



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D C 20460

OFFICE OF  
THE ADMINISTRATOR

April 10, 1990

EPA-SAB-EC-90-011

Honorable William K. Reilly  
Administrator  
U. S. Environmental Protection Agency  
401 M Street, S.W.  
Washington, D.C. 20460

Dear Mr. Reilly:

The Science Advisory Board's 1989 Scientific and Technological Achievement Awards (STAA) Subcommittee has completed its review of the 106 papers nominated by the Agency for this year's awards program. As you are aware, the STAA program is sponsored by the Office of Research and Development. Our recommendations for awards and further improvements in the STAA program are discussed in the attached report.

The Subcommittee believes that the STAA program contributes very positively towards strengthening the level of Agency expertise by recognizing researchers for their special achievements. Therefore, we urge that the program receive support from the highest levels of Agency management and that the winners receive broad recognition throughout the Agency. We are pleased to have participated in this process and believe it is appropriate for the Board to continue this annual review function. The Subcommittee recommends that the Agency publicly congratulate these award winners through a special ceremony or by a special publication, such as an EPA Journal feature article, which should be distributed to all EPA employees.

The Subcommittee notes with gratification, that they were able to recommend five Level I Awards this year. Most of the award winners have produced papers that were published in the more prestigious journals in their fields, known for their strict adherence to peer review. The Subcommittee would like to continue to stress the importance of publishing manuscripts in the most rigorously peer reviewed journals in science and technology, because this subjects the foundation for the Agency's regulatory programs to the most critical technical evaluation.

Recognizing the current Agency needs and focus in the areas of waste minimization, multimedia pollution controls, wetlands protection and ecological risk assessment, we look forward to the development of complementary research programs and Agency expertise that will lead to the nomination of superior research papers in these areas. We are also encouraged to see that a few excellent papers were nominated from the EPA regional and headquarters program offices.

The Subcommittee identified three papers of notable quality characterized by careful, thorough, extensive work which did not reach the award level but definitely deserve honorable mention. The Subcommittee hopes that these authors will be recognized appropriately for their high quality work.

The Subcommittee recommends that Agency managers be encouraged to nominate peer reviewed papers from all programs and areas of scientific research. We recommend that the Office of Research and Development close the nominations earlier (in October) and revise its guidance to nominators to further clarify criteria for nomination. In addition, greater care should be exercised to ensure that the nomination packages are complete; including proper endorsements and all of the peer reviewed articles by the EPA authors that are relevant to the achievement.

To ensure the credibility of the review process and broaden the base of expertise used in the review, the Subcommittee obtained additional reviews from experts by mail. We did not attempt to ensure equality of numbers or proportion of awards across the categories or laboratories. Rather, good science and technology were our sole criteria for recommending awards.

The SAB would appreciate being informed of the final disposition of awards. We look forward to serving the Agency again in this important activity.

Sincerely,



Raymond C. Loehr, Chairman  
Executive Committee  
Science Advisory Board



Calvin H. Ward, Chairman  
1989 Scientific and  
Technological Achievement  
Awards Subcommittee

**Report of the Scientific  
and Technological Achievement  
Awards Subcommittee of the  
Executive Committee**

**Recommendations on the 1989  
EPA STAA Nominations**

## ABSTRACT

The report represents the conclusions and recommendations of the U.S. Environmental Protection Agency's Science Advisory Board regarding the 1989 EPA Scientific and Technological Achievement Awards (STAA) program. The Scientific and Technological Achievement Awards Subcommittee of the Science Advisory Board reviewed and evaluated the 1989 nominations for the STAA program. The Subcommittee evaluated 106 papers that were nominated by EPA managers. The Subcommittee recommended twenty-five papers for awards and also recommended to the Office of Research and Development that three additional papers be recognized as honorable mention. The Subcommittee made no attempt to ensure equality of numbers or proportion of awards across the categories or Agency research components. However, the Subcommittee recommended awards for papers from eleven EPA research laboratories, two EPA regional offices, and one EPA headquarters program office. The Subcommittee recommended that the Agency clarify its instructions to nominators and that the nomination process close in October so that more time could be given for technical review of the nominations by the Subcommittee. The Subcommittee also encouraged the Agency to support the program at the highest levels of management.

