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ABSTRACT

The United States Environmental Protection Agency was created by Presidential order in December of 1970. This order brought together 15 programs scattered among several Federal Government agencies to mount a coordinated attack on environmental problems. These problems include air and water pollution, solid waste management, pesticides, radiation, noise, and toxic substances. In support of the agency's mission, the Office of Research and Development conducts a comprehensive and integrated research and development program. This research is supplemented by general scientific and technical research in other federal agencies, colleges and universities, and elsewhere. The purpose of this program guide is three-fold: (1) to acquaint the research and development community with the organizational structure of the Office of Research and Development, (2) to make public the Office of Research and Development's extramural research program objectives for fiscal year 1976, and (3) to provide general guidelines necessary when developing grant or contract applications. (Author/MA)

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EPA-600/9-77-009
March 1977

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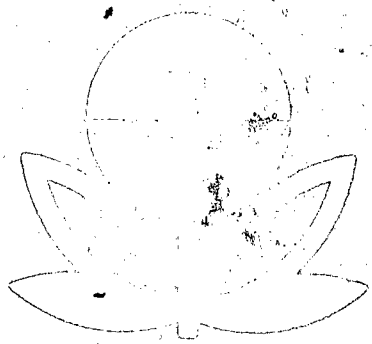
1976

# OFFICE OF RESEARCH AND DEVELOPMENT

# ANNUAL REPORT



## FISCAL YEAR 1976

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

SE020679

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# OFFICE OF RESEARCH AND DEVELOPMENT PROGRAM GUIDE

## Introduction

The U.S. Environmental Protection Agency (EPA) was created by Presidential order in December of 1970. This order brought together 15 programs scattered among several Federal Government agencies to mount a coordinated attack on environmental problems. These problems include air and water pollution, solid waste management, pesticides, radiation, noise and toxic substances.

In support of the Agency's mission the Office of Research and Development (ORD) conducts a comprehensive and integrated research and development (R&D) program to provide:

— The scientific and technical base for reasonable standards and regulations.

— Standardized methods to measure and assure quality control in programs to assess environmental quality, implement regulations and enforce standards.

— Cost-effective pollution control technology and incentives for acceptance of environmentally sound options.

— Scientific, technical, socio-economic and institutional methodologies needed to judge environmental management options and balance these options against competing national needs.

ORD's research is supplemented by general scientific and technical research in other federal agencies, colleges and universities and elsewhere. ORD also supports the Agency's involvement in many international organizations with mutual environmental R&D concerns.

More general functions of ORD include: (1) maintenance of in-house expertise capable of quickly responding to emergencies and giving expert consultation and testimony when necessary; (2) sharing the results of environmental R&D with a wide range of individuals, groups, and agencies in ways that are meaningful and practical; and (3) giving expert scientific and technical assistance to other EPA officies to help them formulate environmental policy.

The purpose of this Program Guide is three-fold: First, to acquaint the research and development community with the organizational structure of the Office of Research and Development — PART I; second, to make public the Office of Research and Development's extramural research program objectives for fiscal year 1976 — PART II; and third, to provide general guidelines necessary when developing grant or contract applications — PART III.

Hand out copies of this Program Guide are available from the EPA's ten regional offices (see Appendix C), from ORD's fifteen associated laboratories throughout the country, and from the Office of Research and Development, Headquarters, Washington, DC. Mail requests should be sent to:

Office of Financial & Administrative Services (RD-674)
Office of Research and Development
Environmental Protection Agency
Washington, DC 20460

Anyone wishing to receive future editions of this Program Guide should complete and return the form located at the back of this publication.

# PART I

## OFFICE OF RESEARCH AND DEVELOPMENT ORGANIZATIONAL DIRECTORY

The Office of Research and Development is responsible for the development, direction, and conduct of a national research, development, and demonstration program in pollution sources, fate, and health and welfare effects; waste management and utilization technology; environmental sciences; and monitoring systems. The Assistant Administrator for Research and Development also serves as principal science advisor to the Administrator and coordinator for the Agency's policies and programs concerning carcinogenesis and related problems.

| | Headquarters Mail Code* | Telephone** |
|---|---|---|
| **Assistant Administrator for Research and Development**<br>**Wilson K. Talley** | RD-672 | (202) 755–2600 |
| Associate Assistant Administrator<br>Carl R. Gerber | RD-672 | (202) 755–0122 |
| Office of Financial and Administrative Services<br>Director, Alan Neuschatz | RD-674 | (202) 426–2355 |
| Office of Planning and Review<br>Director, Phyllis A. Daly | RD-675 | (202) 755–2606 |
| Office of the Principal Science Advisor<br>Principal Physical Advisor, Herbert Wiser | RD-676 | (202) 755–0477 |
| Senior ORD Official, Cincinnati, OH<br>David G. Stephan | | (513) 684–4402 |
| Senior ORD Official Office<br>Director, Robert N. Carr | | |
| Environmental Protection Agency<br>Cincinnati, OH 45268 | | CML (513)<br>FTS 684–7966 |
| Senior ORD Official, Research Triangle Park, NC<br>John H. Knelson, M.D. | | CML (919) 549–8411<br>FTS 629–2281 |
| Senior ORD Official Office<br>Director, Paul A. Kenline | | |
| Environmental Protection Agency<br>Research Triangle Park, NC 27711 | | CML (919) 549–8411<br>FTS 629–2613 |

# OFFICE OF RESEARCH AND DEVELOPMENT
# ORGANIZATIONAL DIRECTORY

## Office of Monitoring and Technical Support

The Office of Monitoring and Technical Support is responsible for the development and demonstration of monitoring systems; quality control of pollutant measurement and monitoring techniques (quality assurance); technical information dissemination; and technical support services.

| | Headquarters Mail Code* | Telephone** |
|---|---|---|
| **Deputy Assistant Administrator**<br>**Albert C. Trakowski, Jr.** | RD-680 | (202) 426-2202 |
| Associate Deputy Assistant Administrator<br>H. Matthew Bills | RD-680 | (202) 426-4453 |
| Program Operations Staff<br>Director, Ross K. Robeson | RD-680 | (202) 755-6403 |
| Regional Services Staff<br>Director, Michael L. Mastracci | RD-680 | (202) 755-9210 |
| Technology Transfer Staff<br>Director, Robert Crowe | | |
| Environmental Protection Agency<br>5555 Ridge Avenue<br>Cincinnati, OH 45268 | | (513) 684-4388 |
| Technical Information Office - Cincinnati<br>Director, Gilbert Gigliotti | | |
| Environmental Protection Agency<br>Cincinnati, OH 45268 | | CML (513) 684-7551<br>FTS 684-7551 |
| Monitoring Technology Division<br>Director, John B. Moran | RD-680 | (202) 426-2026 |
| Technical Support Division<br>Director, William A. Cawley | RD-680 | (202) 426-2382 |
| Technical Information Division<br>Director, W. Randall Shobe | RD-680 | (202) 245-3018 |
| **Environmental Monitoring and Support Laboratory**<br>**Director, S. David Shearer** | | |
| Environmental Protection Agency<br>Research Triangle Park, NC 27711 | | CML (919) 549-8411<br>FTS 629-2106 |

# OFFICE OF RESEARCH AND DEVELOPMENT
# ORGANIZATIONAL DIRECTORY

| | Telephone** |
|---|---|
| **Environmental Monitoring and Support Laboratory**<br>**Director, Dwight G. Ballinger** | |
| Environmental Protection Agency<br>Cincinnati, OH 45268 | CML (513)<br>FTS 684–7301 |
| **Environmental Monitoring and Support Laboratory**<br>**Director, Delbert S. Barth** | |
| Environmental Protection Agency<br>P. O. Box 15027<br>Las Vegas, NV 89114 | CML (702) 736–2969<br>FTS 595–2969 |
| Vint Hill Farm Station<br>P. O. Box 1587<br>Building 166<br>Warrenton, VA 22186 | (703) 347–6224 |

# OFFICE OF RESEARCH AND DEVELOPMENT
# ORGANIZATIONAL DIRECTORY

## Office of Energy, Minerals, and Industry

The Office of Energy, Minerals, and Industry is responsible for the assessment and the development of methods for control of the environmental and socio-economic impacts of energy and mineral resource extraction, processing, conversion, and utilization systems and of other industrial operations.

| | Headquarters Mail Code* | Telephone** |
|---|---|---|
| **Deputy Assistant Administrator**<br>**Stephen Gage** | RD-681 | (202) 755–4857 |
| Associate Deputy Assistant Administrator<br>Steven R. Reznek | RD-681 | (202) 755–4857 |
| Program Operations Staff<br>Director, Richard Laska (Acting) | RD-681 | (202) 426–2683 |
| Energy Coordination Staff<br>Director, Clinton W. Hall | RD-681 | (202) 426–4567 |
| Energy Processes Division<br>Director, Frank T. Princiotta | RD-681 | (202) 755–4857 |
| Industrial and Extractive Processes Division<br>Director, Peter Lederman | RD-681 | (202) 755–9014 |
| **Industrial Environmental Research Laboratory**<br>**Director, John K. Burchard** | | |
| Environmental Protection Agency<br>Research Triangle Park, NC 27711 | | CML (919) 549–8411<br>FTS 629–2821 |

# OFFICE OF RESEARCH AND DEVELOPMENT
# ORGANIZATIONAL DIRECTORY

| | Telephone** |
|---|---|
| **Industrial Environmental Research Laboratory**<br>**Director, David G. Stephan** | |
| Environmental Protection Agency<br>5555 Ridge Avenue<br>Cincinnati, OH 45268 | (513) 684-4402 |
| Oil and Hazardous Materials Spills Branch, Edison, NJ<br>Environmental Protection Agency<br>Edison, NJ 08817 | CML (201) 548-3347<br>FTS 342-7508 |
| Mining Technology Branch, Rivesville, WV<br>P. O. Box 5555<br>Rivesville, WV 26588 | CML (304) 278-5376<br>FTS 923-7496 |
| Food and Wood Products Branch, Corvallis, OR<br>200 SW 35th Street<br>Corvallis, OR 97330 | CML (503) 752-4211<br>FTS 420-4694 |

# OFFICE OF RESEARCH AND DEVELOPMENT
# ORGANIZATIONAL DIRECTORY

## Office of Air, Land, and Water Use

The Office of Air, Land, and Water Use is responsible for the development and demonstration of cost-effective methods for the prevention or management of pollutant discharge or waste disposal into the environment, except those related to energy, minerals, or industrial processes.

| | Headquarters Mail Code* | Telephone** |
|---|---|---|
| **Deputy Assistant Administrator**<br>**Thomas A. Murphy** | RD-682 | (202) 426–2260 |
| Associate Deputy Assistant Administrator<br>Robert Schaffer | RD-682 | (202) 426–3975 |
| Program Operations Staff<br>Director, William Frietsch (Acting) | RD-682 | (202) 426–4255 |
| Agriculture and Non-Point Source Management Division<br>Director, Darwin R. Wright | RD-682 | (202) 426–1532 |
| Waste Management Division<br>Director, William Rosenkranz | RD-682 | (202) 426–2510 |
| Media Quality Management Division<br>Director, Courtney Riordan | RD-682 | (202) 426–2260 |
| **Environmental Sciences Research Laboratory**<br>**Director, A. Paul Altshuller** | | |
| Environmental Protection Agency<br>Research Triangle Park, NC 27711 | | CML (919) 549–8411<br>FTS 629–2191 |
| Regional Air Pollution Study Field Office<br>11640 Administration Drive<br>St. Louis, MO 63141 | | CML (314) 425–7022<br>FTS 279–7022 |

# OFFICE OF RESEARCH AND DEVELOPMENT
# ORGANIZATIONAL DIRECTORY

| | Telephone** |
|---|---|
| **Municipal Environmental Research Laboratory**<br>**Director, Francis T. Mayo** | |
| Environmental Protection Agency<br>Cincinnati, OH 45268 | CML (513)<br>FTS 684-7951 |
| Lebanon Pilot Plant<br>Route 2, Box 7-A<br>Glosser Road<br>Lebanon, OH 45036 | CML (513) 932-1875<br>FTS 684-2000, ask for:<br>(513) 932-4951 |
| EPA-DC Pilot Plant<br>5000 Overlook Avenue, SW<br>Washington, DC 20032 | (202) 562-6200 |
| **Robert S. Kerr Environmental Research Laboratory**<br>**Director, William C. Galegar** | |
| Environmental Protection Agency<br>P. O. Box 1198<br>Ada, OK 74820 | CML (405) 332-8800<br>FTS 743-2224 |
| **Environmental Research Laboratory**<br>**Director, David W. Duttweiler** | |
| Environmental Protection Agency<br>College Station Road<br>Athens, GA 30601 | CML (404) 546-3134<br>FTS 289-3134 |

# OFFICE OF RESEARCH AND DEVELOPMENT
# ORGANIZATIONAL DIRECTORY

## Office of Health and Ecological Effects

The Office of Health and Ecological Effects is responsible for the development of health and ecological data needed for the establishment of standards and criteria or guidelines for those components of the environment in which specific pollutants or activities may require control.

| | Headquarters Mail Code* | Telephone** |
|---|---|---|
| **Deputy Assistant Administrator**<br>**Roy Albert, M.D.** | RD-683 | (202) 755-0611 |
| Associate Deputy Assistant Administrator<br>(Vacant) | RD-683 | (202) 755-0611 |
| Program Operations Staff<br>Director, Harry Thron | RD-683 | (202) 755-8787 |
| Health Effects Division<br>Director, Ronald Engel | RD-683 | (202) 755-0614 |
| Ecological Effects Division<br>Director, Andrew McErlean | RD-683 | (202) 755-0648 |
| Criteria Development and Special Studies Division<br>Director, Roger S. Cortesi | RD-683 | (202) 755-0658 |
| **Health Effects Research Laboratory**<br>**Director, John H. Knelson, M.D.** | | |
| Environmental Protection Agency<br>Research Triangle Park, NC 27711 | | CML (919) 549-8411<br>FTS 629-2281 |
| Wenatchee Research Station<br>P. O. Box 73<br>Wenatchee, WA 98801 | | CML (504) 663-0031<br>FTS 446-0243 |

# OFFICE OF RESEARCH AND DEVELOPMENT
# ORGANIZATIONAL DIRECTORY

| | Telephone** |
|---|---|
| **Health Effects Research Laboratory**<br>**Director, John Garner** | |
| Environmental Protection Agency<br>Cincinnati, OH 45268 | CML (513) 684–7401<br>FTS |
| Recreational Water Quality Criteria Group<br>Environmental Protection Agency<br>South Ferry Road<br>Narragansett, RI 02882 | CML (401) 789–1071<br>FTS 838–4843 |
| **Environmental Research Laboratory**<br>**Director, A. F. Bartsch** | |
| Environmental Protection Agency<br>200 SW 35th Street<br>Corvallis, OR 97330 | CML (503) 752–4211<br>FTS 420–4601 |
| Newport Field Station<br>Marine Science Center<br>Newport, OR 97365 | CML (503) 867–4031<br>FTS 423–4111, ask for (503) 867–4031 |
| Ely Field Station<br>222 West Conan Street<br>Ely, MN 55731 | CML (218) 365–5280<br>FTS 725–4242, ask for (218) 365–5280 |
| Western Fish Toxicology Station<br>1350 SE Goodnight Avenue<br>Corvallis, OR 97330 | CML (503) 757–4735<br>FTS 420–473 |
| Arctic Environmental Research Station<br>College, AK 99701 | CML (907) 479–7728<br>FTS 399–0150, ask for (907) 479–7728 |
| **Environmental Research Laboratory**<br>**Director, Donald I. Mount** | |
| Environmental Protection Agency<br>6201 Congdon Boulevard<br>Duluth, MN 55804 | CML (218) 727–6692<br>FTS 783–9549 |
| Newtown Fish Toxicology Station<br>3411 Church Street<br>Cincinnati, OH 45244 | (513) 684–8601 |

## OFFICE OF RESEARCH AND DEVELOPMENT
## ORGANIZATIONAL DIRECTORY

| | Telephone** |
|---|---|
| Monticello Field Station<br>Box 500<br>Monticello, MN 55362 | CML (513) 295–5145<br>FTS None |
| Large Lakes Research Station<br>9311 Groh Road<br>Grosse Ile, MI 48138 | CML (313) 675–5000<br>FTS ((313) 226–7811 |
| **Environmental Research Laboratory**<br>**Director, Eric D. Schneider** | |
| Environmental Protection Agency<br>South Ferry Road<br>Narragansett, RI 02882 | CML (401) 789–1071<br>FTS 838–4843 |
| **Environmental Research Laboratory**<br>**Director, Thomas W. Duke** | |
| Environmental Protection Agency<br>Sabine Island<br>Gulf Breeze, FL 32561 | CML (904) 932–5311<br>FTS None |
| Bears Bluff Field Station<br>Box 368<br>Johns Island, SC 29455 | CML (803) 559–0371<br>FTS (803) 577–4171, ask for<br>(803) 559–0371 |

*The Office of Research and Development Headquarters mailing address is — Environmental Protection Agency, Washington, DC 20460. Headquarters mail should also include the Mail Code.

