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**13. ABSTRACT (Maximum 200 Words)**

This is the second Annual Report of the Strategic Environmental Research and Development Program (SERDP) Scientific Advisory Board (SAB).

The Strategic Environmental Research and Development Program was established by the Secretary of Defense pursuant to the 10 U.S.C. Sec 2901. The Program is intended to identify and develop technology that will enhance the capability of the Department of Defense (DoD) and the Department of Energy (DOE) to meet their environmental obligations. In addition, the Program is intended to provide technology and information that may be useful to other governmental and private organizations in addressing environmental concerns. SERDP is also intended to facilitate the transfer of appropriate technology from the private sector to address DoD and DOE environmental and energy issues.

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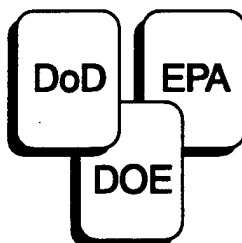
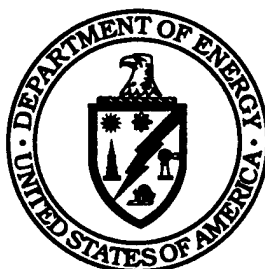
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# SCIENTIFIC ADVISORY BOARD

## FY93 ANNUAL REPORT



# SERDP

Strategic Environmental Research  
and Development Program

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This document was prepared for the Executive Director, Strategic Environmental Research and Development Program (SERDP) by

LABAT-ANDERSON Incorporated

under Contract Number DAAA21-90-D-1015. Questions regarding the SERDP should be directed to the SERDP Program Office temporarily located at 2200 Clarendon Boulevard, Suite 900, Arlington, VA, 22201.

March 8, 1994

Dr. Martha Krebs  
Director, Office of Energy Research  
ER-1, Room 7B-058  
U.S. Department of Energy  
1000 Independence Avenue, S.W.  
Washington, D.C. 20585

Dear Dr. Krebs:

On behalf of the Strategic Environmental Research and Development Program (SERDP) Scientific Advisory Board, I am forwarding the FY93 Scientific Advisory Board (SAB) Annual Report to you for submission to Congress.

In this second year, the SAB proceeded to improve the proposal and evaluation process by providing more efficient and more effective scientific evaluation of the proposals presented to the Board. To this end, the SAB established technology thrust area subcommittees that reviewed and evaluated proposals prior to their presentation at the full SAB. This approach enabled those with the appropriate expertise to more thoroughly evaluate a proposal and make a recommendation to the entire Board.

My service on the Scientific Advisory Board has been very rewarding. Although my term as Chairman has ended, I am hopeful that I and the other members of the Board have contributed to the furtherance of the SERDP goals.

Sincerely,



Dr. Laurence Jahn  
Chairman  
SERDP Scientific Advisory Board

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## FOREWORD

Section 2904(h) of title 10, United States Code, requires that an Annual Report of the Strategic Environmental Research and Development Program (SERDP) Scientific Advisory Board (SAB) be submitted to Congress no later than March 15 of each year. The Annual Report is required to describe the actions of the SAB during the preceding year and provide any recommendations, including recommendations related to projects, programs, information exchange, and additional legislation within the scope of SERDP. This report includes program recommendations made during the SAB meetings of FY93.

## INTRODUCTION

This is the second Annual Report of the Strategic Environmental Research and Development Program (SERDP) Scientific Advisory Board (SAB).

The Strategic Environmental Research and Development Program was established by the Secretary of Defense pursuant to 10 U.S.C. §2901. The program is intended to identify and develop technology that will enhance the capability of the Department of Defense (DoD) and the Department of Energy (DOE) to meet their environmental obligations. In addition, the program is intended to provide technology and information that may be useful to other governmental and private organizations in addressing environmental concerns. SERDP is also intended to provide a vehicle that facilitates transferring appropriate technology from the private sector to address DoD and DOE environmental and energy issues.

Specifically, the purposes of the Program are the following:

- (1) Address environmental matters of concern to DoD and DOE with support for basic and applied research and the development technologies that can enhance the capabilities of the departments to meet their environmental obligations.
- (2) Identify research, technologies, and other information developed by DoD and DOE for national defense purposes, involving the development of energy technologies and technologies that address environmental restoration, waste minimization, hazardous waste substitution, and other environmental concerns; and share such research, technologies, and other information with such governmental and private organizations.
- (3) Furnish other governmental and private organizations with data; enhance collection and analytical capabilities for use by such organizations in the conduct of environmental research.
- (4) Identify technologies developed by the private sector that are useful to DoD and DOE defense activities concerning environmental restoration, hazardous and solid waste minimization and prevention, and hazardous material substitution; and provide for the use of such technologies in the conduct of such activities.

The SERDP Scientific Advisory Board was established pursuant to 10 U.S.C. §2904 and charged with the following:

- (1) Providing technical review of each proposed research project equal to or in excess of \$1 million, including the estimated costs for research in, and development of, technologies related to environmental activities, and making any appropriate recommendations to the SERDP Council regarding such proposal

or project.

(2) Making recommendations to the Council regarding technologies, research, projects, programs, activities, and if appropriate, funding within the scope of SERDP.

(3) Assisting and advising the Council in identifying environmental data and analytical assistance activities within the scope of SERDP.

The SERDP Organization Chart (Figure 1) provides a graphic description of the functional management structure. The SAB is responsible for providing guidance and recommendations to the SERDP Council on those programs reviewed; however, the Council may accept or reject the recommendations. Furthermore, the SERDP Council retains responsibility for Program strategy development.

For FY93, as recommended by the Executive Director, the Scientific Advisory Board reviewed proposed research projects approaching or in excess of \$1 million, made recommendations to the SERDP Council regarding the programs reviewed, and assisted and advised the Council in identifying environmental data within the scope of SERDP. Additional responsibilities of the SAB included providing guidance and advice on other related environmental issues within the scope of SERDP, as requested by the SERDP Council.

## **ORGANIZATION AND PROCESS**

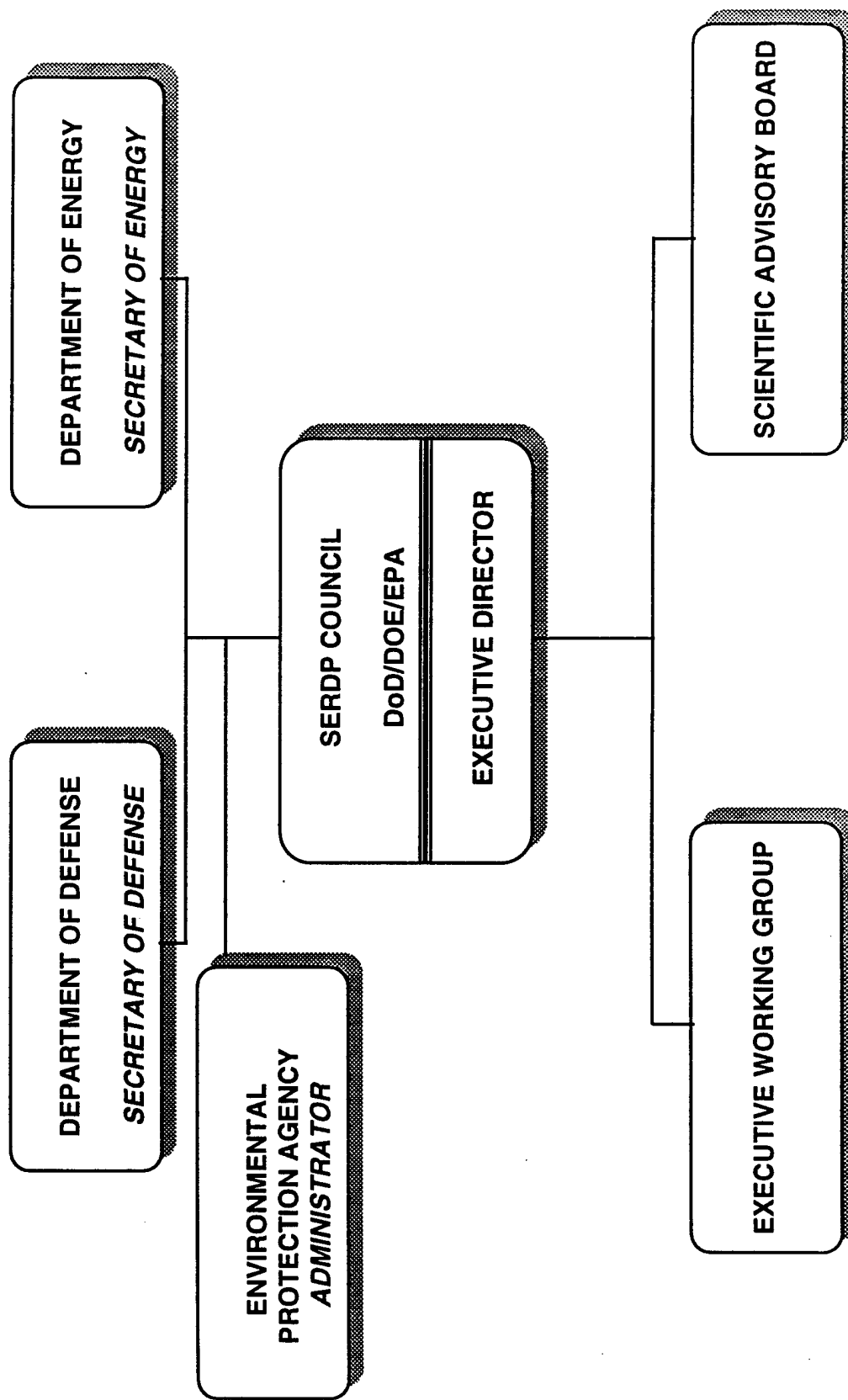
Section 2904(a-c) of title 10 U.S.C. requires the joint appointment of members of the Scientific Advisory Board by the Secretary of Defense and the Secretary of Energy, in consultation with the Administrator of EPA. Membership consists of not less than six (6) nor more than fourteen (14) members, appointed for three (3) year terms, with due regard given to equitable representation of scientists and engineers, and represent women or ethnic minority groups.