U.S. ENVIRONMENTAL PROTECTION AGENCY

NOTICE

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## 1.0 EXECUTIVE SUMMARY

The Scientific and Technological Achievement Awards (STAA) Subcommittee of the Science Advisory Board reviewed and evaluated the 1989 nominations for the STAA program. The Subcommittee evaluated 106 papers that were nominated by EPA research laboratory directors and program division directors. The Subcommittee met in Washington, D.C. on March 5-6, 1990 to determine which papers would be recommended for awards.

The Subcommittee recommended twenty-five papers for awards and recommended that three additional papers be recognized as honorable mention. The Subcommittee made no attempt to ensure equality of numbers or proportion of awards across the categories or Agency research components. However, the Subcommittee recommended awards for papers from eleven EPA research laboratories, two EPA regional offices, and one EPA headquarters program office.

The Subcommittee recommended that the Agency clarify its instructions to nominators and that the nomination process close in October so that more time can be given for technical review of the nominations by the Subcommittee. The Subcommittee also encouraged the Agency to support the program at the highest levels of management.

## 2.0 INTRODUCTION

### 2.1 Request and Charge for Science Advisory Board Review

At the request of the Office of Research and Development (ORD), the Science Advisory Board agreed to convene a committee to review and evaluate scientific papers published by EPA employees that were nominated for the 1989 EPA Scientific and Technological Achievement Awards program. The SAB authorized the formation of a Subcommittee to recommend papers for awards. On February 1, 1990 the Office of Exploratory Research in ORD provided the SAB with copies of 106 nominations, a Statement of the Principles and Processes for the awards program, and rules and advice to nominators. The Office of Exploratory Research grouped the papers into categories and reviewed the nominations for eligibility and the Subcommittee was charged to recommend papers for awards.

The SAB advises the Assistant Administrator for Research and Development of its evaluation and judgement of the nominations, and recommends the winning nominees for each of three Levels of Award. Level I awards are for nominees who have accomplished an exceptionally high-quality research or technological effort. These awards concern the initiation or general revision of

scientific/technological principles or procedures, or highly significant improvements in the value of a device, program or service to the public. Level II awards are to nominees who have accomplished a notably excellent research or technological effort. This award must have timely consequences and contribute as an important achievement within its discipline. Level III awards are to nominees who have accomplished an unusually good research or technological effort. This award must relate to a mission or organizational component of the EPA, or significantly affect an area of science/technology.

## **2.2 Subcommittee Review Procedures**

Copies of all papers and the award program procedures were sent to Subcommittee members for preliminary review to be certain that the members had sufficient expertise to review all nominated papers. As part of the evaluation, Subcommittee members were also asked to rank their own expertise in the field of science and technology addressed by each paper. To ensure the credibility of the review process and broaden the base of expertise used in the review, the Subcommittee obtained additional reviews from experts by mail and would like to recognize the assistance of the following reviewers:

Dr. Lawrence Goldstein	EPRI, Health Studies Program
Dr. E. Marshall Johnson	Jefferson Medical College
Dr. Martha Radike	University of Cincinnati
Dr. Walter Weyzer	EPRI, Health Studies Program
Dr. Ronald Wyzga	EPRI, Health Studies Program

The Subcommittee met on March 5 and 6, 1990, in Washington, D.C. in a closed meeting to develop recommendations for awards.

