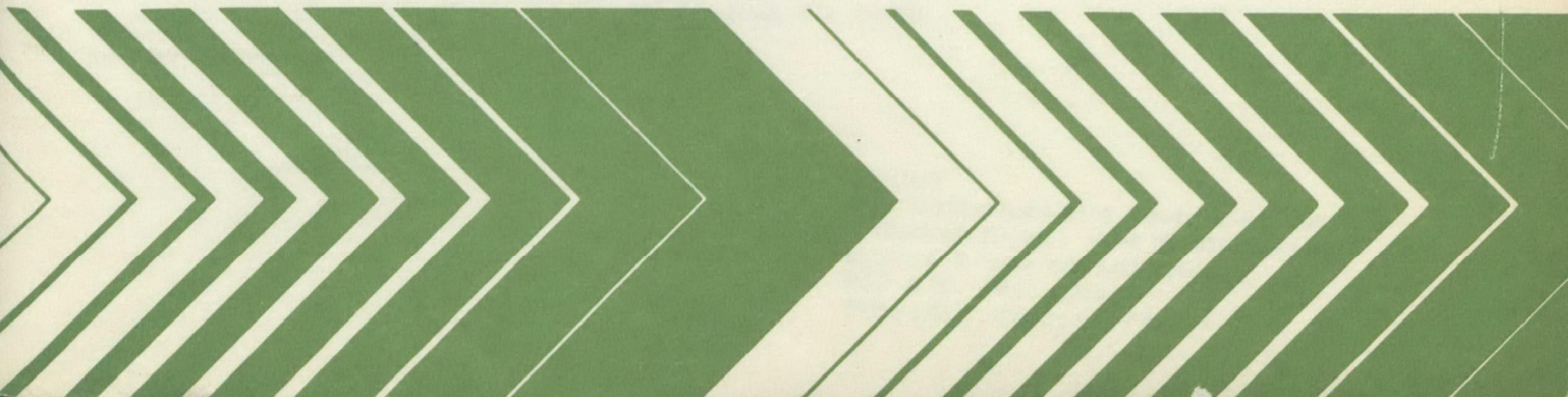


United States
Environmental Protection
Agency

Research and Development



The Office of Research and Development 1990



September 1990

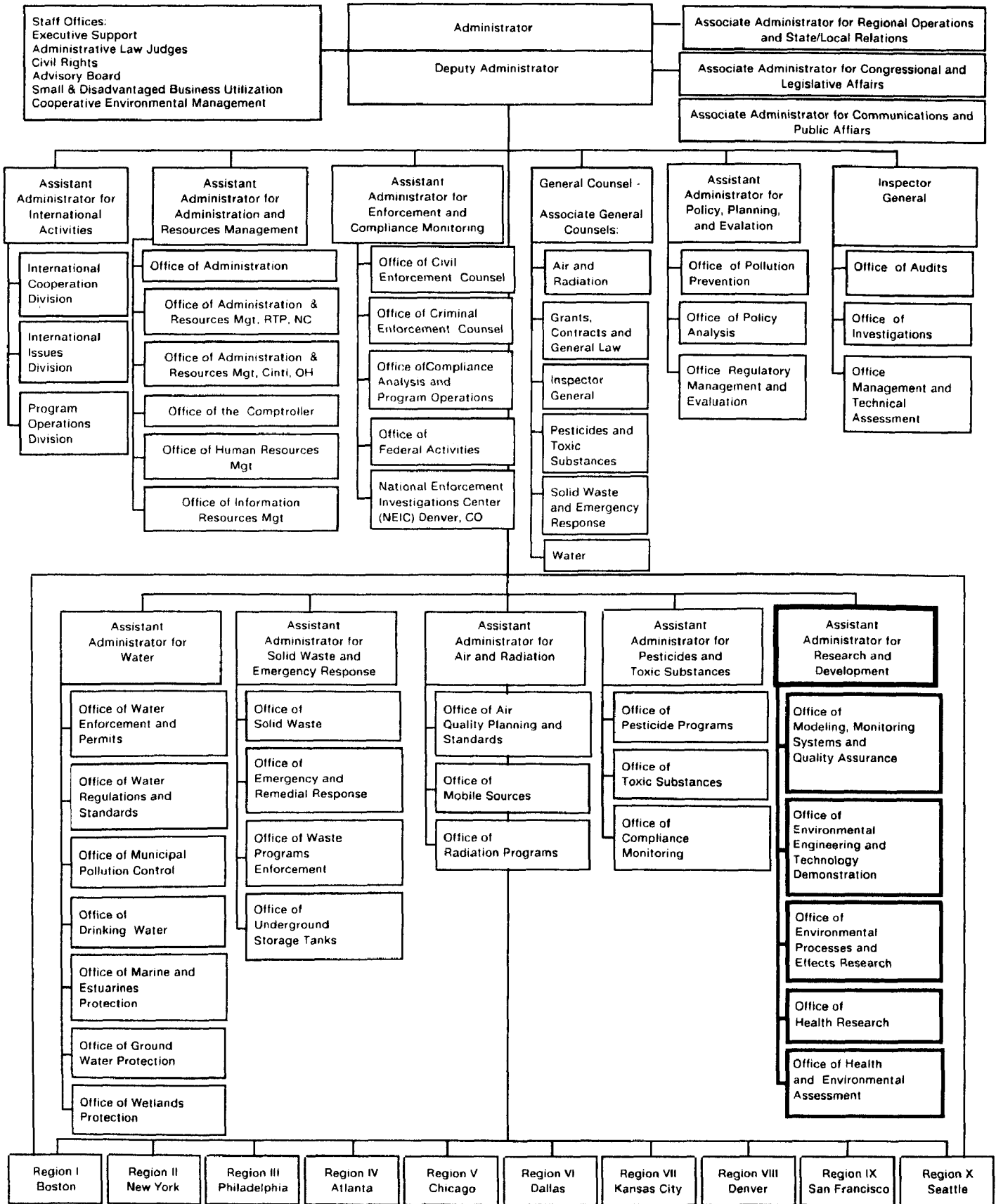
U.S. Environmental Protection Agency

The Office of Research and Development

1990

**U.S. Environmental Protection Agency
Washington, DC, 20460**

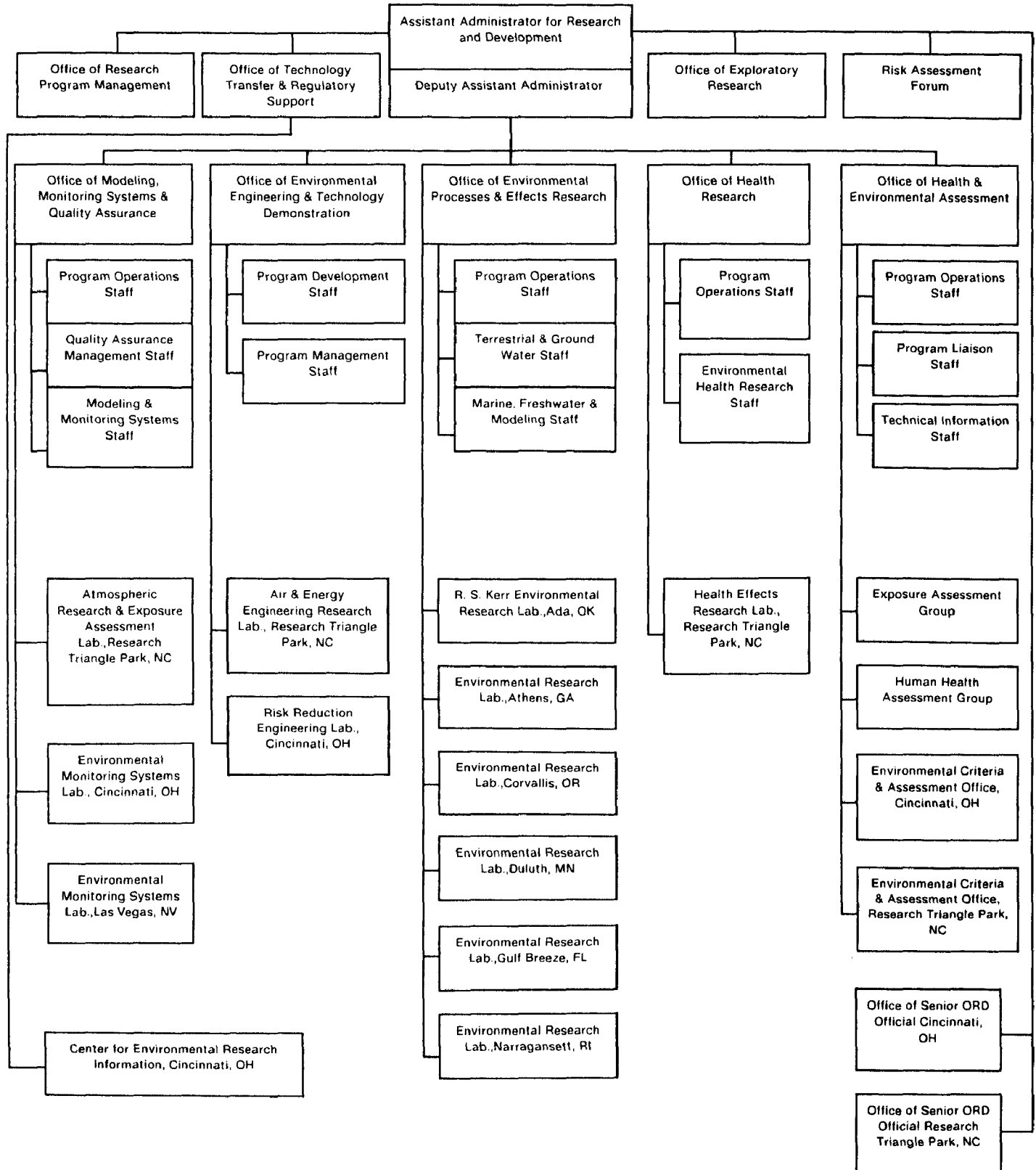
U. S. Environmental Protection Agency Organization Chart



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Office of Research and Development Organization Chart



Office of Research and Development

The Assistant Administrator



Erich W. Bretthauer is the Assistant Administrator for Research and Development. From October 1988 to March 1990, he served as Acting Assistant Administrator and from September 1987 through October 1988, he served as Deputy Assistant Administrator. Within EPA he has served as the Director of both the Environmental Monitoring Systems Laboratory, Las Vegas, and the Office of Environmental Processes and Effects Research, Washington, DC. In 1962 he began his career in scientific research with the Public Health Service. He received Bachelor's and Master's degrees in Chemistry from the University of Nevada, Reno. He has authored many technical papers and has received the EPA Gold Medal.

Our Mission

"The primary mission of the Office of Research and Development(ORD) is to provide high quality, timely, scientific and technical information in support of Agency programs and goals."