The Science Advisor to the President or designee and the Administrator of the National Oceanic and Atmospheric Administration or designee are permanent SAB members. The Heads of the National Academy of Sciences, National Academy of Engineering, and Institutes of Medicine have nominated persons for appointment; the Council on Environmental Quality has nominated at least one person representative of environmental public interest; and the National Association of Governors has nominated at least one person representative of interests of State governments.

During FY93, Dr. Peter Raven resigned as a member of the Board because of excessive professional and personal commitments that precluded his active participation. This event has not affected the balance of the Board.

FIGURE 1

# SERDP ORGANIZATION



Appendix A contains a listing of the FY93 members of the Scientific Advisory Board. All SAB members complied with 10 U.S.C. §2904(i), which requires the filing of a financial disclosure statement by all members.

On July 9, 1992, the Secretary of Defense appointed Dr. Robert B. Oswald to serve as the Executive Director of SERDP. He is the designated employee of the Federal Government for attending the SERDP SAB meetings in accordance with the requirements of Subsection 10(e) and (f) of the Federal Advisory Committee Act. During FY93, Dr. Oswald called the meetings, approved the agendas, and attended all the meetings of the SERDP SAB.

Three SAB meetings were held during FY93 in the Main Auditorium of the National Guard Building, One Massachusetts Avenue, N.W., Washington, DC. The Scientific Advisory Board reviewed the top 50 percent of recommended program proposals during the first meeting, the lower 50 percent during the second meeting, and proposals that were requested to return with further clarification during the third meeting. In accordance with the Federal Advisory Committee Act, announcements of all meetings were published in the Federal Register, meetings were open to the public, detailed minutes were taken, and all records, reports, minutes, working papers, and agendas were made available for public inspection.

The SAB's Charter was renewed on July 8, 1993 and filed with the Department of Defense, Director of Administration and Management, in accordance to the Federal Advisory Committee Act, Section §14(b)(2).

### **PROPOSAL AND PROJECT EVALUATION PROCESS**

Section 2904 of title 10 authorized the SERDP SAB to develop procedures for carrying out its responsibilities. Consistent with this authority and in order to effectively and objectively evaluate project proposals, the SAB developed Project Proposal Formats and Project Selection Criteria in FY92. The understanding of the process, procedures, and criteria were essential elements in the SAB's obtaining pertinent information on a particular project in order to make an objective and informed recommendation to the SERDP Council. The process was further refined during FY93. The members encouraged the Executive Director to demand that the proposals and the briefers comply with the proposal and briefing formats. Failure to comply should be viewed as not fulfilling the requirements of the program. To capitalize on the expertise of members of the Scientific Advisory Board, thrust area subcommittees were established in FY93. The six subcommittees, consisting of no more than two members, met prior to an SAB meeting to review and confer on the proposals being briefed, enabling them to summarize their position and provide a recommendation to the entire Board. Although each proposal was briefed to the full SAB, the Board had the benefit of additional examination and evaluation by subcommittee members who had appropriate expertise in the subject thrust area.

## SERDP THRUST AREAS

The SERDP efforts in FY93 were based on the four existing pillars within the Services Environmental Quality Technology Program and two specific areas of congressional interest - Alternate/Clean Energy and Global Environmental Change. They focused on the need to emphasize the assessment of the state of global atmospheric and ocean environments; the development and evaluation of the effectiveness of clean-up technologies for hazardous waste; the development of approaches to minimize, treat, and dispose of hazardous waste, as well as methods for assessing hazards in existing and restored sites. SERDP also promoted understanding of the impacts of the Department's operations on our natural and culture resources and demonstrated alternative and/or clean energy technologies on DoD installations. The following specific FY93 SERDP Thrust Areas are consistent with these needs.

### **Alternate/Clean Energy**

This area includes research on environmentally sound alternative energy sources to reduce dependence on petroleum-based sources, overall energy consumption, energy costs and greenhouse effects.

Representative activities include research and demonstration on expanded use of renewable energy resources, such as geothermal, solar photovoltaic, wind and hydropower; research and technology demonstration on innovative, substitute and alternative energy sources to reduce emissions and fossil fuel consumption; and research and demonstration on reduced energy-consuming techniques, components, and power units/sources that contribute to reduced energy consumption.

### **Compliance**

This area includes technologies for environmental monitoring, waste treatment, end-of-pipe recycling and disposal, and environmental management not directly related to site restoration, but related to meeting current and future environmental compliance requirements. It includes understanding the fate and transport of defense-related wastes and pollutants as well as methods and techniques for mitigating ecological and health impacts of these materials in the environment.

Representative activities include developing tools to monitor and assess environmental compliance and management; developing source treatment and control technologies for installation support operations (waste, waste water, solid waste management and air pollution); developing new treatment and control technologies for hazardous wastes resulting from energetics production, manufacturing, and maintenance operations; research to ascertain the toxicological effect to humans and ecosystems from exposure to chemicals and materials used in defense activities; and research on environmentally and economically acceptable alternatives to open burning or open detonation of liquid

rocket propellants, munitions, and energetic materials.

### **Conservation**

This area focuses on research toward understanding, protecting, and maintaining biophysical resources and facilities relative to material and cultural resources in order to ensure (1) compliance with environmental laws; (2) sustained use of land and coastal resources; and (3) support for stewardship of those resources on relevant federal lands. These resources include all biophysical resources associated with and related to ecosystems and habitat, e.g. soils, vegetation, landform, water and biodiversity; and facilities and landform associated with historic and archeological resources. Efforts are intended to (1) effectively predict the presence, quantity, and quality of natural and cultural resources; (2) improve the knowledge of the basic processes of these resources as they relate to, and are impacted by, use of lands; and (3) advance the technology to mitigate, rehabilitate, and maintain these resources.

Representative activities include developing and advancing remote field data collection techniques to locate and quantify resources; developing an understanding of species-species and species-habitat relationships and how they are affected by federal land use; developing long-term, multiple use management strategies to optimize resource protection; and developing proactive land use and management tools and techniques to protect threatened and endangered resources and habitats.

