

Statement of
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U.S. Environmental Protection Agency Science Advisory Board
Before the Subcommittee on Environment, Technology and Standards
Committee on Science
U.S. House of Representatives
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Good morning Mr. Chairman and members of the Subcommittee on Environment, Technology and Standards. My name is Granger Morgan. I chair EPA's Science Advisory Board (SAB or Board). I am a faculty member at Carnegie Mellon University where I am a University Professor, hold the Lord Chaired Professorship in Engineering, and am Head of the Department of Engineering and Public Policy, a department in the Engineering College.

Thank you for this opportunity to present the SAB's views about the Agency's 2007 Science and Research Budget Request. The Board is completing approval of its final report, and with the permission of the Chairman, we will submit that report for the record.

Over the past few years, the Board has been working with EPA to review the Agency's science and research programs and budget on a systematic and ongoing basis. The Agency now presents that information to the Board in ways that correlate with EPA's Strategic Plan.

Between 2004 and the proposal for 2007, the inflation adjusted¹ budget for EPA's Office of Research and Development has declined by just over 16%. Yet, the environmental challenges that face the Agency have grown and EPA will face increasingly complex and difficult science challenges over the coming decades. It will also face opportunities to improve our environmental and international competitiveness with new technologies – but, to paraphrase the microbiologist Louis Pasteur, opportunity favors those who are prepared.

We all want environmental decision-making to be based on sound science. However, our nation is not investing adequately in producing that sound science.

I know a number of people who argue that this lack of investment reflects a hope that if the science is not there, somehow additional regulation will not follow. A much

¹ Computed using the NASA Gross Domestic Product Deflator Inflation Calculator, available at <http://cost.jsc.nasa.gov/inflateGDP.html>

more likely outcome is that, if we don't do the needed research we will simply get poorer regulation – which could end up costing the nation a great deal more in the long run.

In my view we all need to work harder on explaining the importance of investing in R&D at EPA if we want to ensure that America will enjoy a clean, safe, healthy and sustainable environment in the years to come.

You have specifically asked if the Agency's overall level of Science and Technology funding is appropriate and whether its research priorities are adequately balanced among core research, mission-driven research, emerging issues, and homeland security. I will elaborate below, but the short answer is no.

You have also asked what impacts the proposed budget reduction may have on the Office of Research and Development's ability to use the latest scientific methods and information in its regulatory decisions, and to build strong ties to the external scientific research community and foster graduate student work in the environmental sciences. Again, while I'll elaborate below, the short answer is these impacts will be serious and negative.

In the discussion below I elaborate on these, and related points, in three contexts:

1. The need for government-wide, systematic tracking of environmental research;
2. Some specific aspects of EPA's proposed 2007 research budget; and
3. The critical problem of continuing reductions in long-term, more fundamental environmental research at EPA.

1. Need for a Government-wide View of Environmental Research and Development

EPA is not the only federal agency that collects environmental data or performs environmental research. The Departments of Agriculture, Energy, Homeland Security, and Interior, as well as the CDC, NASA, NIEHS, NIH, NSF, USGS, and a number of other Federal entities all make significant contributions. Some of these organizations work on topics that may sound similar; in many cases the details turn out to be different in important ways.

In many specific areas of research, there are examples of excellent coordination and cooperation between some of these programs.

But today, across the Federal system as a whole, it is virtually impossible to develop an informed understanding of what research is being done; where it is being done; where there are duplications; and where there are critical gaps. A simple list of topics is not sufficient. Just because the same noun appears in two agency lists of research topics does not mean that they are doing the same thing, or that there is duplication.

Before we on the Science Advisory Board, or you in the Congress, can hope to determine if the U.S. has a balanced and comprehensive national strategy for environmental research, we need a clear picture of what is being done in the form of concise substantive descriptions of all the environmental research programs across the federal system. Conceivably, things could be better than they look from the isolated EPA's budgetary perspective. I suspect that they are worse. However, we need a comprehensive picture.

I urge the Committee to work with the executive and independent agencies to realize the development of such a comprehensive description of all our nation's environmental research. Such a summary would assist everyone involved in ensuring: that needed federal environmental research is being done efficiently; that the different federal agencies involved are sharing information; and that the results are readily accessible to the scientific community, the public, and environmental decision-makers.