The Deputy Assistant Administrator

John H. Skinner is the Deputy Assistant Administrator for Research and Development. He has been the director of several Agency programs, including the Office of Environmental Engineering and Technology Demonstration, the Office of Solid Waste, the State Programs and Resource Recovery Division, and the Land Disposal Division. Before joining the Agency in 1972, Mr. Skinner managed the Energy and Environmental Programs for the General Electric Research and Development Center. He received a Ph.D. and Master's degree in Aeronautical Engineering from Rensselaer Polytechnic Institute and a Bachelor's degree in Engineering from Hofstra University. He has received the EPA Gold Medal and Presidential Meritorious Executive Award.



Office of Research and Development

Introduction

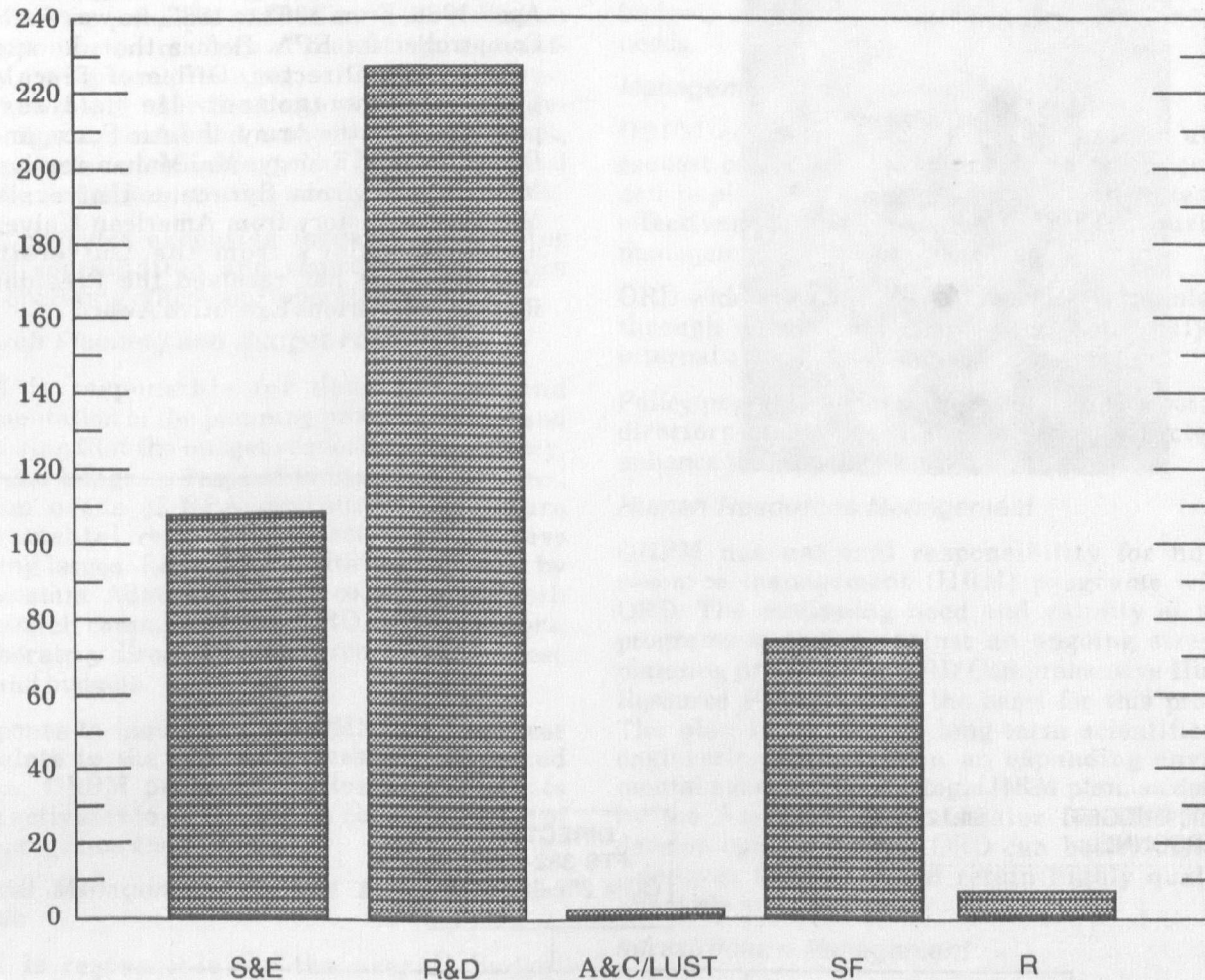
The primary goal of the U.S. Environmental Protection Agency is to mitigate the adverse impacts of pollution on human health and the environment. Toward that end, Agency management must make decisions regarding the development of policy, guidance, standards, regulations, and the appropriate tools for implementing pollution abatement strategies. The Office of Research and Development provides the Agency programs with scientific and technical information, products and assistance, so that management decisions are sound and the Agency's goals are met.

The Research Program

The Agency's research program is conducted through twelve environmental laboratories across the country, employing some 1800 people. The research focuses on areas targeted by the planning process as needing additional emphasis. The overall planning process engenders an applied research and development program focused on answering key scientific and technical studies supporting immediate regulatory and enforcement decisions, and a longer-term research program that extends the knowledge base of environmental science and anticipates environmental problems.

The core research and development program is focused on the following functional areas:

- Health effects research – to determine the adverse effects of pollutants on human health
 - Ecological effects research – to determine the adverse effects of pollutants on ecosystems
 - Environmental processes and fate research – to understand how pollutants are transported and modified as they move through soils, ground and surface waters, and the atmosphere
 - Environmental monitoring research – to develop methods of identifying pollutants in the environment and measuring exposure to such substances
 - Risk assessment research – to develop methods to integrate information on pollutant sources, fate and transport, exposure, and health and ecological effects in order to assess the overall risk posed by a pollutant or a group of pollutants
 - Risk reduction research – to develop control technologies to treat, destroy, or contain pollutants and methods to reduce or eliminate the sources of pollutants or to prevent exposure to pollutants.
- In addition to functional areas, several cross-media problems also categorize the total ORD program. Those cross-media problems receiving special emphasis at present and for the foreseeable future and the Agency programs most concerned are:
- Global climate change (air, water, hazardous waste);
 - Total and human exposure assessment (air, water, hazardous waste/Superfund, pesticides/toxic substances)
 - Wetlands (water, hazardous waste and Superfund);
 - Accidental releases (air, water, hazardous waste and Superfund);
 - Comparative risk for complex mixtures (air, water, hazardous waste and Superfund, pesticides/toxic substances);
 - Technology Transfer (all);
 - Biotechnology (air, water, pesticides/toxic substances).

**FY 90 Resources
(in Millions)**


Total Full Time Employees: 1,739

Total Budget:

Salaries and Expenses (S&E)	\$114,469,145
Research and Development (R&D)	228,978,100
Abatement and Control (A&C)/Leaking Underground Storage Tanks (LUST)	1,302,100
Superfund (SF)	78,528,442
Reimbursable (R)	<u>5,798,541</u>
Grand Total	\$429,076,328

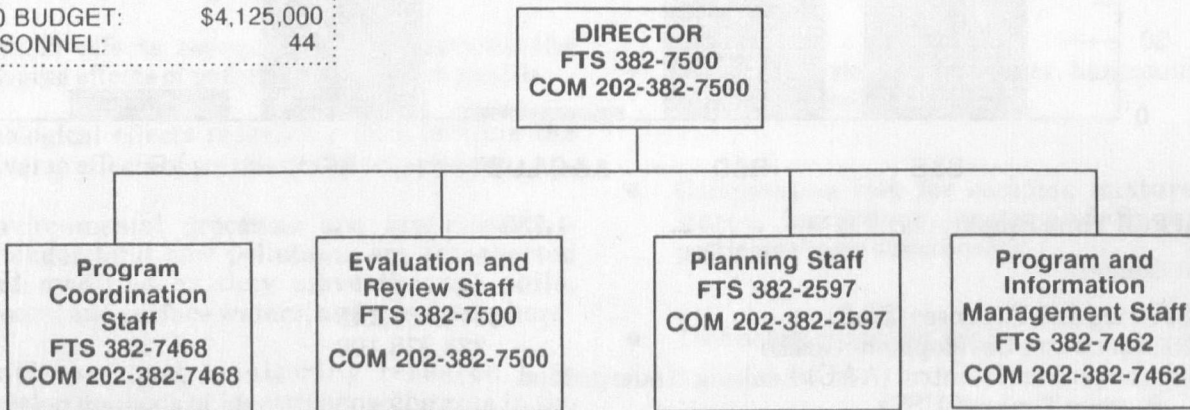
All dollar amounts in this document are as of 3/31/90.

Office of Research Program Management



Clarence E. Mahan has been the Director of the Office of Research Program Management since April 1986. From 1983 to 1986, he was Associate Comptroller for EPA. Before that, he spent a year as the Director, Office of Fiscal and Contracts Management. He held several positions with the Army, the Air Force, and the Department of Energy. Mr. Mahan received an MBA degree from Syracuse University, a Master's in History from American University, and a Bachelor's from the University of Maryland. He has received the Presidential Rank of Meritorious Executive Award.

FY90 BUDGET: \$4,125,000
PERSONNEL: 44



Office of Research Program Management

Functions

The Office of Research Program Management (ORPM) is the principal staff office to the Assistant Administrator on matters of budgeting, accountability, program planning, analysis, review, integration and coordination, resource management, organizational and manpower management, environmental compliance, policy development and analysis, and administrative management services.

ORPM provides executive leadership to foster process coordination and improvement within ORD's operating offices and laboratories.

Research Planning and Budget Formulation

ORPM is responsible for development and implementation of the planning process in ORD and for assuring that the budget requests to the Agency, OMB, and Congress respond to the regulatory and program needs of EPA, and anticipate future environmental research necessary to address emerging issues. Research priorities established by the Assistant Administrator in coordination with the research committees, the ORD office directors, and laboratory directors are incorporated into these plans and budgets.

In response to inquiries from OMB and Congress that relate to the Agency's research issues and budgets, ORPM prepares replies and conducts liaison activities to ensure timely communication of ORD's programs and proposals.

Financial Management, Budget Execution, and Analysis

ORPM is responsible for the overall budget execution and financial management of all ORD resources. These activities include: directing and managing operating plan development for headquarters and field facilities; tracking, monitoring and analyzing operating plan adjustments, changes, and expenditures; comprehensive analyses and projections of spending trends and operating requirements; policy and procedure development and implementation; and similar budget management and analysis functions. These activities operate simultaneously and concurrently to cover three budget cycles, i.e., current year, planning year, and budget year during any given fiscal year.