**Telephone numbers are both commercial and Federal Telecommunications System (FTS) unless otherwise indicated.

# PART II

# OFFICE OF RESEARCH AND DEVELOPMENT FISCAL YEAR 1976 RESEARCH PROGRAM

The Office of Research and Development (ORD) establishes its objectives and priorities in response to the overall mission and priorities of EPA and is highly mission-oriented, concerned with solving specific priority problems rather than only advancing scientific knowledge. Although the scope of ORD projects may vary from quite fundamental research to the full-scale engineering demonstration of new pollution control processes, all projects are directed at meeting specified objectives.

In all phases of the planning process, ORD activities are grouped into five major program areas. These are: Health and Ecological Effects, Energy, Industrial Processes, Public Sector Activities, and Monitoring and Technical Support. Each of the five major program areas, as well as the subprograms within each area is described in this section.

The ORD fiscal year 1976 research program is summarized in the form of "Accomplishment Plans". Each Accomplishment Plan describes a specific ORD research objective; an objective designed to meet a specific Agency goal. Unsolicited proposals and grant applications may be submitted on any subject at any time (see Part III), but all grant and contract proposals will be evaluated in the context of these pre-established Accomplishment Plans.

It should be noted that the extramural funds shown as available for each Accomplishment Plan are funds which were planned for the entire fiscal year. Publication of our fiscal year 1976 research program has been delayed well into its implementation phase. For this reason, most of these funds will have already been committed. A potential grant or contract applicant should contact the cognizant Laboratory Director to first determine what funds still remain available and through what funding mechanism, i.e., grant or contract, the remaining funds will be expended.

# HEALTH AND ECOLOGICAL EFFECTS PROGRAM AREA

The Health and Ecological Effects Program Area is fundamental to EPA's responsibility to set criteria, standards and guidelines to protect and enhance environmental quality. Scientific information on human health effects of pollutants and ecosystem structure is essential in development of environmental quality standards and effective pollution control strategies. The link between existence of a damaging pollutant and the way it entered the environment must also be understood by policy-makers. That is why research on pollutant transport and fate is essential.

The Health and Ecological Effects Program provides information for establishment and reevaluation of water quality criteria, air quality criteria, ocean disposal criteria, pesticide registration guidelines, effluent standards for toxic and hazardous materials and radiation standards. This program contains three subprograms: Health Effects, Ecological Processes and Effects, and Transport and Fate of Pollutants.

## HEALTH EFFECTS SUBPROGRAM

Health effects research is directed toward the assessment of health hazards associated with environmental pollution from a number of media and categories including air, water, pesticides, radiation and noise. Within this program, research problems are classified on the basis of exposure, or the way in which pollutants reach man. In taking environmental action to protect human health, exposure to specific contaminants, not effect, is regulated. Three primary categories are used in the problem classification: "Air Exposures and Their Effects" which deals with contaminants reaching man primarily in air, "Water Exposures and Their Effects" which deals with contaminants reaching man primarily in water, and "Multi-Route Exposures and Their Effects" which addresses pollutants which commonly reach man by a variety of routes of exposure.

### Air Exposures & Their Effects: Refinement of Public Health Risks Assessment on Regulated and Non-Regulated Pollutants Specifically Associated With Transportation — 601B

Extramural Funds: $2,130,000

Accomplishment Plan Summary: This Accomplishment Plan is part of a multidisciplinary research program begun in fiscal year 1975 focusing on the public health consequences of non-regulated pollutants from mobile sources. The program is designed to provide timely decision-making input to the EPA regarding sulfuric acid and other non-regulated pollutants from mobile sources as promised to the Congress in November 1973. The emphasis is on the evaluation of non-regulated emissions from advanced automotive control systems (principally, but not restricted to, catalysts) so as to ensure protection of the public health and welfare. Health intelligence which will permit such future assessments related to regulated and non-regulated pollutants from mobile sources as they pertain to fuels, fuel additives, and emission control devices is required under Section 211 of the 1970 Clean Air Act Amendments.

Laboratory Assignment: Environmental Sciences Research Laboratory, Research Triangle Park
Health Effects Research Laboratory, Research Triangle Park
Health Effects Research Laboratory, Cincinnati

## Determine Effect of Catalyst Equipped Vehicles on Ambient Air Quality — 601B

Extramural Funds: $80,000

Accomplishment Plan Summary: Evaluate existing analytical techniques required to determine pollutants emanating from cars equipped with catalytic converters and obtain air quality data to determine the effect on the ambient air from such vehicles.

Laboratory Assignment: Environmental Monitoring and Support Laboratory, Research Triangle Park

## Air Exposures and Their Effects: Refinement of Health Information on Pollutants for Which Ambient Air Quality Standards Have Been Developed — 601C

Extramural Funds: $3,857,000

Accomplishment Plan Summary: To evaluate the efficacy of existing Ambient Air Quality Standards, certain health information is required to close research gap areas existing at the time that the health criteria for $SO_2$, $NO_2$, CO, TSP, Ox and HC were compiled. This Accomplishment Plan is directed toward building on information which has become available since the criteria were compiled in a way that will provide a scientifically adequate health data base for refining the existing criteria.

The emphasis needed in this work is an evaluation of exposure averaging times for the standards and of the adequacy of existing safety margins. Emphasis is also needed on determining the health benefits of meeting the standards and the health risks of exceeding the standards. Priorities for the pollutants to be studied are listed in descending order: $NO_2$, Ox, particulates, $SO_2$, and CO. This program includes total body burden studies for particular pollutants or combination of pollutants as well as co-stressor effects studies.

Laboratory Assignment: Health Effects Research Laboratory, Research Triangle Park

## Air Exposures and Their Effects: Identification of the Health Implications of Exposure to Non-Criteria Pollutants Reaching Man Primarily in Air — 601D

Extramural Funds: $2,407,400

Accomplishment Plan Summary: Research information is required to elucidate exposure-effects relationships between pollutants and human health in order to develop a data base for determining: (1) Whether restricting exposure to particular pollutants is warranted to protect health; and, (2) If so, to what degree exposure should be restricted. For example, in the case of sulfates, nitrates, and respirable suspended particulates, information is available which indicates that restricting their expsoures may be necessary. The essential questions concerning these pollutants relate to the degree of control required. In the case of other pollutants such as organics, the most basic questions involve identifying whether they have an exposure-effects relation to health. Once an indication is available that they may require control, questions similar to those posed for sulfates, nitrates, and respirable suspended particulates must be addressed.

Laboratory Assignment: Health Effects Research Laboratory, Research Triangle Park

## Multi-Route Exposures and Their Effects: Identification of the Health Effects of Non-Pesticide Organic and Inorganic Substances Commonly Reaching Man by Multiple Routes of Exposure — 601E

Extramural Funds: $1,198,000

Accomplishment Plan Summary: In order to protect human health adequately by the variety of legal mechanisms available to EPA, research is needed which will permit assessments of total exposure, total body burden and their associated health effects. This Accomplishment Plan is directed toward discerning exposure-effects relationships between health and certain non-pesticide environmental contaminants which typically reach man by multiple routes of exposure. Some pollutants to be studied are zinc, copper and lead exposure effects.

Laboratory Assignment: Health Effects Research Laboratory, Cincinnati
Health Effects Research Laboratory, Research Triangle Park

## Water Exposures and Their Effects: Pollutants Posing a Health Risk Related to Water Quality Directly or Indirectly — 607A

Extramural Funds: $1,509,000

Accomplishment Plan Summary: Determine the nature and concentrations of organic, inorganic, and microbiologic contaminants present in water supplies. Evaluate, through literature searches and long-term toxicological studies and epidemiological studies, the health effects of drinking water contaminants. Derive concentration limits necessary for the protection of the public health.

Determine the health effects associated with land treatment and disposal of wastewater and sludge and to develop the necessary criteria for the safe implementation of such practices. Develop water quality criteria for marine and fresh recreational waters and shellfish-growing waters.

Laboratory Assignment: Health Effects Research Laboratory, Cincinnati
Health Effects Research Laboratory, Research Triangle Park
Environmental Research Laboratory, Narragansett

## Air Exposures and Their Effects: Assessment of the Health Effects of Exposure to Radiant Energy — 628A

Extramural Funds: $239,000

Accomplishment Plan Summary: The effects of acute and chronic exposure to non-ionizing electromagnetic radiation (EMR) needs to be assessed. Animal models (whole animal, organ, cellular, subcellular or molecular preparation as appropriate) should be used to investigate: (1) The potential neurophysiologic, behavioral, developmental, biochemical, immunologic and genetic effects of exposure to radio and microwave frequences characteristic of those to which human populations are exposed, and (2) mechanisms of interaction of EMR with biological organisms and the frequency dependence of those interations.

Emphasis should be placed on effects elicited by exposure for prolonged periods of power densities below those equivalent to milliwatts per square centimeter in man. Continuous wave and amplitude modulated radio and microwave frequencies as well as very low frequencies, like those associated with high power transmission lines, need to be investigated. These studies should utilize single frequency as well as multiple frequency irradiations.

There is a need to define, utilizing the atomic bomb survivor populations, the human health risks of exposure to ionizing radiation. The noise program should provide for the collection and evaluation of health effects information for defending and/or revising existing criteria and establishment of acceptable noise levels for development of standards.

Laboratory Assignment: Health Effects Research Laboratory, Research Triangle Park

## Criteria Development and Special Studies Including Socio-Economic Studies to Complement and Support Determination of Pollution's Impact on Health, Ecosystems and General Welfare — 630

Extramural Funds: $572,400

Accomplishment Plan Summary: Develop and verify advanced economic models and methodologies for comprehensive socio-economic assessments and predictions of future environmental health, ecosystem, and welfare problems.

Laboratory Assignment: Health Effects Research Laboratory, Cincinnati

## Multiple Route Exposures and Their Effects: Identification of the Health Effects of Non-Pesticide Organic and Inorganic Substances Commonly Reaching Man by Multiple Routes of Exposure — 629A

Extramural Funds: $400,000

Accomplishment Plan Summary: Conduct a strategy assessment study to identify and prioritize health effects research needs, and to develop a series of strategies/schedules at different research levels to optimize the utilization of dollars, manpower, and facilities in response to the requirement of the pending Toxic Substances Control Act legislation.

Laboratory Assignment: Health Effects Research Laboratory, Research Triangle Park

# HEALTH AND ECOLOGICAL EFFECTS PROGRAM AREA
## ECOLOGICAL PROCESSES AND EFFECTS SUBPROGRAM

Ecological processes and effects research is directed toward determining the effects of air, water and terrestrial pollutants on the structure and function of the ecosystems and on biotic and abiotic subcomponents of these ecosystems. The research effort is planned and organized along specific problem area lines; work is directed toward target media and conducted according to the character of the problem. Media are divided into freshwater, marine and terrestrial components. "Systems Characterization and Impact Assessment", a subdivision within each medium broadly covers projects which include field studies, theoretical or mathematical simulations, and the characterization of laboratory model ecosystems for potential use in criteria development. In contrast; "Ecological Criteria Development" deals mostly with carefully controlled laboratory greenhouse or field studies whose end purpose is the establishment of legally defensible criteria.

### Terrestrial Ecological Processes and Effects Research on Systems Characterization and Impact Assessment — 602A

Extramural Funds: $202,000

Accomplishment Plan Summary: This Accomplishment Plan will describe and characterize scientifically disrupted and/or natural terrestrial ecosystem or ecosystem components which have been, are, or are about to be impacted by air or water (rain) borne pollutants which may occur singly or in combination at varying concentrations and for varying periods of exposure. The resulting data, or mathematical models, as the case may be, shall be so formulated that the information may be used to predict ecological or economic damage based upon projected pollutant concentrations, exposure duration, and the typical biota of a given region, location, or site.

Laboratory Assignment: Environmental Research Laboratory, Corvallis

### Terrestrial Ecological Criteria Development — 602B

Extramural Funds: $392,000

Accomplishment Plan Summary: To develop pollutant control strategies and the scientific data necessary for the establishment of secondary air quality standards as called for in the Clean Air Act, as amended. Research information is required in the following areas: (1) The effects of specific pollutants, individually and in combination, upon terrestrial plants and animals; especially upon those of economic value; and (2) Use of sensitive biological components of natural, disturbed, or microcosm ecosystems to measure the well being of target ecosystems or ecosystem components.

Laboratory Assignment: Environmental Research Laboratory, Corvallis

### Freshwater Systems Characterization and Impact Assessment — 608A

Extramural Funds: $1,555,000

Accomplishment Plan Summary: The objective of this Accomplishment Plan is to develop a sound scientific basis for complying with Public Law 92–500. Research will include: (1) Characterization of natural and stressed freshwater ecosystems; (2) Development of mathematical ecosystem simulations and laboratory models which allow prediction of pollutant stresses on aquatic biota; and, (3) Development of methodology for assessing socio-economic impact of pollutants on aquatic biota.

Stressing factors to be studied include toxic organics and inorganics, nutrients, temperature, suspended solids, and dissolved gases.

Laboratory Assignment: Environmental Research Laboratory, Corvallis
Environmental Research Laboratory, Duluth

## Freshwater Ecological Criteria Development — 608B

Extramural Funds: $287,000

Accomplishment Plan Summary: In order for the EPA to issue Water Quality Criteria as mandated by Section 304(a), and to publish proposed effluent standards as mandated by Section 307(a) and 316 of Public Law 92–500, information is required in four major areas: (1) The effects of organisms in freshwater ecosystems; (2) The effects of specific pollutants and pollutant combinations on ecosystem-level parameters and processes which are dependent on particular functional groupings of organisms rather than on any particular species; (3) The physical, chemical, and biochemical transformation of pollutants which result from their introduction to or passage through freshwater ecosystems; and (4) Environmental requirements and limits for freshwater organisms. Inherent in all of the above is the consideration, where applicable, of intermedia transport and effects.

The pollutants to be studied will include toxic organics and inorganics, both singly and in combination, as well as substances such as chlorinated sewage effluents and asbestiform fibers from which potential harmful effects are suspected. Priorities for the pollutants to be studied will be based on EPA's need for information, known toxicity, potential exposure risk, etc.

Laboratory Assignment: Environmental Research Laboratory, Duluth
Environmental Research Laboratory, Corvallis

## Marine and Estuarine Systems Characterization and Impact Assessment — 608C

Extramural Funds: $466,000

Accomplishment Plan Summary: In order for the EPA to develop water quality criteria for marine and estuarine waters, there must be continued research on characterization of natural and stressed marine and estuarine ecosystems development of mathematical ecosystem simulations and laboratory models which allow prediction of pollutant stresses on aquatic biota, and development of methodology for assessing socio-economic impact of pollutants on aquatic biota.

While it is recognized that intermedia effects occur, the above research provides data and evaluation methods regarding toxicity, distribution and degradation of pollutants, singly and in combination, in marine systems. Pollutants may include, but are not limited to, organic and inorganic compounds, chemical elements, nutrients, solids and heat.