2. Comments on Several Proposed Changes in Individual EPA Programs

Now I'd like to offer four examples of how the proposed cuts to the EPA 2007 research budget will adversely impact the Agency's mission to protect human health and the environment as well as offer some brief comments in response to your question about the expansion of the Agency's program related to Homeland Security.

First, I will address mercury research. While some of the mercury in our food and water comes from power plants and other human activities, much comes from natural sources or is carried across the Pacific from natural and anthropogenic sources in Asia. On a global scale, science cannot yet accurately tell us where all the mercury in the U.S. comes from, where it goes, or in what chemical forms it exists. If we are going to be able to assess the adequacy and effectiveness of the costly mercury controls that EPA regulation is imposing on U. S. industry, we need to understand those planetary flows. However, last year's EPA research budget for mercury was reduced approximately 35% to \$3.4 million. This year's budget proposes only a slight increase. Funding at these levels is too small to even adequately address the issues that EPA-ORD has been addressing, let alone to allow any work on the key problem of planetary flows of mercury.

A second important and undervalued area of research, that the Board is especially concerned about is Ecology and Ecosystems Research which has been systematically cut for several years. While we all value and marvel at the beauty and complexity of natural ecosystems, it is easy to forget that every year these systems also provide us with billions of dollars worth of services that are critical to our way of life.

As an example, the salt-water marshes of the Gulf Coast provide more than wildlife habitat. They also provide protection against erosion, and they buffer the effect of storms on coastal lands. How are we to protect such vulnerable natural systems as the salt-water marshes of the Gulf Coast, the Great Lakes, the Chesapeake Bay, the

Mississippi River Basin, and countless other smaller natural systems in every state in the country, if we don't adequately invest in understanding them?

The \$79.2 million for ecological research in the proposed 2007 amounts to just 15% of the overall ORD research budget. For well over a decade the Board has called on both the Agency and the Congress to revitalize, raise the profile, and increase the funding of ecological research at EPA. Since 2004, the Board has watched budgetary support for ecological research decline by 26%. This is not the route to a clean and healthy future for either us, or for our air, land and waters.

Third, I will say a word about research in human health. The SAB was delighted to see a proposed increase of just under \$3-million in Computational Toxicology. This work holds great potential to streamline the process of assessing the safety of chemicals, speed approval of new products, and in so doing, enhance the productivity and competitiveness of American industry.

However, to make effective use of these powerful new computational tools, researchers also need data to put in the computer models. The Board is deeply troubled by proposed cuts in human health research areas that are needed to provide the data necessary for computational toxicology to be effective. These cuts include a proposed 13% reduction for work on endocrine disruptors, a proposed 14% reduction for pesticides, and an increase of only 3% for other core programs in human health research.

Finally, the Board is concerned about research in Global Change and Sustainability. For each of the past two years, research support for global change has declined by roughly one million dollars. The current budget proposal of \$17.5 million will only allow the agency to meet its impact assessment obligations under the government-wide Climate Change Science Program. The Agency will be forced to terminate, in midstream, research vital to understanding ongoing changes in temperature, precipitation, flooding, snow pack, and other factors will affect water quality across the U.S. To our knowledge, no other federal agency is supporting such work on a national scale.

Following \$9.6 million dollar reduction in 2006, sustainability research is slated for further reduction of \$4.4 million in 2007. These reductions are coupled with the termination of the Superfund Innovative Technology Evaluation Program and Environmental Technology Validation Program. This means that the Agency will lose much of its ability to test and verify new environmental technologies. This loss harms American industry's competitive position for environmental technology in world markets, at a time when other nations treat these technologies as opportunities.

I turn now to your questions about appropriate science priorities and needs for Homeland Security. The proposed 2007 budget calls for an increase of almost 25% to \$39.5-million for Homeland Security research in ORD, and an increase of just under 30% to \$58.1 million for work in other parts of the Agency. These increases will support research and other activities related to increased preparedness and better response for

water security, analytical methods, decontamination, clean-up goals, radiation monitoring and biodefense. Clearly improving our ability to deal with terrorist and other threats is a critical national need and the SAB has been most favorably impressed by the dedication and hard work of the staff addressing these important national priorities. However, while all of us on the SAB agree that this is an important area of national need, we are concerned that it not be met through serious erosion of support for the Agency's core research needs in health and environmental research.