In addition, ORPM is responsible for implementation and oversight for ORD of the Agency's Integrated Financial Management Systems (IFMS). These functions include ensuring

proper maintenance, accuracy, and adequacy of the system to meet the various and complex requirements of ORD entities in fulfilling their budget, operating, financial, and management needs.

Management Analysis and Review

ORPM conducts policy/program reviews at the request of the Assistant Administrator. It develops and implements strategies to promote integrity, effectiveness and efficiency in ORD's business management practices.

ORD-wide accountability framework is maintained through developing, monitoring, and analyzing internal and external management reviews.

Policy/program reviews requested by the laboratory directors and office directors are conducted to enhance their operations.

Human Resources Management

ORPM has national responsibility for human resource management (HRM) programs within ORD. The continuing need and validity of these programs is tested against an ongoing strategic planning process. The ORD Comprehensive Human Resource Plan provides the basis for this process. The plan is to address long-term scientific and engineering objectives in an expanding environmental agenda. The strategic HRM plan, as defined by the Assistant Administrator for ORD, is to develop options on how ORD can better meet its objectives to attract and retain highly qualified scientists and engineers.

Infrastructure Management

Responsibility for keeping ORD's infrastructure strong to ensure that ORD's science can be performed also rests with ORPM. In this area, ORPM provides administrative direction for all functions related to facilities planning and engineering needs at ORD laboratories. This includes the collection of needs and the management of the analyses required to determine priorities of: new construction projects; maintenance projects for facilities; compliance of ORD facilities with environmental regulations; ensuring that ORD facilities have health/safety programs to ensure that employees are not exposed to harmful working conditions.

ORPM also oversees the scientific equipment program. This ensures that the need for new and replacement equipment is addressed during the

Office of Research Program Management

budget process and the existing inventory of scientific equipment is managed in a defensible fashion so that ORD's budget requests are supportable.

Information Management

ORPM is responsible for ensuring that activities carried out by ORD comply with Federal and EPA policies and regulations concerning the maintenance, acquisition, and management of all hardware and software required for data processing. This responsibility includes directing and managing the planning and budgeting for all ORD information systems and the technology needed to support these systems. Information needs are coordinated across ORD and data is integrated where feasible to eliminate unnecessary duplication.

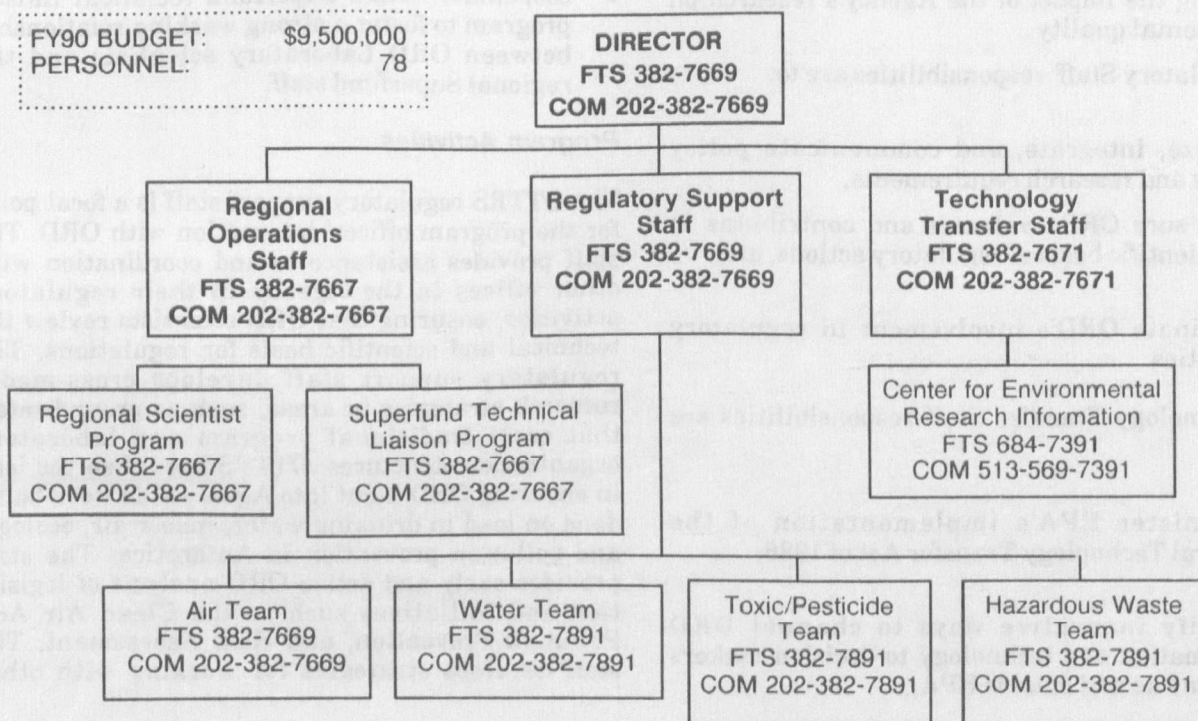
Administrative Management and Analysis

ORPM also provides an ORD-wide oversight function in the following areas: developing policy for contracts, grants, and cooperative agreements; developing and executing the budget for the Office of the Assistant Administrator and associated staff offices; managing the ORD policy and procedures program; managing, coordinating, and staffing the ORD Awards Committee activities; coordinating the review of GAO and Inspector General audits, Agency's reorganization and delegation proposals, Freedom of Information Act requests, and overseeing the Federal Manager's Financial Integrity Act responsibilities. In addition, ORPM coordinates all international travel requests and manages the system which provides reports on all activities.

Office of Technology Transfer and Regulatory Support



Peter W. Preuss has been the Director of the Office of Technology Transfer and Regulatory Support since 1988. From 1985 to 1988, he was the Director of the Office of Health and Environmental Assessment. Prior to joining EPA, Mr. Preuss was Associate Executive Director for Health Sciences for the U.S. Consumer Product Safety Commission. Mr. Preuss began his career with the Boyce-Thompson Institute for Plant Research. He received Ph.D. and Master's degrees in Plant Physiology and Biochemistry from Columbia University and a Bachelor's degree in Chemistry and Mathematics from Brooklyn College.



Office of Technology Transfer and Regulatory Support

Functions

The Office of Technology Transfer and Regulatory Support (OTTRS) has three main functions:

- analysis and integration of scientific and technological information in the development of regulations,
- managing the delivery of ORD products and services through an organized program of technology transfer and technical information exchange, and
- promoting the EPA Regions' interests in Agency research activities.

The Director advises ORD's Assistant Administrator on: (1) matters concerning the scientific and technical aspects of Agencywide regulatory and enforcement issues; (2) methods to enhance overall ORD effectiveness through technical information exchange, technology transfer, implementation of the Technology Transfer Act of 1986; and (3) efforts to support the science and technology needs of the regional offices. There are three headquarters staffs, in addition to the Center for Environmental Research Information, that are responsible for implementing ORD's goal of broadening the impact of the Agency's research on environmental quality.

The Regulatory Staff responsibilities are to:

- analyze, integrate, and communicate policy issues and research requirements,
- make sure ORD evaluates and contributes to the scientific basis of regulatory actions, and
- coordinate ORD's involvement in regulatory activities.

The Technology Transfer Staff responsibilities are to:

- administer EPA's implementation of the Federal Technology Transfer Act of 1986,
- identify innovative ways to channel ORD information and technology to decision makers both inside and outside EPA,

- evaluate the needs of state and local environmental decision makers for ORD products and support programs to deliver those products, and
- develop policy guidance for ORD offices and laboratories on improving the "transferability" of their work and coordinate those efforts among the different ORD groups when necessary.

The Regional Operations Staff responsibilities are to:

- serve as the liaison among regional offices and ORD offices and laboratories,
- identify regional research requirements,
- assist regions with achieving short- and long-term research goals by representing them in ORD's planning and budgeting process,
- administer ORD's Regional Scientist Program, and
- coordinate ORD's Superfund technical liaison program to foster a strong working relationship between ORD Laboratory scientists and the regional Superfund staff.

Program Activities

The OTTRS regulatory support staff is a focal point for the program offices' interaction with ORD. The staff provides assistance to and coordination with other offices in the Agency in their regulatory activities, ensuring that ORD scientists review the technical and scientific basis for regulations. The regulatory support staff develops cross-media research strategies in areas, such as groundwater, that cross traditional program and laboratory organization structures. OTTRS has taken the lead in ensuring ORD input into Agencywide work being done on lead in drinking water, indoor air, ecology, and pollution prevention in Antarctica. The staff provides early and active ORD analysis of legislation and initiatives such as the Clean Air Act, Pollution Prevention, and Risk Assessment. The staff develops strategies for working with other

Office of Technology Transfer and Regulatory Support

offices, such as Enforcement and Compliance Monitoring, that have not been traditional ORD clients.

As the regulatory support staff works within the Agency to bring ORD into activities, the technology transfer staff promotes ORD science and information to the broadest possible audience outside the Agency. There are many complex environmental issues facing states and municipalities that lend themselves to solutions that can be provided through aggressive EPA technology transfer programs. The OTTRS technology transfer staff has taken the lead in developing and advocating biotechnology initiatives, environmental education resources for all levels of students, small community outreach, and electronic information services such as the ORD bulletin board system. Many of the ORD products are already available in the form of documents or workshop manuals. It is the Technology Transfer staff's role to find additional users of the information and unique or customized ways to present it. The areas of pollution prevention, risk assessment modeling, international technology transfer, and communications

have been particularly fruitful opportunities for technology transfer activities. Through the Agency's program for the implementation of the Federal Technology Transfer Act of 1986, ORD resources, through joint efforts with the private sector, are more fully utilized.