Laboratory Assignment: Environmental Research Laboratory, Narragansett
Environmental Research Laboratory, Corvallis

## Marine and Estuarine Ecological Criteria Development — 608D

Extramural Funds: $1,029,000

Accomplishment Plan Summary: In order to establish water quality criteria as mandated by the Federal Water Pollution Control Act and subsequent legislation, certain ecological information is required. The information required includes: (1) The effects of a pollutant or pollutant combination on selected representative sensitive organisms; (2) The effects of a pollutant or pollutant combination on ecosystem level parameters; (3) Methods to measure the relative "health" of an ecosystem; (4) The knowledge of routes and rates of pollutant movement through the ecosystem including routes to man, and (5) Ecological requirements for marine organisms.

Pollutants for which ecological criteria are needed include, but are not limited to, chlorinated compounds, heavy metals, sewage, and oils.

Laboratory Assignment: Environmental Research Laboratory, Narragansett
Environmental Research Laboratory, Corvallis

## Assessment of the Extent of Lake Eutrophication — 608E

Extramural Funds: $30,000

Accomplishment Plan Summary: The goal of the National Eutrophication Survey (NES) is to reduce uncertainties regarding the threat of accelerated eutrophication in the Nation's freshwater lakes and reservoirs. The overall objective of the endeavor is to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impacts on selected freshwater lakes. This data will be used as a basis for the formulation of comprehensive and coordinated national, regional and state management practices relating to point source discharge reduction and nonpoint source pollution abatement in lake watersheds.

Outputs should be developed and formatted expressly to provide maximum utility at state and federal management levels.

The approach to solution of these objectives should be based on the redetermined sampling, analysis, evaluation and documentation protocols established for the approximately 800 freshwater lakes and impoundments jointly selected by EPA and the states for the program.

Laboratory Assignment: Environmental Monitoring and Support Laboratory, Las Vegas

## Substitute Chemical Program and Pesticide Studies Associated With Terrestrial Ecological Criteria development — 615B

Extramural Funds: $382,000

Accomplishment Plan Summary: To permit the assessment of substitute chemicals for compliance with Public Law 93–135 and the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), as amended, research

information is required on the presence, movement, and transformation of chemical substitutes for pesticides in terrestrial ecosystems.

Pollutants to be studied include, but are not limited to, those which fall under FIFRA, as amended, and other toxic or non-toxic substances as may be identified as a threat to the well-being of terrestrial ecosystems and which legitimately fall under the enabling statutes of EPA.

Laboratory Assignment: Environmental Research Laboratory, Corvallis

## Marine and Estuarine Systems Characterization and Impact Assessment — 615C

Extramural Funds: $172,000

Accomplishment Plan Summary: In order for the EPA to develop water quality criteria for marine and estuarine waters, there must be continued research on the characterization of natural and stressed marine and estuarine ecosystems, the development of mathematical ecosystem simulations and laboratory models which allow prediction of pollutant stresses on aquatic biota, and the development of methodology for assessing socio-economic impact of pollutants on aquatic biota.

While it is recognized that intermedia effects occur, the above research provides data and evaluation methods regarding toxicity, distribution and degradation of pollutants, singly and in combination, in marine systems. Pollutants may include, but are not limited to, organic and inorganic compounds, chemical elements, nutrients, solids and heat.

Laboratory Assignment: Environmental Research Laboratory, Gulf Breeze

## Marine and Estuarine Ecological Criteria Development — 615D

Extramural Funds: $312,000

Accomplishment Plan Summary: In order to establish water quality criteria as mandated by the Federal Water Pollution Control Act and subsequent legislation, certain ecological information is required. The information required includes: (1) The effects of a pollutant or pollutant combination on selected representative sensitive organisms; (2) The effect of a pollutant or pollutant combination on ecosystem level parameters; (3) Methods to measure the relative "health" of an ecosystem; (4) The knowledge of routes and rates of pollutant movement through the system, including routes to man; and (5) Ecological requirements for marine organisms.

Laboratory Assignment: Environmental Research Laboratory, Gulf Breeze

# HEALTH AND ECOLOGICAL EFFECTS PROGRAM AREA
## TRANSPORT AND FATE OF POLLUTANTS SUBPROGRAM

The transport and fate research is directed toward the development of empirical and analytical techniques that relate air pollution source emissions to ambient exposures. This requires research in the area of (a) atmospheric processes and effects for the determination of air pollutant sources, sinks, transport and transformation of airborne gaseous and particulate matter; and the effects of air pollutants on visibility, rainfall, and climate and (b) air pollutant characterization and measurement for the development of new and/or improved methodology and instrumentation technology for the characterization and quantification of air pollutants from stationary mobile sources and in the ambient air. A similar problem area exists for the transport and fate of pollutants entering the aquatic environment.

### Atmospheric Processes and Effects — 603A

Extramural Funds: $5,883,000

Accomplishment Plan Summary: Studies on atmospheric processes and effects will be conducted to determine qualitatively and quantitatively the sources and sinks, kinetics of formation and removal, and chemical/physical interactions of airborne gaseous and particulate matter. This area of research covers: (1) The development, evaluation, and validation of air quality simulation models for predicting and describing air quality impacts anticipated from various control abatement strategies; (2) Determination of atmospheric chemical and physical processes for describing the formation and decay of gaseous and particulate air pollutants; and (3) Quantification of the atmospheric effects on visibility, acid rainfall, and climate due to air pollutant and thermal emissions.

Laboratory Assignment: Environmental Sciences Research Laboratory, Research Triangle Park

### Sources, Processes, and Systems — 609A

Extramural Funds: $1,336,000

Accomplishment Plan Summary: Identify and assess present and future water quality problems and provide the scientific understanding, new knowledge, methods and techniques to: (1) Meet the Public Law 92-500 water quality goals established for 1977 and 1983, and (2) solve potential future water quality problems before they become national issues.

Specifically research data on the fate, transport and aquatic ecosystem impact of specific pollutants must be provided to support water quality criteria development and pesticide registration activities. Verified methods and techniques to predict the concentration, form, and impact of pollutants in time and space must be provided to the regions and states for basin planning and waste load allocations for water quality limited systems. Comprehensive basin water quality models incorporating point and non-point source inputs, socio-economic implications, energy conservation and net cost benefits should be provided to the Office of Water and Hazardous Materials, the regions and the states.

Research and development results should be provided in research application reports, scientific papers, problem reports (including model user manuals and card decks and hands-on demonstrations), technical assistance and feedback. Research applications and problem reports should include an analysis of the environmental applicability or limitation of the information provided.

Laboratory Assignment: Environmental Research Laboratory, Athens

# ENERGY PROGRAM AREA

The Energy Program Area is fundamental to EPA's responsibility to protect the public health and welfare from the adverse effects of pollutants discharged by or associated with energy systems. Such protection must be accomplished through a multimedia approach so that the control of one form of pollution does not result in an unacceptable impact occurring in another media. Because of the potentially acute health and ecological effects associated with the traditional, as well as the new technologies for fuel extraction, processing, and conversion, the EPA has a major responsibility in this area to ensure that environmental quality and human health are protected. Further, since many of the problems are long-term, e.g., many technologies will not be available and in commercial use before early 1985, the EPA must have programs underway now to develop the health and technical data base necessary to support future New Source Performance Standards and Ambient Air Quality Standards.

The Energy Program Area is organized into three subprograms: Extraction and Processing Technology; Conservation, Utilization and Technology Assessment; and Health and Ecological Effects.

## EXTRACTION AND PROCESSING TECHNOLOGY SUBPROGRAM

The Extraction and Processing Technology Subprogram includes the assessment of problems and development of control techniques to mitigate the environmental impact of the extraction of energy resources. Solid, liquid and gaseous fuels as well as advanced energy sources, such as uranium and geothermal energy, are considered. Extraction problems cover a wide spectrum of activities from the development of techniques to abate acid mine drainage, to the restoration of strip-mined land in humid and dry areas, to the assessment of the socio-economic impacts of mining a virgin area, to the assessment of practices on off-shore oil rigs. Also included is a program which provides environmental control technology and environmental assessments of important fuel processing schemes, including low and high-BTU gasification, liquifcation, coal cleaning, shale oil processing, and fluidized bed combustion.

### Energy Control Technology: Fuel Processing — 623A

Extramural Funds: $13,083,000

Accomplishment Plan Summary: The Fuel Processing Program will promote and participate in the development of advanced technologies for fuel processing by providing environmental technology development and environmental assessment. Processes for physical/chemical coal cleaning are being developed with the support of the Bureau of Mines and the Energy Research and Development Administration. Environmental support is being given to the National Fluidized Bed Combustion Program. In synthetic fuels and oil shale, the program is identifying and quantifying the discharges from processes under development and evaluating and developing control technology. The chemically active fluid bed process for residual oil cleanup is being demonstrated at a utility. Studies are underway to reduce environmental impacts from parts of the nuclear fuel cycle other than mining and milling.

Laboratory Assignment: Industrial Environmental Research Laboratory, Cincinnati
Industrial Environmental Research Laboratory, Research Triangle Park

## Energy Resource Extraction and Handling; Solid Fossil Fuels — 623B

Extramural Funds: $2,370,000

Accomplishment Plan Summary: As mandated under the Water, Air, and Solid Waste Acts, it is the intent of this Accomplishment Plan to develop and prove new pollution control technology for production of solid fossil fuels. Work will be undertaken to assess the potential environmental damages (air, water, noise, etc), from active and abandoned mining transportation and benefication processes; to develop methods to control, treat and abate environmental pollutants from these operations; to demonstrate and document the technical/operational feasibility and cost/effectiveness of environmental control options; to provide on a timely basis environmental control information; and to prepare manuals of practice which encompass all environmental pollution control aspects in a form that meets the operational needs of both regulatory/control agencies and industry.

Laboratory Assignment: Industrial Environmental Research Laboratory, Cincinnati

## Energy Resource Extraction: Oil and Gas Production — 623C

Extramural Funds: $1,002,000

Accomplishment Plan Summary: Assess the existing and potential adverse environmental impacts (air, water, land) from active and planned oil and gas production, storage and transportation facilities; develop methods, technology and equipment to prevent, control and abate environmental pollutants from these operations; demonstrate and document the technical/operational feasibility and cost/effectiveness of environmental control options; provide on a timely basis environmental control guidelines; provide standardized manuals of practice which encompass all environmental pollution control aspects in a format that meets the operational needs of the industry; and provide technical reports describing the environmental control options available for practice in a manual suitable for regulatory/control agency use and industrial planning/design use.

Laboratory Assignment: Industrial Environmental Research Laboratory, Cincinnati

# ENERGY PROGRAM AREA
## CONSERVATION, UTILIZATION AND TECHNOLOGY ASSESSMENTS SUBPROGRAM

The Conservation, Utilization and Technology Assessments Subprogram includes three distinct parts — conservation, utilization (electrical energy production) and technology assessments.

The conservation portion of the Subprogram will provide environmental assessments and contribute to the development of environmentally compatible advanced technologies and control technologies for waste recovery, indoor air quality, and second generation energy systems, e.g., solar and geothermal energy.

The utilization portion of this subprogram includes the identification, characterization, assessment and development, where appropriate, of control technology for pollutants associated with electric utility and industrial combustion sources. A multi-media approach is planned with gaseous, liquid and solid wastes considered. Both primary pollutants (effluents from uncontrolled combustion systems) and secondary residuals (effluents from control technology) must be carefully considered. Emphasis is focused on generating information which can be used to help set environmental standards and guidelines and develop economical control technology so that such standards can be achieved.

The objective of the integrated assessment portion of this subprogram is the identification of environmentally, socially and economically acceptable alternatives for meeting National energy supply objectives, and assistance in the selection of optimum policies for the attainment of associated environmental quality goals.

### Utility and Industrial Power – 624A

Extramural Funds: $19,575,000

Accomplishment Plan Summary: The overall objective of this Accomplishment Plan is the identification, characterization assessment and development, where appropriate, of control technology for pollutants associated with utility and industrial combustion sources. It is important that a multi-media approach be taken with gaseous, liquid, and solid wastes carefully characterized. Both primary pollutants (effluents from uncontrolled combustion) and secondary residuals (effluents from controlled technology) must be carefully considered. Emphasis must be focused on generating information which can be used to help set environmental standards and guidelines and develop economical control technology so that such standards can be achieved.

Laboratory Assignment: Industrial Environmental Research Laboratory, Research Triangle Park

### Utility and Industrial Power/Control of Waste and Water Pollution — 624A

Extramural Funds: $100,000

Accomplishment Plan Summary: Conduct specific projects as part of the EPA program to control waste and water pollution from utility and industrial flue gas cleaning systems. The objectives of these projects are as follows: (1) Determine the extent to which the migration of chemicals from flue gas cleaning wastes can be attenuated by soils in land disposal sites and develop an empirical method to describe the migration potential; (2) Determine the compatibility of various liner materials when exposed to flue gas cleaning wastes; (3) Determine the leachability and durability of products from first generation flue gas cleaning waste treatment processes; conduct a field evaluation of current flue gas cleaning waste disposal technology; and assess, screen, and demonstate (on a pilot scale) second generation waste treatment processes; and (4) Establish the data base for the future development of standards for the disposal of wastes and identify research and development needs for standards development. Management and results of these projects will be coordinated with other projects in the EPA waste and water program.

Laboratory Assignment: Municipal Environmental Research Laboratory, Cincinnati

## Wastes-As-Fuel — 624B

Extramural Funds: $650,000

Accomplishment Plan Summary: Manage aspects of the wastes as fuel research, development and demonstration program. These activities include technical, environmental, and economic evaluations of waste disposal, including wastes co-incineration and materials recovery equipment and systems; fuel and feedstock preparation; biological conversion energy recovery technologies, including advanced processes; survey of the organic and mixed waste streams, except industrial; development of pollutant assessment criteria, sampling and analysis techniques, and the performance of pollutant characterizations for processes under development by the Municipal Environmental Research Laboratory.

Assess, develop and evaluate equipment and systems for processing wastes for material recovery, for preparing fuels and feedstocks for energy recovery via all conversion processes, and for converting wastes to fuels via biological conversion processes. Analyses will determine the optimal composition of waste inputs, energy balances, materials balances, emissions and residuals, effectiveness of emission controls and residue handling systems, needs for new types of pollutant control equipment, life-cycle costs, economic viability, theory, and other aspects. Major technologies and methods will be explored for materials, fuel, and feedstocks recovery and for bio-conversion.

Laboratory Assignment: Municipal Environmental Research Laboratory, Cincinnati

## Environmental Aspects of Energy Conservation Methods and Advanced Energy Systems — 624B

Extramural Funds: $3,521,000

Accomplishment Plan Summary: This Accomplishment Plan will provide environmental assessments and contribute to the development of environmentally compatible advanced technologies and control technologies for waste recovery, indoor air quality, energy conserving industrial processes, advanced energy conversion cycles, and advanced energy systems (solar and geothermal energy). Techniques and technologies are under development by the Energy Research and Development Administration, Federal Energy Administration, Housing and Urban Development, and other agencies in each of these areas. Environmental and some process development support are provided under this EPA program. Outputs from this program will support EPA's role on two interagency working groups — — the Interagency Task Force on Energy Conservation in Buildings and the Interagency Task Force on Energy Conservation in Industry — — as well as EPA regulatory responsibilities by assuring the environmental compatibility of techniques and technologies.

Laboratory Assignment: Industrial Environmental Research Laboratory, Research Triangle Park
Industrial Environmental Research Laboratory, Cincinnati

## Energy-Integrated Assessment — 624C

Extramural Funds: $2,125,000

Accomplishment Plan Summary: The overall objective of the Accomplishment Plan is the identification of environmentally, socially, and economically acceptable alternatives for meeting national energy supply objectives, and to assist in the selection of "optimum" policies for the attainment of associated environmental quality goals. This objective will be met by: (1) Integrating the results of the environmental research program with the remainder of the Energy Research Program; (2) Evaluating the cost/risk/benefit trade-offs of energy production and pollution control alternatives; (3) Conducting technology asessments which evaluate alternative energy technologies and approaches for implementing energy development, preventing environmental damage, and securing related benefits; and (4) identifying gaps in present research programs and indicating new priority research topics which must be addressed in order to support direct Agency responsibilities.

