human carcinogen due to the lack of consistency between exposure response rates for leukemia or lymphosarcoma when both pertinent studies were considered. The majority opined that 1,3-Butadiene should be classified as a probable human carcinogen.

The Committee found the approaches taken to characterize plausible cancer risks to be reasonable but points out specific data that may have been misinterpreted by the Agency. The Committee supported the use of the benchmark dose procedure in developing Reference levels, and suggested how to further improve the approaches for quantitative assessment of non-cancer endpoints. Greater explanation is needed of the safety factors applied to the benchmark, and of the newly proposed models, especially those modeling time to impact. Also, the EHC recommends that the Agency explain, in more detail, the rationale for the selection of the toxic non-cancer endpoint that is utilized in the derivation of the RfC.

EPA-SAB-EHC-99-004 **Technical Review of the Proposed TSCA Section 403 Regulation (Identification of Dangerous Levels of Lead)**

The Environmental Health Committee (EHC) commends the Agency for its effort to conduct a risk analysis for proposing standards for lead levels in dust and soil as required by the Lead 403 Rule and for the wealth of knowledge on the Lead 403 risk analysis that the Agency displayed during the meeting which was held on September 8-9, 1998. Overall, the EHC found many of the approaches used in the risk analysis to be technically sound, appropriate, and scientifically defensible.

The EHC offers several recommendations, including: a) providing a clearer presentation on how IQ is used for risk and cost benefit analysis, the significance of lack of a threshold, the impact of IQ shifts, the use of additional literature references for the below 70 IQ scores, emphasis on IQ as a neurological surrogate, and improving the explanation that the IQ fractional point loss is valid for risk and economic analysis but not for interpretations for individual children; b) adding more animal data since they support human data by establishing causality, due to the absence of confounding variables, and potential mechanisms for adverse health effects; c) clarifying the discussion regarding the basis for setting the lead standards given the marginal costs and marginal net benefits, d) including a plan for follow-up to specific interventions; e) evaluating the potential role of education as an intervention strategy; f) stating, explicitly, the difference between a soil-lead standard of 2000 parts per million (ppm) and the soil-lead level of concern of 400 parts per million (ppm) and its impact on current practices by the Department of Housing and Development, as well as some States; f) expanding the sensitivity analysis with a case study of a real community that is highly susceptible to lead exposure and a presentation of the costs and benefits associated with the case study; and h) developing a plan for follow-up to evaluate the effectiveness of the specific interventions and lead standards on public health.

Some of these recommendations will require further research. However, there is sufficient scientific evidence to indicate that delaying rulemaking for additional research would leave a significant number of children unnecessarily at risk.

The Agency is highly commended for its stated intent to prepare and distribute educational material tailored to specific circumstances for helping the public comply with the lead standards of the Lead 403 Rule.

EPA-SAB-EHC-99-005 **Development of the Acute Reference Exposure**

The Environmental Health Committee (EHC) reviewed the EPA's methodology document, *Methods for Exposure-Response Analysis for Acute Inhalation Exposure to Chemicals, Development of the Acute Reference Exposure.* The EHC commends the Agency for developing methodology to derive Acute Reference Exposures (ARE), a chemical-specific acute exposure (with an uncertainty spanning an order of magnitude) that is not likely to cause adverse effects in a human population. Overall, approaches for the NOAEL and the benchmark concentration and for duration extrapolation were found to be clear and appropriate. However, the EHC does not support the use of the categorical regression (CatReg) approach for developing an ARE based on the lack of biological-plausibility for the methodology, the lack of justification for the scaling factor to accommodate within-group correlations and group size, and the unreliability of the types of confidence limits used. Also, the Agency did not determine the applicability of categorical regression or provide a basis for this determination with examples of its usefulness with specific chemicals. Regarding the statistical methodology, the EHC recommends that the Agency validate its assumption that all probability curves for the various severities are parallel. The EHC found the expert system for categorizing severity to be inadequate due to the reliance on only a few toxicologists to make decisions on severity of both animal and clinical responses. A workshop to discuss the scientific merit of guidelines for defining severity categories was recommended. The EHC also found that the calculations are lacking in defining risk to children. At the end of the meeting, the Committee recommended that the Agency reassess the database to determine the applicability of categorical regression, the basis for this determination with, if appropriate, examples of its usefulness with specific chemicals, and then return to the SAB for a follow-up review of a revised ARE methodology.

EPA-SAB-99-006 **FY1998 Annual Report**

The Science Advisory Board Staff's annual report captures the SAB's activities for FY 1998.

EPA-SAB-IHEC-99-007 **Disproportionate Impact Methodologies**

The Disproportionate Impact Analysis Methodologies Panel of the USEPA Science Advisory Board (SAB) Integrated Human Exposure Committee (IHEC) met in public session on September 3-4, 1998 to review the Agency's proposed methods for calculating disproportionate impacts of air emissions on surrounding populations of different race, color, or national origin. The Agency is developing these methodologies in connection with Title VI of the Civil Rights Act of 1964 (as amended).

The Panel reviewed two methods: the first was the Relative Burden Analysis (RBA) [in two versions: the Basic RBA (BRBA) and the Enhanced RBA (ERBA)]; the second was the Cumulative Outdoor Air Toxics Concentration Exposure Methodology (COATCEM). The former has been applied on a trial basis to a site in Louisiana; the latter has not yet been applied to a particular site.

The Panel commends the Agency for these initial efforts in trying to determine analytically disproportionate impacts. However, each of the two methods has its limitations in terms of accuracy, uncertainty, data availability, resources, and level of development. The report contains a number of findings, nine specific recommendations, including suggested guidance for moving forward in this important area, and detailed responses to the 14 Charge questions.

EPA-SAB-RAC-99-008 **Estimating Uncertainties in Radiogenic Cancer Risk**

The Science Advisory Board (SAB) was asked by EPA's Office of Radiation and Indoor Air (ORIA) to review the 1997 draft document entitled *"Estimating Radiogenic Cancer Risks Draft Addendum: Uncertainty Analysis,"* October, 1997.

The Charge to the SAB focused on evaluating sources of uncertainty, methods of quantifying uncertainties, and the mathematical quantification of sources of uncertainty.

The review of the Uncertainty in Radiogenic Risk Subcommittee (URRS) of the SAB has concluded that EPA has generated a credible document. The state of knowledge of uncertain input variables has been properly described by the Agency staff within the Office of Radiation and Indoor Air (ORIA) as subjective probability distributions. Monte Carlo simulation is properly employed to combine these input uncertainties into a subjective probability distribution of radiogenic cancer risk. EPA is encouraged to build on the draft methodology and issue a single document that clearly describes its methodology for estimating specific cancer-incidence and mortality risks per unit intake of radioactivity, along with their associated uncertainty.

URRS recommendations for improving the draft report include (a) use of primary data based on cancer morbidity rather than mortality; (b) expansion of the subjective probability distribution for extrapolating from high to low dose and dose rates; (c) accounting explicitly for alternative modeling approaches used to transfer risk coefficients from data on the survivors of the atomic bombings of Japan to estimated risks in the U.S. population; and (d) the use of formal methods of expert elicitation to quantify uncertainty for the most important input variables, so that subjective probability distributions reflect the current state of knowledge.

EPA-SAB-RAC-99-009 — Health Risks from Low-Level Exposure to Radionuclides, Federal Guidance Report No. 13-Part 1, Interim Version (FGR 13-Part 1)

On May 6-7, 1998, the Federal Guidance Report Review Subcommittee (FGRRS) reviewed technical aspects of the draft document, "Health Risks from Low-Level Environmental Exposure to Radionuclides," Federal Guidance Report 13 - Part 1 - Interim Version (FGR 13 - Part 1). This document provides tabulations of unit risk coefficients for cancer morbidity and mortality attributable to exposure to approximately 100 radionuclides through various environmental media, in a population approximated by the age, gender, and mortality experienced in the United States.

The Subcommittee found the report to be well organized and well written and to have used up-to-date scientific methods and data to determine the health risk estimates. Although most of the important limitations of the risk estimates are noted in FGR 13 - Part 1, they are not sufficiently prominent in the current draft, given the potential for misuse or misinterpretation of the estimates. In particular, the magnitudes of the uncertainties in the computed numbers are difficult to ascertain. Other concerns included partial reliance on unpublished methodologies, lack of dose information, insufficient discussion of alternatives to the linear, no-threshold risk model, and several other technical issues. The Subcommittee found that the Agency's plan to calculate risk coefficients for an extended list of radionuclides was appropriate, except that radon and its decay products should also be included. The Subcommittee strongly supports the Agency's stated intent to publish supporting information in electronic form to accompany release of the final version of FGR 13 - Part 1, and recommends that it include the data, models, and dose values used in formulating the risk coefficients.

EPA-SAB-EC-99-010 — Data Suitability Assessment

The Secondary Data Use Subcommittee of the Science Advisory Board's Executive Committee reviewed the Agency's draft "Data Suitability Assessment of Major EPA Databases". This assessment examines and reports upon the extent to which individual EPA regulatory databases can be used for a range of uses other than the use for which the database was designed. The Suitability Assessment is being performed in several stages of which the first, qualitative review, has been completed for six databases.

The Subcommittee found that the Data Suitability Assessment is appropriate for evaluating the general suitability of databases for a range of secondary uses. There was also a consensus that additions to what is in the present draft would improve the usefulness of the data bases to secondary users. The subcommittee not only recommended additions to the assessment but also suggested documents and activities beyond the assessment that would help researchers and the public understand the appropriate secondary uses of specific regulatory databases.

EPA-SAB-EC-99-011 Review of the D-Cormix Model

The US EPAs Science Advisory Board (SAB) convened the D-CORMIX Review Subcommittee to conduct an external peer review of the Agency's D-CORMIX model. The Subcommittee met in public session on August 25-26, 1998 in Washington, DC and reviewed a number a technical aspects as well as implementation issues with the D-CORMIX model for mixing zone analysis.

The charge to the Subcommittee is summarized as follows: a) Is D-CORMIX an appropriate mixing zone model to use for continuous dredged material discharge mixing zone analysis?; b) Does the model accurately capture the physics of negatively buoyant surface plumes, in particular, behavior of the density current and particle settling associated with dredged disposal plumes?; c) What are the essential differences between the D-CORMIX and CD-FATE models and which is preferable as a mixing zone model for continuous dredged material discharge?); d) Does the SAB approve of our outline for laboratory validation? What further suggestions can be offered?; and e) What factors should be considered in developing an AIZ that will not adversely impact the integrity of the aquatic ecosystem? How should the AIZ be sized, especially in relation to distance from the bottom (substrate), and portion of water column encompassed?

In its report, the Subcommittee provided responses to the above questions, addressed several concerns over the actual model itself, and made suggestions for improvements in validation.

EPA-SAB-RSAC-99-012 Review of the FY2000 Presidential Science & Technology Budget Request for the Environmental Protection Agency

On March 3 and 4, 1999, the Research Strategies Advisory Committee (RSAC) of the Science Advisory Board (SAB) met to review the FY2000 Presidential Budget Request for the US Environmental Protection Agency (EPA). The Committee responded to six charge questions. Its findings were that the science and technology activities in the request were selected by a priority-setting process that identifies the highest environmental risks within each environmental goal established in the EPA Strategic Plan using the sound scientific principles of the risk assessment/risk management framework. The RSAC also found the funding request priorities to be appropriate to the environmental goals established in the Agency Strategic Plan. The ORD strategic plan and budget were developed in concert with the Program Offices to develop goals consistent with customer needs. It was possible to examine and evaluate how the budget is allocated to various programs, to science and technology activities, and to various strategic goals. While pleased with the presentation of the budget, RSAC concluded that the budgets proposed in several areas were not likely to be sufficient to meet the goals established by the Agency and ORD in their Strategic Plans. These areas included trophospheric ozone, endocrine disruptors, ecosystem protection, waste site remediation technologies, microbial pathogens and indoor air. Also, the requirements of the "Thompson Report" will require a new program in research to address the knowledge gaps which inhibit comprehensive cost-benefit analyses. Because environmental concerns are becoming ever more complex, and need more scientific insights than the requested budget can likely deliver, the Committee concluded that goals need to be expanded with respect to identifying and addressing emerging environmental problems. Although RSAC understands that budget realities may not permit the funding of every proposed program, even if cost-effective, it recommends that the Agency make available information on high ranking programs that the Agency entertained during the budget-making process, but could not fund due to overall budget-constraints and competition with other programs.

EPA-SAB-EC-99-013 **Review of the EPA's Proposed Environmental Endocrine Disruptor Screening Program**

The 1996 passage of the Food Quality Protection Act and amendments to the Safe Drinking Water Act (SDWA) required EPA to develop a screening and testing strategy for environmental endocrine disruptors. The EPA subsequently asked the Science Advisory Board (SAB) and the FIFRA Scientific Advisory Panel (SAP) to form a Joint Subcommittee to review a set of scientific issues concerning the development of the Agency's endocrine disruptor screening and testing program. The review Subcommittee met on March 30-April 1, 1999, in Arlington VA.

The Charge was broad and complex, posing 18 major questions within four broad areas: a) scope of the program; b) priority-setting; c) the high throughput pre-screening approach; and d) the proposed endocrine disruptor screening program.

The Subcommittee recommended: a mid-course evaluation or optimization of the screening; an initial focus on the methods development effort; the inclusion of more and better-detailed case studies; the use of sub-populations as a criterion within the existing compartments already identified, but not as a separate stand-alone compartment; making users aware of validation problems in systems like IRIS; the inclusion of both dose *and* timing of exposure, particularly with respect to developmental or reproductive events; minimizing the number of animals needed for testing; inclusion of an introductory statement; support with data decisions about which assays are selected, and which protocols are adopted for those assays, should be with data; be aware of the imperfect nature of *any* future agreed strategy; define and agree on some negative control agents for environmental disruption assay validation; do not expand the set of agents until the Agency develops or adopts validated systems and can provide clear decision criteria.

Although the review identified several areas of concern, we wish to congratulate the Agency for dealing effectively with an extraordinarily complex set of issues, many of which are on the cutting edge of the relevant science.

EPA-SAB-EPEC-99-014 **An SAB Report: Review of the Index of Watershed Indicators**

On October 13-15, 1998, the Ecological Processes and Effects Committee of the Science Advisory Board met to review and comment on the Index of Watershed Indicators (IWI) developed by the Office of Water. The stated purpose of the IWI is to provide available data on aquatic resources in a Geographic Information System (GIS) format for assessing the condition and vulnerability of watersheds. Phase I of the IWI, released in 1997, consisted of information on 15 indicators presented individually and in aggregate. In a previous review (EPA-SAB-EPEC-ADV-97-003), the Committee supported in concept Agency plans to include 6 additional indicators (i.e., biological integrity, habitat, groundwater, coastal condition indicator, air deposition, and downstream effects) and further recommended that land use change and other indicators of terrestrial condition be considered. The Committee also recommended that the algorithm used to calculate composite scores for watershed condition and vulnerability be examined prior to the Agency's release of a revised version of the IWI. The primary focus of this second EPEC review was to follow up on the previous Committee recommendations.

The Committee applauds early Agency efforts on the IWI, but recommends strengthening the scientific basis of IWI. The Committee recommends that the Agency: develop a strategic plan to articulate IWI's goals and objectives, identify target audiences, and identify data gaps; develop a conceptual model for the IWI that can be used to guide the selection of additional data layers and refinements to the integrating algorithm; add more indicators of biological and ecosystem effects to the IWI; develop terrestrial indicators using the MRLC data set; and evaluate each indicator to demonstrate that changes in the indicator correspond to meaningful changes in environmental quality. The Committee also urges the Agency to revisit the current integrated index, which falls short of the goal of characterizing watershed condition and vulnerability. As part of this exercise, the Agency should undertake the appropriate analyses to assign differential weights to the individual indicators based on their relative importance as predictors of watershed integrity.

EPA-SAB-EC-99-015

Review of Revised Sections of the Proposed Guidelines for Carcinogen Risk Assessment's Comparative Risk Framework

A Subcommittee of the Science Advisory Board reviewed EPA's revised Cancer Risk Assessment Guidelines (GL) on January 20-21, 1999, addressing the proposed narrative summaries and hazard descriptors; the use of Mode of Action (MOA) information; the use of dose response analysis to calculate the point of departure; and margin of exposure analysis, including human intraspecies variability.