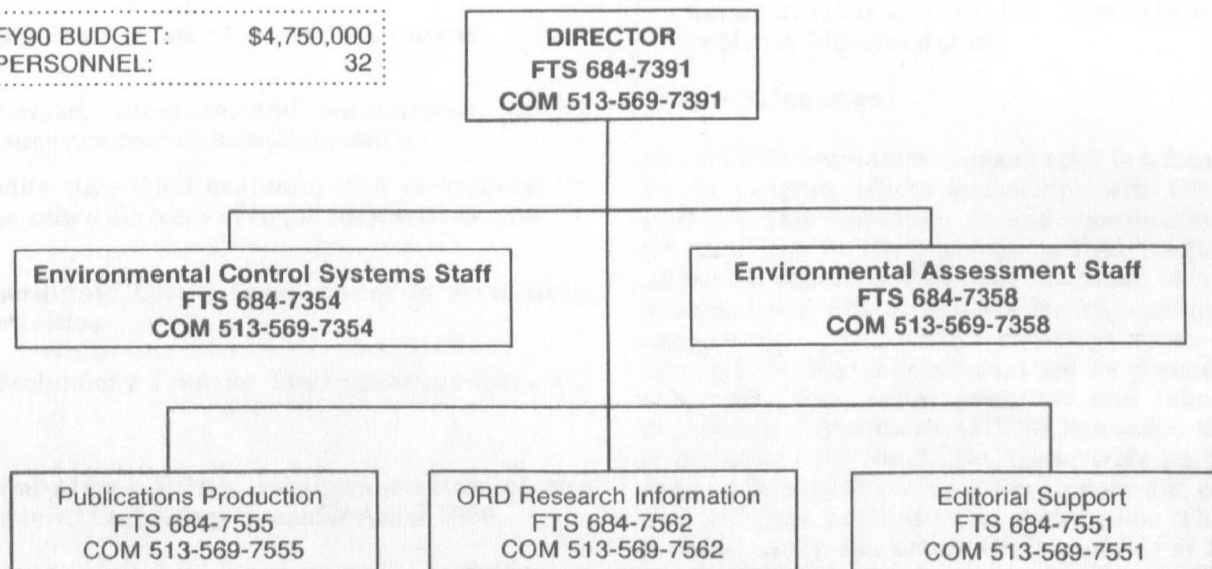
Traditionally, ORD has been very responsive to *ad hoc* requests for technical assistance. Regional research needs, however, have not received the priority attention that they deserve in the ORD planning process. In order to foster a more interactive relationship, we have established the ORD Regional Scientist Program. Senior ORD scientists are assigned to work in the EPA regional offices. Regional Scientists broker technical assistance in the regions and champion regional research needs within ORD. Cooperative agreements with the National Governor's Association; the National League of Cities; and the Association of State and Territorial Health Officials provide us with additional insight into better serving state and local clients.

Center for Environmental Research Information



Calvin O. Lawrence has served as the Director of the Center for Environmental Research Information since 1980. He was the Deputy Director of CERI for three years. Mr. Lawrence worked for ORD in Washington, D.C. from 1972 to 1977 ending his tenure there as Technical Assistant to the Assistant Administrator for ORD. He began his federal career in 1963 as Mathematician and Electrical Engineer at the Naval Ordnance Laboratory, White Oak, Maryland. Mr. Lawrence was awarded an EPA Bronze Medal in 1973. He has a Bachelor's degree in Mathematics from Lamar University and a Master's degree in Numerical Science from John Hopkins University.

FY90 BUDGET: \$4,750,000
PERSONNEL: 32



Center for Environmental Research Information

Functions

The Center for Environmental Research Information (CERI) is a focal point for the exchange of scientific and technical information both within the federal government and to the public. CERI's Technology Transfer and Technical Information staffs coordinate a comprehensive technical information program in support of the activities of EPA's Office of Research and Development (ORD), its laboratories, and associated programs nationwide.

The Technology Transfer Staff is responsible for working with the program offices and regions to produce Technology Transfer products that aid states, local governments, and the regulated

community in complying with EPA regulations. This information is based upon the latest technology and is in a form that is easily understood as well as comprehensive in coverage.

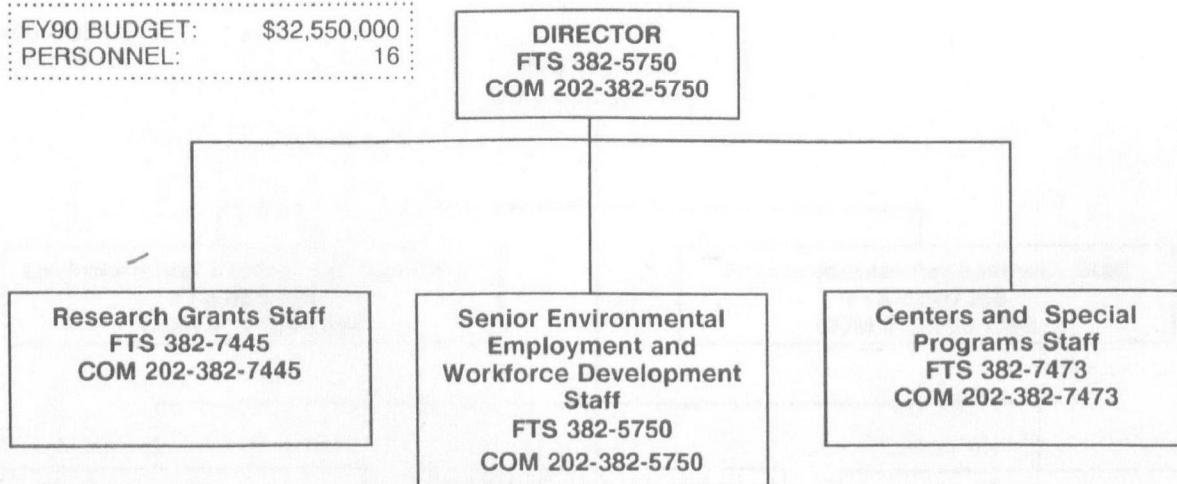
CERI's technical information components are responsible for the production and distribution of scientific and technical reports, for responding to requests for publications, and for quality control of information products through the application of standard procedures for the production of documents and through a review and sign-off mechanism to ensure that the science has met applicable standards.

Office of Exploratory Research



Roger S. Cortesi has been the Director of the Office of Exploratory Research since 1984. From 1972 to 1984, he held supervisory positions in several Agency programs, including the Office of Health and Ecological Effects, the Environmental Research Center, and the Office of Planning and Evaluation. Mr. Cortesi began his career as an advisory engineer with Westinghouse. He received a Ph.D. in Physics from the University of Virginia and a Bachelor's degree in Mathematics from Harvard University.

FY90 BUDGET: \$32,550,000
PERSONNEL: 16



Office of Exploratory Research

Functions

The Office of Exploratory Research (OER) is responsible for planning, administering, managing and evaluating EPA's exploratory research program in general and, in particular, its extramural grant research in response to Agency priorities as established by Agency planning mechanisms. It supports fundamental research aimed at developing a better basic scientific understanding of the environment and its inherent problems and entails close relations with the American environmental research community. OER's main goals are:

- to have the environmental research community aware of and working on problems of interest to EPA;
- to promote close interaction and mutual awareness between EPA researchers and the environmental research community;
- to provide general support to the research community for work on fundamental environmental research, thereby promoting a solid foundation of knowledge for the country's large applied environmental research program, a cadre of scientific and technical personnel in the environmental sciences, and an "over-the-horizon" capability for identifying problems and solutions.

OER's goals are accomplished primarily through four core programs: (a) a competitive investigator-initiated research grants program, (b) an environmental research centers program, (c) a visiting scientists program, and (d) a small business innovation research (SBIR) program.

Program Activities

- The Research Grants Program (RGP) – supports research initiated by individual investigators in areas of interest to the Agency. Research proposals are solicited via two mechanisms: (1) the general "Solicitation for Research Proposals," which is published each year and invites proposals in five broadly defined areas of environmental science and engineering; and (2) the Request for Applications (RFA) which is a more targeted solicitation mechanism that requests proposals in well-defined areas of particular interest to the Agency such as global climate change and hazardous substances. All proposals received in response to either mechanism are subjected to external peer review.

In an effort to provide more support to minority institutions for the conduct of basic environmental research, the Research Grants Program makes available pre-application assistance for minority faculty at Historically Black Colleges and Universities (HBCUs) and Historically Hispanic Colleges and Universities through its Minority Institutions Assistance Program.

- The Research Centers Program (RCP) – supports multidisciplinary research, which is conducted in a university setting and focused in areas of priority interest to EPA. In FY88, the RCP initiated the establishment of five hazardous substance research centers.

- The Visiting Scientists Program – has two components: a competitive visiting scientists and engineers program and a summer fellowship program. The objective of the Visiting Scientists and Engineers Program is to attract accomplished visitors into ORD laboratories for 1 to 3 years to strengthen the Agency's research program by fostering better exchange between EPA researchers and the rest of the environmental research community. The Summer Fellows Program is carried out in cooperation with the American Association for the Advancement of Science and sponsors the assignment of post-doctoral environmental science and engineering fellows to EPA facilities for the summer months to conduct environmental research and policy projects.

- The Small Business Innovation Research Program – is mandated by Public Law 97-219 which requires EPA to devote 1.25% of its extramural research and development budget to Small Business Innovation Research (SBIR). The SBIR Program funds, via contracts, small businesses with ideas relevant to EPA's mission. The program focuses exclusively on projects in control technology or process instrumentation development.

In addition to the above core programs, OER administers other programs which are also important to the accomplishment of its goals. They include:

- a Minority Fellowship Program, which awards fellowships to college seniors and graduate students enrolled on a full-time basis at Historically Black Colleges and Universities and Historically Hispanic Colleges and Universities and majoring in curricula that

Office of Exploratory Research

could be applied to the solution of environmental problems.

- a Minority Summer Intern Program, which extends to recipients of fellowships under the Minority Fellowship Program the opportunity for hands-on experience in the area of their academic training by way of a summer internship at EPA or some other environmental organization.
- the Agency's Senior Environmental Employment Program (SEE), which utilizes the skills and talents of older Americans to meet employment needs of environmental programs throughout EPA.
- the Federal Workforce Training Program, which coordinates ORD's participation in workforce training programs used by state and local governments.
- the Scientific and Technological Achievement Awards Program, which gives recognition and makes monetary awards to EPA/ORD laboratory scientists and researchers for outstanding contributions to environmental research.

Issues

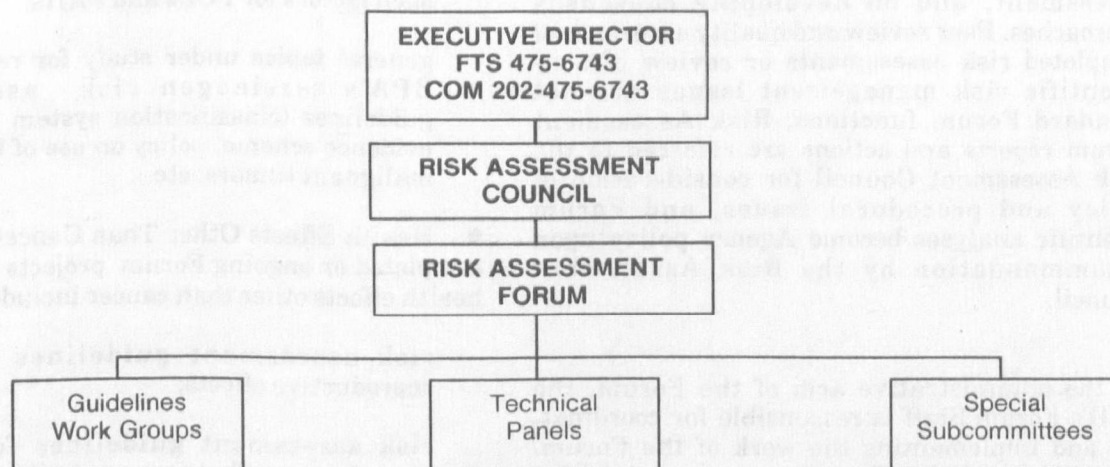
Beginning in FY 1990, the Research Grants Program will increase by \$10M per year, from \$8.2M in FY 1989 to \$50M in FY 1993. This represents more than a five-fold increase in extramural resources, the magnitude of which implies a substantial increase in work involved in awarding and managing a much larger number of grants under general and special solicitations (from about 160 in FY89 to 500 in FY93). Operating at the target level of resources will affect operations of not only the grants program, but of OER generally. For example, in addition to the obvious need for additional personnel, it might be necessary to shift manpower from other programs into grants. Or the creation of an information systems management section might be needed. Or it might be operationally effective and efficient to use contractors to perform certain functions.