Laboratory Assignment: Office of Energy, Minerals and Industry, Headquarters

## Groundwater Geothermal Environmental Impact Assessment Monitoring — 624C

Extramural Funds: $100,000

Accomplishment Plan summary: The objective of this Accomplishment Plan is to accelerate the ongoing EPA assessment of the actual and potential environmental impact of geothermal resource exploitation with particular emphasis on surface and groundwater contamination. EPA must intensify its efforts to obtain environmental data prior to or in concert with the Energy Research and Development Administration (ERDA) development program for geothermal energy which is rapidly expanding and is initially focusing on the Imperial Valley.

The acquisition of environmental data will be needed to develop and support anticipated effluent guidelines relative to potential contamination of surface and groundwater by heavy metals and noncondensible gases such as carbon monoxide, hydrogen sulfide and various radionuclides. This effort is primarily aimed at providing the scientific background information to enable EPA to establish sound effluent guidelines for the geothermal industry and in particular for its initial new development in the Imperial Valley. Secondarily, the effort is aimed at the development of a groundwater monitoring methodology and associated demonstration for geothermal development of the type planned in the Imperial Valley.

Laboratory Assignment: Environmental Monitoring Support Laboratory, Las Vegas

## Ice Fog Control Technology — 624E

Extramural Funds: $66,000

Accomplishment Plan Summary: To design and demonstrate the effectiveness of ice fog control technology for boilers and cooling ponds.

Laboratory Assignment: Environmental Research Laboratory, Corvallis

## Air, Water, and Multi-Route Exposures and Their Effects: Pollutants Associated With Energy Development — 624F

Extramural Funds: $682,000

Accomplishment Plan Summary: Experiments are to be designed and executed to permit an assessment of health effects of exposure to various hazardous substances distributed in the air, land, and water as a result of energy technologies, especially coal, oil shale and synthetic fuels. Exposures are to be characterized for pollutants singly and in combination. Toxicity of the pollutants, their transformation products and metabolic products is to be determined.

Data obtained on the health effects of waterborne pollutants associated with present emerging energy processes and production should include heavy metals and organic chemicals with emphasis on the toxicological, biological, genetic, and other biomedical aspects of subchronic and chronic exposures. Research on exposure to tritium should be included.

Health effects information is to be developed on multi-route exposure from metallic pollutants resulting from fossil fuel, extraction, combustion, and conservation considering fuel development alternatives. The health effects of exposure to metals (including Ni, Hg, Cd, Pb, Mn, Cr, V, As and others) released from fuel combustion and conversion are to be assessed, both singly and in combination.

Laboratory Assignment: Health Effects Research Laboratory, Cincinnati

# ENERGY PROGRAM AREA
## HEALTH AND ECOLOGICAL EFFECTS SUBPROGRAM

The Health and Ecological Effects Subprogram encompasses a program to determine the environmental effects associated with energy extraction, transmission, conversion and use so that measures can be taken in a timely manner to protect human health, the ecosystem, and social goals. Identification of the pollutants released by energy-related industrial operations and determination of their impact on the human and natural environment will define the environmental control requirements for the polluting operations. Included are studies to characterize the risks, costs or benefits associated with development and utilization of energy technology to human health and welfare and to environmental quality and ecological systems.

### Effects of Energy Related Pollutants on Organisms and Ecosystems — 625A

Extramural Funds: $3,222,000

Accomplishment Plan Summary: Determine acute and chronic toxicological effects on freshwater, marine/estuarine and terrestrial organisms and resultant ecosystem impacts from single pollutants and combinations of pollutants released from energy extraction, conversion, transmission and use. Develop requisite baseline information and develop and assess methodology and techniques for reclamation of areas impacted by energy resource development.

Laboratory Assignment: Environmental Research Laboratory, Gulf Breeze
Environmental Research Laboratory, Corvallis
Environmental Research Laboratory, Duluth

### Transport and Fate of Energy-Related Pollutants in Ecosystems — 625B

Extramural Funds: $2,190,000

Accomplishment Plan Summary: Determine the origins, loads, transport pathways, transfer rates and fates in the atmosphere, and fresh surface and groundwaters of single pollutants and combinations of pollutants associated with energy extraction, conversion, transmission and utilization. Develop and test predictive models for determining the transport and fate of energy-related pollutants.

Laboratory Assignment: Environmental Sciences Research Laboratory, Research Triangle Park
Robert S. Kerr Environmental Research Laboratory, Ada
Environmental Research Laboratory, Athens

### Energy Related Pollutant and Effects Monitoring and Associated Methods and Techniques Development — 625C

Extramural Funds: $125,000

Accomplishment Plan Summary: Develop and maintain an interlaboratory quality assurance program for water monitoring laboratories. This includes distribution of standards and spiked samples. Develop techniques for standardizing water monitoring instruments.

Laboratory Assignment: Environmental Monitoring and Support Laboratory, Cincinnati

## Energy Related Pollutant and Effects Monitoring and Associated Methods and Techniques Development — 625C

Extramural Funds: $1,193,000

Accomplishment Plan Summary: The overall objective of this program is to provide validated environmental quality baseline data in those geographical areas where the impact of new energy development is or is projected to be, of major magnitude on the environment and to provide a scientifically valid reference point in which future environmental degradation may be judged and upon which rational policy decisions may be made. These decisions will concern both future environmental standards, and the direction and magnitude of specific energy development. This objective includes the development of new and advanced monitoring methods and techniques needed to provide key data and information of broad scope in support of the main purpose of the program.

Laboratory Assignment: Environmental Monitoring and Support Laboratory, Research Triangle Park
Environmental Monitoring and Support Laboratory, Las Vegas

## Energy Related Pollutant and Effects Monitoring Associated Methods and Techniques Development — 625C

Extramural Funds: $125,000

Accomplishment Plan Summary: Develop sampling procedures, measurement methods and monitoring instrumentation for water pollutants from energy related activities. Develop protocols for coal extraction and new conversion technologies (coal gasification and liquefaction), oil extraction and processing, oil shale processing, desulfurization and geothermal power plants. Develop instrumentation and continuous sensors for toxic elements, phenols, cyanides, nitrates, phosphates, total organic carbon and total oxygen demand.

Laboratory Assignment: Environmental Monitoring and Support Laboratory, Cincinnati

## Energy Related Pollutant Measurement and Instrumentation Development — 625D

Extramural Funds: 490,000

Accomplishment Plan Summary: The objective of this Accomplishment Plan is the development of methods and instrumentation for the measurement of energy-related pollutants and the performance of special field studies and analyses related to characterizing the levels of certain pollutants injected into the environment by new technologies and energy developments at specific geographical sites.

Laboratory Assignment: Environmental Sciences Research Laboratory, Research Triangle Park
Environmental Research Laboratory, Athens

## Air, Water, and Multi-Route Exposures and Their Effects: Pollutants Associated With Energy Development — 625F

Extramural Funds: $3,914,000

Accomplishment Plan Summary: Experiments are to be designed and executed to permit an assessment of health effects of exposure to various hazardous substances distributed in the air, land, and water as a result of energy technologies, especially coal, oil shale and synthetic fuels. Exposures are to be characterized for pollutants singly and in combination. Toxicity of the pollutants, their transformation products and metabolic products is to be determined.

Data obtained on the health effects of waterborne pollutants associated with present and emerging energy processes and production should include heavy metals and organic chemicals with emphasis on the toxicological, biological, genetic, and other biomedical aspects of subchronic and chronic exposures. Research on exposure to tritium should be included.

Health effects information is to be developed on multi-route exposure from metallic pollutants resulting from fossil fuel, extraction, combustion, and conservation considering fuel development alternatives. The health effects of exposure to metals (including Ni, Hg, Cd, Pb, Mn, Cr, Vd, As and others) released from fuel combustion and conversion is to be assessed, both singly and in combination.

Laboratory Assignment: Health Effects Research Laboratory, Research Triangle Park

# INDUSTRIAL PROCESSES PROGRAM AREA

A research program in the Industrial Processes Area is essential for the Agency to meet the requirements of the Clean Air Act, the Water Act and the Solid Waste legislation. By involvement in research in this area, systems are developed and transferred to industries which enable them to comply with abatement requirements. Information is developed for the detection, control and abatement of pollution from industrial and extractive processes, and land use. Another part of the program is concerned with identification and economic evaluation of present and alternate systems. This research program is comprised of two subprograms — the Minerals, Processing and Manufacturing Subprogram and the Renewable Resources Subprogram.

## MINERALS, PROCESSING, AND MANUFACTURING SUBPROGRAM

The Minerals, Processing and Manufacturing Subprogram concerns point sources of water, air and residue pollution arising from the industrial sector of the economy and is focused on those mining, manufacturing, service and trade industries which are involved in the extraction, production and processing of materials into consumer products. In addition, the environmental problems resulting from the accidental spill of selected materials is also relevant. It is the purpose of this research activity to support the technology requirements of the Clean Air and Water Pollution Control Acts through the demonstration of new or improved technology having industry-wide applicability, short-term achievability and long-term viability.

### Hazardous Material Incidents (Air) — 604A

Extramural Funds: $100,000

Accomplishment Plan Summary: The objectives of this Accomplishment Plan are to develop, evaluate and demonstrate new or improved equipment, devices and systems for the prevention, detection, identification, containment, control, removal, cleanup, recovery and disposal of spills or acute releases of hazardous pollution substances. The development of hardware is to be carried out beyond the prototype stage to the point where it is ready for field implementation by the user community. Techniques are to be defined for the redevelopment and restoration of ecosystems that have been biologically damaged as a result of spills; to assess these damages, the ecological effects and persistency of high concentration, short duration slugs (non-continuous discharges of hazardous substances on the environment) are to be determined. Primary efforts are to be directed toward demonstration technologies to protect and minimize damages to the air milieu from sudden discharges of those hazardous chemicals which are proposed to be designated under section 311 of Public Law 92–500. A special category of this program will focus on research and development technical assistance to Federal, state and local personnel for emergency spill response and for supervision of the use of newly developed equipment and techniques during actual spill situations.

Laboratory Assignment: Industrial Environmental Research Laboratory, Cincinnati

## Materials Processing (Air) — 604B

Extramural Funds: $2,068,000

Accomplishment Plan Summary: To develop technology necessary to eliminate the discharge/emission of all pollutants from materials processing industry point sources through the conduct of a technology research program dedicated to a spectrum of research activities culminating in the demonstration or assessment of engineering scale technologies. Research findings will be translated into public/private sector use through reports, seminars, and Agency standards. All research activities must have industry-wide applicability, technical and economic achievability for implementation, long-term viability, and must serve as a basis for establishing, improving or implementing required standards of Public Law 92–600 (Air) or Public Law 92–500. The research can be classified as open cycle, closed cycle, and total environmental control. The decision as to which broad technology option has the highest priority for the Office of Research and Development focus is unique to each point source category and must (a) result from an assessment of the state-of-the-art control technology, (b) fit within the framework of the Agency's discharge/emission standards, and (c) include an evaluation of implementation achievability and viability.

Laboratory Assignment: Industrial Environmental Research Laboratory, Cincinnati
Industrial Environmental Research Laboratory, Research Triangle Park

## Materials Production (Air) — 604C

Extramural Funds: $2,299,000

Accomplishment Plan Summary: The problem area is point sources of pollution associated with the extraction (both active and abandoned mines) and processing of raw materials into intermediate products for consumption by the materials processing industries. Excluded from consideration is the extraction of fuels and processing of solid fuels.

The objective of the materials production research, development and demonstration program is to develop manuals of practice (MOPs), best state-of-the-art, to prevent and/or to control environmental damages from the materials production industries. These MOPs will address the simultaneous control of air, water, and noise pollution and the environmentally acceptable recovery and utilization of industrial residues from all industry pollutant sources and will be in a form that meets the operational needs of both regulatory/enforcement agencies and industry. It is expected that various MOPs representing various stages of technology development will be required for each priority industry to be considered. The goal of this program is to provide MOPs for all materials production industries by 1985.

Laboratory Assignment: Industrial Environmental Research Laboratory, Cincinnati
Industrial Environmental Research Laboratory, Research Triangle Park

## Energy Resource Extraction: Oil and Gas Production (Air) — 604E

Extramural Funds: $100,000

Accomplishment Plan Summary: (1) Assess the existing and potential adverse environmental impacts (air, water, land) from active and planned oil and gas production, storage and transportation facilities; (2) Develop methods, technology and equipment to prevent, control and abate environmental pollutants from these operations; (3) Demonstrate and document the technical/operational feasibility and cost/effectiveness of environmental control options; (4) Provide on a timely basis environmental control guidelines; (5) Provide standardized manuals of practice which encompass all environmental pollution control aspects in a format that meets the operational needs of the industry; and (6) Provide technical reports describing the environmental control options available for practice in a manual suitable for regulatory/control agency use and industrial planning/design use.

Laboratory Assignment: Industrial Environmental Research Laboratory, Cincinnati

## Hazardous Material Incidents (Water) — 610A

Extramural Funds: $1,371,000

Accomplishment Plan Summary: The objectives of this Accomplishment Plan are to develop, evaluate and demonstrate new or improved equipment, devices and systems for the prevention, detection, identification, containment, control, removal, cleanup, recovery and disposal of spills or acute releases of hazardous pollution substances. The development of hardware is to be carried out beyond the prototype stage to the point where it is ready for field implementation by the user community. Techniques are to be defined for the redevelopment and restoration of ecosystems that have been biologically damaged as a result of spills; to assess these damages, the ecological effects and persistency of high concentration, short duration slugs (non-continuous discharges of hazardous substances on the environment) are to be determined. Primary efforts are to be directed toward demonstration technologies to protect and minimize damages to the water milieu from sudden discharges of those hazardous chemicals which are proposed to be designated under Section 311 of Public Law 92–500. A special category of this program will focus on research and development technical assistance to Federal, state and local personnel for emergency spill response and for supervision of the use of newly developed equipment and techniques during actual spill situations.

Laboratory Assignment: Industrial Environmental Research Laboratory, Cincinnati

## Health Effects Criteria for the Industrial and Extractive Processes Division of the Office of Energy, Minerals and Industry — .610B

Extramural Funds: $50,000

Accomplishment Plan Summary: Provide health effects criteria to support the technology research activities of the Industrial and Extractive Processes Division of the Office of Energy Minerals and Industry. Evaluate data from recycle projects and assess the health implications of reuse.

Laboratory Assignment: Health Effects Research Laboratory, Cincinnati

## Health and Ecology Effects Criteria for the Industrial and Extractive Processes Division of the Office of Energy, Minerals and Industry — 610B

Extramural Funds: $100,000

Accomplishment Plan Summary: There is a need to develop health and ecological effects criteria to support the technology research activities of the industrial air pollution control program. The industrial water pollution technology research program frequently explores the viability of technologies for reuse/recycle and resource recovery (product and by-product). At times the degree of these options and their long-term viability is dependent upon the health and ecological effects criteria for environmental compatibility.

Laboratory Assignment: Environmental Research Laboratory, Gulf Breeze

## Materials Processing (Water) — 610B

Extramural Funds: $2,339,000

Accomplishment Plan Summary: To develop technology necessary to eliminate the discharge/emission of all pollutants from materials processing industry point sources through the conduct of a technology research program dedicated to a spectrum of research activities culminating in the demonstration or assessment of engineering scale technologies. Research findings will be translated into public/private sector use through reports, seminars; and Agency standards. All research activities must have industry-wide applicability, technical and economic achievability for implementation, long-term viability, and must serve as a basis for establishing, improving or implementing required standards of Public Law 92-500. The research can be classified as open cycle, closed cycle, and total environmental control. The decision as to which broad technology option has the highest priority for the Office of Research and Development focus is unique to each point source category and must (a) result from an assessment of the state-of-the-art control technology, (b) fit within the framework of the Agency's discharge/emission standards, and (c) include an evaluation of implementation achievability and viability.