The Subcommittee recommended that the GLs should be released as soon as possible and found the GLs were a significant improvement. Other general findings/recommendations included:

a) State that "...the primary goal of EPA actions is public health protection..."
b) Re-consider the loss of flexibility for risk assessors.
c) Discuss sensitive subpopulations for all agents to which the public is exposed.
d) Discuss the need consider background and concurrent exposures.
e) Provide guidance on the use of biologically-based models

More specific findings are:

a) The narrative descriptor "known to be carcinogenic to humans" or "known human carcinogen" should be retained. The Subcommittee did not agree on whether to restrict use of this category to scenarios in which there was conclusive epidemiological data.
b) A common format for the hazard narrative is essential.
c) Continue efforts to achieve compatibility with international organizations.
d) Specific criteria for judging the adequacy of data on a mode of action are needed .
e) The GL remain vague about what data are required to reject default assumptions.
f) The GLs should require testing of the hypothesis before rejecting the default assumption.
g) There should be guidance on whether mode of action data support linear or non-linear extrapolation of risk
h) The Subcommittee is concerned about the linkage between selected risk levels and the incorporation of adjustment and uncertainty factors.
i) Clarify the relationship of the LED_{10}, ED_{10} and the NOAEL.

EPA-SAB-DWC-99-016

An SAB Report on the National Center for Environmental Assessment's Comparative Risk Framework Methodology

The Drinking Water Committee (DWC) of the Science Advisory Board (SAB) reviewed a methodology developed by the US Environmental Protection Agency's (EPA) National Center for Environmental Assessment (NCEA), Cincinnati entitled *Comparative Risk Framework Methodology and Case Study*. The document presents a methodology intended for analyzing, and describing in comparable terms, disparate health risks associated with alternative drinking water treatment approaches. The Committee supported the continued development of this method and the research necessary to allow its further development.

The Committee noted that the proposed methodology presents a potentially powerful tool that provides a structural framework for identifying important variables that influence the nature and extent of complex environmental problems. The case study that was conducted to illustrate the method's application, while demonstrating its promise, highlighted the difficulties that can be anticipated when such a framework is applied. The Committee suggested that with further development, the Comparative Risk Framework Methodology has the potential to provide valuable insights to officials responsible for local and national decisions on the most appropriate intervention to apply to control human health risks associated with drinking water. The text of the report provides advice that highlights the further efforts that will be necessary

for its development and use by the Agency.

EPA-SAB-EC-99-017 **An SAB Report: Recommendations on the 1998 Scientific and Technological Achievement Award (STAA) Nominations**

This report represents the conclusions and recommendations of the U.S. Environmental Protection Agency's Science Advisory Board regarding the 1998 EPA Scientific and Technological Achievement Awards (STAA) Program. The STAA Program is an Agency-wide competition to promote and recognize scientific and technological achievements by EPA employees, fostering a greater exposure of EPA research to the public. The Program was initiated in 1980 and is managed by the Office of Research and Development (ORD).

The Agency submitted for review 94 nominations from the first nine of the eleven award categories this year (Control Systems & Technology, Ecology & Ecosystems Risk Assessment, Health Effects & Health Risk Assessment, Monitoring & Measurement Methods, Transport & Fate, Review Articles, Risk Management and Policy Formulation, Integrated Risk Management, Social Science Research, Environmental Education, and Environmental Trends for Drivers of Future Risk). After the review, the STAA Subcommittee of the Science Advisory Board revised the number of nominations to 89. Of these, the Subcommittee recommended 32 nominations (36 percent of the nominations) for awards at three levels and also recommended that ten additional papers be recognized with Honorable Mention. The Subcommittee recommended awards for 30 Development and two nominations submitted by the Office of Pollution Prevention and Toxics. The Subcommittee encouraged the Agency to continue support for the STAA program as a mechanism for recognizing and promoting high quality research in support of the Agency's mission.

EPA-SAB-EC-99-018 **Review of the SAB Report "Integrated Environmental Decision-Making in the Twenty-First Century"**

A Subcommittee comprised of some SAB Executive Committee members, and Board consultants, reviewed the SAB "Integrated Environmental Decision-Making" report. To ensure an independent peer review, EC members who had served on the IRP were not included on the review subcommittee. The Subcommittee found the approach to be sensible and constructive. Many of the concepts have scientific merit, and provide a good starting point for improving the way in which EPA and other agencies charged with environmental risk management go about their business. The report should encourage the Agency and other environmental risk managers in the direction of a more holistic and rational approach to analyzing problems and making decisions. However, the Subcommittee noted that the report appears to be of two minds as to whether it is recommending a single strategy, or a menu of approaches and tools that hold promise for improved integration. While the report contains many promising ideas that deserve research attention and experimental application, the Subcommittee believes that few of the concepts discussed are ready for direct routine application by EPA and other federal agencies. In most cases such application will require: more solid theoretical and empirical foundations; better natural and social scientific knowledge; and, Agency staff willing to and capable of applying ideas in a critical and inventive way, since their complexity makes it unlikely that it will ever be possible to reduce many of them to routine formulas or step-by-step instructions. Volume 1 should be significantly revised and published as a stand-alone document under a new title which points to a direction, but does not imply a firm strategy. The revised report needs to address the enormous practical difficulties involved in coming to grips with the many different specific pieces of incomplete and uncertain science that underlie the various parts that must be integrated. The report also needs to more explicitly discuss the various objectives that underlie risk-ranking, because even though the results from risk assessments are a useful input to decision-making, most risk managers would not want to use them as the sole basis for setting risk management priorities. If the SAB is going to continue to work on issues that lie at the interface between science, values and decision-making, the peer review subcommittee believes it needs to substantially increase its behavioral and decision science expertise. Similarly, if the Agency is going to begin experimental applications and conduct expanded research on issues of the sort discussed in this report, it will need to increase expertise in these areas.

EPA-SAB-EEC-99-019 **Review of the 1996 Risk Management Plan for Wet Weather Flows and the 1997 Urban Infrastructure Research Plan**

The Wet Weather Flows and Urban Infrastructure Subcommittee of the EPA Science Advisory Board's (SAB) Environmental Engineering Committee reviewed the Office of Research and Development's 1996 *Risk Management Plan for Wet Weather Flows* and the 1997 *Urban Infrastructure Research Plan*. Wet weather flows are one of the largest remaining threats to water quality, aquatic life and human health and the Subcommittee commends EPA for its initiative in developing these two research plans.

The Subcommittee's most important recommendation is that EPA fully address both risk reduction and costs within its wet weather flows research activities.

The five research areas identified in the 1996 *Risk Management Plan for Wet Weather Flows* are appropriate. However, the corresponding research efforts are too narrow and must be couched in the context of risk reduction. The Subcommittee makes specific suggestions for broadening the research program to improve the basis for risk management decisions. The 1997 *Urban Infrastructure Plan -- Water and Wastewater Issues* identified appropriate areas and addressed them in a thoughtful manner.

EPA-SAB-EEAC-99-020 **Review of the Economics Analysis Guidelines**

The Environmental Economics Advisory Committee (EEAC) of the EPA Science Advisory Board (SAB) reviewed the Agency's draft *Guidelines for Preparing Economic Analyses* during a series of meetings extending from August 1998 to July 1999, in response to a request received from EPA to perform a full and complete review. The draft Guidelines have been revised and greatly improved as a result of the interactions between the EEAC and EPA staff during the public meetings over the past year. The EEAC's general conclusion is that the Guidelines now succeed in reflecting methods and practices that enjoy widespread acceptance in the environmental economics profession, notwithstanding the concerns that remain with several particular parts of the Guidelines.

LETTER REPORTS

EPA-SAB-CASAC-LTR-99-001 **Review of ORD Ozone Research Needs Document**

The Clean Air Scientific Advisory Committee (CASAC) of EPA's Science Advisory Board, met on November 16, 1998 to review the March 31, 1998 draft EPA document, "Ozone Research Needs to Improve Health and Ecological Risk Assessment". The Committee found that the draft document provides little sense of the factors influencing recent decisions and the key issues remaining unresolved at those times. Those critical information gaps provide a platform from which the extensive list of current questions regarding the health and welfare effects of ozone can be developed into a prioritized list of research needs which, if met, would significantly improve the basis for future reviews of the standard. While the draft document appropriately notes a number of important research needs within numerous categories, it does little to integrate or prioritize the needs across categories. Additional integration of the information contained in the draft document is needed to provide a useful basis for development of an ozone research strategy.

It was the consensus of the Committee that the Agency should develop and sustain a substantive, well-prioritized and integrated program of research on the health and welfare effects of ozone. The present level of research and the likely funding portrayed by EPA Staff falls far short of an adequate effort. The Committee strongly urges the Agency to develop an ozone research strategy that prioritizes information needs and describes the resources and time required to meet those

needs. The Committee also noted the likely importance of co-pollutant effects, and encourages greater integration of research strategies for ozone, particulate matter, and other air contaminants.

EPA-SAB-EEC-LTR-99-002 **Review of the Implementation of the Agency-Wide Quality System**

EPA's National Center for Environmental Research and Quality Assurance requested that the Quality Management Subcommittee (QMS) of the Science Advisory Board's Environmental Engineering Committee review the implementation of the Agency-wide Quality System.

The Charge asked the QMS to evaluate the Agency's success in implementing the Agency-wide Quality System. The following ideas emerged in the review, and aim at assisting management in countering incomplete buy-in of the Quality System:

a) Consider revisiting the reporting status of the Quality System and institutionalizing it within the Agency structure.

b) Create senior and lower level champions for the Quality System within EPA, states and tribal organizations.

c) Emphasize the bench marking and oversight advantages of the Quality System as management tools.

d) Articulate the need to have independent oversight of the quality of the Agency's products and services.

e) Articulate the benefits and cost reductions that will eventually accrue following incorporation of a Quality System within the Agency structure.

The Subcommittee finds that the Quality System cannot be successfully implemented without buy-in and demonstrated commitment from senior management. The Subcommittee also finds the Agency to be the national and international leader for quality assurance activities within the environmental community.

EPA-SAB-CASAC-LTR-99-003 **CASAC Review of the Draft Document Air Quality Criteria for Carbon Monoxide (EPA/600/P-99/001)**

The Clean Air Scientific Advisory Committee (CASAC) reviewed the February 1999 draft document, *Air Quality Criteria For Carbon Monoxide* (EPA/600/P-99/001). The Committee expressed the unanimous view that the document required revision and re-review by CASAC before it could constitute an adequate statement of the current scientific knowledge as a basis for reviewing the appropriateness of the existing CO NAAQS. Although attention must be given to numerous issues raised by the Panel in order for the document to be acceptable, the extent of the required revisions is modest. The Panel especially complimented Staff for following through with the agreed-upon plan to focus on how new information might alter previous views of the effects of CO, rather than developing an exhaustive compilation of historic information.

The Panel recommended that information be added on the evolution of CO oximetry and its impact on interpretation of results, the implication for standard setting of the involvement of CO in ozone chemistry, interspecies differences in CO toxicokinetics, and potentially susceptible subpopulations. It noted the need for more analytical treatments of CO measurement methods, current health effects data, and uncertainties regarding both exposures and health risks. Additional recent literature on CO epidemiology and certain other topics was recommended for inclusion. The Panel questioned the emphasis given to information on acute high-level exposures and the health effects of CO poisoning, and the lack of justification given for its inclusion. It was recommended that each chapter contain a summary of whether or not, and how, new information changes previously-held views of CO exposures and their health impacts. The Panel raised a broad range

of other specific issues and editorial points that also need to be addressed.

EPA-SAB-CASAC-LTR-99-004 **CASAC Review of the Draft Document: Airborne Particulate Matter: Research Strategy (EPA/600/R-99/045)**

The Clean Air Scientific Advisory Committee (CASAC) reviewed the May 1999 draft document, *Airborne Particulate Matter: Research Strategy* (EPA/600/R-99/045). The Committee complimented the Agency staff for its effort in developing a revised document substantially different in scope and format than the previous draft, and one that clearly demonstrated intent to be responsive to both CASAC's previous comments and to the recommendations of the National Research Council (NRC) PM Research Committee.

The Panel recommended revising the introductory material substantially to focus on the need for the information to be developed by the PM research program, rather than on the mission, structure, and capabilities of the Office of Research and Development. The Panel agreed with the Agency's selection of key research topics, and noted its general consistency with recommendations of the NRC Committee. The Panel recommended strengthening the descriptions of relative priorities and the prioritization process. The strategy also needs strengthening in the areas of coordination with other PM research activities within and outside the Agency, monitoring progress, communication, measuring success in meeting specific information needs, and human resources.

The Panel was unanimous in its opinion that, although the revised document was substantially improved from the last draft, it needs further revision and re-review by CASAC.

ADVISORIES

EPA-SAB-DWC-ADV-001 **National-Level Affordability Criteria and Technologies for Small Systems Under the 1996 Amendments to the Safe Drinking Water Act**

This Advisory was developed by the Drinking Water Committee (DWC) of the Science Advisory Board (SAB) as a result of its June 19, 1998 meeting with the Agency. The DWC recognized the Agency's substantial efforts and progress in developing the criteria described in their draft report entitled, *National-Level Affordability Criteria Under the 1996 Amendments to the Safe Drinking Water Act (*Revised Draft Report dated April 30, 1998). The Committee noted that no statutory definition exists for the concept of Affordability and that the deadline for developing criteria for affordability did not provide ample time for the Agency to conduct original studies that would lead to an empirically derived meaning of affordability. The Committee thought that some of the comparisons between incremental costs for treatment technologies and other expenditures made in the Agency's background document had a raw intuitive appeal while others did not. The Committee thought that the focus on defining affordability by reference to median household income was not well explained by the report. The DWC thought that without a clear conceptual framework, efforts to determine affordability become highly arbitrary. The DWC thought that the Agency analysis was adequate given the lack of guidance and short deadline provided in the legislation; however, they suggested that the report reviewed would benefit from additional input by economists and policy analysts.

EPA-SAB-CASAC-ADV-99-002 **Advisory on the PM2.5 Monitoring Program**

The Technical Subcommittee on Fine Particle Monitoring of the Clean Air Scientific Advisory Committee (CASAC) met on November 30, 1998, at the request of the Agency's Office of Air Quality Planning and Standards

(OAQPS), to provide advice and commentary on two major components of the Agency's $PM_{2.5}$ Monitoring Program, namely, the chemical speciation program, and the "supersites" program. The Subcommittee addressed the following issues: a) evaluating the proposed plan for the initial establishment of 53 sites in the speciation network that would serve as the trends network sites; b) reviewing the revised plans for deployment of the supersite network; c) examining the availability of data (while considerable work has been done in the Agency to characterize the FRM monitor, the results have not yet been presented in the peer-reviewed journal literature.); and d) evaluating provisions for sufficient time and resources to fully utilize the extensive quantity of data that will be collected as a result of the Fine PM Monitoring Program.

To respond to the need for continuing scientific input into the design and implementation of the monitoring program, the Subcommittee agreed that it would be willing to serve as the scientific advisory body to the PM monitoring program. This role would require the Subcommittee to both react to materials prepared by EPA as CASAC has traditionally done and to provide input to the EPA management team as scientific information relevant to the monitoring program becomes available. Thus, a more proactive role is envisioned for the Subcommittee as the monitoring program evolves.

EPA-SAB-EC-ADV-99-003 TRIM.FaTE Module of the Total Risk Integrated Methodology(TRIM)

The Environmental Models Subcommittee (EMS) of the Executive Committee (EC) of the Science Advisory Board (SAB) reviewed the TRIM.FaTE Module of the Total Risk Integrated Methodology (TRIM) being developed by the Office of Air Quality Planning and Standards (OAQPS) in the Office of Air and Radiation (OAR). TRIM is designed to provide a method for integrating multimedia, multipathway sources of pollutants to more accurately estimate exposure to pollutants and effects from environmental releases. The Subcommittee found the development of TRIM and the TRIM.FaTE module to be conceptually sound and scientifically based. It is a very complex model in terms of interconnections, so care needs to be taken to insure that it is applied appropriately and produces realistic results. Recommendations are made to seek input from users before and after the methodology is developed to maximize its utility, to know how it is being used, and to guard against inappropriate uses; to provide documentation of recommended and inappropriate applications; to provide training for users; to test the model and its subcomponents against current data and models to evaluate its ability to provide realistic results; and to apply terminology consistently.

