

# Executive Summary

The Environmental Protection Agency (EPA), in presenting to Congress for the first time a 5-Year Plan for Environmental Research and Development activities, has taken an important step toward expanding the public dialog necessary to identify and establish national environmental goals. Shortcomings in the initial EPA R&D Plan serve notice of potential issues which must be resolved if EPA is to continue to effectively and authoritatively perform its mission of protecting environmental quality for both present and future generations. Foremost among the shortcomings in the R&D Plan is EPA's failure to indicate a commitment to long-range research and, as a corollary, an excessive focus on short-term R&D issues related directly to the enforcement and/or achievement of EPA's current regulations. Accordingly, the Plan emphasizes the development and demonstration of control technologies. In many cases, however, the larger problems involve social, economic, and institutional patterns which not only impede technical solutions but which require nontechnical approaches. To develop effective overall environmental management strategies will require more systematic and sustained socioeconomic research efforts than those specified in the Plan. An added R&D emphasis on long-range environmental concerns and a more responsive role to its line responsibility as coordinator of Federal environmental R&D would do much to enhance EPA's effectiveness and credibility.

In February 1976, the Environmental Protection Agency (EPA) presented a 158-page document to Congress setting forth its plans for research and development over the next 5 years. The Plan, proposing a comprehensive 5-year environmental research agenda for congressional review, provides a unique opportunity to develop a dialog between Congress and EPA that goes beyond the usual considerations of plans and programs for the upcoming fiscal year. Congressional interest in forward research planning by EPA, including the request for this OTA analysis, is an indication of the increasing importance to the legislative process of Federal endeavors in environmental research and development.

The desire on the part of the Congress to ask questions and seek better answers, on which judgments can be based, has led to these inquiries:

- Is the Plan realistic and well-conceived and can EPA carry it out?
- Does it present a well-balanced program that will permit the Agency to meet legislative goals of environmental quality?
- Will it lead to the scientific data necessary to support sound national policy?
- Does it provide mechanisms to integrate Federal environmental research and development programs?

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When EPA was created in December 1970, there were 40 organizationally separate and diverse laboratories that had to be integrated into a unified research and development program. Considerable progress has been made in this difficult task of integrating disparate organizations and diverse skills to meet EPA's complex and demanding research and regulatory responsibilities. These responsibilities are mandated by nine major environmental statutes as well as directives in reports accompanying congressional appropriations for EPA.

### The Principal Finding

The EPA 5-Year Plan does not indicate a clearly defined commitment to long-range environmental research. Where the Plan does address long-range activities, it discusses the development of techniques rather than considering which long-range issues are important. Yet, such broad long-range concerns must be at the heart of an effective environmental research planning process. Examples of the questions that should be addressed are:

- . Can control technologies reduce pollution fast enough to keep pace with economic growth?
- . Can major shifts in economic activities, such as new industries, be made compatible with environmental quality?
- . What balance should be struck between research on pollutants affecting people today and those that could affect future generations-through genetic mutations or gradual changes in the environment?

**This** absence of specific long range issues to guide the research planned by the Office of Research and Development (ORD) will be frequently referred to in the chapters that follow.

ORD's focus on the short-term prevents it from exercising national scientific leadership in environmental research. The short-term emphasis also makes it difficult for ORD to conduct useful policy analyses addressing long-range environmental concerns.

In addition to supporting EPA's short-term regulatory needs, the absence of long-range environmental research commitments may well be caused by factors not under ORD or EPA control. How ORD is constrained by factors such as the following requires exploration:

- Research serves a support function in EPA;
- Environmental concerns appear to be increasingly tempered and modified by concerns over energy and the economy;
- EPA's research resources are diminishing; and
- Civil Service Commission constraints make it difficult to alter the mix of skills of the professional staff to match emerging issues.

