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**EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
Washington, D.C. 20503**

URGENT

February 25, 1993

LEGISLATIVE REFERRAL MEMORANDUM

LRM #M-46

TO: Legislative Liaison Officer -

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**SUBJECT: EPA Proposed Testimony on Environmental
Science, Research, and Technology**

DEADLINE: 4:00 PM February 26, 1993

OMB requests the views of your agency on the above subject before advising on its relationship to the program of the President, in accordance with OMB Circular A-19.

Please advise us if this item will affect direct spending or receipts for purposes of the the "Pay-As-You-Go" provisions of Title XIII of the Omnibus Budget Reconciliation Act of 1990.

CC:
K. McGinty

**TESTIMONY OF DR. GARY FOLEY
ACTING ASSISTANT ADMINISTRATOR FOR RESEARCH AND DEVELOPMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
U.S. HOUSE OF REPRESENTATIVES
SUBCOMMITTEE ON TECHNOLOGY, ENVIRONMENT AND AVIATION
COMMITTEE ON SCIENCE, SPACE AND TECHNOLOGY**

MARCH 2, 1993

Mr. Chairman and members of the Committee:

My name is Gary Foley. I am the Acting Assistant Administrator for Research and Development at the U.S. Environmental Protection Agency. My permanent position in the Agency is Director of the Atmospheric Research and Exposure Assessment Laboratory at Research Triangle Park in North Carolina. I am especially pleased to have been invited to participate in this hearing this morning because I believe that the issues that you have asked me to talk about are of critical import to environmental science, research and technology.

The integration of science, research, and technological development with policy continues to be critically important as we look to the future of environmental protection and sustainable stewardship of the earth's natural resources. If we are to avoid the twin perils of expensive over-regulation and devastating under-protection we must work harder to ensure that a strong scientific base is created that will allow decisions to be based on science and not on the whims or fads of the moment.

We are not alone in thinking about these issues. The Congress, the Carnegie Commission, the National Commission on the Environment, the Committee for the National Institute for the Environment, the EPA Science Advisory Board, and many others have written extensively about the need to revise, realign, reform and

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revitalize the science, technology and research that form the basis for environmental protection in this country. In my view, one of the EPA's primary missions is the integration of our knowledge and understanding of the science of the environment with environmental decision-making. I hope that this Committee will allow us to take the lead in bringing together the many views that are currently circulating, in order to create a new, or modified, institution for environmental research and development to meet the needs of environmental protection, now and in the 21st century.

The term environmental sciences includes a great number of disciplines and cross-disciplinary issues. Today, I would like to focus on two of these: ecological research, and research in the area of innovative technologies for the environment.

The need for enhanced ecological research and monitoring:

During the past 20 years EPA has made great strides in cleaning up pollution. Throughout this period, the problems were often visibly obvious, easily defined in geographic scope, primarily the result of single chemicals associated with impacts on a single medium, and of great concern about their impacts on human health. The problems we face today, and undoubtedly those that we will encounter tomorrow, are far more complex to monitor, understand, predict, assess and manage than those that we have already resolved.

Life as we know it has developed as an adaptive response to conditions we have created. Industrial society has invaded every region of the globe and our environment has changed in response. Sustaining our environment for the generations to follow is no small undertaking, and it requires many changes in the way in which we view and use our natural resources. This stewardship of our environment, a mission for us all, will be impotent without a much better understanding of the ecosystems that our collective, societal actions affect.

The environmental problems that we now face are truly global in scale. They are the result of multiple stresses. Their impact is less easily seen or predicted, and they directly affect the very fabric on which life itself depends--our ecological resources. Yet, we are far less prepared than we have been in the past to develop the necessary scientific assessments and the tools that we need to sustain our environment --- because we do not have the necessary knowledge to do so with acceptable confidence.

Within the Office of Research and Development we have been actively examining ways of better preparing for the decisions that will have to be made to meet our stewardship responsibilities. As it is our goal to serve both the mandates of today, and to influence and resolve those expected in the future, investments

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must be made in both areas. To this end, we believe that we must continue to provide the science to serve in our traditional capacity of support for Congressionally mandated regulatory programs, but we believe that it is also essential that a new dimension, consistent with the challenge of the new generation of environmental problems, be added. Therefore, over the past four years, working with our Science Advisory Board, the outside scientific community, and our own experts, we have begun making significant changes in the research we do and how we plan it.

Drawing from concerns about both the sustainability of the environment and our economic well-being as a nation, we have undertaken a new ecological research program that has four primary elements:

Measuring and monitoring the current conditions of our ecological resources and systems, from which the success and failure of future management and regulatory actions can be judged without bias.

Understanding the structure and function of our ecological resources and systems, from which improved risk management options can be developed.

Predicting the response of ecological resources and systems, including changes in human-induced stresses, from which the expected results of various management policies and restoration efforts can be evaluated.

Assessing the ecological consequences of management actions, from which decision makers can best understand and act on their options.