The issue is: How should the office operate to support the much greater workload associated with the gradual expansion of the Research Grants Program? This issue demands careful consideration in the months ahead.

Risk Assessment Forum



Dorothy E. Patton has been the Executive Director of the Risk Assessment Forum since 1985. Currently, she also chairs that group. From 1976 to 1985, she was an attorney in EPA's Office of General Counsel, where she worked with the pesticides, toxics, and air programs. She has received two EPA Bronze Medals. Before coming to EPA, Ms. Patton was an Assistant Professor of biology in the City University of New York (York College), and did post-doctoral work at Albert Einstein College of Medicine in New York. Ms. Patton received her J.D. degree from Columbia University School of Law, a Ph.D. in Developmental Biology from the University of Chicago, and a Bachelor's degree in Chemistry from the University of Wisconsin.



Risk Assessment Forum

Functions

EPA's Risk Assessment Forum is responsible for scientific and science policy analysis of precedent-setting or controversial risk assessment issues of Agency-wide interest. The primary objective is to promote Agency consensus on risk assessment and to ensure that this consensus is incorporated into appropriate guidance for Agency scientists and managers. To fulfill this purpose, the Forum assembles risk assessment experts from throughout the Agency to study and report on the issues formally and from an Agency-wide scientific perspective.

Program Activities

Forum activities include developing scientific analyses, risk assessment guidance, and risk assessment methodology for use in ongoing and prospective Agency actions; using scientific and technical analysis to propose risk assessment positions for Agency programs; and fostering consensus on these issues. Generally, the Forum focuses on generic issues fundamental to the risk assessment process, analysis of data used in risk assessment, and on developing consensus approaches. Peer review and quality assurance of completed risk assessments or review of non-scientific risk management issues are not standard Forum functions. Risk Assessment Forum reports and actions are referred to the Risk Assessment Council for consideration of policy and procedural issues, and Forum scientific analyses become Agency policy upon recommendation by the Risk Assessment Council.

As the administrative arm of the Forum, the ORD's Forum Staff is responsible for coordinating and implementing the work of the Forum. Accordingly, the staff assists and contributes to scientific analyses, coordinates all activities involving the Forum and its Technical Panels, and manages all interaction between the Forum and senior EPA management, peer reviewers, and the public. At any one time, the Staff is working with a total of 100-150 participants on Technical Panels, Colloquia, and Workshops from all parts of the Agency. In addition, the Forum-sponsored Guidelines Implementation Pro-

gram involves a separate group of approximately 75 people, again from all parts of the Agency.

Issues

The issues before the Risk Assessment Forum vary as risk assessment issues become prominent or controversial within the Agency or in the larger scientific community. Issues currently before the Forum fall into three general categories:

- **Carcinogen Risk Assessment.** Recently concluded or ongoing Forum analyses on carcinogen risk assessment include:

- the relevance of data on rat kidney tumors to human cancer risk assessment;

- policy guidance on the use of neoplastic nodules found in rat liver tissue;

- guidance on the use of non-tumor end points for assessing cancer risk in follicular cells of the thyroid gland;

- toxicity equivalency factors for dioxins other than 2,3,7,8-TCDD, and the possible use of such factors for PCBs and PAHs;

- general topics under study for revisions of EPA's carcinogen risk assessment guidelines (classification system weight-of-evidence scheme, policy on use of benign and malignant tumors, etc.).

- **Health Effects Other Than Cancer.** Recently completed or ongoing Forum projects relating to health effects other than cancer include:

- risk assessment guidelines for male reproductive effects;

- risk assessment guidelines for female reproductive effects;

- a report on cholinesterase inhibition as an adverse toxicologic effect;

- risk assessment guidelines for neurotoxic effects;

- amendments of EPA's 1986 guidelines for developmental toxicity (additional guidance

Risk Assessment Forum

on use the of data on maternal toxicity and on quantification for developmental effects);

workshop report on the use of one- and two-generation reproduction studies;

developmental and reproductive toxicity studies involving dermal exposure; and

general risk assessment guidelines for health effects other than cancer.

- **Exposure Guidance.** Ongoing Risk Assessment Forum projects on exposure issues include:

exposure measurement guidelines to supplement EPA's exposure guidelines issued in 1986;

exposure validation models; and

guidance on standard factors for use in exposure assessment.

- **Ecological Risk Assessment.** New guidance on ecological risk assessment is being developed for peer and public review during 1991. Three areas are under study:

aquatic populations,
terrestrial populations, and
aquatic communities.

Senior Official for Research and Development Cincinnati



Steven D. Lutkenhoff is the Acting Senior Official for Research and Development at the Andrew W. Breidenbach Environmental Research Center in Cincinnati, OH. He previously served as the Director of the Environmental Criteria and Assessment Office where he was also the Deputy Director from 1984 to 1987. Mr. Lutkenhoff came to the agency in 1972 as a research scientist for the Health Effects Laboratory and worked in that position until he went to ECAO as a staff physiologist in 1979. He began his career as a medical laboratory technician at St. Luke Hospital. He is the recipient of the Bronze Medal and is a member of numerous professional organizations. Lutkenhoff is a graduate of Thomas More College with a B.S. in Biology.

Office of the Senior Official for
Research and Development
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COM 513-569-7951

Support and Public Affairs
Office
FTS 684-7966
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Functions

The Office of the Senior Official for Research and Development-Cincinnati is a field element of the Immediate Office of the Assistant Administrator for Research and Development (AARD). The Office is the official spokesperson for ORD and the Agency in Cincinnati and has the lead responsibility for coordinating with regional offices, with Headquarters, and with program offices on all appropriate matters. The Office also has the lead responsibility for the planning and coordination of the Federal Technology Transfer Act and the outreach programs at the Andrew W. Breidenbach Environmental Research Center (AWBERC) including local Congressional affairs, public affairs, and community and academic relations and training, media relations, international and domestic visitors, intergovernmental relations, support services, and related programs.

Specifically, the Office is responsible for initiating and directing programs of:

- Academic Relations
- Congressional Relations
- Federal Technology Transfer Act
- ORD Training
- Public Affairs and Community Outreach
- Regulatory Compliance of AWBERC
- Support Services
- Technical Assistance

Senior Official for Research and Development Research Triangle Park



Elizabeth ("Billie") J. Hudson is the Acting Senior Office of Research and Development Official (SORDO) at the Environmental Research Center in Research Triangle Park, NC. From 1978 to 1990, she was Senior Program Analyst with the National Institute of Environmental Health Sciences (NIEHS), where she was concerned with the analysis of public policy issues and Congressional relations. From 1968 to 1978, Ms. Hudson managed the (NIEHS) Public Information Office; from 1967 to 1968, she was a budget analyst at NIEHS. She holds a B.A. degree in Sociology and Psychology from the University of North Carolina at Chapel Hill, where she was inducted into Phi Beta Kappa and awarded the Loomis Scholarship Key. She received several meritorious performance awards from the Department of Health and Human Services and won the Award of Excellence from the International Technical Publication Competition.

Senior Official for Research
and Development
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Director, Research and
Development Services Staff
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Functions

The Office of the Senior Official for Research and Development at Research Triangle Park is the official spokesperson for the Office of Research and Development and coordinates issues of mutual concern among RTP laboratories and offices, regional offices, headquarters, and program offices on matters that affect ORD/RTP. The office is responsible for planning and coordinating external affairs programs, technical support, community outreach and public affairs programs, academic relations and training, media relations, international and domestic visitors, and inter-governmental relations. The office manages programs for the EPA-RTP offices and laboratories, including medical monitoring, cooperative research ventures, and buildings and facilities requests.

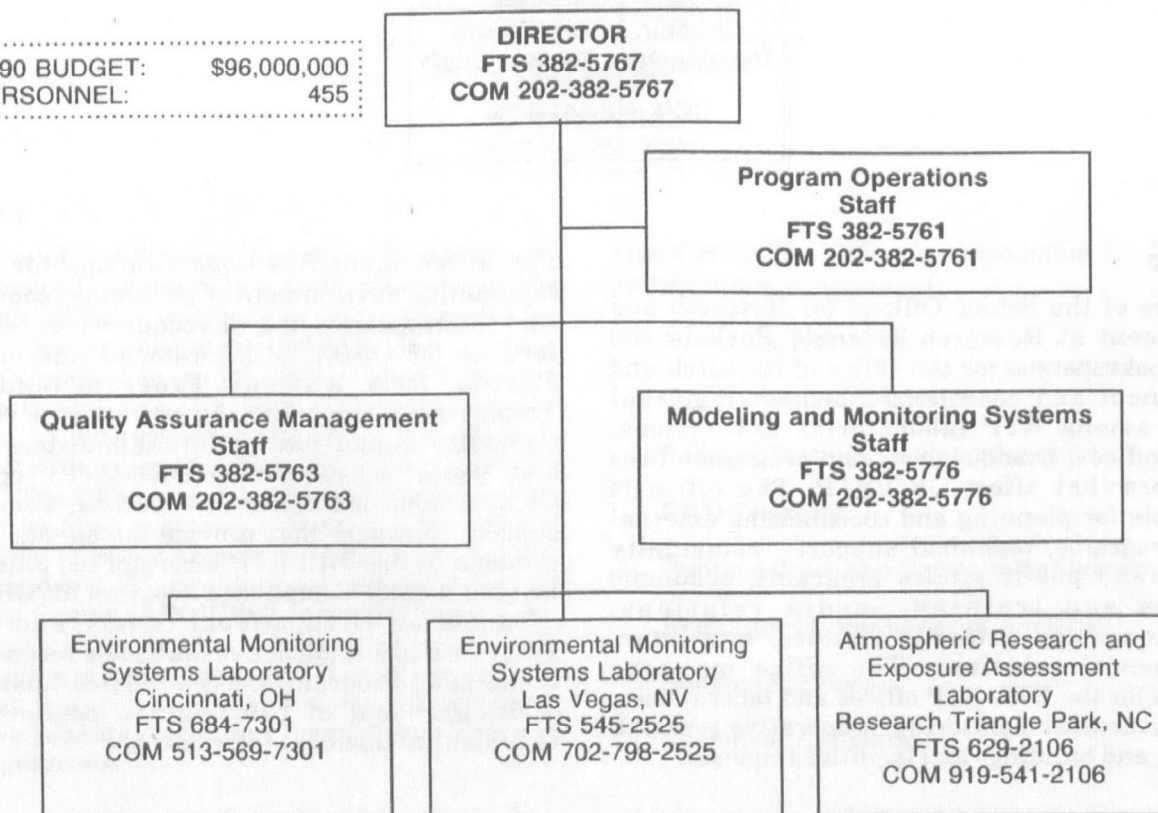
The office identifies opportunities for solving community environmental problems; coordinates such administrative and resources development services for ORD/RTP laboratories and offices as awards, EPA Women's Program, and Equal Employment Opportunity; serves as a National Computer Center focal point; administers facility and space allocations for ORD-RTP; represents ORD in labor-management relations; administers support contracts that provide for on-site services common to the ORD-RTP laboratories; conducts an Environmental Compliance Program for ORD-RTP, conducts an Occupational Safety and Health Program and a Radioactive Materials Licensing and Compliance Program, and coordinates outside audit visit, Freedom of Information requests, and Confidential Business Information.