### **Installation Restoration**

This area focuses on technology development and demonstration for more efficient, effective environmental cleanup of soil, sediment, groundwater, surface water, and structures contaminated with hazardous, radioactive, and toxic materials from past activities. Cleanup/remediation techniques, treatment technologies, and monitoring assessment methods are the principal focus of this area.

Other representative activities include developing and demonstrating innovative technologies or techniques for handling hazardous waste or materials of particular concern or uniqueness to defense programs (not whole site cleanup); developing and demonstrating innovative site characterization techniques; developing and demonstrating innovative monitoring techniques (chemical and biological) to gather data before restoration begins, during the operations, and after it is completed; and developing and demonstrating innovative technologies for assessing fate and transport effects.

### **Pollution Prevention**

Pollution prevention means source reduction, as defined under the Pollution Prevention Act of 1990 and other practices that reduce or eliminate the creation of pollutants through increased efficiency in the use of raw materials, including energy, water and

other resources, or materials substitution. The term includes equipment or technology modifications, process or procedure modifications, reformulation or redesign of products, substitution of materials and improvements in housekeeping, maintenance, training, or inventory control. Under the Pollution Prevention Act, pollution prevention does not include end-of-pipe recycling, energy recovery, treatment, and disposal. Practices commonly described as in-process recycling qualify as pollution prevention.

Representative activities include developing and/or evaluating innovative pollution prevention technologies, processes, and environmental management techniques for reducing or eliminating wastes, effluents, or emissions at DoD and DOE processes and facilities; research on protective coating, coating removal, process modification, substitute processing chemicals, and alternative processes to reduce or eliminate hazardous waste generated by electroplating, paint stripping, and metal cleaning operations; process modeling to eliminate or minimize the waste stream; and research to identify alternatives to introducing hazardous materials into an in-process waste stream in order to render that waste stream environmentally acceptable, preferably benign.

### **PROPOSALS REVIEWED AND RECOMMENDATIONS**

All proposals considered by the SAB during FY93 and their recommendations are summarized in the tables in Appendix B. The SAB received and reviewed 29 proposals, totaling a requested value of \$57.93 million. From their actions, 27 proposals were recommended for funding, and accordingly, \$8.7 million was identified for redistribution to other focused SERDP proposals.

As a separate issue, the Board submitted a recommendation in the form of a letter to the Director, Defense Research and Engineering, to create a Nuclear Engineering Corps (NEC). This uniformed organization would assume the responsibility "for the design, construction and operational management of commercial nuclear power plants and manage/disposal of their waste products. The creation of an independent highly trained and professionally disciplined cadre will have tangible benefits in addition to fostering public confidence."

### **SUMMARY**

The SERDP Scientific Advisory Board represents a diverse membership from the scientific community whose professional backgrounds and areas of expertise provide an unbiased, objective, and forward-looking perspective in the evaluation of proposals. The SAB encourages coordinated efforts by the Department of Defense, the Department of Energy, and the Environmental Protection Agency in successfully meeting their environmental challenges and obligations. It is intended that the SAB be totally integrated within the SERDP management structure and therefore instrumental to establishing an appropriate focused R&D program. The issues include, but are not limited to, recommendations in the project selection process, areas ripe for technology

development, technology transfer between private industries and governmental agencies, feasibility and applicability of using federal data resources for environmental use, and overall strategy formulation and program management issues. This group of high-level, dedicated, environmental professionals ensures that duplication of effort is minimized between the participating agencies and that the SERDP Council is investing scarce resources wisely.

The Scientific Advisory Board has been, and will continue to be, an active and concerned partner in the effort to enhance the agencies' capabilities to meet their environmental commitments, to encourage technology transfer and collaborative efforts, and to focus on methods to meet the environmental challenges of the future.

During FY94, the SERDP Scientific Advisory Board will continue to assist the SERDP Council to effectively address environmental matters of concern to the Department of Defense and the Department of Energy. It is anticipated that the Board will play a more proactive role in program review and development.

## Appendix A - SCIENTIFIC ADVISORY BOARD MEMBERSHIP

Colwell, Rita R.

Current Position: President, Maryland Biotechnology Institute and Director, Center of Marine Biotechnology, University of Maryland.

Degrees: Ph.D., University of Washington.

Previous Positions: Professor of Microbiology, Vice President for Academic Affairs, and Director, Sea Grant College, University of Maryland; Associate Professor of Biology, Georgetown University.

Professional Activities: Chairman, Board of governors, American Academy of Microbiology; Member, National Association of Marine Laboratory Directors; Vice Chairman, Polar Research Board, National Academy of Sciences; Member, Mathematical Sciences Education Board, National Research Council.

Awards: Distinguished Scientist and Lecturer Award, Society for Experimental Biology and Medicine, 1979; Tenth Annual Sea Grant Lecturer and Research Award, MIT, 1982; Fisher Award, American Society for Microbiology, 1985; Gold Medal Award, International Institute of Biotechnology, 1990.

Author or co-author of 14 books, 47 book chapters (since 1984) and 165 articles (since 1983).

Conway, Richard A.

Current Position: Senior Corporate Fellow, Union Carbide Corporation.

Degree: M.S., Environmental Engineering, MIT, 1957.

Previous Positions: Corporate Fellow, Development Associate, Group Leader, and Development Engineer, Union Carbide Corporation.

Professional Activities: Member, National Academy of Engineering; Member, Science Advisory Board, EPA; Member, Committees on Engineering and Technical Systems, National Research Council/National Academies of Sciences and Engineering; Chairman, Hazard Assessment Study Group, International Association on Water Quality.

Awards: Outstanding Leadership Award, ASTM Committee D-34 on Waste Disposal; Award for Personal Achievement in Chemical Engineering, Chemical Engineering, 1986; Dudley Medal, ASTM, 1984; Special Service Award, ASTM Committee D-34, 1983; Rudolfs Award, Water Pollution Control Federation, 1983; State-of-the-Art Civil Engineering Award, American Society of Civil Engineers, 1975; Rudolfs Award, Water Pollution Control Federation, 1974; Hering Award, American Society of Civil Engineers, 1974; Gascoigne Award, Water Pollution Control Federation.

Author or co-author of one book and twenty publications, and editor/co-editor of eight books.

Eno, Amos S.

Current Position: Executive Director, National Fish and Wildlife Foundation, Washington, DC.

Degree: M.A., Cornell University, 1977.

Previous Positions: Director, Conservation Programs, National Fish and Wildlife Foundation; Director, Wildlife Programs, National Audubon Society; Special Assistant to the Chief, Office of Endangered Species, U.S. Fish and Wildlife Service.

Professional Activities: Consultant/Production assistant to National Audubon Society's TV specials and to WTBS for wildlife films; Consultant to President's Commission for Americans Outdoors;

Author of FY 89-93 (annual) Federal Agency Needs Assessments, four Audubon Wildlife Reports, and Crossroads: Environmental Priorities for the Future; co-author, Wolf Recovery in the Northern Rocky Mountains.

Gade, Mary A.

Current Position: Director, Illinois Environmental Protection Agency.

Degree: LLD, Washington University School of Law.

Previous Positions: Deputy Assistant Administrator for Solid Waste and Emergency Response, EPA; Associate Division Director, Branch Chief and Staff Attorney for Superfund, EPA Region 7.

Professional Activities: Instructor, Roosevelt University; Membership on various EPA workgroups and task forces.

Published an article, "Hazardous Waste Management in Developing Countries", 1987.

Jahn, Laurence R.

Current Position: Chairman, SERDP Scientific Advisory Board.

Degree: Ph.D., Wildlife Ecology and Management, University of Wisconsin.

Previous Positions: Past Board Chairman, United Conservation Alliance; Board Chairman; President; Vice-President; Director of Conservation, Wildlife Management Institute. Wildlife Research Biologist, Wisconsin Dept. of Natural Resources.

Professional Activities: Chairman, Natural Resources Council of America; Secretary-Treasurer, North American Wildlife Foundation; Secretary, Wildfowl Foundation; Member and Chairman, National Watershed Coalition; Chairman, U.S. Implementation Board for the North American Waterfowl Management Plan; Chairman, Chief of Engineers' Environmental Advisory Board.