## **3.0 EVALUATION OF THE 1989 SCIENTIFIC AND TECHNOLOGICAL ACHIEVEMENT AWARDS NOMINATIONS**

### **3.1 Award Recommendations**

The papers that were recommended for awards were widely distributed among eleven EPA research laboratories, two EPA Regions, and one headquarters office. Awards were recommended for each category of science and technology. This year, a special category was added for review articles. One award was recommended for a critical review in the Health Effects category. A summary of the award recommendations is presented in Table 1.

Although awards were recommended in each category, the Subcommittee noted that there was a lack of scientific research papers nominated for wetlands protection, effluent toxicity reduction, waste minimization, and ecological risk assessment,

Table 1. 1988 Scientific and Technological Achievement Awards Recommendations

Recommendations for Awards	Number Nominated	Level 1	Level 2	Level 3	Total Awards	(Percent)
Control Technology	14	1	0	2	3	(21%)
Ecology	17	0	1	3	4	(23%)
Monitoring and Measurement	13	1	1	2	4	(31%)
Transport and Fate	19	2	2	2	6	(32%)
Health	35	1	3	4	8	(23%)
Reviews	8	0	0	1	1	(13%)
	106	5	7	14	26	(24%)

areas in which the Agency is facing many regulatory questions regarding ecology and control technologies. The Subcommittee believes that the Agency should emphasize the publication of its basic regulatory research in peer reviewed journals because it subjects the foundation for the Agency's regulatory programs to the most rigorous level of technical evaluation. In addition, this emphasis on the quality of technical achievements enhances the stature of the Agency's research and its scientific and technical staff.

The Subcommittee recommendations for awards are listed below for five areas: Control Systems and Technology, Ecology, Health Effects, Monitoring and Measurements, and Transport and Fate.

#### CONTROL SYSTEMS AND TECHNOLOGY

**Air and Energy Engineering Research Laboratory**  
 Research Triangle Park, North Carolina  
 Frank T. Princiotta, Director

LEVEL 1 AWARD "Fabric Filtration With Integral Particle Charging and Collection in a Combined Electric and Flow Field: Part I. Background, Experimental Work, Analysis of Data, and Approach to the Development of a Mathematical Engineering Design Model," Journal Electrostatics 20: 247-266 (1988) and "Part II. Development and Verification of the Mathematical Engineering Design Model," Journal Electrostatics 20: 267-290 (1988).

EPA Author: Norman Flaks

LEVEL 3  
AWARD "Structural Changes in Surfactant-Modified Sorbents During Furnace Injection," AIChE Journal 35: 500-506 (1989) and "Enhancement of Reactivity in Surfactant-Modified Sorbents for Sulfur Dioxide Control," Industrial Engineering Chemistry Research 28: 2398-2400 (1989).  
EPA Author: David A. Kirchgessner  
Non-EPA Authors: Wojciech Jozewicz (First paper) and Jeffrey Lorrain (Second paper)

LEVEL 3  
AWARD "Characterization of Advanced Sorbents for Dry SO<sub>2</sub> Control," Reactivity of Solids 6:243-262 (1988).  
EPA Authors: Charles B. Sedman and Theodore G. Brna  
Non-EPA Authors: Wojciech Jozewicz and John C. S. Chang

#### ECOLOGY

Environmental Research Laboratory-Corvallis  
Corvallis, Oregon  
Thomas A. Murphy, Director

LEVEL 3  
AWARD "The Cutworm Peridroma saucia (Lepidoptera: Noctuidae) supports growth and transport of pBR322 bearing bacteria," Applied Environmental Microbiology 55(9): 2200-2205.  
EPA Authors: John L. Armstrong, L. Arlene Porteous, and Nathan D. Wood

LEVEL 3  
AWARD "Changes in Mallard Hen and Brood Behaviors in Response to Methyl Parathion-Induced Illness of Ducklings," Environmental Toxicology Chemistry 7: 499-503 (1988).  
EPA Authors: Anne Fairbrother, S. Mark Meyers, and Richard S. Bennett