Office of Modeling, Monitoring Systems and Quality Assurance



Rick A. Linthurst is the Director of the Office of Modeling, Monitoring Systems and Quality Assurance. Mr. Linthurst joined the Agency in 1985 as Director of the Acid Deposition Aquatic Effects Research Program. Before joining the Agency, he was the Director of Ecological Services for Kilkelly Environmental Associates and managed the Acid Deposition Research Program at North Carolina State University. He has received two Bronze Medals. Mr. Linthurst received his Ph.D. degree in Botany and a Master's degree in Ecology at North Carolina State University and a Bachelor of Science degree in Biological Sciences from Lebanon Valley College in Pennsylvania.

FY90 BUDGET: \$96,000,000
PERSONNEL: 455



Office of Modeling, Monitoring Systems and Quality Assurance

Functions

The Office of Modeling, Monitoring Systems and Quality Assurance (OMMSQA) is responsible for:

- characterizing the sources, atmospheric and environmental transformations and pathways, and the physical, chemical, and biological properties of pollutants stressing human and ecological systems;
- quantifying human and ecosystem exposure to pollutants and to support exposure assessments essential to the Agency's risk assessment program;
- determining the status and trends in pollutant concentrations and ecosystem condition;
- developing models to estimate the atmospheric sources, transport, fate, and concentrations of pollutants for use in exposure and risk assessments and in developing effective control strategies for risk reduction;
- developing the measurement techniques, analytical tools, and quality assurance protocols necessary to assess pollutant exposure and ecosystem condition;
- developing and supporting policies, procedures, and management systems to assure the quality of environmental data; and
- generating research tools and environmental data to predict air pollutant source to receptor relationships and to conduct hazard and exposure assessments for developing risk management strategies to verify their effectiveness.

In carrying out these responsibilities, the Office:

identifies research, development, demonstration, and service needs and priorities;

establishes program policies and guidelines;

administers program plans including objectives and estimates of resources required;

assigns program responsibility and resources to the laboratories;

reviews program progress and assures timeliness, quality and responsiveness of outputs.

Program Activities

Air

- National Ambient Air Quality Standards – Evaluate and standardize monitoring systems for measuring criteria air pollutants and develop quality assurance procedures. Develop a data base to support the development and evaluation of secondary (welfare) national ambient air quality standards, especially air pollutant effects on visibility reduction and material damage.
- New Source Performance Standards (NSPS) and State Implementation Plans (SIPs) – Develop and evaluate monitoring methodology in support of NSPS and SIPs, including methods for remote monitoring, compliance, and quality assurance. Develop and evaluate air quality models for assessing the effectiveness of abatement control strategies on reducing ambient air pollutants, including ozone and particulate matter.
- Hazardous Air Pollutant Regulatory Activities – Develop and evaluate monitoring methodology for hazardous air pollutants (HAPs). Also, assess the effects of human exposure to HAP. Determine the concentrations, transformation products, and removal rate of HAPs in the atmosphere.
- Mobile Source Pollutant Regulatory Activities – Determine population exposure to mobile source pollutants. Characterize the tailpipe and evaporative emissions of motor vehicles using gasoline, methanol, and ethanol to determine the effects of driving conditions and seasonal conditions (winter vs. summer) on motor vehicle emissions.
- Indoor Air Quality Research – Investigate sources, exposures, health effects and mitigation of pollutants in indoor air with other federal agencies through the Committee on Indoor Air Quality (CIAQ).
- Stratospheric Ozone – Analyze air models to predict the influence of increasing ultraviolet-B (UV-B) radiation on ambient ozone formation in urban areas. Determine UV-B changes at the earth's surface and exposure of humans, plants, and animals. This work is an integral

Office of Modeling, Monitoring Systems and Quality Assurance

component of ORD's stratospheric ozone program.

- Global Warming – Develop and evaluate statistical methods and air quality models to detect and predict the impact of the emissions of trace gases on climate and air quality levels. This work is an integral component of ORD's global climate program.
- Acid Deposition – Determine the status and trends of wet and dry deposition in urban and non-urban areas and provide quality assurance for measurements. Determine effects of acid deposition on various ecosystems (surface waters and forests) and on cultural resources (metals and painted surfaces). Develop simulation models (e.g., RADM) and use as assessment tools.

Water Quality

- Water Quality Based Approach – Permitting. Provide assurance that ambient water quality monitoring data for regulation setting, enforcement, or compliance purposes are scientifically valid and legally defensible. Obtain precision and accuracy data for each monitoring method. Promulgate "Analytical Methods for the Analysis of Pollutants" as required by Section 304(h) of the Clean Water Act.
- Waste Water Treatment Technology – Provide quality control materials and calibration standards for regulated CWA analytes. Evaluate performance of EPA, EPA Contractors Grantee, state and local laboratories. Evaluate and revise data quality criteria and develop reference materials.

Drinking Water

- Drinking Water Technology – Provide contaminant monitoring procedures to assure compliance with maximum contaminant levels pursuant to Section 1401 of the Safe Drinking Water Act and provide quality assurance/quality control programs for on-site evaluation and certification of drinking water monitoring laboratories. Support laboratories and offices involved with data collection. Develop methods and analytical procedures to produce measurement systems for chemical, radio-chemical, and microbiological analysis. Develop

and distribute QC and PE samples for drinking water laboratory certification program.

- Groundwater – Develop measurement systems, methods for locating abandoned wells, geophysical methods to detect and evaluate underground movement of fluids from injection wells, quality control procedures and guidelines to support Agency-wide QA program, and methods for well head protection.

Hazardous Waste

- Waste Identification – Develop analytical techniques for hazardous waste characterization. Develop and evaluate subsurface monitoring methods for use at RCRA waste sites.
- Quality Assurance – Support quality assurance of the RCRA data generated by the EPA regional offices, contractors and state and local agencies.
- Releases – Provide aerial photography, satellite imagery, and multispectral scanner support to assist regional offices in Spill Prevention, Control and Counter-measure (SPCC) surveys, planning, and emergency response. Develop and evaluate procedures for external monitoring around underground storage tanks (UST), determining active leaks and the boundaries for corrective action, and UST cleanup progress.

Pesticides

- Health: Markers, Dosimetry, and Extrapolation – Evaluate the use of biomarkers in monitoring of pesticide exposure and support the operation of the pesticides and industrial chemical repository.
- Exposure Monitoring – Monitor dietary, non-dietary and residential exposure scenarios to investigate human exposure to pesticides.

Radiation

- Manage Off-Site Radiation Monitoring Program for DOE including hydrologic and human surveillance monitoring. Maintain quality assurance support program for measurement of ionizing radiation contaminants in air, water, milk and food.

Office of Modeling, Monitoring Systems and Quality Assurance

Multimedia Planning

- Manage EPA's Quality Assurance Program, the Environmental Monitoring and Assessment Program (EMAP), and exposure research. Conduct management systems reviews; implement the data quality objectives process; and manage an Agency-wide QA training program.

Toxic Substances

- Analytical Methods Development for Toxic Substances – Develop immunoassays for measurement of organic compounds in biological and environmental samples and investigate new separation procedures for analysis including chemometric approaches.
- Health: Markers, Dosimetry, and Extrapolation – Evaluate DNA and protein adducts for use in human exposure monitoring studies.
- Exposure Monitoring Systems Development – Develop predictive models for human exposure and characterize human activity patterns.
- Biotechnology/Microbial and Biochemical Pesticides Control Agents – Develop guidelines and processes for monitoring the release of genetically engineered microorganisms (GEMS) in the environment. Determine half-life in bacterial aerosols.
- Support – Provide quality assurance and reference standards and develop guidelines to govern routine exposure and environmental monitoring for toxic chemicals.

Superfund

- Provide techniques and procedures for site and situation assessments. Provide monitoring techniques and procedures for site assessment; geophysical methods; remote sensing; soil sampling methods and survey designs.
- Assist in site-specific monitoring and characterization of Superfund investigations.
- Provide quality assurance/quality control support for the Superfund Contract Laboratory Program; provide assessment and improvement of methods to evaluate Superfund sites; and provide an independent QA laboratory to support monitoring activities.

- Under the Superfund Innovative Technology Evaluation (SITE) program, evaluate systems for characterizing and assessing contamination at Superfund sites.

Issues

Expanding Environmental Characterization Research

Environmental characterization is essential to determining what pollutants are released into the environment, their transport, transformation products, and fate. This information is the foundation of hazard identification and consequently the risk assessment process. Unfortunately, the increasing pressure to investigate pollutants of visible importance has eroded efforts to identify potentially damaging pollutants as is needed to guide monitoring, assessment, and dose-response research.

OMMSQA develops methods and quality assurance programs for environmental characterization. It has maintained only a modest program in this research area that includes source characterization, atmospheric transport, transformation, and pollutant fate modeling, media characterization, and methods development. To remain on the cutting edge of remote characterization techniques and analytical chemistry will require increased attention to characterization studies and state-of-the-science analytical instrumentation.

In emphasizing environmental measurement and monitoring methods research, OMMSQA will revitalize the methods development programs and will support environmental trends monitoring. The long-term goal of this research is to ensure that in-house capabilities are maintained to continue meeting the methods development needs of the program offices and regions.