Awards: Aldo Leopold Medal, Wildlife Society; Barbara Swain Medal, Natural Resources Council of America.

Authored numerous papers and reports, assisted editing and publishing a number of award-winning books on wildlife ecology and management.

**Moss, Marvin K.**

Current Position: Provost and Vice Chancellor for Academic Affairs, The University of North Carolina at Wilmington.

Degree: Ph.D., Physics, North Carolina State University, 1961.

Previous Positions: Associate Vice-Chancellor for Marine Sciences, University of California, San Diego, and Deputy Director, Scripps Institution of Oceanography.  
Director, Office of Naval Research; Associate Director, Office of Energy Research, DoE; Director, Nuclear Division, U.S. Arms Control and Disarmament Agency; Professor of Physics, North Carolina State University.

Awards: Executive Committee, International Ocean Drilling Program; American Association for the Advancement of Science; American Geophysical Union; Atomic Energy Commission Fellow; NSF Senior Post-Doctoral Fellow, Tait Institute of Mathematical Physics, University of Edinburgh and Imperial College, University of London; IAEA International Nuclear Fuel Cycle Evaluation Committee; Presidential Rank Meritorious Government Executive, 1985; U.S. Navy Distinguished Civilian Service Award, 1987.

**Parker, Frank Leon**

Current Position: Distinguished Professor of Environmental and Water Resources Engineering, Vanderbilt University.

Degree: Ph.D., Harvard University, 1955.

Previous Positions: Professor of Management of Technology, Vanderbilt University; Senior Research Associate, Vanderbilt Institute of Public Policy Studies;

Professional Activities: Chairman, Environmental Advisory Committee, Pennsylvania Power and Light Company; Chairman, Board of Radioactive Waste Management, National Academy of Sciences (NRC); Leader, National Academy of Sciences Delegation to the Soviet Union on Cooperation in Radioactive Research and Management.

Awards: The Alexander Heard Distinguished Service Professor, 1988-89, and appointment as a Senior Research Fellow, The Beijer Institute, The Royal Swedish Academy of Sciences, 1984-1987.

Co-author of three books, co-editor of two books, author or co-author of 25 book chapters and 40 journal articles.

**Raven, Peter H.**

Current Position: Director, Missouri Botanical Gardens; Professor of Botany, Washington University; Adjunct Professor of Biology, St. Louis University and University of Missouri-St. Louis.

Degree: Ph.D., UCLA, 1960.

Previous Positions: Senior Research Fellow, New Zealand Department of Scientific and Industrial Research; Associate Professor, Stanford University; Taxonomist and Curator, Rancho Santa Ana Botanic Garden, Claremont, CA; NSF Postdoctoral Fellow, British Museum (Natural History).

Professional Activities: President, International Organization of Plant Biosystematics; Member of Editorial or Advisory Boards for sixteen professional journals; Member, Scientific Advisory Board, National Tropical Botanical Garden; Council member, International Association for Plant Taxonomy; Member, Committee on Research and Exploration, National Geographic Society; Member, Chairman's Council, Conservation International; Member, National Council, World Wildlife Fund and Conservation Foundation.

Awards: Honorary D.Sc. degrees from eight U.S. and foreign universities, 1982-1990; Honorary D.Hum., Webster University, 1989; Award of Merit, Botanical Society of America, 1977; Distinguished Service Award, American Institute of Biological Sciences, 1981; International Environmental Leadership Medal, United Nations Environmental Program, 1982; International Prize for Biology, Government of Japan, 1986; Honor Roll of Global 500, United Nations Environmental Program, 1987; National Conservation Achievement Award, National Wildlife Federation, 1989.

Co-author, editor or co-editor of nine books and nine other publications since 1985.

**Ryan, Michael J.**

Current Position: Senior Vice President, Metcalf & Eddy Incorporated.

Degree: Ph.D., Environmental Engineering, University of North Carolina, 1975.

Previous Positions: Executive Vice-President, ICF Technology Inc.; Program Director of various ICF programs; Chief of Environmental Policy, USAF; Director of Environmental Engineering and Industrial Hygiene, Strategic Air Command HQ.

Professional Activities: Consultant to the USAF Surgeon General; Member, USAF Engineering and Services "Future Vision" Panel; Professional Engineer (Texas); Board Certified Industrial Hygienist.

Author or co-author of nine articles or other publications since 1985.

**Weber, Walter J., Jr.**

Current Position: Chairman, University Program in Water Resources and Director, Great Lakes and Mid-Atlantic Hazardous Substance Research Center, University of Michigan.

Degree: Ph.D., Water Resources Engineering, Harvard University, 1962.

Previous Positions: Visiting Professor, University of California at Berkeley and University of Melbourne, Australia, 1971; Post-Doctoral Fellow, Harvard University, 1962-1963.

Professional Activities: Member, National Academy of Engineering, National Society of Professional Engineers, American Academy of Environmental Engineers, American Chemical Society, American Institute of Chemical Engineers, American Society of Civil Engineers (Fellow); Advisory Board, Journal of Environmental Science and Technology; Editorial Board, Journal of Contaminant Hydrology; Board of Environmental Studies and Toxicology, NRC.

Awards: Distinguished College Professor, University of Michigan, 1987; Stephen S. Atwood Award for Engineering Excellence, University of Michigan, 1987; Distinguished Faculty Award, State of Michigan, 1989; Distinguished Scientist Award, EPA, 1991.

Author or co-author of 42 publications since 1985.

**SCIENTIFIC ADVISORY BOARD MEMBERSHIP**  
**Permanent Membership Positions**

**Maynard, Nancy G.**

**Represents Science Advisor to the President**

Current Position: Assistant Director for the Environment, Office of Science and Technology Policy, Executive Office of the President.

Degrees: Ph.D., Biological Oceanography, University of Miami, Florida, 1974.

Previous Positions: Associate Chief for Research, Laboratory for Oceans, NASA/Goddard Space Flight Center; Branch Head, Oceans and Ice Branch, NASA/Goddard Space Flight Center; Resident Research Associate, National Research Council (NASA), Jet Propulsion Laboratory, California Institute of Technology; Research Associate, Visibility Laboratory, Scripps Institution of Oceanography, University of California; Staff Director, Board on Ocean Science & Policy, National Academy of Sciences; Policy Analyst, Executive Office of the President, Office of Science and Technology Policy, Department of Commerce, Science and Technology Fellow; Oil Spills Scientific Support Coordinator, National Oceanic and Atmospheric Administration.

Professional Activities: American Association for the Advancement of Science, The Oceanography Society, American Geophysical Union, Association for Women in Science, Member, Board of Directors for the Women's Aquatic Network, Member, Corporation of Bermuda Biological Station for Research.

Awards: Certificate of Recognition from National Oceanic and Atmospheric Administration, IXTOC I Oil Spill; Unit Citation from National Oceanic and Atmospheric Administration, Campeche Oil Spill; Public Service Commendation from U.S. Coast Guard, Alaska Oil Spill Response.

Author or co-author of more than 20 chapters or scientific journal articles.

**Ostenso, Ned A.**

**Represents Administrator, NOAA**

Current Position: Assistant Administrator for Oceanic and Atmospheric Research and Chief Scientist, National Oceanic and Atmospheric Administration (NOAA).

Degrees: Ph.D., University of Wisconsin, 1962.

Previous Positions: Deputy Assistant Administrator for Research and Development and Director of the National Sea Grant College Program; Deputy Director and Senior Oceanographer of the Ocean Science and Technology Division, Office of Naval Research; Assistant Presidential Science Advisor in the Office of Science and Technology of the Executive Office; Faculty, University of Wisconsin, Department of Geology and Geophysics.

Professional Activities: Member of numerous scientific professional associations and advisory committees; Johns Hopkins School for Advanced International Studies; American Political Science Association Fellow in the U.S. Senate and U.S. House of Representatives, where he developed the National Earthquake Hazard Reduction and National Climate Program Acts; Woods Hole Oceanographic Institution; the Lamont-Doherty Geological Observatory of Columbia University; the Arctic Institute of North America.