Laboratory Assignment: Industrial Environmental Research Laboratory, Cincinnati
Industrial Environmental Research Laboratory, Research Triangle Park

## Energy Resource Extraction and Handling Solid Fossil Fuels — 610B

Extramural Funds: $276,000

Accomplishment Plan Summary: As mandated under the Water, Air and Solid Waste Acts, it is is the intent of this Accomplishment Plan to develop and prove new pollution control technology for production of solid fossil fuels. Work will be undertaken (1) To assess the potential environmental damages, air, water, noise, etc., from active and abandoned mining transportation and beneficiation processes; (2) To develop methods to control, treat and abate environmental pollutants from these operations; (3) To demonstrate and document the technical/operational feasibility and cost/effectiveness of environmental control options; (4) To provide on a timely basis environmental control information; and (5) To prepare manuals of practice which encompass all environmental pollution control aspects in a form that meets the operational needs of both regulatory/control agencies and industry.

Laboratory Assignment: Industrial Environmental Research Laboratory, Cincinnati

## Materials Processing Petrochemicals — 610B

Extramural Funds: $244,000

Accomplishment Plan Summary: Develop technology necessary to eliminate the discharge of all pollutants from materials processing petrochemical industry point sources through the conduct of a technology research program dedicated to a spectrum of research activities culminating in the demonstration or assessment of engineering scale technologies. Research findings will be translated for public/private sector use through reports, seminars, and Agency standards. All research activities must have industry-wide applicability, technical and economic achievability for implementation, long-term viability, and must serve as a basis for establishing, improving or implementing required standards of Public Law 92–500. The research can be classified as open cycle, closed cycle, and total environmental control. The decision as to which broad technology option has the highest priority for the Office of Research and Development focus is unique to each point source category and must (a) result from an assessment of the state-of-the-art control technology, (b) fit within the framework of the Agency's discharge standards, and (c) include an evaluation of implementation achievability and viability.

Laboratory Assignment: Robert S. Kerr Environmental Research Laboratory, Ada

## Materials Production — 610C

Extramural Funds: $1,169,000

Accomplishment Plan Summary: The problem area is point sources of pollution associated with the extraction (both active and abandoned mines) and processing of raw materials into intermediate products for consumption by the materials processing industries. Excluded from consideration is the extraction of fuels and processing of solid fuels.

The objective of the materials production research, development and demonstration program is to develop manuals of practice (MOPS), best state-of-the-art, to prevent and/or to control environmental damages from the materials production industries. These MOPs will address the simultaneous control of air, water, and noise

pollution and the environmentally acceptable recovery and utilization of industrial residues from all industry pollutant sources and will be in a form that meets the operational needs of both regulatory/enforcement agencies and industry. It is expected that various MOPs representing various stages of technology development will be required for each priority industry to be considered. The goal of this program is to provide MOPs for all materials production industries by 1985.

Laboratory Assignment: Industrial Environmental Research Laboratory, Cincinnati
Robert S. Kerr Environmental Research Laboratory, Ada

## Energy Resource Extraction: Oil and Gas Production (Water) — 610E

Extramural Funds: $320,000

Accomplishment Plan Summary: (1) Assess the existing and potential adverse environmental impacts from active and planned oil and gas production, storage and transportation facilities; (2) Develop methods, technology and equipment to prevent, control and abate environmental pollutants from these operations; (3) Demonstrate and document the technical/operationsl feasibility and cost/effectiveness of environmental control options; (4) Provide on a timely basis environmental control guidelines; (5) Provide standardized manuals of practice which encompass all environmental pollution control aspects in a format that meets the operational needs of the industry; and (6) Provide technical reports describing the environmental control options available for practice in a manual suitable for regulatory/control agency use and industrial planning/design use.

Laboratory Assignment: Industrial Environmental Research Laboratory, Cincinnati

## Areawide-Combined Industrial Point Sources — 610F

Extramural Funds: $373,900

There are many industrial establishments which generate point sources of pollution which seek to manage their problems on an area wide basis so that maximum effects can be realized. This requires a total system concept and this program is devoted to this utilizing engineering scale systems for integrated research, development and demonstration.

Laboratory Assignment: Robert S. Kerr Environmental Research Laboratory, Ada

# INDUSTRIAL PROCESSES PROGRAM AREA
## RENEWABLE RESOURCES SUBPROGRAM

The Renewable Resources Subprogram encompases the development of total management systems, including predictive methodology, to control air, water and land pollution from the production and harvesting of food and fiber and their related residual wastes and assessment of probable trends in the production of renewable resources and their resulting environmental impact. Major activities include crops on both irrigated and non-irrigated lands, silviculture practices and animal production.

### Irrigated Crop Production — 617A

Extramural Funds: $1,134,000

Accomplishment Plan Summary: The control of environmental degradation caused by irrigated crop production is a multifaceted problem involving technical, legal, economic, and institutional considerations. The objective of this program is to develop and demonstrate by bench, pilot plant and field scale studies the fundamental technology needed for full scale pollution control programs in irrigated areas. This technology includes: canal and lateral lining and other structural controls for water delivery systems; methods to minimize water use; increased water use efficiency; control of nutrient losses; salinity control; sediment control; leaching losses; pesticide transport in irrigated systems; and treatment processes. The evaluation of the legal, economic, and institutional constraints to water management reform and technology changes is required. Development and verification of mathematical simulation and predictive techniques based on physical-chemical-biological processes occuring in irrigated soil systems are required to assess the effects of on-farm water management practices on the water quality of receiving streams. These models can be used to develop technically sound alternative pollution control management schemes for irrigated systems. The alternatives will include wastes stream treatment processes. The outputs would be used by Federal, state, and local planning and pollution control agencies for the assessment and control of pollutants resulting from irrigated crop production activities.

Laboratory Assignment: Robert S. Kerr Environmental Research Laboratory, Ada

### Non-Irrigated Crop Production — 617B

Extramural Funds: $1,079,000

Accomplishment Plan Summary: Define and assess management practices available to preserve desirable environmental quality affected by non-irrigated agriculture. Develop engineering and management methods to preserve or restore desirable environmental quality. Determine whether different practices on different areas of a watershed may be necessary to abate pollution rising from varying climatic and edaphic conditions. Demonstrate and transfer this information to users. As part of this effort, develop mathematical predictive and simulative models for degradation and/or runoff of agricultural chemicals, sediment and oxidizable organics. Test, perfect and demonstrate these models to (1) predict impacts of agricultural practices on pollutant transport and thus on water quality, and (2) assess the effectiveness of alternative control/management methods. Determine the socio-economic impact and cost/effectiveness of alternative control options.

Influence and utilize the expertise of the United States Department of Agriculture and other agencies in achieving these goals. This work should be completed in time to meet the 1983 requirements for "best non-point source management practices." The outputs would be used by Federal, state, and local planning and pollution control agencies for the assessment and control of pollutants resulting fron non-irrigated crop producing activities.

Laboratory Assignment: Environmental Research Laboratory, Athens

## Animal Production — 617D

Extramural Funds: $896,000

Accomplishment Plan Summary: The major problem confronting the Agency in the area of animal production, including both animals and poultry, is that of providing the management tools to dispose of animal wastes in an environmentally safe manner. Currently the most economically feasible means of disposing of wastes from the majority of animal production units is by means of land application. Land application may not, in all cases, be environmentally feasible, therefore, application techniques must be evaluated and guidelines suggested for all regions of the Nation. For those animal production units not now under any permit system, guidelines must be suggested for alternative pollution management systems. The majority of animals in the Nation are produced under non-feedlot conditions and therefore represent a distinctive non-point pollution source. Pollution potentials from these conditions must be evaluated and control/management systems must be developed. Continued animal production in these areas is dependent on the utilization of waste disposal methods other than land application. The program will evaluate these systems, characterize their waste streams, and propose possible means of disposal along with an evaluation of the effectiveness of each system. The animal production industry is one of constant change and certain of these changes will impact the environmental acceptability of present management systems. Changes in production systems will be evaluated by the program to safeguard against potential adverse environmental consequences. New pollution control management systems will be suggested and evaluated to correspond with industry changes.

Laboratory Assignment: Robert S. Kerr Environmental Research Laboratory, Ada

## Alternate Pest Management Systems — 617E

Extramural Funds: $544,000

Accomplishment Plan Summary: The objective of this Accomplishment Plan is to provide the necessary basis for development of strategies and tactics of pest control for major pesticides using crop ecosystems which will permit marked reduction or virtual elimination of dependence on pesticide chemicals as a regular agricultural pest management practice. Concomitantly, a similar but a smaller effort will be devoted to development of scientific basis for control strategies for urban pests.

Laboratory Assignment: Office of Health and Ecological Effects, Headquarters

# PUBLIC SECTOR ACTIVITIES PROGRAM AREA

This area contains many sub-programs that are fundamental to EPA's responsibilities. These subprograms have been combined into a single program area, Public Sector Activities, because they are inter-related and also require many of the same skills and equipment development. This research program focuses on pollution problems resulting from community, residential or other nonindustrial activities; health effects resulting from contaminated drinking water supplies; water treatment systems management and ground water management; and land use management studies. This program has three components — Waste Management, Water Supply, and Environmental Management.

## WASTE MANAGEMENT

The Waste Management Subprogram includes prevention, control, treatment and management of pollution resulting from community, residential or other non-industrial activities. Technical areas include municipal and domestic wastewater, land surface runoff, municipal solid wastes and air pollutants. This program provides technical information for the Agency's operating programs in construction grants, comprehensive planning and solid and hazardous waste management.

### Runoff Pollution Control — 611A

Extramural Funds: $799,000

Accomplishment Plan Summary: Approximately half of the stream miles in this country are water quality limited. Using broad indices, almost one-third of the U.S. stream lengths are polluted with urban runoff characteristics. The incidence of polluted stream reaches is highly correlated with major urban population concentrations. For these stream segments, secondary treatment of dry weather flows is not sufficient to produce required receiving water quality. Control of runoff pollution becomes an alternative for maintaining stream standards. Runoff enters the waters via three modes of conveyance. These are combined sewers, storm sewers and non-point discharges. Congress recognized the importance of runoff specifically in Section 105 of Public Law 92–500. The objective of the runoff program is to consider all cost effective approaches in the control or abatement of pollution from rainfall and snow melt. These range from source control such as development of improved street cleaning techniques through flow attenuation by use of new construction materials, such as porous pavement, flow control by use of storage in sewer systems and storage vessels, to treatment of the storm and combined sewer overflows before discharge. While treatment of stormwater usually precedes discharge, reclamation for reuse must also be considered. As an adjunct to the program, studies to assess more accurately the pollution impact of stormwater are conducted. Answers to special needs such as reduction of infiltration, improvement in sewer construction materials and methods, specialized instrumentation, and also, impacts of urbanization and hydrologic modification and its associated effects are sought.

Laboratory Assignment: Municipal Environmental Research Laboratory, Cincinnati

## Community Systems Management: Alaska Village Demonstration Projects — 611B

Extramural Funds: $740,000

Accomplishment Plan Summary: The objective of this Accomplishment Plan is to demonstrate methods to provide central community facilities for safe water elimination and control of pollution in those native villages of Alaska lacking such facilities.

Laboratory Assignment: Environmental Research Laboratory, Corvallis

## Wastewater Treatment Technology — 611B

Extramural Funds: $3,237,000

Accomplishment Plan Summary: Improved unit operations will be aggressively pursued to implement the aim of Public Law 92–500 including control of nitrogenous nutrients, reliable control of suspended solids, disinfection without the release of toxic chemicals, and physical chemical processes to remove toxic substances. Methods for upgrading conventional wastewater treatment processes to meet required levels (at minimum cost to the communities) will be demonstrated. Reliable cost estimates for various sludge treatments will be developed and new processes will be evaluated to deal with the increased volume of sludges that will be produced. System management to define the most cost-effective combination of processes will be developed. Operation and maintenance to get full value from the capital invested in treatment plants will be demonstrated, as will the contribution of instrumentation and automation to performance and reliability. Complete treatment resulting in a water suitable for reuse will be demonstrated as a step toward zero discharge and to provide high quality reclaimed water for evaluation of safety and plant reliability. Complete systems analyses of available processes will be carried out to determine the optimum treatment systems for meeting any water quality standard. The special problems of small flows, including recreational wastes, will be included as appropriate in all aspects of the above mentioned objectives.

Laboratory Assignment: Municipal Environmental Research Laboratory, Cincinnati

## Soil Treatment Systems — 611C

Extramural Funds: $464,000

Accomplishment Plan Summary: The scope of this Accomplishment Plan includes the development and demonstration of new or improved control technology for the effective and economical treatment of municipal and industrial wastewaters using the soil as a treatment media. Primary efforts are to be directed to demonstrate technologies for nutrient control and removal, removal of organic materials, and microrganisms removal. The potential for beneficial uses such as crop irrigation, animal grazing, soil conditioning, etc., and their compatibility with the basic treatment systems are to be thoroughly evaluated. Full definition of the technological factors for design, construction and operation of land application systems must be produced. Treatment capability, health factors, groundwater protection, loading factors, potential for instrumentation and automation must be defined. Full development, demonstration and evaluation of alternative cost-effective processes with firmly established

dependability must be considered as alternatives for a broad spectrum of plant sizes, flow rates, feed characteristics, and climatic zones.

Laboratory Assignment: Robert S. Kerr Environmental Research Laboratory, Ada

## Soil Treatment Systems — 611C

Extramural Funds: $651,400

Accomplishment Plan Summary: The approach chosen to achieve this Accomplishment Plan is to determine safe cost effective methods of applying sludge to land for four different purposes, i.e. disposal, improvement of agricultural land producing food chain crops, improvement of land producing fiber (non foodchain) crops, and improvement or reclamation of improverished lands. For each system the constraints will be studied and assessed and design criteria developed to alleviate the constraints. The constraints are odor potential, nutrient pollution of ground and surface water, heavy metals and trace elements, organic compounds that can pollute groundwater, surface water and soils, pathogens and parasites of animals, humans, or plants, and socio-political factors.

Laboratory Assignment: Municipal Environmental Research Laboratory, Cincinnati

## Solid and Hazardous Waste Management — 618A

Extramural Funds: $1,945,000

Accomplishment Plan Summary: The objective of this research program is: (1) To identify any adverse health and welfare effects due to the release of material present in solid waste in the environment, and to develop methods to eliminate such effects; (2) Develop and apply new and improved methods of collecting and disposing of solid waste, and processing and recovering materials from solid waste; (3) Identify solid waste components and potential materials and energy recoverable from such waste components; and (4) Establish data to support the Agency's efforts in developing guidelines for solid and hazardous waste management in the form of reports, conferences, technical assistance, etc.

Laboratory Assignment: Municipal Environmental Research Laboratory, Cincinnati

# PUBLIC SECTOR ACTIVITIES PROGRAM AREA
## WATER SUPPLY SUBPROGRAM

The Water Supply Subprogram includes research, development and demonstration activities relating to the provision of a dependably safe supply of drinking water and to the health effects resulting directly or indirectly from contaminants in drinking water. The research activities provide the technical information for the Agency's operating Water Supply Program as conducted under the Safe Drinking Water Act (Public Law 92–523).

### Water Supply: Water Treatment and Systems Management — 614A

Extramural Funds: $3,166,000

Accomplishment Plan Summary: Develop new or improved technology for the effective and economic control of drinking water contaminants during storage, treatment and distribution. Program efforts will be directed to determine technologies for removal of infectious agents and potentially toxic contaminatnts so that municipal sectors will be able to achieve compliance with present and future primary drinking water regulations. Improved methods of operation for both new and existing water supply facilities will be developed and determined. Technology will be developed for small, as well as large water supply systems.