Environmental Monitoring and Assessment Program

The Environmental Monitoring and Assessment Program (EMAP) assesses the nation's ecological resources by focusing on national- and regional-scale conditions over extended periods of time. It helps determine the extent, magnitude, and location of deteriorating or improving environmental conditions and monitors the status and trends in representative ecological resources at risk from environmental stresses. The data derived will indicate whether serious changes are occurring and

Office of Modeling, Monitoring Systems and Quality Assurance

whether single or multiple pollutants are responsible.

EMAP monitors conditions in near-coastal systems, wetlands, inland surface waters, forests, and other terrestrial ecosystems. It monitors exposure related to air pollution and acidic deposition, habitat loss and modification, nonpoint source pollutant impacts to surface water and estuaries, and climate change. Estuaries and forests were selected as part of the pilot surveys because of strong interagency commitments and because estuarine watersheds are primary recipients of pollution. During all phases of the EMAP effort, OMMSQA will work with other Agency offices and federal agencies such as the National Oceanic and Atmospheric Administration (NOAA), the U.S. Department of the Interior (USDI), and the U.S. Department of Agriculture (USDA).

Exposure

The Agency relies on exposure assessment conducted by OMMSQA to regulate chemicals and appropriate resources. In human exposure, emphasis is placed on the need for measuring personal exposure through monitoring of media that contact the target and measurements of the biomarkers of exposure. This approach involves the measurement or estimate of total exposure, the measurement of the contribution of each route of exposure, and the apportionment of the exposure among the sources.

Areas of human exposure research are: (1) characterization and classification; (2) design of monitoring systems to assess exposure trends; (3) use of models and surrogate systems to develop the science of predicting exposures to pollutants; and (4) improvement of the process of conducting exposure assessments. These research areas will be incorporated into the major components of the exposure research program, that is, methods

development, measurement and data collection, modeling, and exposure assessments.

Ecological risk assessments also depend on exposure and effects modeling techniques to evaluate chemical effects and exposure scenarios. Enhanced capabilities are needed to predict ecological exposure, especially for multiple chemicals, at various ecological levels of integration. Researchers are developing methods for determining chemical and environmental characteristics of exposure of individual plants and animals to environmental pollutants under field conditions. Future emphasis will be placed on modeling population, community, and ecosystem exposures to single and multiple pollutants.

OMMSQA will exchange information on the results of their efforts with other federal agencies, non-federal groups, and state organizations involved in environmental research. A data base management system will be devised to handle the data obtained from these sources.

Atmospheric Sciences Research

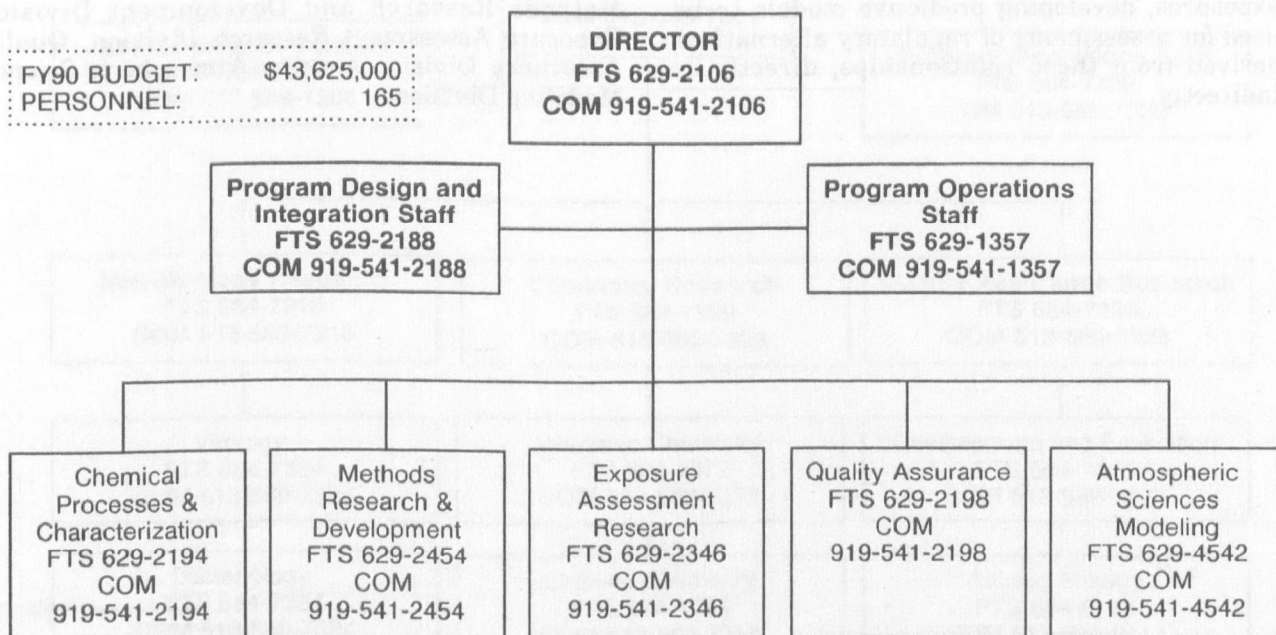
OMMSQA's atmospheric sciences research models the movement and deposition of atmospheric pollutants. Research information enhances EPA's capabilities to evaluate the human and ecological effects of atmospheric pollutants. One objective is to develop local, regional, and global predictive models for assessing alterations in air quality and air pollutant exposures that result from changes in ecosystem management and regulatory decisions. In addition, OMMSQA research evaluates air quality resulting from global climate change, modeling techniques that describe atmospheric physical processes affecting buoyant and dense gas pollution dispersion under unique meteorological situations, terrain features, and source configurations.

Atmospheric Research and Exposure Assessment Laboratory



Gary J. Foley is the Director of the Atmospheric Research and Exposure Assessment Laboratory at Research Triangle Park, NC. He has served as Staff Director for ORD's Acid Deposition Research Program and Acting Division Director, Energy and Air, for ORD's Office of Environmental Processes and Effects Research. Mr. Foley began his career with EPA in 1973 as a Senior Chemical Engineer. Before joining the Agency, Mr. Foley served as a Project Manager for the American Oil Company. He received his Ph.D. in Chemical Engineering from the University of Wisconsin, Madison. Mr. Foley has been awarded 3 Bronze Medals by EPA.

FY90 BUDGET: \$43,625,000
PERSONNEL: 165



Atmospheric Research and Exposure Assessment Laboratory

Functions

The Atmospheric Research and Exposure Assessment Laboratory (AREAL), Research Triangle Park, North Carolina, conducts intramural and extramural research programs, through laboratory and field research, in the chemical, physical, and biological sciences designed to:

- characterize and quantify present and future ambient air pollutant levels and resultant exposures to humans and ecosystems on local, regional, and global scales;
- develop and validate models to predict changes in air pollution levels and air pollutant exposures and determine the relationships among the factors affected by predicted and observed changes;
- determine source-to-receptor relationships relating to ambient air quality and air pollutant exposures, developing predictive models to be used for assessments of regulatory alternatives derived from these relationships, directly or indirectly;
- provide support to program and regional offices and to state and local groups, in the form of technical advice, methods research and development, quality assurance, field monitoring, instrument development, and modeling for quantitative risk assessment and regulatory purposes;
- develop and carry out long-term research in the areas of atmospheric methods, quality assurance, biomarkers, spatial statistics, exposure assessment, and modeling research to solve cutting edge scientific issues relating to EPA's mission; and
- collect, organize, manage, and distribute research data on air quality, human and ecosystem exposures and trends for program and regional offices, ORD, the scientific community, and the public at large.

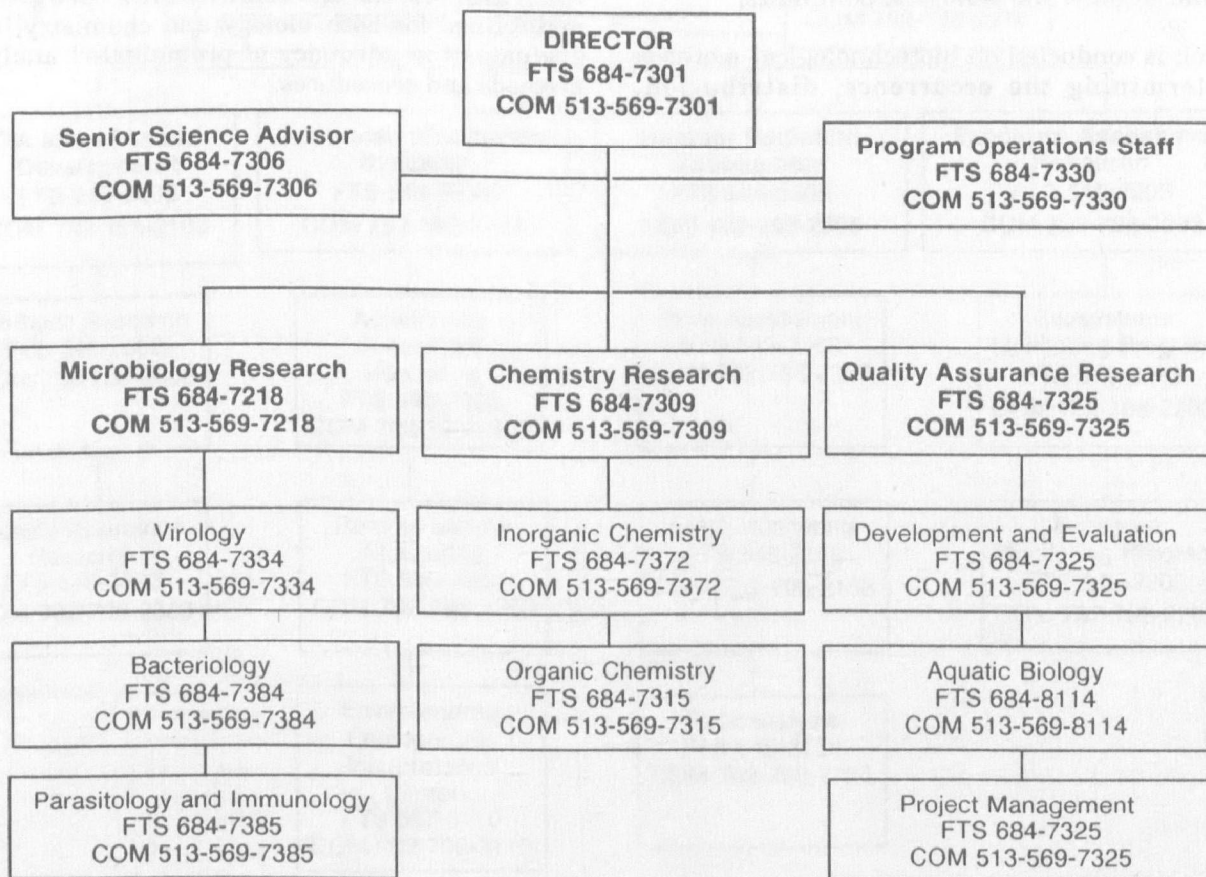
The Laboratory is composed of the following major components: Office of the Director, Program Design and Integration Staff, Program Operations Staff, Chemical Processes and Characterization Division, Methods Research and Development Division, Exposure Assessment Research Division, Quality Assurance Division and the Atmospheric Sciences Modeling Division.