EPA-SAB-IHEC-ADV-99-004 National Human Exposure Assessment (NHEXAS) Pilot Studies

On September 29-30, 1998, the EPA Science Advisory Board (SAB) Integrated Human Exposure Committee (IHEC) reviewed the preliminary data on the National Human Exposure Assessment Survey (NHEXAS) pilot studies in Durham, North Carolina. The NHEXAS pilot studies were designed to provide critical information about multipathway, multimedia population exposure distribution for selected chemical classes.

IHEC found NHEXAS to be an excellent project that has significant promise for improving public health in a cost-effective manner. The Committee also found NHEXAS to be outstanding in both design and implementation. When completed, NHEXAS should greatly improve understanding of human exposure to selected pollutants. This, in turn, would be helpful in determining the most effective strategies to reduce the public's risk to hazardous environmental chemicals. (The uncertainty and limitations associated with the data should be presented along with the data in order to add to the transparency of the information.) Therefore, the Committee strongly encourages the EPA to pursue the completion of the study results in an expeditious manner.

To increase the utility of NHEXAS, the Committee recommends that the EPA: a) develop a strategic plan for analyzing the data; b) publicize the NHEXAS framework by informing the public through various media such as an EPA publication that is available in hardcopy and on the Internet; c) evaluate the flexibility of NHEXAS to study special populations such as minorities and sensitive populations; d) link the exposure data from NHEXAS with biological markers from NHANES where possible; and e) improve the communication between the NHEXAS investigators and state and local

health officials.

The Committee was particularly concerned about the limited resources allocated to the analysis of the NHEXAS data and the lack of a strategic plan for follow-up studies. If NHEXAS were to stop at this time, the considerable efforts and expenditures incurred during the last five years would be of limited utility to the Agency. It is important, therefore, that the costs of this program be presented within a frame of future savings as a result of improved public health resulting from better targeted, more effective, and less costly regulatory efforts. The Committee was also concerned about the selection of the chemicals that were measured in NHEXAS. Several recommendations are provided for the planned analyses of the data, actions for the increased utility of the data, and follow-up studies in both the near term and in the future.

EPA-SAB-COUNCIL-ADV-99-005 CAAA (1990) Section 812 Prospective Study Health & Ecological Effects Initial Studies

The Health and Ecological Effects Subcommittee (HEES) of the Advisory Council on Clean Air Compliance Analysis (Council), of the Science Advisory Board, has reviewed precursors to the first Prospective Study: Report to Congress. The HEES concludes that the approach to the health/ecological effects assessment lacks a framework for ecological evaluations. The Agency should develop a comprehensive methodology for valuing natural resources and ecological services, incorporating contemporary ecological thinking and findings. This framework must be made explicit and clear to the user. The HEES encourages the Agency to explore valuations at the watershed level or larger (or other scales of concern) to avoid double-counting of pollutant effects and interactions among pollutants.

The absence of disaggregation of costs and benefits by pollutant or source category was highlighted as a deficiency. The Agency should progress toward disaggregation in the Prospective Studies, in order to evaluate the various parts of the 1990 Clean Air Act Amendments (CAAA-90) (e.g.,industrial sectors by title).

The HEES has provided guidelines and a proposed framework for evaluating ecological effects, provided advice on air toxics, and recommended a procedure for selecting toxic chemicals that might yield quantifiable risks, as well as a procedure for screening the list of 189 hazardous air pollutants (HAPS) for identifying candidate pollutants warranting more in-depth analysis. The HEES has also provided advice on a number of specific technical issues, including particulate matter (PM) mortality response functions and has recommended that PM-related infant mortality data not be included in the current analyses, and that the use of time lags to adjust for downward trends is premature.

EPA-SAB-RAC-ADV-99-006 Modeling of Radionuclide Releases from Disposal of Low Activity Mixed Waste

On November 17-19, 1998, the Science Advisory Board's Radiation Advisory Committee conducted an advisory of the Office of Radiation and Indoor Air's (ORIA) modeling of low activity mixed waste, including: dose assessment over a wide range of disposal site-specific hydrogeologic and climatic settings; the 1000 year modeling time frame; and using a "high" release rate from concrete for the modeling.

The Committee found that the sites modeled do not necessarily cover the range of conditions that might be encountered at RCRA-C facilities. It recommends that ORIA should further assess the impact of site-specific conditions to bound probable site performance better. While the Committee did not reach consensus on the modeling time frame, it recommends that ORIA consider: conducting a sensitivity analysis to address the variation of peak dose with time; improving its waste characterization; the relationship between radioactive and hazardous waste modeling time frames; uncertainties in its technical assumptions and future medical and social conditions; site ownership; and its degree of conservatism given the intent of the proposal. The Committee recommends that ORIA perform a simulation to verify that its assumptions about the releases from concrete are reasonably conservative.

Beyond the Charge, the Committee recommends that ORIA: better justify choosing the PRESTO model; consider classifying radionuclides according to half-life; consider whether the total quantity of waste as well as its radionuclide concentrations should be part of the decision process; re-examine certain modeling assumptions; propose concentration

criteria addressing "dry" and "wet" sites; and compare control systems and acceptance criteria for radioactive and hazardous wastes.

EPA-SAB-IHEC-ADV-99-007 Advisory on Defining the Trade-offs between Instituting Indoor Air Quality and Energy Coils

The Integrated Human Exposure Committee (IHEC) of EPA's Science Advisory Board, supplemented by an economist (a liaison from the SAB Environmental Economics Advisory Committee), reviewed the draft EPA project reports on Energy Costs and Indoor Air Quality Performance of Ventilation Systems and Controls. The purpose of this project was to assess the compatibilities and trade-offs between energy and indoor air quality objectives in the design and operation of heating, ventilation, and air-conditioning (HVAC) systems in commercial buildings. In its draft reports, the EPA concludes that indoor environmental quality appears to be compatible with energy efficiency goals when energy saving measures and retrofits are applied wisely.

Overall, the Committee found the Energy Cost and Indoor Air Quality Performance of Ventilation Systems and Controls Project to be well-executed and clearly presented. The Committee was particularly impressed with the technical components of the methodology. The Committee also found that, in general, the findings of the report were supported by the modeling results and that, in general, the analyses were adequate for understanding some differences in the costs associated with having good indoor air quality amongst different ventilation systems. The Committee found that the major contribution of this modeling effort is that the results suggests that the tradeoffs are not very large, rather than that they do not exist.

The IHEC found the EPA reports to be ready for dissemination and broader discussion as long as the Agency further clarifies the limitations and caveats of the model and addresses the Committee's immediate concerns which are identified in the report. The Committee also found that additional work in several areas would strengthen the analysis when it is used to support specific policies. Specifically, the IHEC recommends that: a) the EPA work with DOE to further validate the DOE-2 model; b) the Agency clarify the significance of applying the ASHRAE standard and state whether or not the Agency is assuming that compliance with the ASHRAE standard implies that the indoor air quality is good for a given building and; c) the EPA further explain the cost of achieving improvements in IAQ by adjustments in the HVAC system, the cost associated with poor indoor air quality, and the benefits of improving indoor air quality through reduced occupant illness. The IHEC also offered several suggestions to be considered as ongoing research directions for future analyses.

EPA-SAB-IHEC-ADV-99-008 Building Assessment and Survey Evaluation (BASE) Study Proposed Data Analysis

The Integrated Human Exposure Committee (IHEC) of the Science Advisory Board met on March 9, 1999 in Washington, DC to conduct an advisory on the proposed data analyses for the Building Assessment Survey Evaluation (BASE) study. BASE is a cross-sectional multi-year study designed to define key characteristics of IAQ in 100 public and commercial buildings. The ultimate goal of the BASE study is to improve public health through improvements in indoor air quality.

Overall, the Committee found the proposed analyses to be the most relevant and extremely useful in providing significant data on the contributions of indoor environments to human exposure and reported symptoms. The BASE data is expected to be normative (typical of public and commercial buildings) because the buildings used in the study were randomly selected. The frequency distributions of the normative data are the hallmark of this project and should be extremely useful in supplying relevant and useful yardsticks to practitioners studying indoor air. The Committee found the overall proposed analyses to be useful in helping the Agency to meet GPRA Goal 4, Objective 4, which states that "By 2005, 15 million more Americans will live or work in homes, schools, or office buildings with healthier indoor air than in 1994." The analyses of the study parameters can also be useful in determining good IAQ practices and, subsequently, in helping the EPA to achieve its GPRA goal of having 5% of the office buildings managed with good IAQ practices by 2005. The

IHEC highly encouraged the Agency integrate the BASE project into the Agency's efforts to analyze cumulative exposure in order to maximize the impact of BASE on the overall protection of public health.

The IHEC strongly recommended that the Agency focus on conducting Quality Assurance/Quality Control on the data and then conduct an in-depth evaluation of the descriptive statistics in order to provide critically needed baseline information on the various parameters that have been monitored in the 100 commercial and public buildings that were included in the study. The Committee urged the Agency to release the information to the public as soon as the QA/QC and descriptive statistics analyses are completed. It was recommended that more complex analyses, such as testing for associations, be considered after the baseline data are released. The IHEC provides several recommendations for the subsequent data analyses. The IHEC emphasized that the Agency should determine (*a priori*) the acceptable power before testing for associations.

The IHEC recommended that the Agency incorporate guidelines regarding the scientific limitations in using the data. Such guidelines would reduce the likelihood that the data are misinterpreted or that invalid associations are inferred and would minimize the likelihood of data dredging, especially given the large number of variables in the study. The Committee cited a few data sets with analyses that EPA may be able to use as guidance in its data analysis efforts and emphasized the importance of analyzing both the BASE data and the data from the Office of Research and Development longitudinal study, the Temporal Indoor Monitoring and Evaluation Study (TIME). The Committee also encouraged the Agency to establish collaborative relationships with other researchers when developing the strategy to conduct the BASE analyses and while conducting the BASE analyses.

EPA-SAB-EC-ADV-99-009 Advisory on the Charter for the Council on Regulatory Environmental Modeling (CREM)

The Environmental Models Subcommittee (EMS) reviewed the draft "Proposed Charter, Council on Regulatory Environmental Modeling". They concluded that the draft charter provides adequate and appropriate guidance to help the Agency develop, apply, evaluate and improve, scientifically-based and defensible models of high quality, and it made recommendations for improving the CREM charter. The Subcommittee also felt that the proposed CREM charter should help the Agency communicate its activities to the public.

The Subcommittee strongly urged the Agency to charter and employ CREM to develop policies and procedures for the development, validation and use of environmental regulatory models at EPA. The Subcommittee felt that this is necessary and long overdue to ensure that models used by EPA are of the highest quality and that they are scientifically-based and defensible. However, the Subcommittee was not convinced that EPA is fully committed and willing to launch the CREM with the level of senior management support needed for its success. Given the past difficulty within EPA of establishing Agency-wide guidance for model development and use the Subcommittee strongly urged EPA senior management to establish CREM and support its charter strongly recommending that the CREM be given sufficient authority to do its job, as well as the appropriate oversight and support from EPA senior management.

The Subcommittee believes that a "carrot and stick" approach is the best way for CREM to accomplish its mission. This can be done by providing incentives and support for those who provide input and share their modeling efforts through the CREM. In addition, by instituting a mechanism for full disclosure of modeling activities at the Agency, pressure will be exerted to improve the quality of these activities. Through a well-designed process of highlighting Agency modeling efforts in a unique and distinctive manner, CREM can identify where modeling practices are working well; CREM can also identify gaps and areas that need improvement. To be effective in this important activity CREM must have input and access to information about model development and model use in the Programs and Regions.

The Subcommittee commends EPA's proposal for involving the public in this effort. This process can lead not only to a better understanding of EPA's models, but a better acceptance of models used in regulatory activities. It also provides a way to tap the work done by others, thereby leveraging EPA's resources.

EPA-SAB-RAC-ADV-99-010 **An SAB Advisory: Assessing Risks from Indoor Radon**

On March 24-26, 1999, the Science Advisory Board's Radiation Advisory Committee conducted an advisory for the Office of Radiation and Indoor Air (ORIA) on a White Paper concerning proposed methodologies for assessing risks from indoor radon, which was based on the National Academy of Sciences/National Research Council Biological Effects of Ionizing Radiation (BEIR) VI report.

The Committee found that ORIA has proposed a reasonable method for extending the findings from BEIR VI to form an Agency radon risk model, and made a thorough effort in considering most aspects of this complex task. The comments offered are intended to help ORIA improve a good product, sharpen its approach, and communicate its recommendations more clearly.

A model that would provide risk estimates between those of the concentration and duration models was recommended by the Committee, although an exact method was not proposed. This recommendation is supported by other models discussed in BEIR VI, which yield intermediate risk estimates.

The Committee generally supports modifications of the BEIR VI models intended to improve the usefulness of the EPA radon model, including expanded treatment of smoking prevalence by age and continued investigation on distinguishing the risks of current and former smokers. While ORIA identified and quantified numerous important uncertainties in the radon risk estimates, further identification, discussion, and quantification is desirable.

The final radon risk model should be made usable for assessments that require specific mixes of sex, age, and smoking status. Further, easily used tools should be provided so that the model can be used outside of ORIA to estimate radon risks for a variety of situations.

EPA-SAB-EC-ADV-99-011 **Advisory on the "White Paper on the Nature and Scope of Issues on Adoption of Model use Acceptability Criteria"**

The general approach contained in the "White Paper on the Nature and Scope of Issues on adoption of Model use Acceptability Criteria" and the specific points raised in it are very constructive. The "White Paper" can provide the basis for a more effective and consistent process of model development and application across the Agency. However, there is a lack of a common nomenclature surrounding model application and usage. The models acceptability "White Paper" could help by defining key terms, and then using these definitions consistently throughout the document as well as in its future work. In addition, the "White Paper" needs a broader view of what needs to be included for effective model development and the associated steps required for implementation. EPA can benefit greatly from targeted stakeholder participation to obtain insight into the range of applications, available data and constraints that exist in different locales throughout the U.S. EPA also needs to ensure that the public, the regulatory community and local decision-makers appreciate the role that value judgments play in the selection of a model and the way a model is used. EPA Program Offices should consider developing educational materials to assist stakeholders in the selection, understanding and use of models to address their program's mandates. Tracking model selection and model use by state and local decision-makers will provide a valuable data set to EPA regarding the efficacy of its programs. The Subcommittee supports the establishment of the Committee for Regulatory Environmental Modeling (CREM) and a model clearinghouse by the CREM. This will allow model users to document the model evaluation process to help others understand. As an additional benefit, it will allow those outside the EPA to access this information and it will provide them with an opportunity to provide feedback.

EPA-SAB-COUNCIL-ADV-99-012 **The Clean Air Act Amendments (CAAA) Section 812 Prospective Study of Costs and Benefits (1999): Advisory by the Health and Ecological Effects Subcommittee on Initial Assessments of Health and Ecological Effects; Part 1**

This HEES Advisory for the Section 812 Prospective Study of the Costs and Benefits of the Clean Air Act Amendments (CAAAs) of 1990 provides comment on the draft health and ecological assessments provided for review and the degree of uncertainty or certainty associations with the individual tasks necessary to complete the current Study. The recommendations are designed to strengthen the health and ecological assessments that will provide the basis for the cost and benefits analysis in this year's Prospective Study. The Council will review the draft Study at its meeting on July 13-14, 1999, pursuant to the requirements of the CAAA.

This Advisory also identifies gaps in information, data, and methods that need to be filled to strengthen future Prospective Studies, which the CAAA require to be submitted to Congress every two years. The study will be the first attempt at a prospective analysis. It is expected that the comprehensiveness of the analysis will increase over time, especially as further research becomes available for use in model simulations of emissions, exposure, health and ecological effects, and costs and benefits.

EPA-SAB-COUNCIL-ADV-99-013 **The Clean Air Act Amendments (CAAA) Section 812 Prospective Study of Costs and Benefits (1999): Advisory by the Air Quality Models Subcommittee on Modeling and Emissions**

This AQMS Advisory commends the Agency for the progress on developing the Prospective Study. It provides advice on three levels: (1) assumptions in the analysis, uncertainties in the results, and implications for overall conclusions that need to be more clearly discussed in the current Prospective Study; (2) changes in the general modeling approach, data bases and analysis to be used in the next prospective study; and (3) recommendations for Agency-wide review of emissions models to enhance validity not only of this 812 Prospective Study, but also other studies.