Awards: Meritorious Service Award from the Department of Defense, the Navy Department, and the National Academy of Sciences; Mountain in Antarctica and a seamount in the Arctic Ocean named after him.

Author of over 50 published scientific research papers.

## APPENDIX B - PROPOSALS AND RECOMMENDATIONS

TITLE / AGENCY / REQUESTED VALUE	SUMMARY	RECOMMENDATION
<b>ALTERNATE/CLEAN ENERGY</b>		
<p>Demonstration and Evaluation of New Energy Technology in Department of Defense Installations (DOE) \$2M</p>	<p>The goal of the project is to foster accelerated deployment of new and emerging U.S. technologies at DoD facilities. These technologies are aimed at saving energy, reducing operating expenses, providing positive environmental benefits, and enhancing facilities operation. A key objective is to document and disseminate the benefits associated with use of new U.S. technologies in DoD facilities. Both technology demonstration and technology transfer are emphasized.</p>	<p>In spite of the fact that this proposal is a continuation and enhancement of a Phase I effort, the Board voted unanimously not to recommend this proposal. This rejection is based on the factors that it lacks R&amp;D, lacks planning to target specific energy conservation technology areas, and exhibits limited basis of systems comparisons for cross referencing and down select of technologies.</p>
<b>COMPLIANCE</b>		
<p>Jet Engine Test Cells and steady State Combustion Emissions Control (Air Force) \$1M</p>	<p>The principal technical objective of this project is use the engineering platform of a full-scale installation on an operating jet engine test cell (JETC) to work out the technical details needed to prepare a generic design for a NOx control for JETCs. The secondary objective is to gather performance and cost data (including disposal of spent sorbent) for applications to a representative spectrum of steady-state sources: a field incinerator for spill remediation, a boiler, a bank of diesel generators, and tailpipe emissions from gasoline and diesel vehicle engines. The latter will be used in cost-benefit comparisons with established control technologies.</p>	<p>The Board concurred with the concept of this proposal as it demonstrates a potential to reduce combustion emissions. However, emphasis should be shifted from a focus of demonstrating test cell emission control, to one of understanding the science and mechanics of this emissions control technology. The revised proposal objective should help exploit this technology to both listed applications and other opportunistic applications. The Board further suggested that the title of this project be amended to "Steady state and non-steady state source emissions control." The Board voted unanimously to recommend acceptance of the modified proposal. It answered the Board's concerns and followed their guidance for modification to address R&amp;D issues and broadened applications, and not to focus solely on an Air Force base compliance action.</p>

TITLE / AGENCY / REQUESTED VALUE	SUMMARY	RECOMMENDATION
<b>COMPLIANCE</b>		
Solar Detoxification of Explosives in Water (DOE) \$1.3M	The goal of this proposal is to develop a cost effective solar photochemical process that can reduce the level of contaminants in pink water to meet environmental regulations. While the contaminated groundwater must be dealt with on a site-by-site basis, eliminating explosives-contaminated water effluent from the various munitions processes will deal with the problem at its source and is the long-term solution to the problem.	The SAB had concerns over the program plan and requested funds (\$1.3 million), specifically, that the subcontract statement of work is scheduled to be developed prior to completion of the research that would establish limits and specifications necessary to define and design a prototype system. Accordingly the Board disapproved the proposal as submitted, but supported the development of this technology by requested the presenter to revise the proposal to concentrate on the basic research necessary to: define the problem, describe the research required, and communicate the steps necessary to develop and demonstrate this technology. A revised proposal that complied with the desires of the Board was submitted for \$890 thousand and was recommended for FY93 funding.
ADVACATE Boiler Emission Control System (EPA) \$1.3M	The ADVACATE process was developed by the University of Texas, Air and Energy Engineering Research Laboratory/EPA, and Acurex Environmental, Inc. as a low-cost SO <sub>2</sub> control process using a unique dry sorbent prepared from boiler fly ash and lime. The goal of this project is to augment with FY93 funds a demonstration of ADVACATE SO <sub>2</sub> control technology previously funded in Phase I by adding features for NO <sub>x</sub> control, adding air toxics control, extending testing and analyses to demonstrate NO <sub>x</sub> and air toxics reduction, and preparing an engineering evaluation in final report that evaluates applicability and projected pollutant reductions at DoD facilities.	The Board recognizes the responsibility that has been placed on the Department of Energy with regard to stimulating technology development to enhance coal energy power, as directed by Congress. The proposal adequately addresses a significant issue for "stoker" coal-burning boilers and accordingly recommends approval.

TITLE / AGENCY / REQUESTED VALUE	SUMMARY	RECOMMENDATION
Supercritical Water Oxidation Technology Demonstration (Navy/DOE) \$900K	<p>The primary objective of this proposed joint effort is to demonstrate SCWO technology, at the pilot plant scale, as a method of destroying selected, non-radioactive, organic hazardous wastes generated by DoD and DOE industrial shop operations. The proposed joint project will consist of three phases: (1) Demonstration using existing pilot plant, Data Acquisition, and Implementation process development (2) Advanced Pilot Plant Design and Demonstration, and (3) Transition Plans.</p>	<p>The Board initially did not recommend approval of this proposal. Critical issues of concern, including those relating to system corrosion and alternate/advanced materials application, can and need to be demonstrated at laboratory scale. A restructured, redirected effort was encouraged and welcomed for return to the Board. In lieu of a presentation to the Board, a letter from the DOE was submitted explaining that the DOE and the Supercritical Water Oxidation National Steering Committee "has evaluated the present state of the technology and have determined that a pilot scale development is warranted and required to advance the technology for processing hazardous and mixed radioactive waste." They acknowledged a need for materials research to combat the corrosion problems and stated that the Steering Committee participants were engaged in materials development. Consequently, DOE did not feel that a representation would reveal any new information to the SAB. The Board then drafted a letter in response stating that SERDP maintained interest in the technology development and would be willing to reevaluate a new proposal in the future that could demonstrate the reliability of this technology without extensive corrosion problems. Subsequent to the meeting, this proposal was appealed by the Office of the Secretary of Defense (Environmental Security) and the Navy. A revised proposal requesting \$900 thousand was submitted to the Executive Director with milestones that were consistent with the recommendations of the Board. This revised effort was funded.</p>

TITLE / AGENCY / REQUESTED VALUE	SUMMARY	RECOMMENDATION
<b>COMPLIANCE</b>		
Shipboard Non-Oily Wastewater Treatment System (Navy) \$1.25M	<p>The technical objective of this project is to demonstrate ultrafiltration membranes as the basis for a treatment process for shipboard graywater, blackwater, and combined graywater and blackwater aboard a U.S. Navy auxiliary ship (submarine or destroyer tender). The successful shipboard system will be capable of consistently producing an effluent that meets water quality standards of 30 mg/l for Biochemical Oxygen Demand (BOD), 30 mg/l for Total Suspended Solids (TSS), fewer than 14 Fecal Coliform/100 ml, and be non-toxic.</p>	<p>The proposal initially disapproved this proposal due of an inordinate emphasis on ultra-filter membrane technology, an approach which taken alone will not achieve demonstration nor system objectives. The Board requested that the proponent return with a revised, phased proposal that would incorporate the demonstration of a bench scale prototype to address the pre- and post-treatment problems that were uncovered in the original brief. The proponent included those suggestions from the previous meeting into the revised proposal. The Board approved the proposal and suggested that the National Institute of Science and Technology be consulted for its biochemical expertise.</p>
Capacitive Deionization as a Means of Elimination Secondary Wastes Associated with Conventional Ion Exchange (DOE) \$1.1M	<p>The project proposes the development of capacitive deionization as an efficient process for the removal of ionic contaminants from aqueous streams. In this novel process, ions are retained in electric double layers formed at the surfaces of two porous electrodes of opposite polarity. If this process is successful, capacitive deionization will probably replace many existing ion exchange processes, thereby eliminating the associated secondary waste. Such technology could be used to treat various aqueous streams, including waste water, drinking water, boiler water for power plants, and process water for semiconductor manufacturing. Deionization of boiler water is used as a means of preventing fouling and corrosion of heat transfer surfaces. It may even be possible to use capacitive deionization for the energy-efficient desalination of sea water.</p>	<p>While impressed with the proposal's overall research objectives and methodology, the Board considered the manpower costs extraordinarily high for the tasks to be conducted. The SAB recommended that Principal Investigator provide a detailed budget delineating costs per task and associated manpower necessary to conduct the proposed bench-scale evaluation. After entering a technical discussion with the Board regarding the critical path technology, the demonstration of carbon aerogel, they jointly negotiated a technical approach that was properly structured and had the best chance of success. The Principle Investigator submitted a revised proposal which was funded at \$795K.</p>