I would like to offer two other cautions regarding the Agency's current research program in homeland security research. First, there is some risk of focusing too much at the level of individual devices and sub-systems, without first understanding at a broad level such key issues as how effective alternative approaches can hope to be in providing needed protection, and whether the nation can afford them. Second, we are concerned that current programs are not sufficiently informed by the behavioral and social sciences, which are crucial to effectively organizing the complex systems needed to manage these technologies and communicating research results and risk to the general public.

You also asked about sole reliance on Science and Technology funding for the WaterSentinel pilot program expansion, and if EPA has adequate plans for transitioning WaterSentinel to an operational program. The SAB understands the need for WaterSentinel, but EPA's strategy for allocating resources to this program is unclear. Science and Technology funding is probably appropriate for developing the scientific aspects of WaterSentinel, but other aspects of the program appear to be operational. Accordingly, the SAB believes that operational aspects of WaterSentinel should be funded by appropriate operational funds. The SAB Panel that reviewed WaterSentinel recommended development of a plan to transition WaterSentinel from research and development to an operational program. The SAB is concerned that WaterSentinel funding comes at the expense of the Agency's other responsibilities.

3. Longer-term More Fundamental Research

EPA is a mission-oriented agency, charged with assuring that America enjoys, and will continue to enjoy, a clean and healthy environment. Earlier I paraphrased Louis Pasteur. Don Stokes, the former dean at Princeton's Woodrow Wilson School wrote a wonderful little book² that argues that research cannot simply be sorted out along a line between basic and applied. Some important real world problems, such as those that lead Pasteur to understand how to preserve milk, can only be addressed by doing fundamental research that is *motivated* by real-world needs. Many environmental problems fall into this category – what Stokes termed "Pasteur's quadrant." Much of the knowledge that is needed to assure continued success in EPA's mission requires research of this kind – research which is not being done anywhere else across the Federal system.

² Donald E. Stokes, *Pasteur's Quadrant: Basic science and technological innovation*, Brookings Institution Press, 180pp, 1997

In our meetings with agency research managers, we were deeply troubled when we were told that the basic or "core" portions of ORD's research budget have shrunk from roughly 40% to 25% of current research investments. Environmental issues are complex, and often subtle. If EPA does not continue to invest in a significant amount of basic environmental science, we will likely find ourselves making costly regulatory mistakes in the future. We also run the risk of paralyzing innovative industries, like nanotechnology, uncertain about the regulatory rules that they will face.

The SAB is especially troubled by the ongoing difficulty that EPA has had with the application of the OMB Performance Assessment Review Tool or "PART" process. My own view is that both the agency and the OMB need to work harder to resolve this issue, especially in the context of ecosystem research. On the one hand, OMB needs to recognize the need for a portion of EPA's research to be fairly fundamental in nature. As I have argued above, not all EPA research has immediate short-term applications – nor should it have. Long-term investments in developing basic understanding of environmental and ecological science are very important if we are to achieve sensible and efficient environmental protection. At the same time, EPA needs to do a better job of refining and communicating several of its research programs, especially those in ecosystem research, a topic whose importance has been stressed by both the SAB and National Academy of Sciences. Simply continuing to cut the budget is not a viable strategy for achieving future improvement.

Looking back at the analyses that the SAB has done of EPA's science and research budgets over the past several years, the SAB has become convinced that the Agency is in danger of losing core scientific expertise in both conventional and emerging environmental issues. A number of the agency's research programs are in need of major rejuvenation and modernization, but this is almost impossible in the face of ever shrinking resources. On top of this, a significant number of retirements is anticipated over the coming decade. If proposed cuts in the STAR Doctoral Fellowship program are not restored, where will the next generation of U.S. environmental scientists come from?

Thank you again for the opportunity to testify about EPA's science and research budget request. My colleagues and I would be pleased to answer your questions.