For the current Prospective Study, the AQMS recommends that the Agency describe the uncertainties associated with the analytical tools and data used and how those uncertainties could affect the air quality trends analysis and impact the cost/benefit analysis. The Subcommittee recommends that these considerations be summarized at each step in the analysis in tables that include the data and tools, their limitations, the implications of the limitations for study results, and to the extent possible, that the Agency provide an estimate of the uncertainty in the findings that result.

The AQMS recommends that future prospective studies benefit from an Agency-wide analysis of emissions modeling, use of a high quality air quality modeling system platform (such as EPA's Models-3) across the entire United States, and further exploration of more robust techniques for dealing with uncertainties in complex assessments.

COMMENTARIES

EPA-SAB-EEAC-COM-99-001 **Importance of Reinstating the Pollution Abatement and Control Expenditures (PACE) Survey**

The Environmental Economics Advisory Committee (EEAC) of the EPA Science Advisory Board (SAB) received a briefing by representatives from EPA's Office of Policy (OP) on the now discontinued Pollution Abatement and Control

Expenditures Survey which until 1994 was conducted by the Bureau of the Census. The survey has provided data for many economic reports by EPA, including the Section 812 Retrospective on Clean Air Act.Costs, the Cost of Clean, and a number of Regulatory Impact Analyses. By this Commentary, the SAB endorses the reinstitution of this Survey with the help and joint funding by various EPA offices.

EPA-SAB-EEC-COM-99-002 Waste Leachability: The Need for Review of Current Agency Procedures

The Science Advisory Board's Environmental Engineering Committee (EEC) initiated a Commentary to highlight the need to review and improve EPA's Toxicity Characteristic Leaching Procedure (TCLP). The TCLP is applied too broadly, and when used to characterize toxicity, can be improved by accounting for additional parameters. Current lawsuits support the view that EPA needs greater flexibility in waste leachate testing, and that EPA's testing needs to account for more parameters affecting actual leaching of contaminants in the field.

The current state of the science encourages the development and use of different leach tests for different applications. A leaching protocol should be both accurate and reasonably related to conditions governing leachability under actual conditions. The underlying science supports consideration of scenarios other than the municipal solid waste scenario on which the TCLP currently relies for determining waste toxicity characteristic. When leach testing is applied in a regulatory program to characterize toxicity, it may be appropriate for the leaching protocol to be waste-specific within the context of one or more accepted generic worst-case mismanagement scenarios.

The Committee's single most important recommendation is that EPA improve leach test procedures, validate them in the field, and then implement them. The Committee recognizes the difficulty of developing different leach tests for different applications while at the same time retaining sufficient consistency and commonality to be both workable and logical. Maximum use should be made of a conceptual model followed by an analogue model with good statistical rigor.

EPA-SAB-EEC-COM-99-003 Environmental Impacts of Natural Hazards: The Need for Agency Action

The Environmental Engineering Committee of the EPA Science Advisory Board (SAB) recommends that EPA develop programs to deal with environmental impacts of natural hazards and their effects, including human health. The Committee first raised this issue in its 1995 report *Future Issues in Environmental Engineering* (SAB, 1995).

The Agency can reasonably expect that natural hazards will continue to occur, that there will be impacts on the environment and human health, and that it is possible, in general, to both anticipate the ramifications of extreme events to prevent or reduce them. The Committee therefore recommends that Agency expand its activities to reduce environmental impacts of natural hazards. A range of options is available to the Agency including research, communication, education, guidance, permit requirements, etc. EPA should continue collaborating with other government programs.

Because of EPA's expertise and compatibility with existing elements of EPA's research, the Committee recommends that EPA lead research on the assessment and mitigation of environmental impacts arising from natural hazards. The Agency might find it useful to develop hazard zoning schemes in which environmental sensitivity is a key parameter, for example, or develop revised design methodologies to cover the reliability of structures in hazard-prone locations. Such methodologies could be connected and extended to ecosystem and human health risk assessments through estimates of probable contaminant release quantities and concentrations and their effects.

EPA-SAB-EEC-COM-99-004

Commentary on the Need for Research on Risk Reduction Options for Particulate Matter PM2.5

In this commentary, the Environmental Engineering Committee of the Science Advisory Board recommends that research on options for reducing risks from Particulate Matter 2.5 ($PM_{2.5}$) be conducted in parallel with research on the relationship of $PM_{2.5}$ to health effects. The time needed to test and evaluate a risk reduction option depends upon the nature of the option, the opportunities for testing it, and the quality & quantity of the data needed for decision-making. For some options, the time between the decision to evaluate and the availability of the results may be measured in years. Therefore, research on a limited number of promising options will improve the scientific basis for regulatory decision making and associated technical support programs to address both primary and secondary particulate matter standards.

The Agency has initiated source control research and the Committee encourages research on an expanded range of options. Research planning should consider a number of hypotheses about the sources of risk and various options for intervention (such as control technology, pollution prevention, and market incentives). The following research themes are examples of those that could be considered:

a) Approaches that enhance and explore technologies which capture particles and which can capture both primary particles and secondary particulate matter precursors.

b) Development of source-specific "chemical fingerprints" to better understand contributions of specific sources to atmospheric concentrations of $PM_{2.5}$.

c) The linkage between source processes (e.g., combustion conditions, secondary $PM_{2.5}$ formation) and composition of $PM_{2.5}$.

F3 SAB REPORTS AND THE INTERNET

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The Science Advisory Board is concerned that its advice be accurate, useful, and timely. Accuracy is addressed through the qualified and balanced Panels that conduct the reviews. Usefulness is measured, in part, by the degree to which the Panels complete the Charge, i.e., the list of questions that guide the review. Timeliness depends on a number of factors including the complexity of the issue, size of the SAB Panel and report, and the capacity of the SAB process (members and staff) to focus on the report.

In FY 1994 the SAB adopted as a measure of timeliness the length of time that transpires from the last public meeting on an issue (some issues may require more than one such meeting) until the final report is transmitted to the Administrator. This time period is referred to as "time-to-completion (TOC)". For most reports (those of the Council and CASAC being the exceptions) this time period can be divided into two segments:

Segment 1: The time from the last public meeting until approval by the Executive Committee (EC). This period is devoted to drafting the report and reaching Committee consensus on its content.

Segment 2: The time from approval by the EC until the transmission of final report to the Administrator. During this period of time, the DFO and Committee Chair address generally minor concerns raised by the Executive Committee that has formally approved the report, sometimes subject to final approval by members who are designated to vet the report on behalf of the entire EC.

In FY 1995 the SAB reached its self-proclaimed goal of a TOC averaging no more than six months. Hence, in keeping with the tenants of Total Quality Management (TQM), the Board announced another timeliness goal: an average TOC of no more than 4 months.

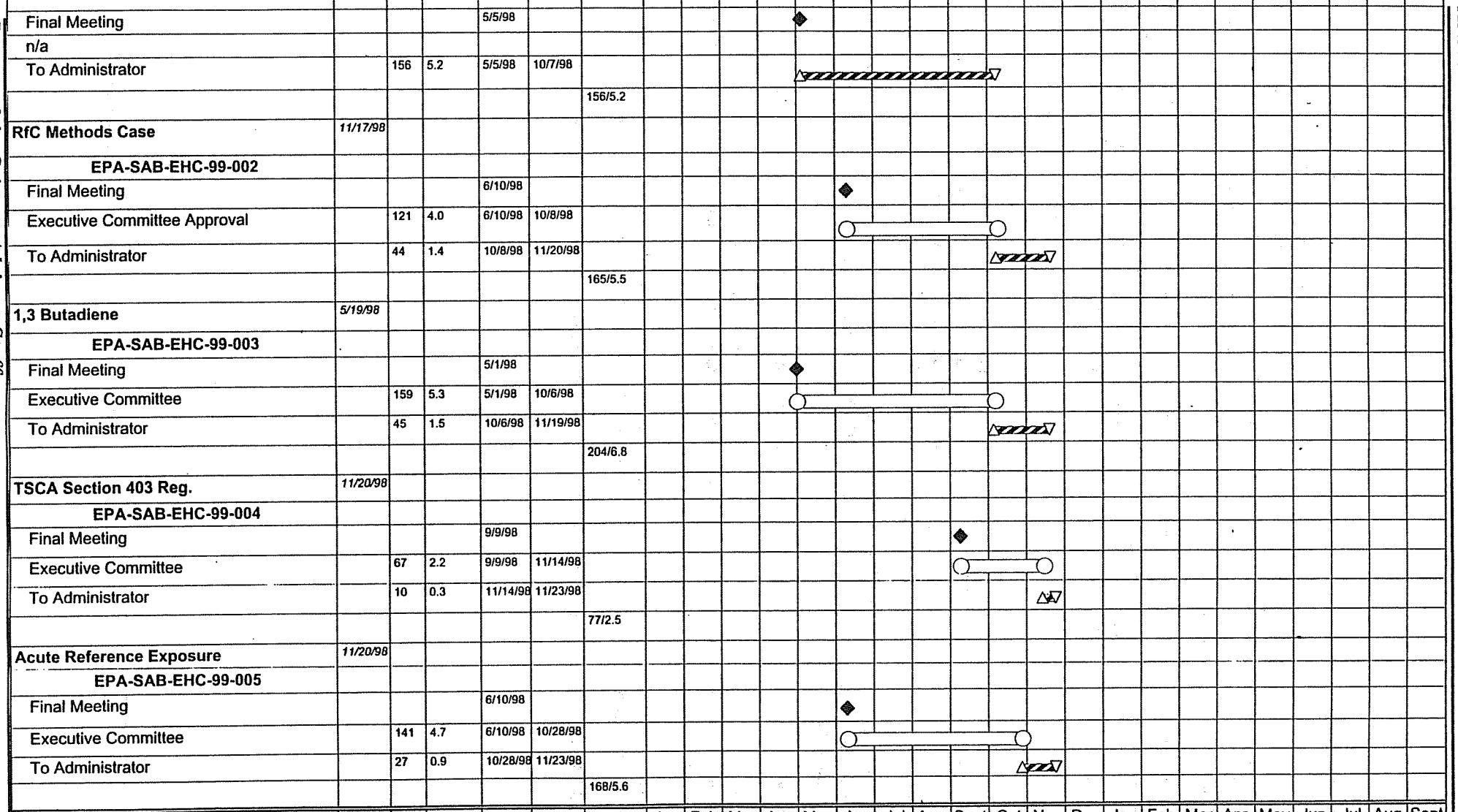
The TOC data for FY 1999 are displayed in Charts, in text/numerical form, and in graphical form.

Note that the data from the Council and CASAC consist of only a single figure; i.e., the time from the public meeting to the time of transmission to the Administrator. These two Committees are separately chartered and report directly to the Administrator, without having to past through the EC.

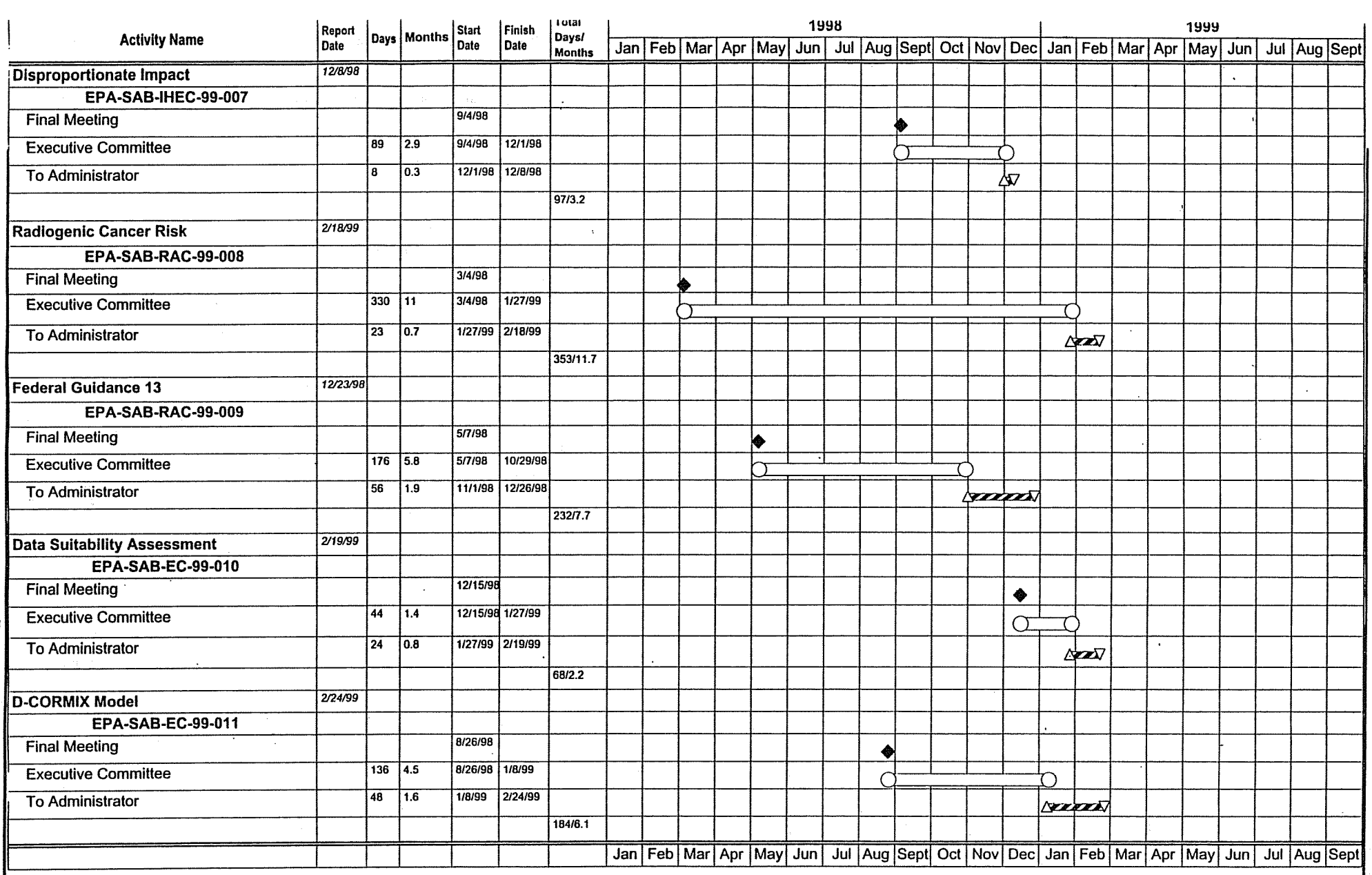
This year, we are continuing our efforts to improve our time to completion for SAB Reports. The full report average of time to completion falls to approximately 4.8 months. The time to complete letter reports was 3.2 months.

Please note: CASAC and Council reports (as well as the review of the IRP) do not have an EC approval requirement.