I believe that it is particularly important to note that while these words may differ from those used by the Committee for the National Institute for the Environment, our Science Advisory Board, the Ecological Society of America, or the Carnegie Commission, there is no difference of opinion as to the need for improved ecological monitoring, research and assessment, or the need for investing in the academic institutions from which the next generation of environmental scientists and managers must come. The debate, if any, centers about the institutional arrangements that could best ensure that these needs are met.

The need for innovative technology:

Accompanying our need to better understand our environment is the need to develop new technologies to protect it. In recent years, these technologies have

not been coming from the private sector at rates that would be expected given the potential for the market.

Within the limits of our current financial and human resource capabilities, we at EPA have moved to facilitate private sector development and commercialization, mostly through collaboration with inventors, entrepreneurs and their industry customers. Specifically, we have been effective in:

Serving in our role as an honest broker. ORD conducts technology evaluations and demonstrations of privately developed technology to overcome the resistance of first use while providing credible cost effectiveness information for potential users. These evaluations and demonstrations are best represented by our successful Superfund Innovative Technology Evaluation (SITE) program.

Taking the lead as a catalyst in the market place. To foster cooperative research ventures with private sector groups, we have made extensive use of the Cooperative Research and Development Agreements (CRADAs) possible under the Federal Technology Transfer Act (FTTA). We now have more than fifty agreements in place. An example of such a program is our lead role in a consortium that has developed state-of-the-art sulfur oxide removal technology. This consortium has included the Tennessee Valley Authority, Bechtel, Combustion Engineering, the Electric Power Research Institute, Babcock and Wilcox, Ohio Edison, Virginia Power, Flakt, and our own engineering laboratories.

As a leader in promoting and guiding opportunities for needed technologies. For example, the Bioremediation Action committee, organized by ORD and comprised of private companies, academic institutions and government experts, has had demonstrated success in steering the development of promising remediation technologies.

ORD is not alone in the Agency in the encouragement of market penetration of environmentally preferable technologies. EPA's Office of Air and Radiation, for example, is achieving remarkable success with its "Green Lights" program, a voluntary program designed to encourage businesses, Federal, state and local governments, universities, hospitals, environmental groups and others to install energy saving and profitable new lighting technologies. The "Green Lights," the Office of Air and Radiations (OARs) Energy Star Computer and Energy Star Buildings Programs result in pollution prevention at a profit, thereby creating jobs and increasing the competitiveness of businesses. The Technology Innovation Office, part of the Agency's Superfund Program, has worked with the states, the EPA Regions, Industry and ORD to dramatically increase the use of innovative remediation technologies at Superfund sites. Currently, all of our Program Offices, through the encouragement of the Agency's Innovative Technology Council, are

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exploring ways to make our regulatory programs more friendly to innovative technologies in general, and to pollution prevention techniques in particular.

We stand ready to do more, as I believe that improved technology is one of the keys to sustaining both our environment and our country's economic foundation. The development and use of innovative environmental technologies promises to allow us to manage the quality of the environment while improving the competitiveness of American industry on the world market --- by reducing the cost of production and compliance here at home and simultaneously exporting the technology to others. One new program that we are developing would enhance the use of U.S. technologies in solving international environmental problems. This program, U.S. Technology for International Environmental Solutions (U.S. TIES), will make credible performance information available in foreign markets through an EPA, Department of Commerce, and industry partnership.

I believe that we need to consider how we can best develop the infrastructure necessary for further development and testing of new technology. In moving in this direction I envision the development of new public-private partnership programs, programs based on revolving funds, and the development of testing facilities for new technologies. Most importantly, however, I see the need to invest in process modifications, product changes, and raw materials substitution as the most cost effective means of achieving our environmental goals. As we sit here today, wholesale redesign of production technology is taking place. While not undertaken solely to meet environmental goals, these goals do figure prominently in the changes that we see. Government must aid in these pollution prevention approaches; the EPA is now developing programs to bring the fruits of pollution prevention technology to medium and small business sectors where financial and technical resources are insufficient to support the research and development necessary to adapt prevention technology and strategies.

Furthermore, I think that more cost effective environmental technologies are the only way to hold the line on further escalation of the cost of environmental protection. While protecting our environment, these new technologies could also move us into a world leadership position in environmental technology --- in a market that may be as large as five hundred billion dollars a year by the turn of the century.

New technology is a necessary but not sufficient element to sustain our environment. In parallel, we must know if our investments in technology and regulation are having the desired effects on our environment and we must have the scientific knowledge to help us identify where technological advancement could be most beneficial.

Where is ORD today?