TITLE / AGENCY / REQUESTED VALUE	SUMMARY	RECOMMENDATION
<b>CONSERVATION</b>		
Assessment and Management of Risks to Biodiversity and Habitat (EPA) \$1M	This research will develop and test a new risk based paradigm for identifying those areas having species assemblages that contribute the greatest genetic diversity to the biota of their biogeographic regions and then managing those areas to sustain biodiversity.	The Board recommended approval for providing \$1 million of SERDP FY93 funds to the program, but the funds be limited to support the West Coast Transect Project. Within this Transect, the effort should focus on resident military facilities, and accordingly, the major deliverables should be modified to focus on (DoD) concerns.
Fishing Enforcement/Stock Assessment and Marine Mammal Monitoring (Navy) \$2M	The technical objectives of this proposal are to recognize, analyze, record, track, and catalog the acoustic signatures of appropriate fishing vessels, fishing stocks, and marine mammals, on an ocean-basin scale. Also to exploit and extensively automate existing Inter-Array Processor (IAP), Low Frequency Analyzing and Recording (LOFAR), and related capabilities. Additional objectives are to apply neural net technology in the automation improvements, to provide accurate position information on potential violators to U.S. Coast Guard/National Marine Fisheries Service, and to optimize the measurement of noise spectra and their association to biologics.	Noting that this effort is a prime example of effective dual-use of Defense technology developed for the betterment of society, the Board strongly recommended this proposal for funding. Furthermore, the Board recommended use of this project as an example of how we can maintain the readiness of perishable, defense, manpower resources while at the same time provide this dual-use technology to environmental purposes. The Board urges this continued use and maintenance of military skills in view of declining Defense budgets.
<b>GLOBAL ENVIRONMENTAL CHANGE</b>		
Environmental Task Force \$2M	The ETF, a compilation of preeminent scientists from the 13 scientific disciplines, will be responsible for coordinating the environmental community's information needs with the unique classified data and data collection systems of the intelligence community. They will make recommendations on data opportunities in a final report for DoD, DOE, and the intelligence community organizations.	The SAB agrees fully with the objectives and approach of the proposal. The Board urges the Executive Director to discuss the possibility of increasing the funding amount.

TITLE / AGENCY / REQUESTED VALUE	SUMMARY	RECOMMENDATION
<b>GLOBAL ENVIRONMENTAL CHANGE</b>		
<p>Responsive Airborne Sensor Testbed for Environmental Research (RASTER-I) (Navy) \$1M</p>	<p>The technical objective of this project is to take advantage of existing environmental remote sensing capability in the form of a responsive multi-sensor aircraft (RASTER-I). Current data products, collection techniques and distribution techniques will be evaluated. Exploitation algorithms and methods, concept of operations, tasking procedures, etc. will be developed. Other sensors to be evaluated as possible subsidiary instruments include a multi-spectral imager, advanced Mid Wave and Long Wave Infra Red imagers, ultraspectral sensors (using a standard FTS instrument, or perhaps a spatially-modulated transform device) and a standard stereo mapping camera. These sensors, primarily existing equipment, would provide complimentary data extending collections into regimes with higher spatial resolution and improved emissive IR sensitivity.</p>	<p>The Board acknowledged that the proposal had significant potential to assist in assessing required environmental status, but it currently lacked many specific details that were crucial to determine life cycle success; specifically the identification of the user, the airframe and the suite of suitable technologies to address a need. A revised proposal was requested and included: the identification of the sensors to be used, a technical plan to integrate these sensors, and the correlation between the data to be collected and already existing data. The Board agreed to approve for first year funding.</p>
<b>INSTALLATION RESTORATION</b>		
<p>Demonstration of Enhanced Source Removal for Aquifer Restoration (EPA) \$2.2M</p>	<p>The objective of this research is to demonstrate processes for enhancing contaminant removal (enhanced pump-and-treat technologies) in a variety of geologic settings and to produce guidance documents for applying these processes to remediate contaminated groundwater. The guidance will address the entire remediation effort, including site characterization and supporting laboratory work required to achieve the maximum benefit from the remediation technologies included in the study.</p>	<p>The SAB unanimously approved the proposal for SERDP funding after ensuring that it was cooperatively supported by the Air Force and that it addressed a spectrum of non-aqueous phase liquids.</p>

TITLE / AGENCY / REQUESTED VALUE	SUMMARY	RECOMMENDATION
<b>INSTALLATION RESTORATION</b>		
Simulation of Impacts of Subsurface Heterogeneities on Remediation Effectiveness (Army) \$4.31M	<p>The project to be a joint effort with EPA and DOE that will improve the ability to cleanup contaminated groundwater sites. Currently, there are no reliable model systems that take subsurface heterogeneities into account to assist remediation efforts. The approach of this effort will include a detailed study of DoD/DOE candidate sites for data to verify results of models.</p>	<p>Acknowledging that the subject is an issue that deserves high priority, the SAB offered the presenters an opportunity to meet with resident knowledgeable members, Drs. Weber and Parker, to review the proposed research in sufficient detail, ascertain its technical merit, and provide suggestions to focus the research on key elements (i.e. constituents to be modeled and data requirements for model application). The Board suggested that details on proposal team coordination and funding allocation be clearly stated and a mechanism for oversight of the program be established. During a rebrief, the Board recommended approval of this project. A significant amount of effort over the last year has been expended to establish appropriate research objectives and ensure adequate coordination with other partners. If funded, it was recommended that this project be reviewed annually for a follow-on funding recommendation and should include a review of comments by a peer evaluation group which would be a new milestone to be included as part of the project.</p>
In-Situ Treatment of JP-5 and Fuel Oil Vapors in Unsaturated Soils (Navy) \$950K	<p>A field pilot study is ongoing at NAS Fallon, where a one acre system is treating part of a large JP-5 subsurface plume. The main emphasis of this proposed project is to scale-up existing bioventing technology, using information generated from NAS Fallon and published studies biotreating diesel fuel and Jet Fuel A. This scale-up will be accomplished through conducting a well monitored field demonstration study, which will involve bioventing an entire 4 acre JP-5 subsurface plume that surrounds Tank #1253 at MCAS Kaneohe Bay, Oahu, Hawaii. Research will be concentrated in approximately a 0.5 acre subplot that dissects the plume radius.</p>	<p>The SAB had concerns regarding the transferability of similar work done by the Air Force on JP-5 for the Navy problems with JP-4. Furthermore, the Board did not have confidence that the proposal represented sufficient R&amp;D, but rather that it reflected substantial remediation efforts. Accordingly, the Board did not initially recommend this proposal for approval, but did approve a motion to permit the briefer to resubmit the proposal with a statement as to how the work will advance the science and address the above issues. Upon rebriefing, the Board recommended approval for funding this revised proposal. However, they requested that one Air Force funded task to develop a DNA-based detection system for microorganisms, that degrade JP-5, be directly linked to the project's milestones and measures of success.</p>