Laboratory Assignment: Municipal Environmental Research Laboratory, Cincinnati

### Water Exposures and Their Effects: Water Supply Health Effects Research — 614B

Extramural Funds: $4,644,000

Accomplishment Plan Summary: Determine the nature and concentration of organic, inorganic, and chloro organic contaminants present in water supplies. Evaluate through literature searches, and long-term toxicological studies and epidemiological studies, the health effects of drinking water contaminants. Derive concentration limits necessary for the protection of the public health.

Laboratory Assignment: Health Effects Research Laboratory, Cincinnati

### Water Supply: Ground Water Management — 614C

Extramural Funds: $961,000

Accomplishment Plan Summary: In order to protect existing and potential underground drinking water, the following questions must be answered: (1) Determine the National problem scope; (2) Identify sources of pollutants in the underground environment; (3) Establsih waste disposal site selection criteria; (4) Develop management technology for underground drinking water basins; and (5) Investigate deep well injection and other waste disposal technology in terms of underground drinking water contamination.

Laboratory Assignment: Robert S. Kerr Environmental Research Laboratory, Ada

## Water Supply Identification and Measurement — 614D

Extramural Funds: $715,000

Accomplishment Plan Summary: Develop and improve analytical techniques for the concentration, separation, identification and measurement of drinking water contaminants; namely, organic compounds, viruses and inorganic elemental analyses.

Laboratory Assignment: Environmental Research Laboratory, Athens

## Water Supply: Identification and Measurement — 614D

Extramural Funds: $245,000

Accomplishment Plan Summary: Analytical techniques for the concentration, identification, and measurement of organic compounds in drinking water will be developed. Special emphasis will be placed on volatile contaminants and total organic carbon determinations. Methods will be developed for identifying viruses rapidly. This is important because presently available methodology requires days or weeks for identifying viruses, and waters used for potable or other purposes must be released before their safety can be assured by direct confirmed tests for the presence of viruses. Moreover, such methodology should lend itself to rapid automated recovery and identification systems.

Laboratory Assignment: Environmental Monitoring and Support Laboratory, Cincinnati

# PUBLIC SECTOR ACTIVITIES PROGRAM AREA
## ENVIRONMENTAL MANAGEMENT SUBPROGRAM

The Environmental Management Subprogram focuses on the development of improved procedures for planning, implementing, enforcing, and assessing cost-effective environmental protection strategies for particular problem areas (air, water, etc.) and development of a comprehensive planning procedure for integrating all environmental programs in an efficient manner, utilizing land use management as the basic integrating mechanism.

### Environmental and Community Systems Management — 619A

Extramural Funds: $1,234,000

Accomplishment Plan Summary: The objective of this Accomplishment Plan is to provide regional environmental planners and managers with a set of analytical procedures which can be used as effective management tools to identify feasible alternative solutions to recognized environmental quality control problems and to provide decision methodology and selection criteria for identifying least cost solutions. The program emphasizes the integration of structural and non-structural solutions using land use management as the basic framework or integrating mechanism. Non-structural efforts include development of improved multi-media planning techniques, improved collection of environmental quality and economic information, and development of comprehensive systems analysis and evaluation methodology. The program will also include efforts to investigate the linkages among various residuals (solids, liquids, gases) discharged from community activities; analyze the positive and negative impacts of various pollution control technologies across environmental media (air, land, water); analyze the costs and effectiveness of alternate structural solutions; and demonstrate the feasibility and benefits of integrated structural environmental technology management solutions. The program output will be user oriented and will include both the information needed and the decision methodology required for selection and implementation of effective environmental quality control programs on a community and regional level.

Laboratory Assignment: Municipal Environmental Research Laboratory, Cincinnati

# MONITORING AND TECHNICAL SUPPORT PROGRAM AREA

The program includes both direct research activities and direct assistance and support to the rest of the Agency. This research program focuses on the development of reference or standard environmental measurement and monitoring equipment, techniques and systems, as well as development of Agency-wide quality assurance programs including standardization of analytical methods and sampling techniques. The components of this program are the Measurement Techniques and Equipment Development Subprogram, Quality Assurance Subprogram, and the Technical Support Subprogram.

## MEASUREMENT TECHNIQUES AND EQUIPMENT DEVELOPMENT SUBPROGRAM

The Measurement Techniques and Equipment Development Subprogram is focused on providing approaches and measurement techniques for all pollutants (pesticides, toxic substances, industrial chemicals, petrochemicals, combustion products, etc.) in air, ground water, and surface waters (lakes, rivers, streams, estuaries, etc.). The spectrum of activities begins with the elucidation of fundamental physical, chemical or biological principles upon which monitoring techniques are based and ends with determination of the reliability and standardization of fully operational monitoring methods or systems.

### Air Pollutant Characterization and Measurement — 605B

Extramural Funds: $3,220,000

Accomplishment Plan Summary: This Accomplishment Plan is designed to respond to the needs associated with the detailed description of the composition and level of air contaminants. This level of detail is necessary to elucidate parameters such as: chemical and physical interference, environmental constraints, and end-use requirements. The output of this Accomplishment Plan is new and/or improved methodology and instrumentation technology which will be utilized for stationary source, mobile source, and ambient air requirements that will support the development and maintenance of Agency air quality goals.

The outputs of this activity are requisite to the achievement of sub-objectives associated with the generation of air contaminants, their transport, transformation, decay, and ultimate sinks. This technology is basic for the determination of atmospheric effects, atmospheric chemical and physical processes and the development and evaluation of air quality simulation modeling.

Laboratory Assignment: Environmental Sciences Research Laboratory, Research Triangle Park

### Criteria Development for Selection of Stationary Source Measurement Strategies, Methodologies, and Instrumentation — 605C

Extramural Funds: $158,000

Accomplishment Plan Summary: The objective of this effort is to develop the criteria to be used in identifying measurement strategies, methodologies, and instrumentation that can be considered to be "equivalent" to the Agency's reference or standards for monitoring new or modified stationary sources. The national standards of performance for new or modified

stationary sources allow measurement of emissions by the methods prescribed or by methods approved by the Administrator. The standards also require that EPA provide guidance and assistance in the selection and use of required monitoring equipment. The outputs of this effort should serve to fulfill this EPA requirement.

Laboratory Assignment: Environmental Sciences Research Laboratory, Research Triangle Park

## Monitoring Systems Development for Operation Applications — 612A

Extramural Funds: $50,000

Accomplishment Plan Summary: The basic objective of this effort is to assist EPA and related State operational monitoring programs in the identification of present and future measurement techniques and the development of the most efficient and effective monitoring systems for meeting these needs. This includes the modification and adaptation of measurement and monitoring technology to meet the specfic requirements of EPA and State operational monitoring programs; the adaptation of advanced monitoring techniques and development of monitoring system design optimization procedures for the purpose of maximizing the costeffectiveness of monitoring operations; and ensuring that these technology advancements are put to proper use by EPA through the Office of Monitoring and Technical Support's role as the Agency's technical coordinator of all monitoring activities and the reviewer of all Agency monitoring-related plans and budgets. All aspects of monitoring operations, from system design and sample acquisition through data analysis and interpretation, are covered by this Accomplishment Plan. Emphasis shall be given to the necessary improvements in those methods required to adequately enforce standards and regulations already promulgated or now under consideration and to achieve significant increases in monitoring cost-effectiveness. Priority shall be given in fiscal year 1976 to completion of an Agency-wide monitoring strategy (in coordination with other EPA programs), and development of methods for monitoring industrial wastewater discharges, sludges, ocean-disposed wastes, marine waters, groundwaters, non-point sources, including methods for determining microbiological and biological quality of water.

Laboratory Assignment: Environmental Monitoring and Support Laboratory, Cincinnati

## New Techniques Development for Identification and Measurement of Chemical Constituents of Water and Soil — 612B

Extramural Funds: $335,000

Accomplishment Plan Summary: Develop new techniques to identify and measure all chemical constituents that relate to assessing, improving, and maintaining water quality through research and regulation. Techniques should identify and measure organic compounds and chemical elements, should determine the species of the chemical elements, and relate responses to problems without necessarily identifying or measuring specific constituents (e.g. an instrument to measure cholinesterase enzyme inhibitors). Output should be a series of research reports describing techniques whose applications to pertinent subobjectives have been assessed. The reports will describe equipment, operation, applicability and limitations. They will contain data from application to current Agency problems with analyses of the effectivenesses of the techniques in these applications. The performing organization will be responsible for assisting users in developing competence in recommended techniques.

Laboratory Assignment: Environmental Research Laboratory, Athens

## Methodology for Concentration, Recovery, and Identification of Viruses from Ambient Waters and Wastewaters — 612C

Extramural Funds: $240,000

Accomplishment Plan Summary: Rapid procedures will be developed for the quantitative detection, concentration, and identification of viruses in large volumes of tap, waste, renovated, ocean and all other surface and ground waters. Also, rapid procedures will be developed for quantitative detection, concentration, and identification of viruses absorbed to solids in water. Rapid procedures for quantitative detection of viruses in water and waste water treatment sludges, landfill solids, and leachates will also be developed. Methods will be developed to detect quantitatively viruses in shellfish because shellfish filter large volumes of water and thereby concentrate viruses. Methods will be developed for detecting tumor-inducing agents in fish that inhabit waters receiving sewage effluents. Efforts will be made to correlate the occurrences of viruses of human source with the presence of bacteriophages and bacterial indicators of pollution. Methodology will be developed to optimize the reliability of disinfection procedures. Rapid detection and identification procedures will be automated.

Laboratory Assignment: Environmental Monitoring and Support Laboratory, Cincinnati

## Monitoring Systems Development for Operations Application — 620A

Extramural Funds: $253,000

Accomplishment Plan Summary: The basic objective of this effort is to assist EPA and related state operational monitoring programs in the identification of present and future data needs. This will be met through monitoring and devlopment of the most efficient and effective monitoring systems for meeting these needs. This includes the modification and adaptation of measurement and monitoring technology to meet the specific data accuracy and precision requirements of EPA and state operational monitoring programs; the adaptation of advanced monitoring techniques and development of monitoring system design optimization procedures for the purpose of maximizing the cost-effectiveness of monitoring operations; and ensuring that these technology advancements are put to proper use by the Agency. All aspects of monitoring operations, from system design and sample acquisition through data analysis and interpretation, are covered by this Accomplishment Plan. Emphasis shall be given to the necessary improvements in those methods required to enforce adequately standards and regulations already promulgated or now under consideration and to achieve significant increases in monitoring cost-effectiveness. Priority shall be given in fiscal year 1976 to completion of an Agency-wide monitoring strategy (in coordination with other EPA programs), development of criteria for selecting "equivalent" stationary source measurement methods, and improvement of candidate and reference methods for monitoring stationary sources, industrial wastewater discharge, sludges, ocean-disposed wastes, marine waters, groundwaters, non-point sources and microbiological and biological quality of water.

Laboratory Assignment: Environmental Monitoring and Support Laboratory, Las Vegas

# MONITORING AND TECHNICAL SUPPORT PROGRAM AREA
## QUALITY ASSURANCE SUBPROGRAM

The Quality Assurance Subprogram serves all environmental monitoring activities throughout the Agency, and, through the Regions and ORD laboratories, serves State and local environmental control programs. This Subprogram focuses on standardization of measurement methods, provision of standard reference materials and samples, development of quality control guidelines and manuals, on-site evaluations of all regional laboratories, inter-laboratory performance tests for air and pesticide measurements, monthly cross-check sample studies for State and private radiation laboratories, development of Agency-wide laboratory certification and quality assurance policies, studies for automation of laboratory instruments and statistical data handling, and participation in regional quality control meetings.

### Monitoring Quality Assurance Methods and Procedures Preparation — 621A

Extramural Funds: $635,000

Accomplishment Plan Summary: The objective of this Accomplishment Plan is to provide the reference or standard monitoring methods, quality control procedures, associated standard reference materials, and quality control program audits needed by the Agency's operational monitoring programs in the acquisition of accurate and legally defensible ambient and source environmental quality data. Emphasis shall be given to the promulgation of those reference methods and quality control procedures and the production of those standard reference materials needed to enforce standards and regulations now in existence and being planned for adoption.

Emphasis in fiscal year 1976 shall be on evaluation of methods for the measurement of vinyl chloride, sulfate, and arsenic in ambient air, assessing the feasibility of a laboratory certification program, and audit of laboratory monitoring procedures.

Laboratory Assignment: Enyironmental Monitoring and Support Laboratory, Research Triangle Park

### Monitoring Quality Assurance Methods and Procedures Preparation — 621A

Extramural Funds: $400,000

Accomplishment Plan Summary: The objectives of this Accomplishment Plan is to provide the reference or standard monitoring methods, quality control procedures, associated standard reference materials, and quality control program audits needed by the Agency's operational monitoring programs in the acquisition of accurate and legally defensible ambient and source environmental quality data. Emphasis shall be given to the promulgation of these reference methods and quality assurance procedures and the production of those standard reference materials needed to enforce standards and regulations now in existence and being planned for adoption.

Emphasis in fiscal year 1976 shall be on evaluation of methods for the standardization of water/wastes discharge flow measurements; bioassay procedures for the National Pollution Discharge Elemination Systems (NPDES) program; development of sample and siting criteria for environmental measurements; and issuance of guidelines for water/wastes sampling and sample preservation.

Laboratory Assignment: Environmental Monitoring and Support Laboratory, Cincinnati

## MONITORING AND TECHNICAL SUPPORT PROGRAM AREA
### QUALITY ASSURANCE SUBPROGRAM

**Development and Operation of a Total Quality Assurance Program for Pesticide Residues Measurements — 621B**

Extramural Funds: $170,000

Accomplishment Plan Summary: To continually document the precision and accuracy of the monitoring data that are produced, a total quality assurance activity must be developed and operated for the measurement of pesticide residues in air, water, soil, and biota. For each pesticide for which routine monitoring is required by EPA directives or regulations, this effort will produce standard reference samples and measurement methods; quality control procedures and guidelines; routine assessment reports of systems performance; data screening and audits; certification of laboratories; and quality control training. Priorities include continuation of services for community studies contract laboratories, compliance monitoring for the permit program, and monitoring associated with the Safe Drinking Water Act, Public Law 93–523.

Laboratory Assignment: Health Effects Research Laboratory, Research Triangle Park

# MONITORING AND TECHNICAL SUPPORT PROGRAM AREA
## TECHNICAL SUPPORT SUBPROGRAM

The Technical Support Subprogram provides assistance in all fields of environmental science that the Office of Research and Development provides to other components of the Agency and in many cases to elements outside of EPA. It has been the policy of ORD to provide assistance for the immediate technical needs of the Agency whenever possible by drawing on the expertise of its research personnel. In the past, costs associated with this effort have been absorbed in the base program. This fiscal year, these costs are being identified and planned for spearately. The decision to identify technical support work separately reflects a determination that ORD will be more responsive to the immediate needs of EPA.

The Technical Information Program is included under this Subprogram. The main purpose of the Technical Information Program is to deliver the results of ORD's research program to the user community in a form that is tailored to the user's needs. The program includes technology transfer, publications, and library oversight.

Additionally, the Minority Institutions Research Support Program (MIRS) is included under the Technical Support Subprogram. The purpose of the MIRS program is to assist approximately 100 minority colleges and universities in the development of their environmental research capabilities which are utilized through grant projects to provide certain technical support to Agency research problems.

### Provision of Technical Support to Agency Programs and Regional Offices — 606A

Extramural Funds: $350,000

Accomplishment Plan Summary: The objective of this Accomplishment Plan is to provide technical support to Agency programs including international monitoring activities, and regional offices in the area of environmental monitoring. This involves providing guidance and assistance as is appropriate, in the design, implementation, and operation of field and laboratory systems to collect and/or measure valid environmental samples; evaluation of instruments and methods; short-term methods development; assessment and analysis of the data; and issuing of reports. Emphasis will be given to pollutants with proven or potential adverse effects to human health and welfare including polycyclic organics, trace elements, and non-inorganic ions such as sulfates. State-of-the-art expertise shall be maintained to permit rapid response under rigorous quality control and, as is necessary, under chain-of-custody to produce legally admissible data.