Activity Name	Report Date	Days	Months	Start Date	Finish Date	Days/ Months
FULL REPORTS						
Diesel Health Assessment	*10/1/98*					
EPA-SAB-CASAC-99-001						
Final Meeting				5/5/98		
n/a						
To Administrator		156	5.2	5/5/98	10/7/98	
						156/5.2
RfC Methods Case	*11/17/98*					
EPA-SAB-EHC-99-002						
Final Meeting				6/10/98		
Executive Committee Approval		121	4.0	6/10/98	10/8/98	
To Administrator		44	1.4	10/8/98	11/20/98	
						165/5.5
1,3 Butadiene	*5/19/98*					
EPA-SAB-EHC-99-003						
Final Meeting				5/1/98		
Executive Committee		159	5.3	5/1/98	10/6/98	
To Administrator		45	1.5	10/6/98	11/19/98	
						204/6.8
TSCA Section 403 Reg.	*11/20/98*					
EPA-SAB-EHC-99-004						
Final Meeting				9/9/98		
Executive Committee		67	2.2	9/9/98	11/14/98	
To Administrator		10	0.3	11/14/98	11/23/98	
						77/2.5
Acute Reference Exposure	*11/20/98*					
EPA-SAB-EHC-99-005						
Final Meeting				6/10/98		
Executive Committee		141	4.7	6/10/98	10/28/98	
To Administrator		27	0.9	10/28/98	11/23/98	
						168/5.6



Activity Name	Report Date	Days	Months	Start Date	Finish Date	Total Days/ Months
Disproportionate Impact	*12/8/98*					
EPA-SAB-IHEC-99-007						
Final Meeting				9/4/98		
Executive Committee		89	2.9	9/4/98	12/1/98	
To Administrator		8	0.3	12/1/98	12/8/98	
						97/3.2
Radiogenic Cancer Risk	*2/18/99*					
EPA-SAB-RAC-99-008						
Final Meeting				3/4/98		
Executive Committee		330	11	3/4/98	1/27/99	
To Administrator		23	0.7	1/27/99	2/18/99	
						353/11.7
Federal Guidance 13	*12/23/98*					
EPA-SAB-RAC-99-009						
Final Meeting				5/7/98		
Executive Committee		176	5.8	5/7/98	10/29/98	
To Administrator		56	1.9	11/1/98	12/26/98	
						232/7.7
Data Suitability Assessment	*2/19/99*					
EPA-SAB-EC-99-010						
Final Meeting				12/15/98		
Executive Committee		44	1.4	12/15/98	1/27/99	
To Administrator		24	0.8	1/27/99	2/19/99	
						68/2.2
D-CORMIX Model	*2/24/99*					
EPA-SAB-EC-99-011						
Final Meeting				8/26/98		
Executive Committee		136	4.5	8/26/98	1/8/99	
To Administrator		48	1.6	1/8/99	2/24/99	
						184/6.1



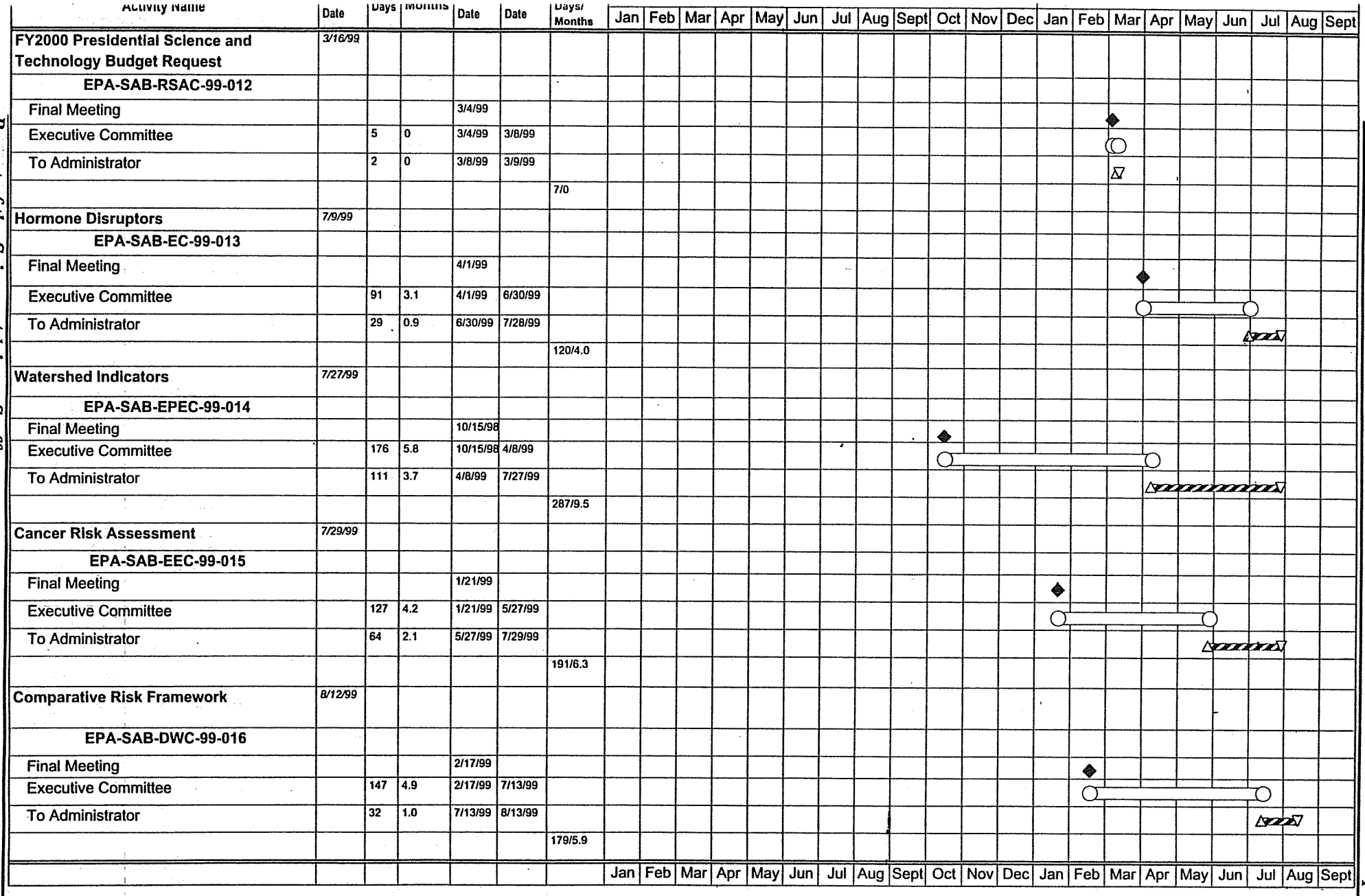
Legend

Final Meeting

Amount of days from last public meeting until EC Approval

Number of days from EC approval until transmittal

Activity Name	Date	Days	Months	Date	Date	Days/ Months
FY2000 Presidential Science and Technology Budget Request	3/16/99					
EPA-SAB-RSAC-99-012						
Final Meeting				3/4/99		
Executive Committee		5	0	3/4/99	3/8/99	
To Administrator		2	0	3/8/99	3/9/99	
						7/0
Hormone Disruptors	7/9/99					
EPA-SAB-EC-99-013						
Final Meeting				4/1/99		
Executive Committee		91	3.1	4/1/99	6/30/99	
To Administrator		29	0.9	6/30/99	7/28/99	
						120/4.0
Watershed Indicators	7/27/99					
EPA-SAB-EPEC-99-014						
Final Meeting				10/15/98		
Executive Committee		176	5.8	10/15/98	4/8/99	
To Administrator		111	3.7	4/8/99	7/27/99	
						287/9.5
Cancer Risk Assessment	7/29/99					
EPA-SAB-EEC-99-015						
Final Meeting				1/21/99		
Executive Committee		127	4.2	1/21/99	5/27/99	
To Administrator		64	2.1	5/27/99	7/29/99	
						191/6.3
Comparative Risk Framework	8/12/99					
EPA-SAB-DWC-99-016						
Final Meeting				2/17/99		
Executive Committee		147	4.9	2/17/99	7/13/99	
To Administrator		32	1.0	7/13/99	8/13/99	
						179/5.9



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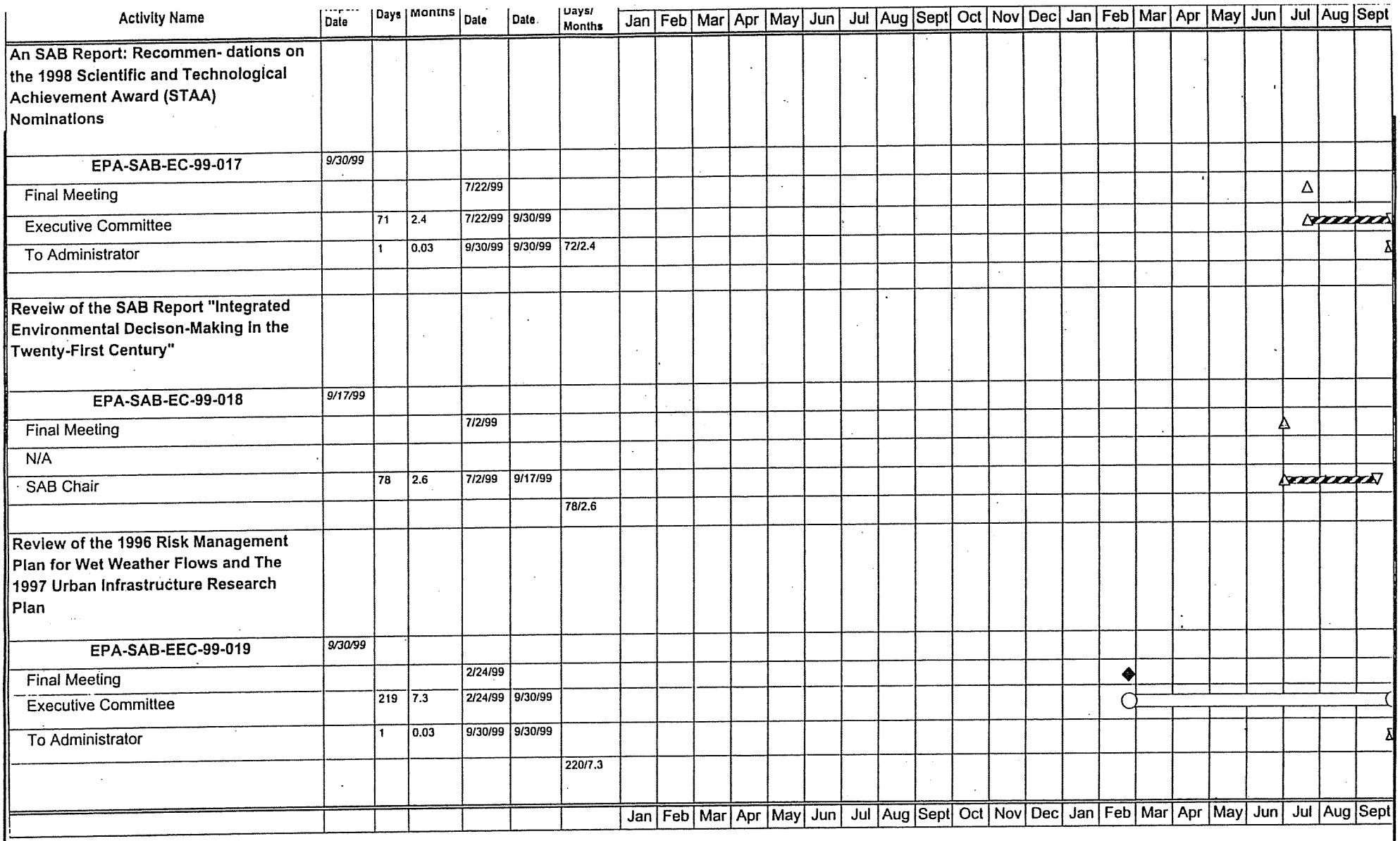
Final Meeting

Amount of days from last public meeting until EC Approval

Number of days from EC approval until transmittal

Activity Name	Date	Days	Months	Date	Date	Days/ Months
An SAB Report: Recommen- dations on the 1998 Scientific and Technological Achievement Award (STAA) Nominations						
EPA-SAB-EC-99-017	*9/30/99*					
Final Meeting				7/22/99		
Executive Committee		71	2.4	7/22/99	9/30/99	
To Administrator		1	0.03	9/30/99	9/30/99	72/2.4
Reveiw of the SAB Report "Integrated Environmental Decison-Making in the Twenty-First Century"						
EPA-SAB-EC-99-018	*9/17/99*					
Final Meeting				7/2/99		
N/A						
SAB Chair		78	2.6	7/2/99	9/17/99	
						78/2.6
Review of the 1996 Risk Management Plan for Wet Weather Flows and The 1997 Urban Infrastructure Research Plan						
EPA-SAB-EEC-99-019	*9/30/99*					
Final Meeting				2/24/99		
Executive Committee		219	7.3	2/24/99	9/30/99	
To Administrator		1	0.03	9/30/99	9/30/99	
						220/7.3



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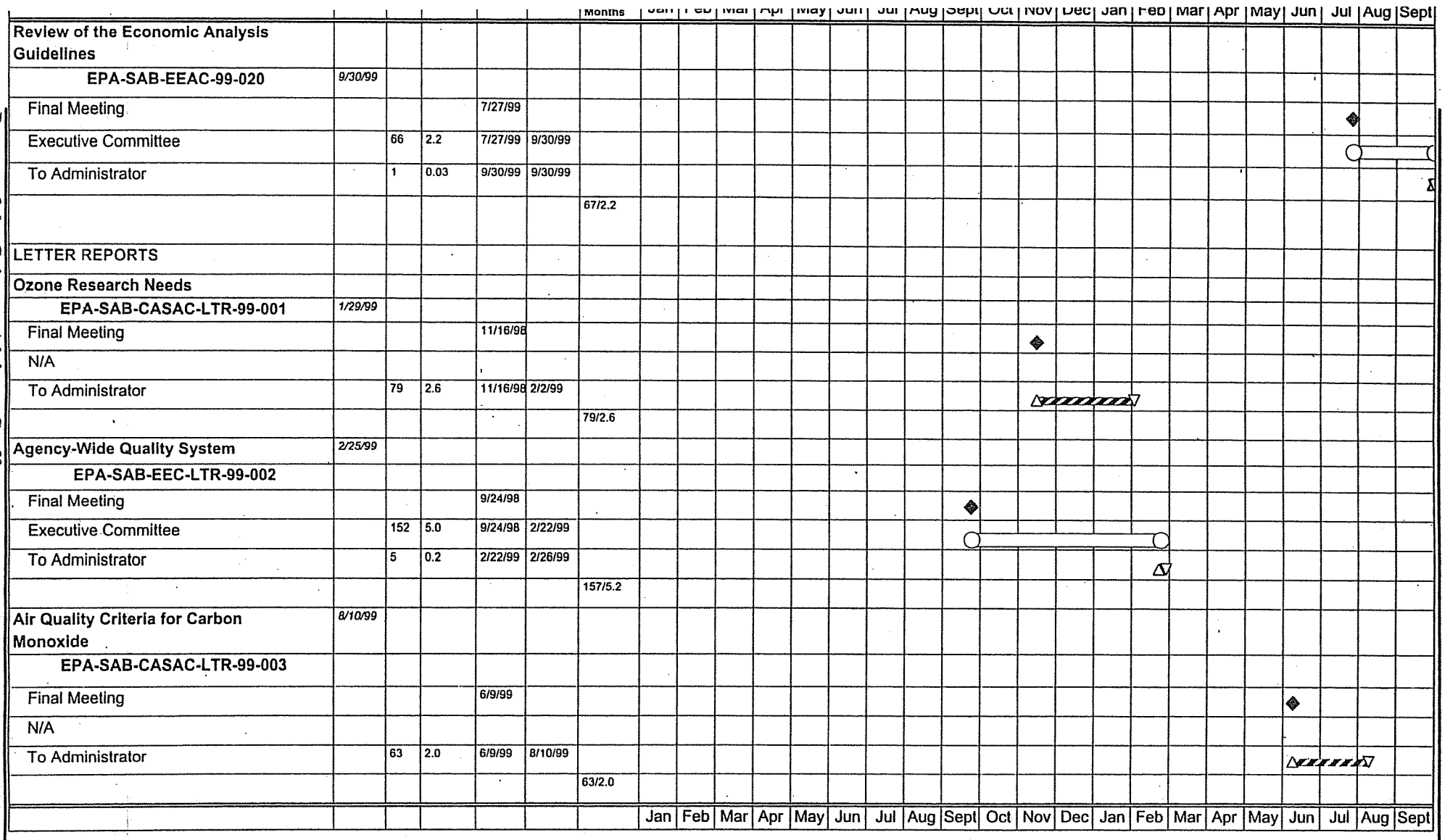
Final Meeting

Amount of days from last public meeting until EC Approval

Number of days from EC approval until transmittal

						Months
Review of the Economic Analysis Guidelines						
EPA-SAB-EEAC-99-020	9/30/99					
Final Meeting				7/27/99		
Executive Committee		66	2.2	7/27/99	9/30/99	
To Administrator		1	0.03	9/30/99	9/30/99	
						67/2.2
LETTER REPORTS						
Ozone Research Needs						
EPA-SAB-CASAC-LTR-99-001	1/29/99					
Final Meeting				11/16/98		
N/A						
To Administrator		79	2.6	11/16/98	2/2/99	
						79/2.6
Agency-Wide Quality System	2/25/99					
EPA-SAB-EEC-LTR-99-002						
Final Meeting				9/24/98		
Executive Committee		152	5.0	9/24/98	2/22/99	
To Administrator		5	0.2	2/22/99	2/26/99	
						157/5.2
Air Quality Criteria for Carbon Monoxide	8/10/99					
EPA-SAB-CASAC-LTR-99-003						
Final Meeting				6/9/99		
N/A						
To Administrator		63	2.0	6/9/99	8/10/99	
						63/2.0