TITLE / AGENCY / REQUESTED VALUE	SUMMARY	RECOMMENDATION
<b>INSTALLATION RESTORATION</b>		
<p>PCB Decontamination Using Base Catalyzed Decomposition Process (BCDP) (Navy) \$1M</p>	<p>The objective of this project is to conduct RDT&amp;E to modify, automate and perfect an effective technological procedure and process for remediating PCB-contaminated media. The BCDP is a chemical dechlorination method for PCB decomposition using inexpensive and non-toxic baking soda under a low temperature. A 1-2 ton per hour BCDP system has been fabricated for testing at Public Works Center, Guam. Further RDT&amp;E will result in a perfected, fully automated, cost-effective PCB decontamination system. The project tasks include the testing the existing unit at Guam, design of scaled-down BCDP operating units for future use, preparing a technology transfer package and assisting in technology implementation. The benefits of this effort are achieve PCB cleanup standards using non-toxic chemicals at a low temperature, and having a mobile treatment system that can be adapted to other chlorinated contaminants.</p>	<p>The Board resolved that this proposal contained tasks that were not appropriately funded by R&amp;D dollars. Scale design and systems development are the responsibility of the systems program manager, and consequently, the SAB rejected the proposal as submitted. However, the Board did approve a motion that requests the briefer to resubmit his proposal after eliminating the inappropriate, objectionable tasks, and focusing efforts on R&amp;D tasks including collection and synthesis of data, demonstration of the technology, and development of a data package for the future design of varied through-put processes. The Board provided approval/acceptance authority to the Executive Director should the revised proposal value be less than \$1 million. A revised proposal was submitted that complied with the desires of the SAB, and the Executive Director approved the \$400 thousand effort.</p>
<p>Ground Water Cleanup of Organic Contaminants (TCE/PCE) Using Methanotrophic Bioreactors (DOE) \$1.65M</p>	<p>This project is concerned with the demonstration of a large scale continuous flow fermenter (bioreactor) for the treatment of trichloroethylene and tetrachloroethylene. Contaminated ground water will be pumped to the surface and into a large vessel containing ceramic and activated carbon particles with a biofilm of methane-oxidizing microbes capable of degrading TCE and PCE completely to carbon dioxide and chloride. Cost effectiveness modeling has demonstrated that this technology will save at least 40-60% over conventional air stripping/activated carbon adsorption.</p>	<p>It was the Board's unanimous position that this proposal was well thought out; it contains an excellent team of expert participants; and it exhibits an apparent high assurance of success. Accordingly, the Board highly recommends approval of this proposal.</p>

TITLE / AGENCY / REQUESTED VALUE	SUMMARY	RECOMMENDATION
<b>INSTALLATION RESTORATION</b>		
Fuel Hydrocarbon Remediation (Navy) \$1.85M	<p>Many Navy/DoD sites contaminated with gasoline, diesel and JP-5 are located in coastal areas with shallow to moderately deep ground water aquifer. The goal of the this project, which is linked to the National DoD Test Site program, is to conduct field demonstrations of technologies that can remediate fuel contamination and transfer of these technologies for implementations to other sites. The target organizations for tech transfer will include Navy, DoD and other agencies that have fuel contamination. The technology demonstrations will be of value to the industrial sector as well.</p>	<p>This proposal was disapproved based upon its original presentation. It was requested to return by the Board with more emphasis on technical detail, planning for specific side-by-side demonstration, and integration of a peer evaluation process into the milestones. During the rebriefing, the Board acknowledged the importance and need for research in this area but was completely dissatisfied with the suggested technical approach. The SAB suggested that private industry be solicited via Broad Agency Announcement for further identification of novel technologies to be compared and specified that the focus of this proposal be kept to soil treatment. Costly technologies, such as photochemical oxidation, should be avoided. The Board approved to fund the Phase I soil treatment after the Principal Investigator negotiated with Executive Director to develop an acceptable plan and an appropriate budget. The proposal funding was reduced from \$1.85 million to \$895 thousand.</p>
A National Bioremediation Field Research and Demonstration Initiative, Wurtsmith AFB (EPA) \$1M	<p>The technical objective is to conduct controlled tests of alternative bioremediation approaches and processes in the field and to provide information necessary to design and engineer effective systems. Proven bioremediation technologies need to be developed for direct application at DOE, DoD, and Superfund sites. Closer correlation of laboratory and field results is an associated objective for these needs.</p>	<p>The Board recognized this proposal as a unique opportunity to coalesce the research advancements in biotechnology. The proposal was recommended for approval with the assurance that this would not necessarily be the only national bioremediation site.</p>

TITLE / AGENCY / REQUESTED VALUE	SUMMARY	RECOMMENDATION
<b>INSTALLATION RESTORATION</b>		
<p>Berkley Pit Resource Recovery Project at Butte, Montana (DOE) \$2M</p>	<p>The goal of this proposal is to evaluate, test and demonstrate technologies for the recovery of metals and minerals from dilute aqueous solutions and the reclamation of surface and ground water. The technical objective is to demonstrate available technologies for treating water to drinking water or agricultural/recreational standards and recovering metals for recycling.</p>	<p>While the magnitude of the problem of Berkley Pit is acknowledged, the Board was concerned about its relationship and pay off with respect to DoD and DOE objectives. Furthermore, it appeared that the proposal describes a down-select of several vendor-provided solutions, each of which having significant inherent deficiencies that will contribute to probable failure. The SAB recommended that a modified proposal should focus on the weaknesses of the various technical approaches of the candidate solutions. A package of technical approaches, that will collectively have a good probability of success, should be presented to demonstrate how they respond to DoD/DOE needs. In this manner, both the Federal and private sectors would benefit from proven technologies. Upon return, the Board again did not understand the proposal's relationship to SERDP objectives. It still did not specify those technologies that would be most effective. As written, the proposal was rejected, however the Board recommended that, should a future proposal be submitted, the proponent should identify the criteria for technology selection, narrow down the list of technologies to be compared and provide feasibility study data on those technologies having the greatest chance of success.</p>
<p>Development of Military IRIS System for the Hazard Identification and Risk Assessment/ Characterization of Defense Related Pollutants (EPA) \$1M</p>	<p>The goal of this research project is to develop a multi-level integrated risk information system for EPA/DOE and DoD. This project builds upon the current Phase I system for developing, sharing and transferring chemical specific health risk information, assessments and methods. This effort will be expanded to include research for the development of interactions data and methods for the risk assessment/characterization of defense/energy related chemical mixtures.</p>	<p>The Board recognized the value and importance of the proposed research and recommended that the proposal be funded, with modification. The SAB does not believe that it encompasses sufficient effort in the area of exposure assessment and transport issues. Coincident with this deficiency, the requested budget appears to be below that necessary to conduct meaningful research and accomplish the desired goals. An enhanced effort in the form of a revised proposal was asked to be returned to the Board for review. The revised proposal did not appear to be a coordinated, integrated effort. Consequently, the Executive Director limited the funding and scope of this proposal to that which was originally submitted and asked the proponents to plan for an expanded effort in the future.</p>

TITLE / AGENCY / REQUESTED VALUE	SUMMARY	RECOMMENDATION
<b>INSTALLATION RESTORATION</b>		
Ecotox Data Base (EPA) \$1.3M	The goal of this project is to develop a comprehensive computer-based system that provides chemical-specific toxicity values for aquatic life, terrestrial plants, and wildlife. It is intended that this database will support consistent ecologically-based regulatory activities within EPA, DoD and DOE that are needed to implement remedial action plans at contaminated Federal facilities.	The Board expressed concern that the proposal's objectives should be accomplished by EPA. However, they did agree that this effort is needed and funds be provided for only one year to initiate the effort. This recommendation includes their desire to send a clear message to EPA that follow-on data entry and data base maintenance should become a multi-agency responsibility and cost-sharing program in the outyears.
Tri-Service National Environmental Technology Demonstration Program (Tri-Services) \$9.07M	The goal of this proposal is to provide the infrastructure for the conduct and evaluation of side-by-side technology demonstrations on a characterized DoD site in a consistent, standardized methodology. The intent is to determine the relative cost-benefit of these side-by-side demos and down select based on the results. With participation by the EPA and local regulators, among others, it is hoped that acceptance and transition of the demonstrated technology will be facilitated. A minimum of six sites will be required to initiate demonstrations in the near-term. These six sites are based on the: contaminant of interest (energetics, fuels, solvents, heavy metals); media (soil or groundwater); and variability of soil conditions and types of contaminants.	The Board acknowledged that a well-managed National Test Center would not only be cost effective in the outyears, but would facilitate the transfer of technology into the private sector. However, the Board expressed concerns that the proposal was unable at this time to depict accurate funding needs and therefore requested a revised proposal to include specific information on site establishment including a revised funding profile. Final approval that requested \$8.24M was provided upon the Board receiving an acceptable revised proposal.