Environmental Research Laboratory-Gulf Breeze  
Gulf Breeze, Florida  
Robert E. Menzer, Director

LEVEL 2  
AWARD "The Membraneous Labyrinth in Baculovirus-infected Crustacean Cells: Possible Roles in Viral Reproduction," Diseases Aquatic Organisms 7: 39-53 (1989).  
EPA Author: John A. Couch

**Environmental Research Laboratory-Narragansett**  
Mark O. Hatfield Marine Science Center  
Newport, Oregon  
Norbert A. Jaworski, Director

LEVEL 3  
AWARD "Effects of Mixtures of Sediment Contaminants on the Marine Infaunal Amphipod, Rheopoxynius abronius," Environmental Toxicology Chemistry 7: 1013-1020 (1988).  
EPA Authors: R.C. Swartz, P.F. Kemp, D.W. Schults, and J.O. Lamberson

**HEALTH EFFECTS**

**Health Effects Research Laboratory-RTP**  
Research Triangle Park, North Carolina  
Lawrence W. Reiter, Director

LEVEL 1  
Award "Extrathoracic and Intrathoracic Removal of O<sub>3</sub> in Tidal-breathing Humans," Journal Applied Physiology 65(1): 393-400 (1988).  
EPA Authors: Timothy R. Gerrity, Dennis E. House, and John E. O'Neil  
Non-EPA Authors: Richard A. Weaver and Jon Berntsen

LEVEL 2  
AWARD "Pulmonary Function and Symptom Responses After 6.6 Hour Exposure to 0.12 ppm Ozone with Moderate Exercise." JAPCA 38: 28-35 (1988).  
EPA Authors: Donald H. Horstman  
Non-EPA authors: Lawrence J. Follinsbee and William F. McDonnell

LEVEL 2  
AWARD "Importance of Glutathione in the Acquisition and Maintenance of Sperm Nuclear Decondensing Activity in Maturing Hamster Oocytes," Developmental Biology 125: 181-186 (1988).  
EPA Authors: Sally D. Perreault and Randy R. Barbee  
Non-EPA authors: Valerie L. Slott

LEVEL 2  
AWARD "Incorporation and Disappearance of Oxygen-18 in Lung From Mice Exposed to 1 ppm <sup>18</sup>O<sub>3</sub>," Toxicology Applied Pharmacology 98: 75-80.  
EPA Authors: Gary E. Hatch and Ralph Slade  
Non-EPA Authors: Jeffrey Santrock and J.M. Hayes

LEVEL 3 "Human Subject Age and Activity Level: Factors  
AWARD Addressed in a Biomathematical Deposition Program for  
(1989) Extrapolation Modelling," Health Physics 57:49-59

EPA Author: T.B. Martonen  
Non-EPA Authors: R.C. Graham and W. Hofmann

LEVEL 3 "Conditioned Flavor Aversions: Applications in  
AWARD Assessing the Efficacy of Chelators in Heavy-metal  
Intoxication," Toxicology Applied Pharmacology 88: 397-  
410 (1987) and "Behavioral Consequences of Chelator  
Administration in Acute Cadmium Toxicity," Fundamental  
and Applied Toxicology 11: 416-428 (1988).

EPA Authors: Jackie D. Farmer and Robert C. McPhail  
Non-EPA Author: David B. Peele

LEVEL 3 "Acute Exposure of the Neonatal Rat to Triethyltin  
AWARD Results in Persistent Changes in Neurotypic and  
Gliotypic proteins Journal Pharmacology Experimental  
Therapeutics 244: 368-378 (1988) and "Acute Exposure  
of the Neonatal Rat to Tributyltin Results in Decreases  
in Biochemical Indicators of Synaptogenesis and  
Myelinogenesis," Journal Pharmacology Experimental  
Therapeutics 246: 445-452 (1988).