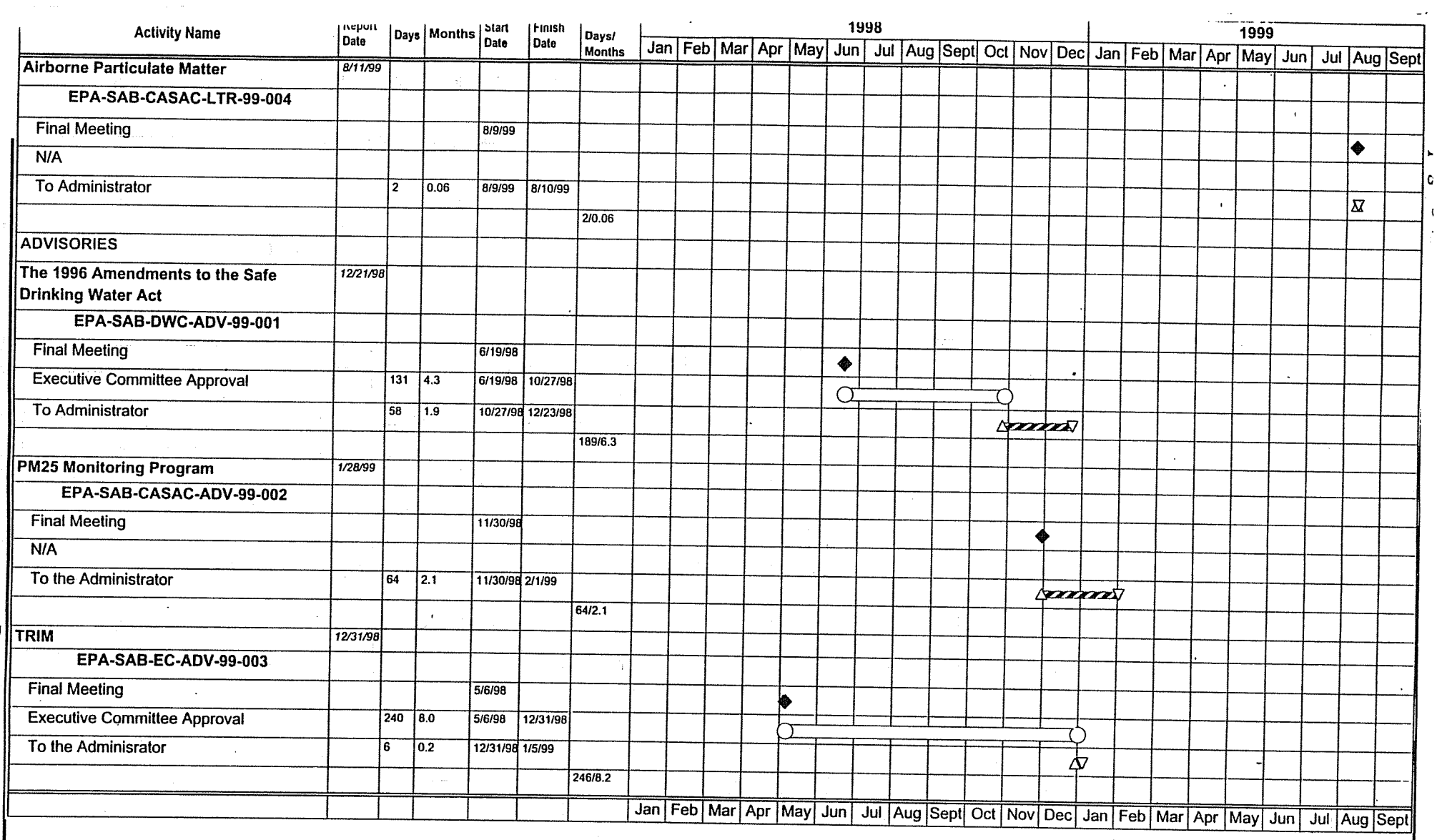
Legend

Final Meeting

Amount of days from last public meeting until EC Approval

Number of days from EC approval until transmittal

Activity Name	Report Date	Days	Months	Start Date	Finish Date	Days/ Months
Airborne Particulate Matter	*8/11/99*					
EPA-SAB-CASAC-LTR-99-004						
Final Meeting				8/9/99		
N/A						
To Administrator		2	0.06	8/9/99	8/10/99	
						2/0.06
ADVISORIES						
The 1996 Amendments to the Safe Drinking Water Act	*12/21/98*					
EPA-SAB-DWC-ADV-99-001						
Final Meeting				6/19/98		
Executive Committee Approval		131	4.3	6/19/98	10/27/98	
To Administrator		58	1.9	10/27/98	12/23/98	
						189/6.3
PM25 Monitoring Program	*1/28/99*					
EPA-SAB-CASAC-ADV-99-002						
Final Meeting				11/30/98		
N/A						
To the Administrator		64	2.1	11/30/98	2/1/99	
						64/2.1
TRIM	*12/31/98*					
EPA-SAB-EC-ADV-99-003						
Final Meeting				5/6/98		
Executive Committee Approval		240	8.0	5/6/98	12/31/98	
To the Adminisrator		6	0.2	12/31/98	1/5/99	
						246/8.2



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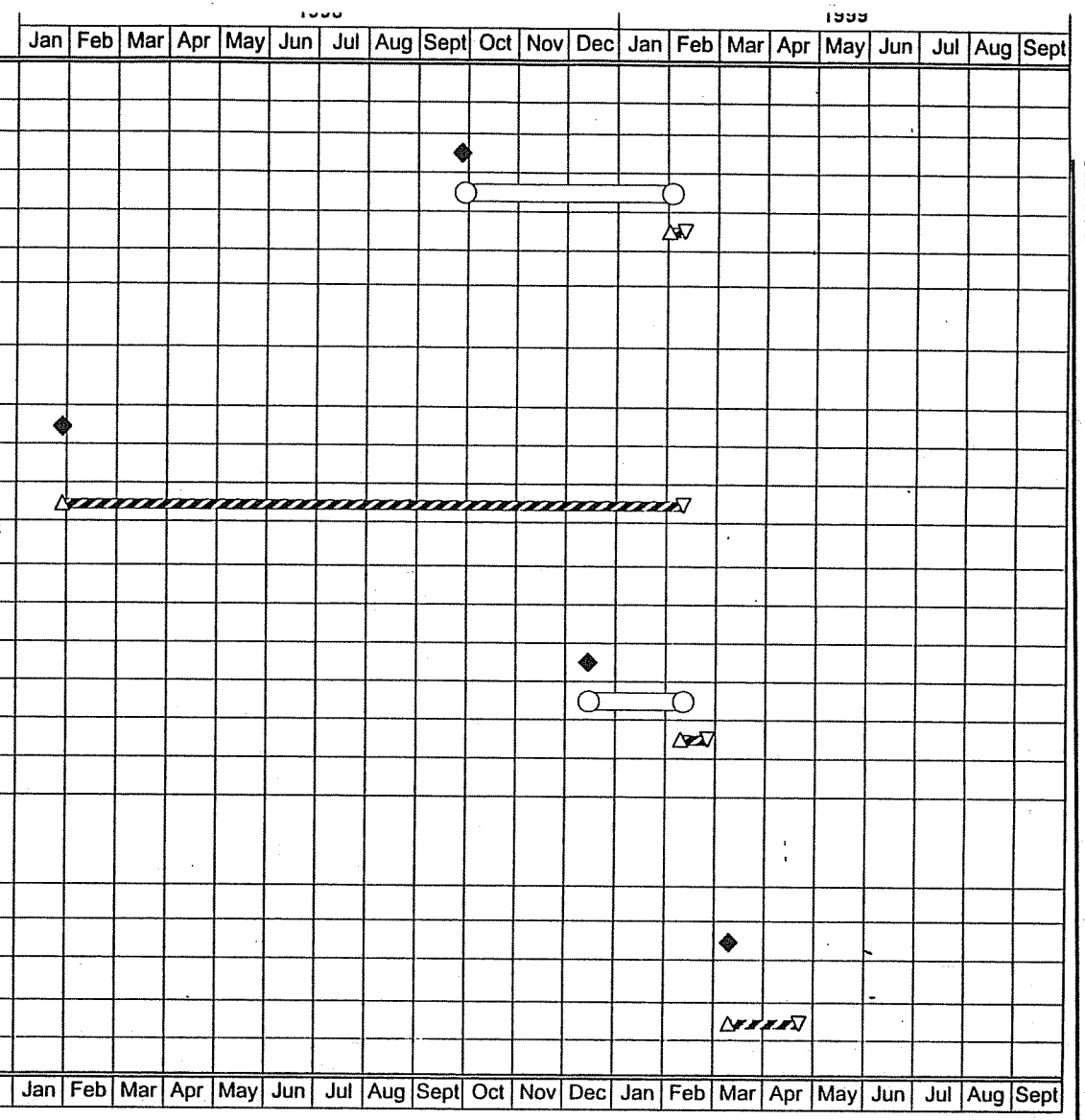
Final Meeting

Amount of days from last public meeting until EC Approval

Number of days from EC approval until transmittal

Activity Name	Report Date	Days	Months	Start Date	Finish Date	Days/ Months
NHEXAS	2/9/99					
EPA-SAB-IHEC-ADV-99-004						
Final Meeting				9/27/98		
Executive Committee Approval		127	4.2	9/29/98	2/2/99	
To the Administrator		9	0.3	2/2/99	2/10/99	
						136/4.5
Section 812 Prospective Study	2/10/99					
EPA-SAB-COUNCIL-ADV-99-005						
Final Meeting				1/30/98		
N/A						
To the Administrator		377	12.5	1/30/98	2/10/99	
						377/12.5
Radionuclide Releases	2/22/99					
EPA-SAB-RAC-ADV-99-006						
Final Meeting				12/15/98		
Executive Committee Approval		58	1.9	12/15/98	2/10/99	
To the Administrator		15	0.5	2/10/99	2/24/99	
						73/2.4
Trade-offs Between Instituting Indoor Air Quality and Energy Coils	4/22/99					
EPA-SAB-IHEC-ADV-99-007						
Final Meeting				3/10/99		
Executive Committee Approval						
To the Administrator		44	1.4	3/10/99	4/22/99	
						44/1.4



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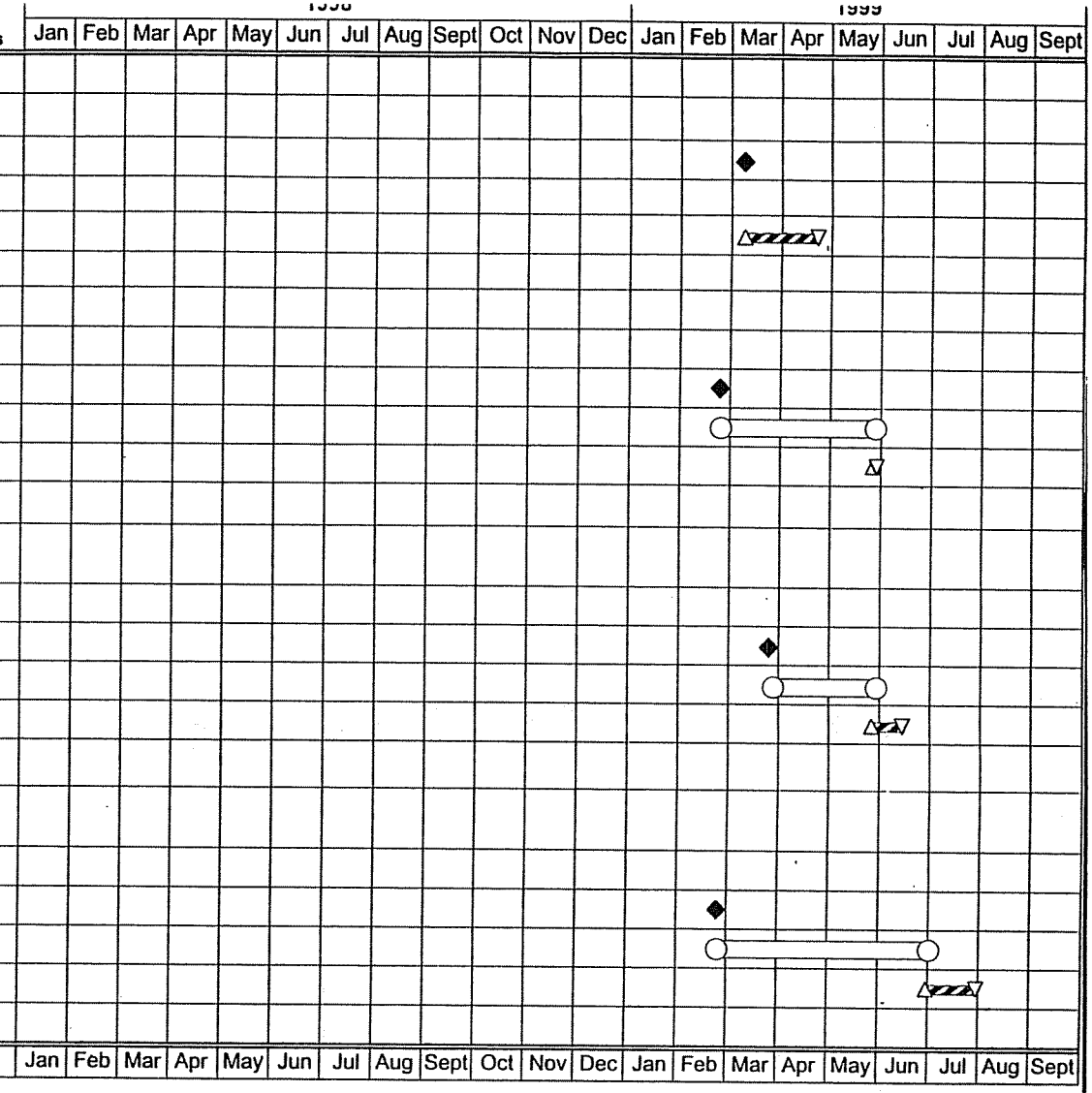
Final Meeting

Amount of days from last public meeting until EC Approval

Number of days from EC approval until transmittal

Activity Name	Report Date	Days	Months	Start Date	Finish Date	Days/ Months
BASE Study	*4/22/99*					
EPA-SAB-IHEC-ADV-99-008						
Final Meeting				3/9/99		
Executive Committee Approval						
To the Administrator		45	1.5	3/9/99	4/22/99	
						45/1.5
CREM	*6/7/99*					
EPA-SAB-EC-ADV-99-009						
Final Meeting				2/24/99		
Executive Committee Approval		93	3.1	2/24/99	5/27/99	
To the Administrator		3	0.1	5/27/99	5/29/99	
						96/3.2
Assessing Risks from Indoor Radon	*7/14/99*					
EPA-SAB-RAC-ADV-99-010						
Final Meeting				3/26/99		
Executive Committee Approval		63	2.1	3/28/99	5/29/99	
To the Administrator		19	0.6	5/27/99	6/14/99	
						82/2.7
Adoption of Model Use Acceptability Criteria	*7/29/99*					
EPA-SAB-EC-ADV-99-011						
Final Meeting				2/24/99		
Executive Committee Approval		127	4.2	2/24/99	6/30/99	
To the Administrator		31	1.0	6/30/99	7/30/99	
						158/5.2