Laboratory Assignment: Environmental Monitoring and Support Laboratory, Research Triangle Park

### Provision of Technical Support to Agency Programs and Regional Offices — 613B

Extramural Funds: $300,000

Accomplishment Plan Summary: The objective of this Accomplishment Plan is to provide technical support to agency programs and regional offices through research and development expertise, manpower and funds. This may involve providing guidance and assistance as appropriate in the particular projects involved. This may include, but not be limited to, design, implementation and operation of field and/or laboratory systems to collect/measure samples, evaluation of instrumental methods, assessment and analysis of data and issuing reports. Emphasis will be given to projects which may not be readily completed by laboratory facilities or staff. This activity is designed to supplement existing Laboratory Accomplishment Plans through providing additional resources, usually through extramural contracts/grants.

Laboratory Assignment: Office of Monitoring and Technical Support, Headquarters

## Provision of Technical Support to Agency Programs and Regional Offices — 622A

Extramural Funds: $383,000

Accomplishment Plan Summary: The following items are representative of the types of requests received for technical support. Since the requests exceed the budget, specific projects to be funded must be determined through negotiations with the program offices. (1) Assist Office of Enforcement in overflights for remote sensing. (2) Assist the Oil and Special Materials Control Division in the assessment and documentation of oil spills and provide aerial surveillance and monitoring for oil spill prevention. (3) Prepare summary state-of-the-art of remote sensing detection of hazardous substances for the Criteria and Standards Division, Hazardous Substances Branch. (4) Assist Region VIII with remote sensing and maping of strip mines.

Laboratory Assignment: Environmental Monitoring and Support Laboratory, Las Vegas

## Minority Institutions Research Support Program — 622B

Extramural Funds: $541,000

Accomplishment Plan Summary: The objectives of the Minority Institutions Research Support Program are: (1) To identify existing and potential environmental research capabilities within minority institutions and assist these institutions in utilizing these capabilities to participate in EPA research activities; (2) To help minority institutions become more competitive with other institutions for research funds; (3) To award research and demonstration grants to minority institutions in a manner which will support the research objectives of the Office of Research and Development, and (4) To promote a good working relationship between the Agency and participating institutions.

Laboratory Assignment: Office of Monitoring and Technical Support, Headquarters

## Technical Information Transfer and Support — 622C

Extramural Funds: $350,000

Accomplishment Plan Summary: The principal objective of this Accomplishment Plan is to provide technical information support services which will optmize the transfer of technical information into the Office of Research and Development (ORD), between ORD components, and through ORD to the environmental research and development user community. The scope of these support services includes, but is not limited to the following: Centralized management, processing, publishing and distribution of technical/scientific publications, information booklets, newsletters, etc.; graphic arts, technical editing and television support services; planning, implementation, coordination and maintenance of special technical information systems and data bases; support for technical information inquiries; and general coordination and support activities with EPA/ORD library systems, technology transfer staff and others as required to support ORD technical information goals and objectives.

# MONITORING AND TECHNICAL SUPPORT PROGRAM AREA
## TECHNICAL SUPPORT SUBPROGRAM

Laboratory Assignment: Industrial Environmental Research Laboratory, Cincinnati

### Technology Transfer — 622C

Extramural Funds: $1,380,000

Accomplishment Plan Summary: The principal objective of this program is to provide a cost—effective mechanism for transferring the outputs of the Office of Research and Development (ORD) research program to a broad spectrum of environmental research and development users in a form which can be readily understood and applied to solve environmental problems. The form of outputs provided by this program typically include design manuals, seminars, summary capsule reports, movies, display exhibits, newsletters, etc. The principal objective of the fiscal year 1976 program is to provide maximum impact on the Municipal Construction Grants Program and the Industrial Permits Program. Increased emphasis has also been given to non-point source problems, monitoring, air pollution control technology and water supply technology.

Laboratory Assignment: Industrial Environmental Research Laboratory, Cincinnati

# PART III

## Office of Research and Development's Grant and Contract Activities*/

Some of the work required by the Accomplishment Plans described in Part II will be carried out directly by EPA's staff and some of the work will be planned for accomplishment by grant or contract. After these Accomplishment Plans were approved by both Headquarters and Field personnel, the cognizant Laboratory Director prepared detailed work plans describing the specific projects or "Tasks" required to achieve the goal of the Accomplishment Plan. From these Work Plans, the Laboratory Director can furnish grant/contract information on specific Accomplishment Plans, what dollars are available for individual grant or contract projects, and what "legislative authority" under which the work must be carried out. Appendix A describes the various legislative authorities within which the Office of Research and Development must work. From Appendix A an applicant can determine eligibility requirements, cost sharing, and funding limitations for a project.

All planned contracting is carried out competitively with notices of the availability of Request for Proposal (RFP) documents publicly advertised. Unsolicited contract proposals should *not* be submitted for such projects. The review/selection procedures followed may vary slightly from project to project, but all pertinent information regarding both the project objectives and criteria for evaluation of proposals will be included in each RFP package. The Laboratory Director should not be contacted for information on contracts that have been advertised since such communication may conflict with Federal Procurement Regulations and could serve to disqualify a prospective contractor from further consideration.

With regard to all grant projects, contact with the cognizant Laboratory Director is encouraged. The Laboratory Director will generally be the individual responsible for making the award/reject recommendation on individual proposals.

*/Note: Information on other EPA grant programs is presented in the publication "Grant Assistance Programs of the Environmental Protection Agency", available from EPA's Grants Administration Division, Washington, DC 20460. Information on contracting procedures and policies is presented in the booklet, "Contracting with EPA — A Guide for Prospective Contractors", available from EPA's Contracts Management Division, Washington, DC 20460.

## Guidelines For Submission Of Grant Applications Or Contract Proposals

A. Solicited contract proposals –

Requests for Proposals (RFP's) for all planned contracts will be advertised in the Commerce Business Daily issued by the U.S. Department of Commerce. A subscription to this publication may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C. 20402. These advertisements will provide instructions for obtaining RFP packages from EPA's Contracts Management Division. Each RFP package will include detailed information describing the form and context of proposals to be submitted as well as the required time and place of submission.

EPA's Contracts Management Division publishes "Contracting With EPA – A Guide for Prospective Contractors" to assist the business community in its efforts to find new markets in the Environmental Protection Agency. This publication includes the names and addresses of contracting offices in EPA and the Office of Research and Development laboratories, the types of products and services procured, general information about the Agency, and hints to aid businessmen in selling to EPA.

B. Unsolicited contract proposals –

While most of OR&D's contract research and demonstration is conducted through use of RFP's to solicit proposals (item A above), contracts can also be awarded on the basis of unsolicited proposals which meet the sole-source requirements of the Federal Procurement Regulations. Unsolicited contract proposals should be addressed to the Grants Administration Division (PM-216), Environmental Protection Agency, Washington, DC 20460. While no specific format is required, such proposals should generally contain:

1. Name, address and telephone number of the organization or individual submitting the proposal.
2. Date of preparation or submission.
3. Type of organization (profit, non-profit, educational, individual, other).
4. Concise title.
6. Project objective.
7. Need, utility and significance of project.
8. Scope of work, i.e., an outline and discussion of the purpose of proposed effort of activity, the method of attacking the problem, and nature and extent of anticipated results.
9. Experimental data developed by feasibility studies previously completed.
10. Estimated duration of the project, proposed starting and completion dates.
11. Scientific or technical references.
12. Names of key personnel to be involved, brief biographical information, including principal publications and relevant experience.
13. Equipment, facilities and personnel requirements.

14. Proposed budget, including separate cost estimates for salaries and wages, equipment, expendable supplies, services, travel, subcontracts, other direct costs and overhead.

The material submitted should contain both a *technical* and a *business* proposal. The *technical* proposal should clearly define the unique concept involved (as required for sole-source procurements) and include a plan for turning the concept into reality. It is suggested that the technical proposal identify any proprietary aspects of the proposed ideas or process. The *business* proposal should include a detailed cost proposal, information concerning past Government contracts, and any special terms and conditions desired.

C. Research or demonstration grant applications –

**Pre-application activity —**

Although grant applications may be submitted at any time and on any subject, potential grantees should take the following actions prior to submission of a formal grant application in order to save time and effort both for the applicant and EPA.

1. Review OR&D's current research program, as described in Part II, to determine if funds are available in the specific area of interest; and

2. Contact the appropriate research and development personnel cited in this document to ascertain if a grant project is planned prior to submission of an official grant application.

Submission of a preproposal is also strongly encouraged. The preproposal should be sent directly to the cognizant Laboratory Director listed in Part II of this document for review. A preproposal should normally consist of a three or four-page narrative outlining the project concept and containing the following information:

1. **Objective** – a clear statement of the specific objective is necessary. If the objective is designed to fulfill a specific project (as identified in Step I above), the project should be identified. If the objective cannot be associated with any specific project, some statement of the presumed value to EPA of attaining the research objective should be made.

2. **Project Plan** – a brief description of the research/development/demonstration concept and the plan for execution of the proposed project, including a projected time-schedule for accomplishments of intermediate outputs or key occurrences indicating progress (milestones) and the final objective.

3. **Budget** – a preliminary estimate of total costs which will be incurred in order to complete the project. Also, the share of the costs which will be provided by the applicant should be indicated.

4. **Staff and Facilities** – a brief listing of key project staff and capabilities and a brief description of any special facilities or other factors which would contribute to the success of the project. A single person who will have responsibility for planning, coordinating, and supervising the project should be identified along with the fraction of his time to be devoted to the project.

Following review and evaluation of the preproposal by the cognizant Laboratory Director, the prospective applicant will be advised whether (a) an application should be submitted for formal review, (b) submission of a modified preproposal is suggested, (c) possible submission of the preproposal to another Agency, Department, or source of funds is suggested, or (d) further pursuit of the particular topic is discouraged.

**Formal applications —**

All formal grant applications are to be submitted to the Grants Administration Division, Environmental Protection Agency, Washington, DC 20460. After formal "logging in" and acknowledgement, those applications falling with the Office of Research and Development's purview are referred to Research and Development for program relevance review by the cognizant Laboratory Director. This review quickly screens out those applications for which EPA has no authority or interest or those for which no funds are available. For those proposals in which ORD has an interest, scientific/technical merit reviews are then conducted by *both* in-house and extramural experts. Extramural reviews are obtained in the National Science Foundation fashion — individual written reviews submitted by mail. Comments are also obtained from the Regional Office in the Region where the applicant is located and where the project would be conducted to determine the relationship of the proposed project to Regional programs and policies.

The individual coordinating the scientific/technical merit review (normally the cognizant Laboratory Director) assembles and evaluates both intramural and extramural review comments and prepares a recommendation for action on each application. The recommendation may be to award a grant, to reject the application, or to attempt to negotiate with the applicant to modify the scope of work. In those cases where the proposed scope of work could be modified in order to relate more directly to EPA's objectives and thereby qualify for funding, direct contact is made with the applicant to determine whether or not acceptable adjustments in the scope of work can be made.

# APPENDIX A

## EXTRAMURAL PROGRAM AUTHORIZING LEGISLATION

This Appendix describes the legislative authorities within which the Office of Research and Development must operate.

Auth. Leg. Code

14

**Statutory authority:** Section 14, Noise Control Act of 1972 (P.L. 92-574) 42 U.S.C. 4900.

**Purpose:** To conduct research on the effects, measurement and control of noise including, but not limited to, investigation of the psychological and physiological effects of noise on humans and the effects of noise on domestic animals, wildlife and property and determination of acceptable levels of noise on the basis of such effects, the development of improved methods and standards for measurement and monitoring of noise and the determination of the most effective and practical means of controlling noise emissions.

**Eligible grantees:** Non-profit institutions of higher education or non-profit organizations whose primary purpose is the conduct of scientific research.

**Funding limitations:** Grants may not exceed 95 percent of the estimated total eligible cost of the project.

**Other limitations:** None

20

**Statutory authority:** Section 20, Federal Insecticide, Fungicide and Rodenticide Act, as amended (P.L. 92-516) --- 7 U.S.C. 135 et seq.

**Purpose:** To develop biologically integrated alternatives for pest control and to conduct other research as necessary to carry out the purposes of the Act.

**Eligible grantees:** Universities or others.

**Funding limitations:** Grants may not exceed 95 percent of the estimated total eligible cost of the project.

**Other limitations:** None

103

**Statutory authority:** Section 103, Clean Air Act, as amended (P.L. 88-206) --42 U.S.C. 1857 b.

**Purpose:** To support and promote the coordination of research, development and demonstration projects relating to the causes, effects, extent, prevention and control of air pollution.

**Eligible grantees:** Air pollution control agencies, other public or non-profit private agencies, institutions and organizations and individuals.

**Funding limitations:** Grants may not exceed 95 percent of the estimated total eligible cost of the project.

103 **Other limitations:** None

104 **Statutory authority:** Section 104, Clean Air Act, as amended (P.L. 88–206) --42 U.S.C. 1857 b-1.

**Purpose:** To support research and development projects on new and improved methods having industrywide application for the prevention and control of air pollution resulting from the combustion of fuels.

**Eligible grantees:** Public or nonprofit agencies, institutions, organizations and individuals.

**Funding limitations:** Grants may not exceed 95 percent of the estimated total eligible cost of the project, or $1,500,000, whichever is less.

**Other limitations:** None

104b **Statutory authority:** Section 104 (b)(3), Federal Water Pollution Control Act, as amended, (P.L. 92–500) --- 33 U.S.C. 1254.

**Purpose:** Conduct and promote the coordination and acceleration of research, investigations, experiments and demonstrations relating to the causes, effects, extent, prevention, reduction, and elimination of water pollution.

**Eligible grantees:** State water pollution control agencies, interstate agencies, other public or nonprofit private agencies, institutions, organizations and individuals.

**Funding limitations:** Grants may not exceed 95 percent of the estimated total elibible cost of the project.

**Other limitations:** Grants to River Study Centers shall not exceed $1,000,000 in any one Fiscal Year.

105 1) **Statutory authority:** Section 105 (a), Federal Water Pollution Control Act, as amended, (P.L. 92–500) 33 U.S.C. 1255.

**Purpose:** To assist in the development of (1) projects to demonstrate new or improved methods of preventing, reducing, and eliminating the discharges into any waters of pollutants from sewers which carry storm water or both storm water and pollutants; or (2) projects to demonstrate advanced waste treatment and water purification methods or new or improved methods of joint treatment systems for municipal and industrial wastes.

**Eligible grantees:** States, municipalities or inter-municipal or interstate agencies.

**Funding limitations:** Grants may not exceed 75 percent of the estimated total eligible cost of the project.

**Other limitations:** Proposed projects must have been approved by the appropriate State Water Pollution Control agency or agencies. In addition, the Administrator must determine that such project will serve as a useful demonstration for the purpose as set forth above.

105 or 2) **Statutory authority:** Section 105 (b).

**Purpose:** To demonstrate in river basins or portions thereof, advanced treatment and environmental enhancement techniques to control pollution from all sources including non-point sources, together with instream water quality improvement techniques.

**Eligible grantees:** States or interstate agencies.

**Funding limitations:** Grants may not exceed 95 percent of the estimated total eligible cost of the project.

**Other limitations:** None

or 3) **Statutory authority:** Section 105 (c).

**Purpose:** To support research and demonstration projects for prevention of pollution of any waters by industry including but not limited to, the prevention, reduction, and elimination of the discharge of pollutants.

**Eligible grantees:** Individuals, corporations, partnerships, associations, States, municipalities, commissions or political subdivisions of a State, or any interstate body.

**Funding limitations:** Grants may not exceed 75 percent of the estimated total eligible cost of the project.

**Other limitations:** The Administrator must determine that the project will develop or demonstrate a new or improved method of treating industrial wastes or otherwise prevent pollution by industry, which method shall have industrywide application.

or 4) **Statutory authority:** Section 105 (d).