EPA Authors: James P. O'Callaghan and Diane B. Miller

Office of Policy Analysis  
Washington, D.C.  
Robert Brenner, Director

LEVEL 3 "Mortality and Air Pollution in London: A Time Series  
AWARD Analysis," American Journal Epidemiology 131: 185-194  
(1990).

EPA Author: Joel Schwartz  
Non-EPA Author: Allan Marcus

**REVIEW ARTICLE-HEALTH EFFECTS**

**Health Effects Research Laboratory-RTP**  
Research Triangle Park, North Carolina  
Lawrence W. Reiter, Director

LEVEL 3 "Genotoxic Activity of Organic Chemicals in Drinking  
AWARD Water," Mutation Research 196: 211-245 (1988).  
EPA Author: John R. Meier

**MONITORING AND MEASUREMENT**

**U.S. EPA Region X**  
Seattle, Washington  
Robie G. Russell, Administrator

LEVEL 1 "Model Complexity and Data Worth: An Assessment of  
AWARD Changes in the Global Carbon Budget," Ecological  
Modeling 39: 201-226 (1987).  
EPA Author: John R. Yearsley  
Non-EPA Author: Dennis P. Lettenmaier

**Environmental Research Laboratory-Cincinnati**  
Cincinnati, Ohio  
Thomas A. Clark, Director

LEVEL 2 "Determination of Nonvolatile Organic Compounds in  
AWARDS Aqueous Environmental Samples Using Liquid  
Chromatography/Mass Spectrometry," Analytical  
Chemistry 60: 2076-2083 (1988).  
EPA Authors: Thomas A. Bellar and William L. Budde

**Environmental Research Laboratory-Athens**  
Athens, Georgia  
Rosemarie C. Russo, Director

LEVEL 3 GC/FT-IR Analysis of the Thermally Labile Compound  
AWARD Tris(2,3-dibromopropyl) phosphate," Journal High  
Resolution Chromatography 12(5): 337-340 (1989).  
EPA Authors: J. Jackson Ellington and  
Timothy Collette  
Non-EPA Author: William D. Payne

U.S. EPA Region VII  
Kansas City, Kansas  
Morris Kay, Regional Administrator

- LEVEL 3  
AWARD "Procedures Used to Measure the Amount of 2,3,7,8-Tetrachlorodibenzo-p-dioxin in the Ambient Air Near a Superfund Site Cleanup Operation," Environmental Science Technology 21: 550-555 (1987).  
EPA Authors: Billy J. Fairless, Dale I. Bates, Jody L. Hudson, Robert D. Kloepper, Thomas T. Holloway, and Debra Morey  
Non-EPA Author: Tony Babb

TRANSPORT AND FATE

Environmental Research Laboratory-GB  
Gulf Breeze, Florida  
Robert E. Menzer, Director

- LEVEL 1  
AWARD "Action of a Fluoranthene-Utilizing Bacterial Community on Polycyclic Aromatic Hydrocarbon Components of Creosote," Applied Environmental Microbiology 55(12): 3085-3090 (1989).  
EPA Authors: James G. Mueller, Peter J. Chapman, and Parmely H. Pritchard

Environmental Research Laboratory-Athens  
Athens, Georgia  
Rosemarie C. Russo, Director

- LEVEL 1  
AWARD "Reactivity of the Carbonate Radical With Aniline Derivatives," Environmental Toxicology Chemistry 7:1-10 (1988).  
EPA Author: Richard G. Zepp  
Non-EPA Author: Richard A. Larson
- LEVEL 2  
AWARD "Hydrolysis of Chlorostilbene Oxide: I. Hydrolysis in Homogeneous Systems. Environmental Toxicology Chemistry 8:553-562 (1989).  
EPA Author: N. Lee Wolf  
Non-EPA Author: Mohammed El-Sayed Metwally
- LEVEL 3  
AWARD "Microbial Degradation of Seven Amides by Suspended Bacterial Populations," Applied Environmental Microbiology 55(10): 2545-2549 (1989).