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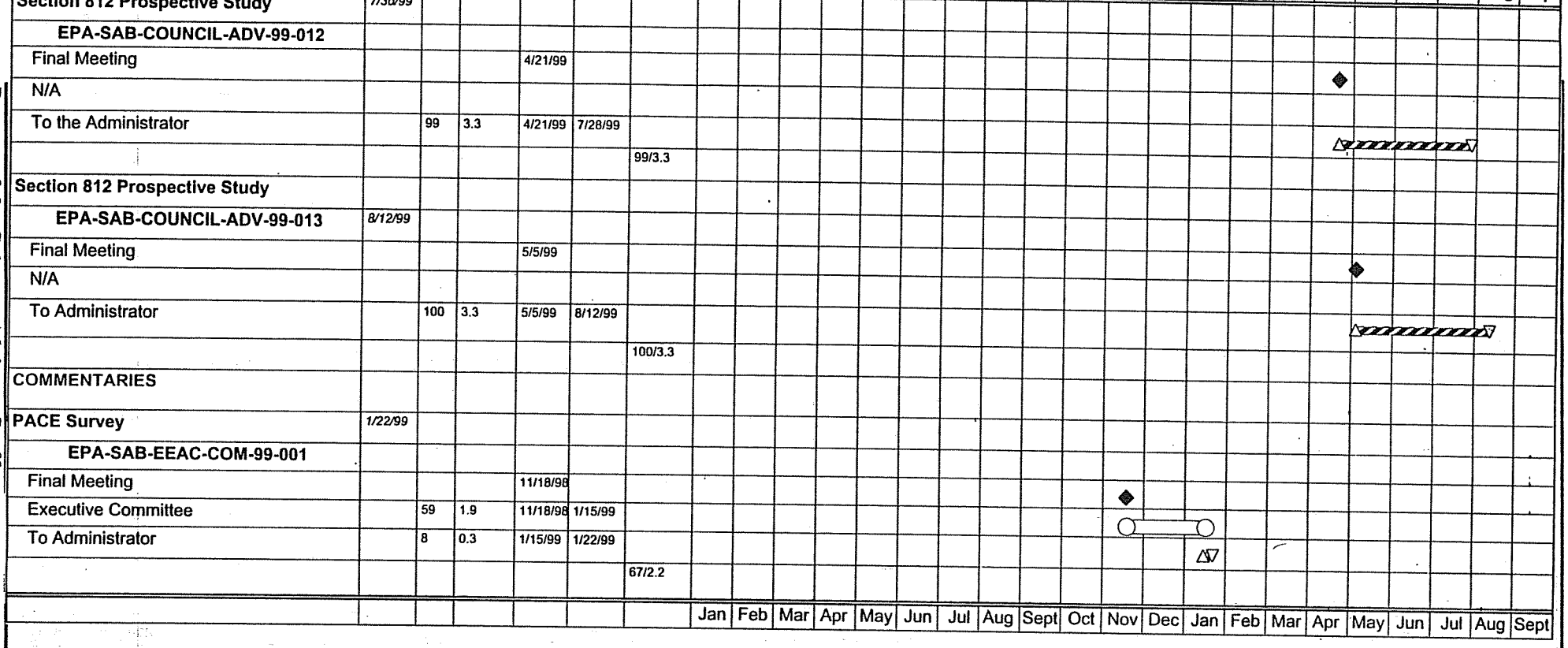
Final Meeting

Amount of days from last public meeting until EC Approval

Number of days from EC approval until transmittal

Activity Name	Report Date	Days	Months	Start Date	Finish Date	Days/ Months
Section 812 Prospective Study	7/30/99					
EPA-SAB-COUNCIL-ADV-99-012						
Final Meeting				4/21/99		
N/A						
To the Administrator		99	3.3	4/21/99	7/28/99	
						99/3.3
Section 812 Prospective Study						
EPA-SAB-COUNCIL-ADV-99-013	8/12/99					
Final Meeting				5/5/99		
N/A						
To Administrator		100	3.3	5/5/99	8/12/99	
						100/3.3
COMMENTARIES						
PACE Survey	1/22/99					
EPA-SAB-EEAC-COM-99-001						
Final Meeting				11/18/98		
Executive Committee		59	1.9	11/18/98	1/15/99	
To Administrator		8	0.3	1/15/99	1/22/99	
						67/2.2



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Final Meeting

Amount of days from last public meeting until EC Approval

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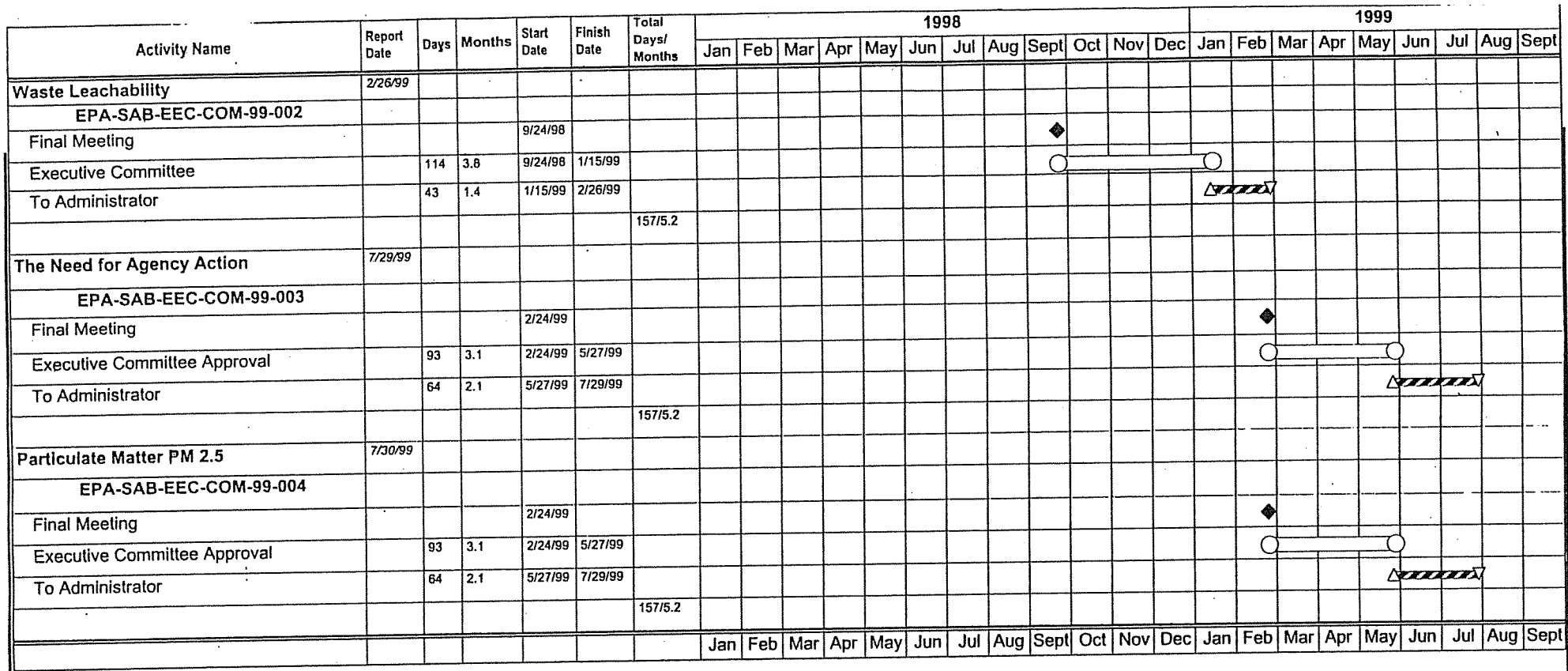
Activity Name	Report Date	Days	Months	Start Date	Finish Date	Total Days/ Months
Waste Leachability	2/26/99					
EPA-SAB-EEC-COM-99-002						
Final Meeting				9/24/98		
Executive Committee		114	3.8	9/24/98	1/15/99	
To Administrator		43	1.4	1/15/99	2/26/99	
						157/5.2
The Need for Agency Action	7/29/99					
EPA-SAB-EEC-COM-99-003						
Final Meeting				2/24/99		
Executive Committee Approval		93	3.1	2/24/99	5/27/99	
To Administrator		64	2.1	5/27/99	7/29/99	
						157/5.2
Particulate Matter PM 2.5	7/30/99					
EPA-SAB-EEC-COM-99-004						
Final Meeting				2/24/99		
Executive Committee Approval		93	3.1	2/24/99	5/27/99	
To Administrator		64	2.1	5/27/99	7/29/99	
						157/5.2



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APPENDIX H
BIOGRAPHICAL SKETCHES OF THE SENIOR STAFF MEMBERS

Staff Director	Dr. Donald G. Barnes
Special Assistants	Ms. Anne Barton
Deputy Staff Director	Dr. John R. Fowle III
Team Leader, Committee Operations Staff	Mr. A. Robert Flaak
Designated Federal Officers	Mrs. Kathleen Conway Ms. Roslyn Edson Dr. K. Jack Kooyoomjian Ms. Karen Martin Mr. Tom Miller Ms. Angela Nugent Mr. Samuel Rondberg Ms. Stephanie Sanzone
Management Assistants	Ms. Dorothy Clark Ms. Wanda Fields Ms. Diana Pozun Ms. Priscilla Tillery-Gadson Ms. Mary Winston
NOWCC Office Assistant	Ms. Betty Fortune

DR. DONALD G. BARNES
Staff Director
Designated Federal Official for the Executive Committee

DR. DONALD G. BARNES assumed his position as Staff Director in 1988. Since arriving, he has overseen a 25% growth in the Committees of the Board and a 50% increase in the membership of the Board. During his tenure the Board has completed four major de novo reports [Future Risk (1988), Reducing Risk (1990), Beyond the Horizon (1995), and Integrated Decisionmaking (1999)] and two self-studies (1989 and 1994), in addition to more than 300 reports to the Administrator.

Dr. Barnes is active in Agency-wide issues associated with science and risk assessment. For example, he serves on the Administrator's Science Policy Council and on the Steering committee for the Council.

Dr. Barnes came to the SAB following 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, the implementation of Section 5 of TSCA, and "dioxin", for which he received two EPA Gold Medals for Superior Service.

He has been active in the area of risk assessment for nearly two decades as practitioner, reviewer and instructor. For example, he participated in the White House's Office of Science and Technology Policy-led effort to produce a consensus view of cancer in the Federal government; i.e., Cancer Principles. He has been was active in the writing of a number of the Agency's risk assessment guide-lines; e.g., for cancer and for mixtures. In a tangential activity he has worked with the government of Bulgaria to inculcate risk-based decision making in their emerging environmental protection program, both at the ministry and regional levels. He is on the editorial staff of a peer-review journal and serves as a reviewer for a second risk-related journal.

Prior to coming to EPA, Dr. Barnes was Associate Professor and Science Division Chair at St. Andrews Presbyterian College in North Carolina. His formal education includes a BA (chemistry) from the College of Wooster, a PhD (physical chemistry, with a minor in physics) from the Institute of Molecular Biophysics at Florida State University, and subsequent graduate courses in several health-related areas; i.e., pharmacology, toxicology, immunology and epidemiology.

His real world education continues to be provided by Dr. Karen K. Barnes and their two sons.

DR. JOHN R. "JACK" FOWLE III
Deputy Staff Director

DR. JACK FOWLE joined the staff as Deputy Director in September 1995. In addition to duties with the SAB staff, Dr. Fowle is interested in the use of science to inform policy and works with the Agency's Science Policy Council, cochairing efforts to implement EPA's Risk Characterization Policy. He is also a member of the Agency's Risk Assessment Forum(RAF), and he chairs the Public Policy Committee for the Society for Risk Analysis.

Dr. Fowle was detailed from EPA to the U.S. Senate as Senator Daniel Patrick Moynihan's Science Advisor from January 1992 until December 1994. While focusing on environmental legislation, he provided advice to the Senator and to the Senate Committee on Environment and Public Works on a wide range of issues. He was the principal staff person working on Senator Moynihan's risk bills in the 102nd and 103rd Congresses.

Before joining Senator Moynihan's staff, Dr. Fowle spent three years in Research Triangle Park, NC as Associate Director of EPA's Health Effects Research Laboratory. He planned and managed EPA's Drinking Water Health Research Program, and coordinated EPA's R&D work efforts with the World Health organization.

Dr. Fowle first came to EPA in 1979 when he joined ORD's Carcinogen Assessment Group, and has served in a variety of other capacities since then. He managed the development of EPA's initial Biotechnology Research Program in 1983 and 1984 and was subsequently detailed to Congressman Gore's Investigation and Oversight Subcommittee, Committee on Science and Technology, as a Science Advisor on Biotechnology issues. He directed the Environmental Health Research staff of the Office of Health Research in ORD at EPA headquarters from 1985 to 1987, and was Health Advisor to EPA's Assistant Administrator for Research & Development in 1988 and 1989, and in 1995.

Dr. Fowle received both his baccalaureate and doctoral degrees in genetics from George Washington University in Washington, DC.

Dr. Fowle, a resident of Washington, DC, is an amateur musician. As a member of the BOOGAG ("Bunch of Old Guys and Gals") bicycle riding club puts in 40 to 60 miles each weekend climbing the hills of western Maryland, northern Virginia and southern Pennsylvania. "It's not a ride unless you climb over 1800 feet." His daughter, Eliza, is a junior at Smith College.

MS. ANNE BARTON
Special Assistant to the Staff Director

MS. ANNE BARTON was on detail to the SAB from November 1996 to March, 1999, when she retired from federal service. She worked primarily on the futures project and the SAB strategic plan and its follow-up, but has also served as DFO for the Endocrine Disruptors panel and the Secondary Data Use Subcommittee.

Ms. Barton has long taken an interest in the science/policy interface in regulatory agencies, particularly in the area of ecological risk. During her last year with EPA, she served as co-chair of an Agency workgroup which is developing guidance for EPA risk managers to help them set ecological objectives. She is continuing to contribute to that project during her retirement.

Ms. Barton came to EPA in 1975 and spent most of her EPA career in the Office of Pesticide Programs. She lives in northwest DC with her husband, two cats, a lot of goldfish and some frogs.

MR. A. ROBERT FLAAK
Team Leader, Committee Operations Staff; Designated Federal Officer for the Clean Air Scientific Advisory Committee

MR. A. ROBERT FLAAK served as the Board's Assistant Staff Director from 1991 through 1995. Under the current staff reorganization, he serves as the Team Leader of the Committee Operations Staff of the Board and as Designated Federal Official for one committee. Mr. Flaak was first associated with the Science Advisory Board (SAB) in 1978 when he became the DFO for the Clean Air Scientific Advisory Committee (CASAC) when the committee was first chartered. Since then he has been the DFO for the following SAB committees: CASAC (1978-1979; 1984-1991; 1995-present); Indoor Air Quality/Total Human Exposure Committee (now the Integrated Human Exposure Committee) (1986-1993); Drinking Water Committee (1991-1993; 1995); ad hoc Industrial Excess Landfill (IEL) Panel (1992-95); Environmental Futures Committee (1993-1995); Research Strategies Advisory Committee (1995-1998), and a host of SAB subcommittees and working groups involved with issues such as global climate, biotechnology and reducing risk.

In addition to his duties with the Board, Mr. Flaak has continued his part-time detail to the Agency's Science Policy Council as a member of the Agency's Peer Review Advisory Group, providing oversight to EPA on the implementation of its peer review policy. As part of that peer review process oversight, the Agency published the new EPA Peer Review Handbook which was coauthored by Mr. Flaak. For his efforts on peer review, Mr. Flaak was awarded The EPA Bronze Medal in 1999. Since 1988 Mr. Flaak has assisted the General Services Administration (GSA) in the development and presentation of its National training course on Federal Advisory Committee Act (FACA) Management. Along the way he has helped teach over 1500 Federal workers how to run Federal Advisory Committees legally and effectively. Mr. Flaak also has conducted training on FACA and peer review for other Federal agencies including the Office of Government Ethics, Centers for Disease Control, National Institutes for Health, Bureau of Land Management, and the US Forest Service.

Mr. Flaak's academic training is in biological oceanography. He graduated from the City College of New York (BS, Zoology); University of Delaware's Graduate College of Marine Studies (MS, Marine Studies); and Central Michigan University (MA, Public Administration). He has taken other graduate level environment and management courses and has over 20 years of experience as a trainer. He has developed national environmental policy for bridge construction and highway modifications with the Department of Transportation; designed oceanographic surveys and coordination field sampling, laboratory analysis and data analysis and interpretation as Staff Marine Biologist with an engineering consulting firm; conducted original research on phytoplankton dynamics and was a consulting Marine Taxonomist for clients including Du Pont, Roy F. Weston, Inc., and the University of Delaware.

Mr. Flaak was a member of the US Army Reserves from 1966-1995. He retired in 1995 after 29 years including wartime service in South Vietnam in 1968-69, and in Saudi Arabia, Kuwait and Iraq during Operation Desert Storm in 1990-91. He lives in Clifton, Virginia with his wife Dottie, their 14 year old son Chris, and their dog Jennie.

MS. KATHLEEN CONWAY
Designated Federal Official for the Environmental Engineering Committee

MS. KATHLEEN WHITE 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. Her work as sanitary engineer -- first for the Massachusetts Department of Public Health and later for U. S. Environmental Protection Agency's Region I -- involved inspecting and trouble shooting problems with water supplies, landfills, and wastewater treatment plants. She also reviewed plans, assisted with outbreak investigations, proposed and provided training. During this time she chaired the Boston Section of the Society of Women Engineers.