### General Appraisal of the Plan

With the exception of plans for energy-environmental research, the ORD Plan fails to recognize the function of EPA in coordinating Federal environmental programs. At present, there appears to be no coherent integration of Federal environmental research programs. Because of EPA's line responsibility in setting and enforcing standards, ORD is the logical leader in determining the goals and priorities of environmental research conducted by Federal agencies. ORD's scientific resources must provide a strong basis for EPA's regulatory function. ORD's research program is properly responsive to EPA's regulatory needs; however, it ought not be unduly limited by short-term regulatory considerations.

The document prepared by EPA lacks the essential characteristics of a plan. It does not clearly delineate program priorities nor does it relate priorities to overall program goals. The planning process is vague and no guidelines are offered for future updates of the Plan. It is difficult to discern a rationale for the strategic thrusts suggested in the budget. For example, the Plan offers no basis for the dominant expenditure on developing control technology over the 5-year period.

## Control and Abatement Technology Research

EPA's efforts in the development of control and abatement technologies appear to favor demonstration over exploratory research projects. EPA's efforts in this area need to be planned with due regard for the Energy Research and Development Administration's (ERDA) specific mandate to develop environmentally sound energy technologies and for the efforts of private companies with the capability and economic incentive to continue control technology development. To the extent that EPA is both regulator and developer, it could be put in the position of promoting its own technology.

The EPA Research Plan fails to address the tasks of identifying and controlling pollution from new industrial technologies or from changes in raw material usages, new requirements in industrial energy or large-scale use of waste, biomass, solar and geothermal energy sources. Research into the economic and institutional problems of operating complex secondary and tertiary wastewater treatment plants requires more attention than is given in the EPA Plan.

## Transport, Fate, and Monitoring Research

Much of the work planned in researching the transport, fate, and monitoring of pollutants seems fragmented. Research into the complex of processes that link emissions from a source and their effect on the biosphere has not been assigned a high enough priority to support the scientific basis of the regulatory process. The ORD Plan does not offer a program to develop a centrally coordinated and technically strong monitoring capability to unify the fragmented responsibilities that now exist in ORD. Nor does it reveal an adequate screening program to detect toxic materials; it is the absence of such a capability

that has contributed to the current "pollutant of the month" syndrome.

Although analyses of global processes of chemical transport and transformation of pollutants may seem to have little apparent relevance to the Agency's immediate regulatory needs, EPA should insure that no gaps exist in data about atmospheric and oceanic processes of transport of pollutants through the biosphere. Moreover, it would be useful to undertake studies and to develop a taxonomy of ecosystems not covered by generalized ORD studies. Such long-range studies may lead to regulations which reflect regional variations in environmental sensitivity.

## Health and Ecological Effects Research

Long-term studies into the health effects of chronic, low-level exposure to pollutants are needed to strengthen the basis for standards. Because of the present commitment of EPA to respond to near-term exigencies, it has not been able to develop a strong long-term health research capability. Nonetheless, it is within the scope of ORD's research program to develop a system for discovering previously undetected pollutants in the environment and assessing their relative potential for harm.

The ORD 5-Year Plan does not describe how health research will be coordinated or how results will be shared with other Federal agencies.

Because some contractor and university research groups depend on EPA for continued financial support, there is a danger that EPA's declared regulatory policies may affect the objectivity of contractor scientists.

Although EPA is mandated to perform and coordinate research on noise, such research is not discussed in the Plan. The ORD Plan makes only a brief reference to indoor air quality and neglects consideration of environmental management techniques for its improvement.

## **Socioeconomic Research**

Despite repeated references to socioeconomic research in the Plan, neither the document itself nor interviews with ORD officials indicate that there will be a systematic and sustained research effort in this area. ORD places the highest priority on technological solutions to environmental problems, although in many cases the most important and difficult problems are institutional—namely, the implementation and en-

forcement of environmental standards. Effective strategies of environmental management, combining both technological and nontechnical approaches, require greater contributions from socioeconomic research than appear in the Plan. Attention is lacking in the Research Plan to the development and application of socioeconomic research methods responsive to these needs. The organizational structure and commitment of resources suggested in the Plan to develop and use socioeconomic research methods appear inadequate.