At EPA we are proud to have taken important steps toward national leadership in establishing a new and much needed ecological research paradigm. Implementing a new strategy requires a new model for using limited scientific and fiscal resources. Research priorities must be established from factual analysis, and not based simply on perceived problems, as the cost of both research and regulation are high. Therefore, we believe it is necessary to measure and monitor the extent, condition and trends in the condition of our most valued resources, such as our forests, wetlands, estuaries, lakes, streams, grasslands and deserts. Accordingly, we have established the Environmental Monitoring and Assessment Program (EMAP). Designed to help us determine the extent and magnitude of ecological degradation or improvement in response to the aggregate of our environmental management efforts, it will bring environmental problems into defensible perspective, providing the Agency, the public, and the Congress with a factual base that transcends expert opinion alone. Further, it will serve as a foundation for objectively deciding where our research and management resources should be targeted, for demonstrating the effectiveness of our current and future regulatory decisions, and for understanding the geographic scales at which stresses are affecting our resources so that local, regional, and/or global problems can be resolved with strategies aimed at the correct scales of impact. It is our hope that this Program, still in its infancy as the technical challenges before it remain great, will become a cornerstone of any strategy for improving our ecological knowledge.

We did not undertake this effort alone. In fact, we have worked to incorporate the expertise of many other agencies who share our interest in maintaining and managing our natural resources; including, the U.S. Department of Agriculture's Agriculture Research Service, Forest Service, Soil Conservation Service, and the National Agricultural Statistical Survey, the Department of Interior's Bureau of Land Management, Fish and Wildlife Service, and the Geologic Survey, and the Department of Commerce's National Atmospheric and Oceanic Administration, among others.

As we in ORD proceed with this program, the next elements of the research strategy must be initiated as well. This research must include that element specific to important ecosystems (systems focused), studies of the effects of known impacts associated with global, regional and local stresses (problem focused), and investigations tailored to water, soil and air impacts (media focused). Whether the focus is on systems, problems or media, the questions remain the same:

What is the cause of observed and suspected problems? and,

What are the options to best reduce risk?

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To address these questions, ORD has begun limited research programs designed to better understand and predict the response of ecosystems to both single and multiple stresses. These include research programs in:

Coastal and Marine Systems, Large Lakes and Rivers, Wetlands, and Forests and Agriculture.

We maintain effects research programs that are consistent with, complementary to, and supportive of the above studies, but that are more problem oriented and focused on multiple systems. These studies include the impacts and effects of:

Global Climate Change, Stratospheric Ozone Depletion, Tropospheric Ozone, Non-point Sources, Acid Deposition, and Air Toxics.

Programs are also underway that focus on assessment criteria for determining the seriousness of anthropogenic stresses and impacts on specific media including:

Contaminated Sediments, Aquatic Ecocriteria, Hazardous Waste, and Municipal Solid Waste.

The addition of more fundamental research to address how our interactive environment works and how we sustain our ecosystems, such as envisaged by the National Institutes of the Environment (NIE) proposal, is a necessary expansion of the programs that currently exist at EPA and other Federal agencies. Fully consistent with the NIE proposal, it is the triad of monitoring, understanding, and management that must go together if we are to be fully successful in improving the science that is needed for the decisions that we will all face tomorrow. By adding to, and improving, what is now being done, we can make significant advancements. With only parts of the triad in place, as is now the case because of limitations in resources, the advancements will not be there when needed.

What of the future?

Ecologically, applied and basic research for the purpose of decision making must be managed together. They are inseparable elements for successful environmental management, and attempting to split them apart into different institutions is not a formula for success. Part of the confusion in this area may be the result simply of inadequate communication. It seems to me that some of the participants in this discussion are assuming that short-term and long-term research are equivalent to 'regulatory' and 'non-regulatory' research respectively. We do not believe that this is the case. Short-term and long-term research are both necessary components of a holistic program to identify and assess problems, and to solve them. While there is no doubt that we in EPA have invested in the current at the expense of the future, this is not the way it should be.

In addition, we believe that research, whether short- or long-term, should be risk assessment driven. The focus should be on identifying solutions to known, perceived and possible ecological degradation threatening the sustainability of our resources.

The gap between the true needs of the decision makers and the scientist's perceptions of those needs must also be narrowed. We expect that this will require an expansion of our current efforts to guide science from the laboratory and journal through to its translation into policy and decisions.

We also believe that monitoring, research, assessment, information dissemination, reporting, and training are essential elements of a properly balanced environmental institution, not unlike those elements proposed by EPA, the Carnegie Commission or the NIE Committee. Separating these, as we have had to do to a degree in the Agency due to funding constraints, is as flawed a concept as the artificial separation between basic and applied research.

Conclusion:

I am hopeful that the best ideas that have been put forward, all addressing in their own way obstacles to improving our scientific knowledge and understanding, can be considered in light of a new era in environmental research. We all have a common goal to improve environmental decision making through a better understanding of our environment. I believe, that if charged to do so, we within EPA, working together with the broad community at large, could agree on the mission, goals, structures and resources that would enable us to make the societal contributions that we believe are so necessary. I hope you will so charge us to return with such an assessment in the months ahead.

Thank you for your attention.

I would be pleased to answer any questions that you may have.