Ms. Conway left field work in New England for EPA Headquarters in Washington, D.C. Her subsequent service as acting Director for two divisions in the Office of Health Research led 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. After returning to EPA, she joined the Science Advisory Board staff as Deputy Director.

In 1989, after deciding to work less and enjoy life more, she resigned as Deputy. She continued to work part-time as a Designated Federal Officer and has supported the Environmental Engineering Committee as DFO since 1993. She is a visual arts volunteer for Arlington County where she lives with her three sons, two ferrets, elderly rabbit and chow.

DR. K. JACK KOOYOOMJIAN
Designated Federal Official for the Clean Air Act Compliance Analysis Council and the Radiation Advisory Committee

DR. JACK KOOYOOMJIAN joined the Science Advisory Board (SAB) in July, 1988 as Designated Federal Official (DFO) of the Environmental Engineering Committee (EEC). In 1993, he transitioned to the Radiation Advisory Committee (RAC). In January of 1994, he also served concurrently as DFO of the Advisory Council on Clean Air Compliance Analysis (Council) through March of 1999. He brings to his work at the SAB over 29 years of engineering and professional experience with environmental issues, including over 25 years of diverse experience within EPA Headquarters.

In the mid-1970's he worked in the Office of Solid Waste (OSW), 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 has over four years experience in the Office of Water developing guidelines and regulations for industrial wastewater sources. From 1979 through 1988, Jack was involved with the Superfund's Emergency Response program and developed the multi-media hazardous substance reportable quantity regulations. He was also responsible for oil and hazardous substance pollution prevention regulations, oil spill reporting, as well as the oil and dispersant testing and registration program 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 include membership of the Board of Control of the Water Pollution Control Federation (WPCF) [now known as the Water Environment Federation (WEF)] from 1986 to 1989, as well as a being 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. He is also very active in the Federal Water Quality Association (FWQA), the local member association of WEF, where he has served in numerous capacities, including President, and "Ambassador-at-Large." He is currently Chairman of the Government Affairs Committee of the FWQA. He is listed in "Who's Who in Science and Engineering," and "Who's Who in the Eastern United States."

In 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 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. In the summer of 1995, he was an invited lecturer in environmental management to the American University of Armenia (AUA) in Yerevan, Armenia. In this capacity, he taught a University of Southern California sponsored course in Environmental Management focusing on environmental ethics and sustainability concepts to three classes of graduate students, who were majoring in Public Health, Political Science, and Business Administration. In 1997, he was selected as Chairman of the Organizing Committee to form the Greater Metropolitan Washington Area Section (GMWAS) of the Armenian Engineers and Scientists of America (AESA).

Closer to home, which he shares with his wife Gerry, and their three daughters, Jennifer (25), Melissa (20) and Jessica (18), Dr. Kooyoomjian is involved in numerous civic activities which focus on development, land-use and environmental issues in his area. He was a candidate for the Governor's Award for volunteerism for the state of Virginia in 1991. He also has received the EPA Public Service Recognition Award in 1988 and 1992 and several County Recognition Awards, and in 1995 a Virginia State Planning Association award for his civic involvement. In addition to his civic activities, since 1996 he has been serving on the Board of Directors of the Prince William County Service Authority.

MS. ROSLYN EDSON
Designated Federal Official for the Environmental Health Committee and the Integrated Human Exposure Committee

LIEUTENANT-COMMANDER ROSLYN EDSON is a commissioned officer in the United States Public Health Service. Ms. Edson has been detailed to the EPA Science Advisory Board (SAB) since July 1997. She serves as the DFO for the Environmental Health Committee and the Integrated Human Exposure Committee.

Prior to joining the SAB, Ms. Edson worked as an industrial hygienist in the EPA Safety, Health and Environmental Management Division where she developed health and safety guidance material for the EPA Safety and Health Program Management (SHEMP) managers. She also conducted ergonomic worksite assessments and ergonomics training to reduce the number and severity of work-related musculoskeletal disorders experienced by EPA employees. Ms. Edson has also worked as an industrial hygienist for the National Institutes of Health, the United States Government Printing Office, the Occupational Safety and Health Administration, the Potomac Electric Power Company and Service Employees International Union.

Ms. Edson pursed undergraduate studies (B.S. in Biology, 1988) at the City College of New York and graduate studies (Sc.M. in Environmental Health (Industrial Hygiene), 1990) at the Harvard School of Public Health. Ms. Edson continues to pursue her strong interest in ergonomics by conducting training for professional organizations and public school systems. She plans ultimately to obtain a doctorate degree in a public health field. Ms. Edson resides with her daughter Samantha who will begin second grade this Fall. Ms. Edson enjoys hiking, jogging, cooking exotic meals, and the challenge of motherhood.

MS. KAREN L. MARTIN
Designated Federal Official

MS. KAREN L. MARTIN R.S., joined the Science Advisory Board (SAB) in September 1998 as a Intern with Environmental Protection Agency Intern Program (EIP). The EIP program is a component of the Environmental Protection Agency's commitment to diversity action plans and work force development strategies which will have long term positive impacts on the Agency and the environment. This Internship, will allow Ms. Martin to participate in a intensive two-year program of rotational assignments combined with career development training. During Ms. Martin's rotation with the SAB, she assisted the DFO for the Integrated Human Exposure Committee and the Environmental Health Committee. Other assignments included assisting other DFO's with meeting planning, meeting minutes and report preparation.

Prior to joining the SAB, Ms. Martin worked as a Public Health Sanitarian with the Adams County Health Department in West Union, OH. In this position she worked to promote environmental health and the control of sanitation through enforcement of state and local laws and regulations. She also worked closely with other state and local agencies, public officials and the general public to improve environmental health in Adams County.

Ms. Martin pursued undergraduate (B.S. in Biology, 1992) and graduate studies (M.S. in Environmental Health, 1994) at Mississippi Valley State University.

MR. TOM MILLER
Designated Federal Official for the Drinking Water Committee and the Environmental Economics Advisory Committee

MR. TOM MILLER joined the Science Advisory Board (SAB) in June, 1996 as Designated Federal Official (DFO) for the Drinking Water Committee (DWC) and the Environmental Economics Advisory Committee (EEAC). Tom was detailed to the SAB during 1994 and served as the DFO for the Clean Air Scientific Advisory Committee CASAC) and the Drinking Water Committee at that time. Tom is also the DFO for the Valuation Subcommittee and the Economic Analysis Subcommittee of the Integrated Risk Project. Tom has worked at the Environmental Protection Agency in regulatory (pesticides, toxic substances), budget, and planning activities (research and development programs) since 1974.

Mr. Miller received a BS (Wildlife Management) in 1972 and an MS (Wildlife Management) in 1975, both from West Virginia University. For his Master's research, Mr. Miller conducted a radio-telemetry study of the black bear in the Monongahela National Forest of West Virginia. In 1993, Tom received a Masters of Public Policy from the University of Maryland School of Public Affairs. Tom's major professional interest is the study of the ways that science and policy development interact to identify and implement appropriate approaches to environmental management, and the role of citizens in decisions leading to the selection of management approaches. He also has an interest in the development of techniques and strategies, to add this body of knowledge to the science curricula in secondary education, the primary venue for science learning for the vast majority of our citizens.

Tom is married and is the father of one daughter (who is a University Senior) and one son (who is a Junior in high school). Tom is involved with leadership positions in his church, and he enjoys flyfishing, backpacking, woodworking, and baseball.

DR. ANGELA NUGENT
Designated Federal Official for the Advisory Council on Clean Air Compliance Analysis

DR. ANGELA NUGENT is a historian who has found work at EPA as interesting as combing the archives for the history of public health, science and technology. Angela has been detailed to the EPA Science Advisory Board(SAB) since March 1999. She serves as the DFO for the Council and its two subcommittees, the Health and Ecological Effects Subcommittee and the Air Quality Monitoring Subcommittee. She also serves as adviser to the Staff Director on SAB's "New Approaches" project and implementation of the SAB Strategic Plan.

Prior to joining the SAB, Angela served as a coordinator for the inter-agency Clean Water Action Plan in EPA's Office of Water. From 1995 to 1998, she was Deputy Director of the Office of Sustainable Ecosystems and Communities in EPA's Policy Office, and from 1992-1995 headed the Science Policy Staff in the same office. She has also worked in the Office of Air and Radiation on peer review and air toxics issues, in the Office of Pesticide Programs on reregistration issues, and in the Office of Toxic Substances on biotechnology and new chemical regulation. Prior to joining EPA in 1985, Angela worked at Arthur Andersen & Associates as a Management Information Consultant (which partly explains her fascination with new computer applications). She was an Assistant Professor of the History of Public Health and Medicine at the University of Maryland and a post-doctoral fellow at the Johns Hopkins School of Medicine. She holds a Ph.D. (1982) and M.A. (1976) from Brown University, where her research focused on the history of industrial toxicology. She received a B.S.F.S. degree from Georgetown University's School of Foreign Service in 1974.

Angela is married to Bruce Odessey, a writer-editor for the U.S. Information Agency. She enjoys most of all spending time with him and their four-year old daughter, Rachel. Together, they like to dance, sing, travel, and read.

MR. SAMUEL RONDBERG
Designated Federal Official

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 and Surgery. He also served in the US 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's wife (Ruth) of 35 years is a Rehabilitation Counselor; they have one daughter, who completed a Master's degree in Social Work. Sam 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 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 has been a Designated Federal Official at the EPA Science Advisory Board for 6 years, working primarily with the Ecological Processes and Effects Committee. 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. Prior to coming to SAB, she spent 4 years with EPA's National Estuary Program, a program which assists states and local communities to manage and protect bays and estuaries based on sound science. Ms. Sanzone has also worked to bring science to the legislative process, serving as legislative staff at both the state and federal levels. Her professional interests include management of coastal environments, the role of science and risk assessment in policy making, and making science and scientists intelligible to lay audiences (e.g., policy makers, managers and the public).

MS. DOROTHY MAXINE CLARK
MANAGEMENT ASSISTANT

MS. DOROTHY MAXINE CLARK is the Management Assistant who assists Thomas Miller with the Environmental Economics Advisory Committee, Drinking Water Committee and along with Samuel Rondberg with the Chloroform Risk Assessment Review Subcommittee, also Jack Fowle and Jack Kooyoomjian with the Environmental Models Subcommittee. Dorothy joined the Science Advisory Board (SAB) March 17, 1980, as a secretary for the Environmental Engineering Committee, Highlevel Radioactive Level Subcommittee and several other Subcommittees and standing Committees. During her tenure at EPA, Dorothy has worked for several SAB Committees. She enjoys working with committee members and getting along with all levels of staff.

Last but not least, in Dorothy's spare time she enjoys reading, shopping, and most of all watching the Washington Redskins play football.

MS. WANDA R. FIELDS
MANAGEMENT ASSISTANT

MS. WANDA R. FIELDS is the Management Assistant who assists Samuel Rondberg with the Environmental Health Committee (EHC) and the Integrated Human Exposure (IHEC). She also assisted Thomas Miller and Stephanie Sanzone with the Integrated Risk Project Steering Committee (IRP). Wanda joined the Science Advisory Board (SAB) in the spring of 1997 as a secretary for the Ecological Processes and Effects Committee (EPEC) and the Integrated Risk Project Steering Committee (IRP) were she assisted Stephanie Sanzone. In 1998, her title changed to management assistant. Prior to joining us she was a secretary with the Office of Water for nine years here at the Environmental Protection Agency. During her tour with Water, she took a tremendous amount of computer and administrative training. She graduated with honors from a career enhancement program that was offered by EPA. She is also currently a member of the Office of the Administrator Customer Service Workgroup, established to help implement customer service standards and improve customer service. She came to EPA in 1988 after leaving the Office of Personnel Management where her government career began.

MS. DIANA L. POZUN
MANAGEMENT ASSISTANT

MS. DIANA L. POZUN joined the Science Advisory Board as a Staff Secretary in August, 1991. She was assigned to the Environmental Engineering Committee and various subcommittees. In June of 1993 she switched committee responsibilities to be the Staff Secretary for the Radiation Advisory Committee. In May 1998 her title was changed to Management Assistant. She is now responsible for the Radiation Advisory Committee (RAC), Advisory Council on Clean Air Compliance Analysis (COUNCIL) and the Clean Air Scientific Advisory Committee (CASAC). She comes to us from the private sector, where she was Executive Secretary in the Big Six accounting firm of Ernst & Whinney in their tax department in Washington, D.C. for about eight years. In that position, she was involved in all aspects of the proposal process and maintained State and Local tracking systems, mailing lists, travel arrangements and word processing support. Prior to that, she worked for the National League of Cities in Washington, D.C. for four years, where she maintained files, worked on guidebooks and various case studies and helped coordinate several national conferences among other duties. Diana has a broad range of experience with various D.C. area firms.

She lives in Mt. Airy, Maryland with her fifteen year old daughter, Megan.

MS. PRISCILLA Y. TILLERY-GADSON
PROGRAM SPECIALIST

MS. PRISCILLA Y. TILLERY-GADSON joined the Science Advisory Board (SAB) as the Staff Secretary to the Staff Director in March 1993. She serves as SAB Coordinator and Liaison for the Federal Advisory Committee Act (FACA) Executive Committee (EC) meetings. In August 1998, she was reassigned as a Program Specialist providing special assistance to the Staff Director, Deputy Staff Director, and the Team Leader for the Committee Operations Staff (COS). She is the Team Leader for the Management Assistants (MA) and immediate supervisor of the National Older Worker Career Center (NOWCC) SEE Program Enrollee (Office Assistant). She is the SAB Travel Management Center Program Office Coordinator, Correspondence Control Point, Freedom of Information Act Coordinator, Property Custodial Officer, and the SAB's Customer Service Representative on the Office of the Administrator's (OA) Customer Service Workgroup.

Ms. Tillery-Gadson came to us from EPA's Office of Research and Development (ORD), Office of Health Research (OHR) where she held several positions as Secretary for about $15^{1}/_{2}$ years. She served as OHR International Travel Coordinator and ORD's Headquarters Black Employment Program (BEP) Representative. She also provided updates to the budgetary data in the Office of Research and Development Information System (ORDIS). Prior to working with ORD, she worked with the EPA Office of Pesticides Program (OPP), Registration Division, Insecticide-Rodenticide Branch as a Clerk-Typist and Pesticide Products Clerk for about four years and 10 months. She compiled historical and statistical data for answering inquiries containing scientific data from registrants who applied for registration of their pesticide products.

Prior to coming to EPA, she worked for the U.S. Department of Agriculture for about 1-year under a school/work program. As you can see, Ms. Tillery-Gadson brings a broad range of work experience to SAB, especially the ability to work as a team with her co-workers. She has 28 years of government services, and resides in the Maryland suburbs with her husband and her 26-year-old daughter. She receives a joy in doing for others and has a special love for children.

MS. MARY L. WINSTON
MANAGEMENT ASSISTANT

MS. MARY L. WINSTON joined the Science Advisory Board (SAB) in 1988. Prior to joining us she worked in the Test Rules and Development Branch here at the Environmental Protection Agency. Mary came to the Environmental Protection Agency after leaving the U.S. Coast Guard where she worked for 14 years as a secretary. In May of 1998 her title changed from secretary to Management Assistant. Before the reorganization she worked with Samuel Rondberg on the Environmental Health Committee and with Thomas Miller on the Drinking Water Committee. Mary now assists Kathleen Conway with the Environmental Engineering Committee (EEC), also Stephanie Sanzone with the Ecological Processes and Effects Committee (EPEC), and A. Robert Flaak with the Scientific & Technological Achievement Award (STAA) Nominations.

Mary resides in Maryland where she enjoys quilt making, reading and knitting.

MS. BETTY B. FORTUNE
OFFICE ASSISTANT

MS. BETTY B. FORTUNE joined the Science Advisory Board in September 1993. Her job title is Office Assistant in the Director's Office. She works closely with the Director, Program Specialist and the Executive Committee. During her years with SAB, and several administrative changes, she has worked for the entire staff and with other SAB committees. Betty came to SAB after completing a long tenure with the District of Columbia Public Schools (DCPS). She was the administrative assistant at Hardy Middle School during the final years of her employment in DCPS. She had always worked in the field of Education and has many pleasant memories of her work years with staff, parents, and students. She has received many plaques, awards, and certificates. She is a member of the Senior Choir at her church which performs excerpts from the Messiah during the Christmas season. She lives in Washington, DC and her family consists of two children and four grand-children which she greatly enjoys.