TITLE / AGENCY / REQUESTED VALUE	SUMMARY	RECOMMENDATION
<b>INSTALLATION RESTORATION</b>		
<p>Toxicology and Human Health Risks (Air Force) \$1.5M</p>	<p>It is the Toxicology Divisions's intent to go beyond PB-PK dosimetry studies and establish links between tissue dose and biological effect (pharmacodynamics). Pharmacodynamics aspects of research will include accounting for liver and kidney metabolism in rodents and humans and examining the cellular responses of these tissues to TCE/PCE and their metabolites. This research effort will use state-of-the-art techniques in molecular biology and mathematical modeling to derive scientifically based estimates of the risks posed to humans exposed to PCE and TCE.</p>	<p>The Board was in agreement on the need and importance of this research, and suggested that the Principle Investigator turn some of the attention to identifying exposure pathways. Fate and transport modeling would, according to the Board, give more meaning when quantifying the effects of TCE in human tissue. The Board also suggested that the proponents solicit the expertise of Dr. Roger McClelland of the Chemical Industry Institute of Technology. The proposal was approved unanimously.</p>
<p>Air Sparging and In-Situ Bioremediation Integrated Project Demonstration at Picatinny Arsenal, NJ (DOE) \$950K</p>	<p>The technical objective is to conduct controlled tests of alternative bioremediation approaches and processes in the field and to provide information necessary to design and engineer effective systems. Proven bioremediation technologies need to be developed for direct application at DOE, DoD, and Superfund sites. Closer correlation of laboratory and field results is an associated objective for these needs.</p>	<p>After being asked to return to the SAB with a better definition of the objectives of this proposal, the Board had serious reservations regarding the efficacy of the demonstration plan, as it did not appear to demonstrate an ability of the technology to address the unique characteristics of the plume, including total dissolved solids, dissolved organics, and chlorine, among others. The Board expressed a need for controlled experiments at the bench and pilot scale to better identify measures of effectiveness. Approval of a new, revised proposal was given provided that it was a) limited to a pilot scale demonstration, and b) reduced in budget and scope. Drs. Oswald and Weber were granted final review authority and approved the revised proposal and its modified request of \$557 thousand.</p>

TITLE / AGENCY / REQUESTED VALUE	SUMMARY	RECOMMENDATION
<b>POLLUTION PREVENTION</b>		
<p>Joint DoD/DOE Program for Agile, Clean Manufacturing for Technology for Propellants, Explosives, and Pyrotechnics (PEP) (Navy) \$2M</p>	<p>The technical objective is to develop critical pollution prevention technologies and an Integrated Product/Process Development based factory design that will enable greater than 90 percent reduction in total PEP life cycle wastes compared to the 1992 baseline. The technical approach is for governmental and industrial PEP R&amp;D labs, pilot plants, and production facilities to be organized into a program network. Present products, processes, PEP chemicals, and technologies will be surveyed. Models and simulations will predict life cycle performance. Pollution prevention technologies and new factory concepts will be experimentally tested in existing facilities. When use of existing facilities is not practical, a special demonstration testbed may be built. The factory design will then be developed, including detailed descriptions of products, chemical engineering unit operations, utility requirements, regulatory and qualification approaches, safety, and pollution prevention devices to be used in its operation.</p>	<p>The Board fully concurs with the concept and approach of this proposal.</p>
<p>Electron Beam Melting and Scrape Recycling of Uranium (DOE) \$2.5M</p>	<p>The technical objective is to eliminate waste generated in the component manufacturing of weapons with a secondary goal of applying this process to uranium scrap recycling.</p>	<p>The Board recommended funding at an appropriate level for the R&amp;D portion of the proposal, but deferred to DOE to support the manufacturing enhancements. Accordingly, the proposal funding profile was adjusted from \$2.5 million to \$1.3 million.</p>

TITLE / AGENCY / REQUESTED VALUE	SUMMARY	RECOMMENDATION
<b>POLLUTION PREVENTION</b>		
<p>Non-hazardous, Low VOC Corrosion Protection Paints and Coatings (Navy) \$3.5M</p>	<p>Navy shipboard paints and coatings have in-service performance requirements based upon maintenance schedules and critical need for operational readiness that makes them unique to other DoD/DOE paints and coatings. The technical objective of this program is to reformulate Navy shipboard paints to eliminate hazardous materials (i.e., lead, chromium, etc.) and to conform to Federal and State regulations limiting emissions of volatile organic compounds (VOC). Navy shipboard paints and coatings will be reformulated to meet new stringent limits for hazardous materials and reductions in marine coating VOC regulations.</p>	<p>After considerable discussion regarding the lack of support from the U.S. chemical industry in their quest to develop environmentally compliant paints and coatings, the SAB recommended approval for funding one year of this effort. This approval is contingent upon the understanding that it is the Navy's responsibility to provide outyear funding from its Tech Base and Advanced Technology Development programs.</p>
<p>Noncyanide Strippers to Replace Cyanide Strippers (Air Force) \$1.1M</p>	<p>The technical objective of this project is to validate that the noncyanide baths that are being developed to replace cyanide baths do not create any long range detrimental effects on the properties of the treated metal. Furthermore, it will develop a generic metal stripping bath that would eliminate the necessity to discard complete baths when additional cyanide is needed due to the incompatibility of a new vendors product with the previous one. Full-scale demonstrations are planned for an Air Force Material Command installation. The final product will be a technical data package for new chemical strippers.</p>	<p>Recognizing the technical merit and overall value of this effort, the Board recommended approval of this proposal.</p>

TITLE / AGENCY / REQUESTED VALUE	SUMMARY	RECOMMENDATION
<b>POLLUTION PREVENTION</b>		
Plutonium and Uranium Metal Forming Technologies (DOE) \$5M	The overall objective is to reduce waste generation from the processing of plutonium and uranium, especially mixed wastes. The technical objectives are to apply precision die casting technology to plutonium casting to eliminate essentially all machining and to apply near-net shape casting technology to uranium to eliminate the majority of the forming and machining steps currently used.	While it was clear that a 50% reduction in production waste is a major accomplishment, the overall costs of the project remain a concern. Dr. Parker was asked by the remainder of the Board to provide a technical assessment of the efficacy of this technology development in light of the fact that weapons production had markedly decreased. The Board recommended approval of FY93 funding, but will be reluctant to provide any follow on funding due to the questionable cost/benefit ratio at this juncture.
Alternatives to Halon 1301 for Ground Vehicle Crew Compartments (Army) \$1.5M	This program addresses replacement of Halon 1301 in manned spaces of ground combat vehicles with an environmentally safe alternative.	The Board appreciated the magnitude and significance of the proposal's objectives but could not justify \$20 million over the next few years for a unique, limited Army/Marine issue. The SAB recommended approval for funding one year of this effort with the understanding that it is the Army's responsibility to fund the outyear requirements, including joint funding opportunities.
VOC and Hazardous Air Pollutant Emissions Reduction for Painting, Cleaning and Vapor Degreasing Facilities (EPA) \$2.75M	It is the goal of the Marine Corp Multi-commodity Maintenance Center (MC) <sup>3</sup> s to demonstrate, evaluate, and improve innovative pollution prevention and control technology approaches which can be used to reduce air emissions from painting, cleaning, and vapor degreasing facilities at the (MC) <sup>3</sup> s and other similar military installations. The research planned will achieve rapid improvement in the quality of air emissions from paint spray booths and vapor degreasing tanks at (MC) <sup>3</sup> Barstow and (MC) <sup>3</sup> Albany and develop information on advanced air pollution prevention and control approaches applicable to problems in the private sector.	The Board was generally dissatisfied with the initial detail of the funding profile provided, as the costs seemed disproportionate to the tasks. The SAB recommended that they outline in detail the unique R&D aspects of this proposal and reflect specific milestones versus costs. Although the Board was satisfied with the revised funding requests, uncertainty continued with regard to actual research to be conducted. Ultimately, the proposal was approved after the Principal Investigator elaborated on the specific research elements to be conducted in an additional submission to the Executive Director.