**Purpose:** To develop, refine and achieve practical application of: (1) waste management methods applicable to point and non-point sources of pollutants to eliminate the discharge of pollutants, including, but not limited to, elimination of runoff of pollutants and the effects of pollutants from inplace or accumulated sources;

(2) advanced waste treatment methods applicable to point and non-point sources, including inplace or accumulated sources of pollutants, and methods for reclaiming and recycling water and confining pollutants so they will not migrate to cause water or other environmental pollution; and

(3) improved methods and procedures to identify and measure the effects of pollutants on the chemical, physical and biological integrity of water, including those pollutants created by new technological developments.

**Eligible grantees:** Individuals, corporations, partnerships, associations, States, municipalities, commissions, or political subdivisions of a State, or any interstate body.

**Funding limitations:** Grants may not exceed 75 percent of the estimated total eligible cost of the project.

**Other limitations:** None

105 or 5) **Statutory authority:** Section 105 (e).

**Purpose:** To support research and demonstration projects with respect to new and improved methods of preventing, reducing, storing, collecting, treating, or otherwise eliminating pollution from sewage in rural and other areas where collection of sewage in conventional, community-wide sewage collection systems is impractical, uneconomical, or otherwise infeasible, or where soil conditions or other factors preclude the use of septic tank and drainage field systems.

**Eligible grantees:** Individuals, corporations, partnerships, associations, States, municipalities, commissions, or political subdivisions of a State or any interstate body.

**Funding limitations:** Grants may not exceed 95 percent of the estimated total eligible cost of the project.

**Other limitations:** Grants must be made in consultation with the Secretary of Agriculture or other interested Federal agencies.

107 **Statutory authority:** Section 107, Federal Water Pollution Control Act, as amended, (P.L. 92-500) --- 33 U.S.C. 1257.

**Purpose:** To demonstrate comprehensive approaches to the elimination or control of acid or other mine water pollution resulting from active or abandoned mining operations and other environmental pollution affecting water quality within all or part of a watershed or river basin, including siltation from surface mining.

**Eligible grantees:** Individuals, corporations, partnerships, associations, States, municipalities, commissions, or political subdivisions of a State, or any interstate body.

**Funding limitations:** Grants may not exceed 95 percent of the estimated total eligible cost of the project.

**Other limitations:** In selecting watersheds, the Administrator shall be satisfied that the project area will not be affected adversely by the influx of acid or other mine water pollution from nearby sources. The State shall acquire any land or interests therein necessary for such project and the State shall provide legal and practical protection to the project area to insure against any activities which will cause future acid or other mine water pollution. In addition, for any demonstration project in the Appalachian region (as defined in Section 403 of the Appalachian Regional Development Act of 1965, as amended) the Appalachian Regional Commission shall determine that such demonstration project is consistent with the objectives of the Appalachian Regional Development Act of 1965, as amended.

113

**Statutory authority:** Section 113, Federal Water Pollution Control Act, as amended (P.L. 92–500) --- 33 U.S.C. 1263.

**Purpose:** To demonstrate methods to provide for central community facilities for safe water and elimination or control of water pollution in those native villages of Alaska without such facilities.

**Eligible grantees:** The State of Alaska.

**Funding limitations:** Grants may not exceed 95 percent of the estimated total eligible cost of the project.

**Other limitations:** Projects shall include provisions for community safe water supply system, toilets, bathing and laundry facilities, sewage disposal facilities, and other similar facilities, and educational and informational facilities and programs relating to health and hygiene. Such demonstration projects shall be for the further purpose of developing preliminary plans for providing such safe water and such elimination or control of pollution for all native villages in Alaska.

204

**Statutory authority:** Section 204, Solid Waste Disposal Act, as amended (P.L. 89–272) --- 42 U.S.C. 3253.

**Purpose:** To support and promote the coordination of research, development and demonstration projects relating to any adverse health and welfare effects of the release into the environment of material present in solid waste and methods to eliminate such effects, the operation and financing of solid waste disposal programs, the reduction of the amount of such waste and unsalvageable waste materials, the development and application of new and improved methods of collecting and disposing of solid waste and processing and recovering materials and energy from solid waste, and the identification of solid waste components and potential materials and energy recoverable from waste components.

**Eligible grantees:** Public or private agencies and institutions and individuals.

**Funding limitations:** Grants may not exceed 95 percent of the estimated total eligible cost of the project.

**Other limitations:** All information, uses, processes, patents and other developments resulting from these projects will be made readily available on fair and equitable terms to industries utilizing methods of solid waste disposal and industries engaging in furnishing devices, facilities, equipment and supplies to be used in connection with solid waste disposal.

301

**Statutory authority:** Section 301, Public Health Service Act, as amended (P.L. 78–410) -- 42 U.S.C. 241.

**Purpose:** To support and promote the coordination of research projects for the determination of the extent and character of radiation problems, mechanisms of radiation damage in humans, improvements in techniques for assessing the effects of radiation and radiation dose-disease relationship.

**Eligible grantees:** Universities, hospitals, laboratories and other public or private institutions or individuals.

**Funding limitations:** Grants may not exceed 95 percent of the estimated total eligible cost of the project.

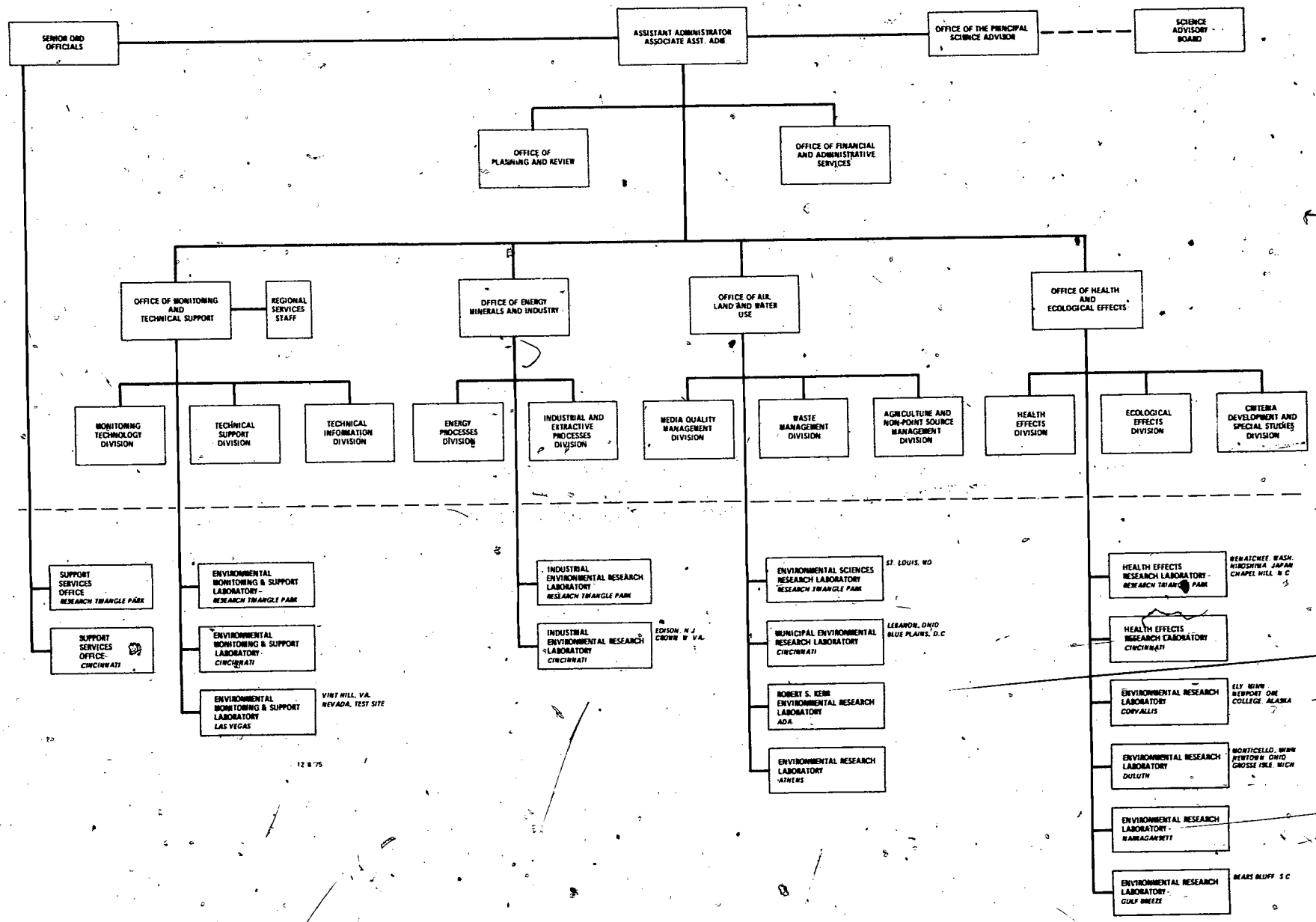
**Other limitations:** All grants must be recommended by the National Advisory Health Council.

Mixed

Statutory authority and other requirements can be any of the listed laws or the Grants Act, 42 U.S.C. 1891, depending upon the specific purpose of the project.

# APPENDIX B

## U.S. ENVIRONMENTAL PROTECTION AGENCY
## OFFICE OF RESEARCH AND DEVELOPMENT




12/8/75

# APPENDIX C

## EPA OFFICIALS AND REGIONAL CONTACTS

| | Telephone | States Served |
|---|---|---|
| **Administrator**<br>**Russell E. Train**<br>Environmental Protection Agency<br>A – 100<br>Washington, DC 20460 | (202) 755–2700 | |
| **Office of Regional and Intergovernmental Operations**<br>**Peter L. Cashman**<br>Environmental Protection Agency<br>A – 101<br>Washington, DC 20460 | (202) 755–0444 | |
| **Region I** | | |
| Environmental Protection Agency<br>Room 2203<br>John F. Kennedy Federal Building<br>Boston, Massachusetts 02203 | | Connecticut<br>Maine<br>Massachusetts<br>New Hampshire<br>Rhode Island<br>Vermont |
| Regional Administrator<br>John A. S. McGlennon | (617) 223–7210 | |
| Public Affairs Director<br>Paul G. Keough | (617) 223–4704 | |
| R&D Contact<br>Helen McCammon | (617) 223–3477 | |
| **Region II** | | |
| Environmental Protection Agency<br>Room 1009<br>26 Federal Plaza<br>New York, New York 10007 | | Delaware<br>New Jersey<br>New York<br>Puerto Rico |
| Regional Administrator<br>Gerald M. Hansler | (212) 264–2525 | |
| Public Affairs Director<br>Donald R. Bliss, Jr. | (212) 264–2515 | |
| R&D Contact<br>Robert W. Mason | (212) 264–3100 | |

# EPA OFFICIALS AND REGIONAL CONTACTS

| | Telephone | States Served |
|---|---|---|
| **Region III** | | |
| Environmental Protection Agency<br>Curtis Building<br>6th & Walnut Streets<br>Philadelphia, Pennsylvania 19106 | | District of Columbia<br>Maryland<br>Pennsylvania<br>West Virginia<br>Virginia |
| Regional Administrator<br>Daniel J. Snyder III | (215) 597–9814 | |
| Congressional and Public Affairs Director<br>Diane Margenau | (215) 597–9370 | |
| R&D Contact<br>Albert Montague | (215) 597–9856 | |
| **Region IV** | | |
| Environmental Protection Agency<br>1421 Peachtree Street, N.E.<br>Atlanta, Georgia 30309 | | Alabama<br>Florida<br>Georgia<br>Kentucky<br>Mississippi<br>North Carolina<br>South Carolina<br>Tennessee |
| Regional Administrator<br>Jack E. Ravan | (404) 526–5727 | |
| Public Affairs Director<br>Charles D. Pou | (404) 526–3004 | |
| R&D Contact<br>Edmond Lomasney | (404) 526–2786 | |
| **Region V** | | |
| Environmental Protection Agency<br>230 S. Dearborn<br>Chicago, Illinois 60604 | | Illinois<br>Indiana<br>Michigan<br>Minnesota<br>Ohio<br>Wisconsin |
| Regional Administrator<br>George Alexander | (312) 353–5250 | |
| Public Affairs Director<br>Frank M. Corrado | (312) 353–5800 | |
| R&D Contact<br>Clifford Risley, Jr. | (312) 353–8880 | |

# EPA OFFICIALS AND REGIONAL CONTACTS

| | Telephone | States Served |
|---|---|---|
| **Region VI** | | |
| Environmental Protection Agency<br>Suite 1100<br>1600 Patterson Street<br>Dallas, Texas 75201 | | Arkansas<br>Louisiana<br>New Mexico<br>Oklahoma<br>Texas |
| Regional Administrator<br>John C. White | (214) 749–1962 | |
| Public Affairs Director<br>Betty Williamson | (214) 749–1962 | |
| R&D Contact<br>Mildred Smith | (214) 749–1885 | |
| **Region VII** | | |
| Environmental Protection Agency<br>1735 Baltimore Avenue<br>Kansas City, Missouri 64108 | | Iowa<br>Kansas<br>Missouri<br>Nebraska |
| Regional Administrator<br>Jerome H. Svore | (816) 374–5493 | |
| Public Affairs Director<br>Randall S. Jessee | (816) 374–5894 | |
| R&D Contact<br>Aleck Alexander | (816) 374–2921 | |
| **Region VIII** | | |
| Environmental Protection Agency<br>Suite 900<br>1860 Lincoln Street<br>Denver, Colorado 80203 | | Colorado<br>Montana<br>North Dakota<br>South Dakota<br>Utah<br>Wyoming |
| Regional Administrator<br>John A. Green | (303) 837–3895 | |
| Public Affairs Director<br>Howard W. Kayner | (303) 837–4905 | |
| R&D Contact<br>John E. Hardaway | (303) 837–3849 | |

# EPA OFFICIALS AND REGIONAL CONTACTS

| | Telephone | States Served |
|---|---|---|
| **Region IX** | | |
| Environmental Protection Agency<br>100 California Street<br>San Francisco, California 94111 | | Arizona<br>California<br>Hawaii<br>Nevada |
| Regional Administrator<br>Paul DeFalco, Jr. | (415) 556–2320 | |
| Chief, External & Inter-Governmental Relations Branch, Allan Abramson | (415) 556–6266 | |
| R&D Contact<br>William Bishop | (415) 556–6506 | |
| **Region X** | | |
| Environmental Protection Agency<br>1200 6th Avenue<br>Seattle, Washington 98101 | | Alaska<br>Idaho<br>Washington<br>Oregon |
| Regional Administrator<br>Clifford V. Smith, Jr. | (206) 442–1220 | |
| Public Affairs Director<br>Robert H. Jacobson | (206) 442–1203 | |
| R&D Contact<br>Robert Courson | (206) 442–1296 | |

## MAILING LIST FORM

Complete this form and return it to the address listed below if you wish your name added to or retained on the mailing list for the ORD Program Guide.

Name of Organization

Sub-Division or Department

Street Address

City State Zip

Individual Contact

Complete the above information and mail to:

Office of Financial and Administrative Services (RD-674)
Office of Research and Development
Environmental Protection Agency
Washington, DC 20460

# TECHNICAL REPORT DATA

*(Please read Instructions on the reverse before completing)*

| | |
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| 4. TITLE AND SUBTITLE Office of Research and Development Program Guide | 5. REPORT DATE March 1976 (Issuing Date) |
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| | 11. CONTRACT/GRANT NO. |
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15. SUPPLEMENTARY NOTES

16. ABSTRACT

The Program Guide provides the public with information on the Office of Research and Development's current extramural research program and serves as a guide to Office of Research and Development's key personnel. This publication will be updated each fiscal year.

17. KEY WORDS AND DOCUMENT ANALYSIS

| a. DESCRIPTORS | b. IDENTIFIERS/OPEN ENDED TERMS | c. COSATI Field/Group |
|---|---|---|
| Guides (instructions), Organization charts, Grants, Contracts, Financial management, Research management | Research programs, Health and ecological effects, Energy program, Industrial processes, Public sector, Monitoring and technical support | 5A |

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