**EPA Authors: William C. Steen and Timothy W. Collette  
Robert S. Kerr Environmental Research Laboratory  
Ada, Oklahoma  
Clinton W. Hall, Director**

**LEVEL 2 AWARD** "Field Evaluation of a Simple Microcosm Simulating the Behavior of Volatile Organic Compounds in Subsurface Materials," Water Resources Research 23(8): 1547-1553 (1989).  
**EPA Authors: John T. Wilson and Garmon B. Smith**  
**Non-EPA Authors: Jack W. Cochran, James F. Barker, and Paul V. Roberts**

**Atmospheric Research and Exposure Assessment Laboratory  
Research Triangle Park, North Carolina  
Gary J. Foley, Director**

**LEVEL 3 AWARD** "Contribution of Woodsmoke and Motor Vehicle Emissions to Ambient Aerosol Mutagenicity," Environmental Science Technology 22: 968-971 (1988).  
**EPA Authors: Charles W. Lewis, Ralph E. Baumgardner, Robert K. Stevens, Larry Claxton, and Joellen Lewtas**

### **3.2 Honorable Mention**

The Subcommittee also identified three papers of notable quality characterized by careful, thorough, extensive work, which did not reach the award level, but definitely deserve honorable mention. They are:

- a. A review article entitled, "Granular Activated Carbon: Design, Operation and Cost" by Dr. Benjamin W. Lykins and Dr. Robert M. Clark of the Risk Reduction Engineering Laboratory in Cincinnati, Ohio.
- b. A review paper entitled, "Environmental Software at the U.S. Environmental Protection Agency's Center for Exposure Assessment Modelling" by Dr. Robert B. Ambrose, Jr. and Dr. T.O. Barnwell, Jr. from the Environmental Research Laboratory in Athens, Georgia.
- c. An article entitled, "Experiences With Single-Species Tests for Acute Toxic Effects on Freshwater Animals" by Dr. Foster L. Mayer, Jr. from the Environmental Research Laboratory at Gulf Breeze, Florida and Dr. Mark Ellersieck from the University of Missouri.

### 3.3 Other Findings of the Subcommittee

The Subcommittee believes that the STAA program contributes very positively towards strengthening the level of Agency expertise by recognizing researchers for their special achievements. Therefore, we urge that the STAA program receive support from the highest levels of Agency management and that the winners receive broad recognition throughout the Agency. We are pleased to have participated in this process and believe that it is appropriate for the Board to continue this annual review function. The Subcommittee recommends that the Agency acknowledge these award winners through a special public ceremony or by a special publication, such as an EPA Journal feature article, which should be distributed to all EPA employees.

In the past, the Office of Exploratory Research has received nominations through the month of December, then OER reviews and verifies the nominations, and the Subcommittee is given about two months to read and evaluate the papers. This makes a tight schedule which apparently does not allow adequate time for verification of the nominations by OER and it makes it difficult for the Subcommittee to obtain special expertise if it is needed. The Subcommittee recommends that the Office of Research and Development close the nominations earlier, perhaps in October, to allow for more thorough review and verification.

During the review, the Subcommittee noted several instances in which the nominations did not conform to the rules of the STAA program. Several papers were improperly nominated by an author or first line supervisor. Many of the review articles, a new category this year, did not contain critical analysis or were not published in peer reviewed journals. Thus we did not recommend them for awards, however, we noted that the advice for review articles was confusing on these points. In several papers of high merit, we felt that the contribution of the EPA author was too small to justify an award recommendation. We recommend that the Office of Research and Development revise its guidance to nominators to further clarify criteria for nomination. In addition, greater care should be exercised by the nominators to realistically appraise the contribution made by the authors and the OER to be sure that the nomination packages are complete; including proper endorsements and all of the peer reviewed articles by the EPA authors that are relevant to the achievement.