Environmental Monitoring Systems Laboratory - Cincinnati



Thomas A. Clark is the Director of the Environmental Monitoring Systems Laboratory. He previously served as its Deputy Director from 1985 to 1988. From 1973 to 1981, Mr. Clark worked in the Quality Assurance Division of EMSL-RTP in various supervisory positions and also served as Deputy Director of that Laboratory from 1981 to 1985 before moving to Cincinnati. He was awarded a Bronze Medal in 1982 and 1986. Mr. Clark began his career as an Analytical Chemist at the Matheson Company in Norwood, Ohio. He has a Bachelor's in Chemistry from Xavier University.

FY90 BUDGET: \$12,175,000
PERSONNEL: 98



Environmental Monitoring Systems Laboratory- Cincinnati

Functions

The Environmental Monitoring Systems Laboratory - Cincinnati (EMSL-Cincinnati) has as its primary mission to conduct research in development, evaluation, and standardization of chemical and biological methods for environmental assessments; to conduct research for detecting, identifying, and quantifying microbial pathogens found in environmental media; and to operate the U.S. Environmental Protection Agency (USEPA) Quality Assurance (QA) Program for maintaining the scientific credibility of the Agency's water, wastewater, and solid wastes/Superfund/ toxics data bases.

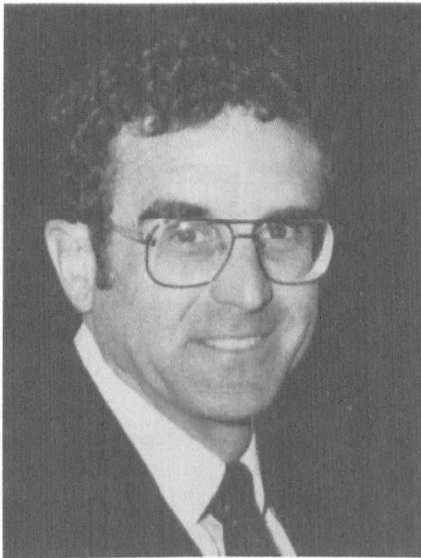
Developed and standardized methods are used to identify inorganic and organic pollutants and to detect and identify bacteria, viruses, parasites, and aquatic organisms in the environment. Analytical methods for effluent compliance monitoring [304(h)] are improved, modified, and updated on a regular basis. These methods include procedures for inorganic, organic and biological pollutants.

Research is conducted on biotechnological methods for determining the occurrence, distribution,

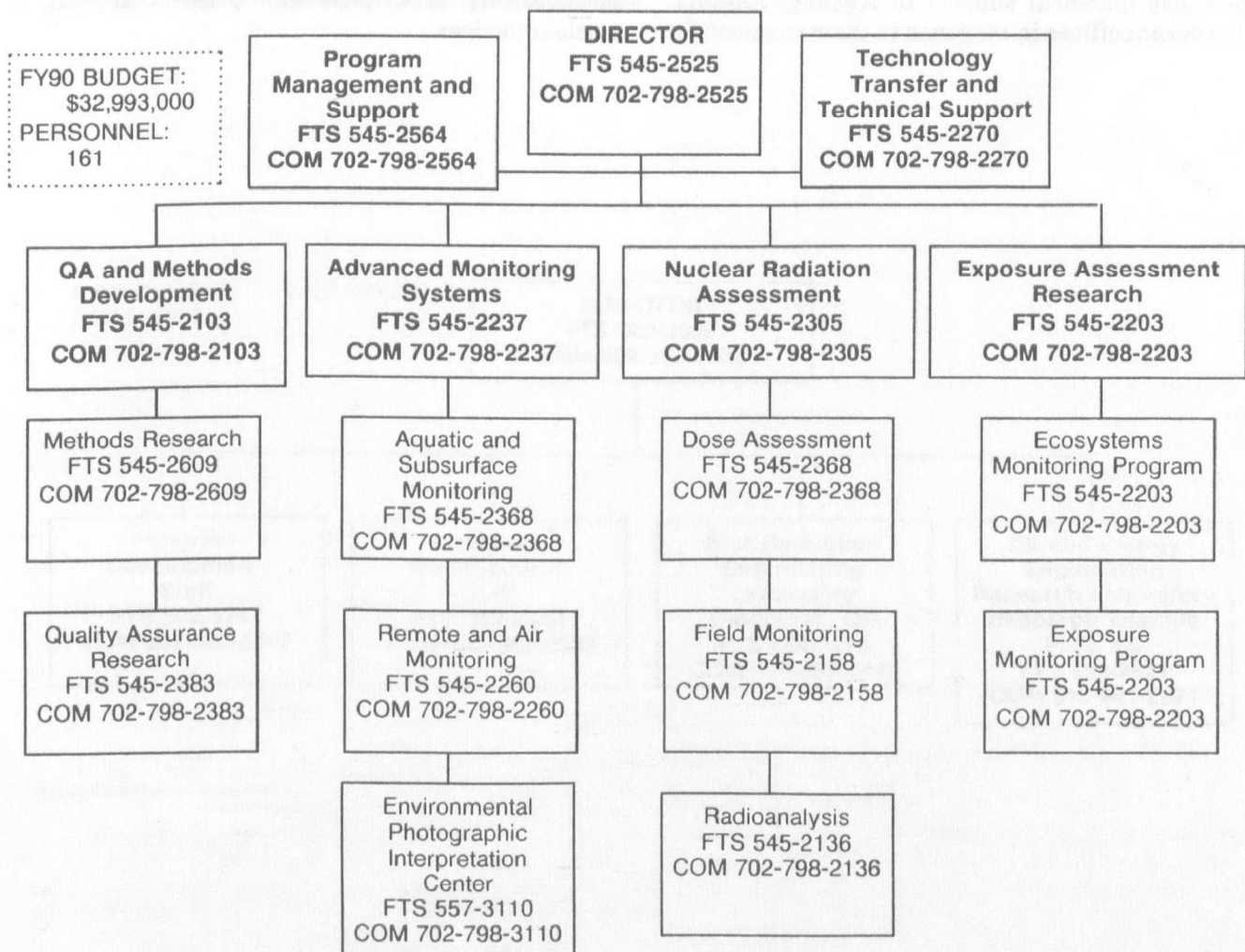
transport, and fate of human pathogenic parasites in the environment. Methods are developed and evaluated for the detection, enumeration, and identification of indicator and pathogenic bacteria in environmental media. Methods for sample handling, transport, and preservation are also developed. Field methods and advanced state-of-the-art approaches are developed to be applicable to drinking water, ambient water, raw and treated wastewaters, sediments, sludges, and biological samples.

The QA program involves method confirmation and validation studies to establish the precision and bias of USEPA's selected analytical methods, QA manuals and guidelines, quality control (QC) samples, and calibration standards for all analytes regulated under water and waste programs. Performance evaluation studies and laboratory certification activities are conducted to evaluate and report on the competency of analysts and laboratories. A QA monitoring program is maintained for both biology and chemistry, which evaluates the adequacy of promulgated analytical methods and procedures.

Environmental Monitoring Systems Laboratory - Las Vegas



Robert N. Snelling is Acting Director of the Environmental Monitoring Systems Laboratory, Las Vegas, NV, where he had previously served as Deputy Director since 1985. From 1970 to 1985, Mr. Snelling held various technical and managerial positions within EPA. A career Public Health Service Officer commissioned in 1963, Mr. Snelling began his professional activities as an instructor in Environmental Radiological Health at the Taft Engineering Center in Cincinnati. He received a Master's degree in Sanitary Engineering from the University of Cincinnati and a Bachelor's degree in Civil Engineering from Tufts University.



Environmental Monitoring Systems Laboratory - Las Vegas

Functions

The Environmental Monitoring Systems Laboratory-Las Vegas develops methods, systems and strategies for monitoring the environment with the primary purposes of assessing the exposure of man and other receptors in the environment to polluting substances, characterizing the status of environmental quality, and identifying the trends in environmental quality.

The Laboratory develops and applies field monitoring techniques, analytical methods, and remote sensing systems for monitoring environmental pollutants. It field tests, demonstrates, and applies these systems, and initiates transfers of operational systems to Agency user organizations. It provides technical support to Agency, regional and program offices in response to their requests for

pollutant monitoring, testing and surveillance assistance.

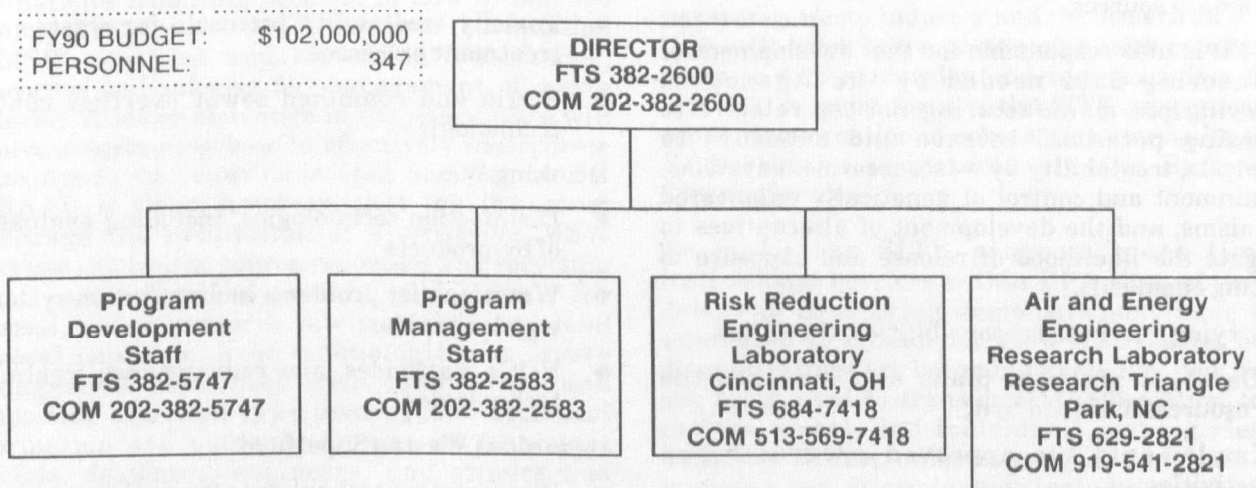
The Laboratory develops and operates quality assurance programs for radiation, hazardous wastes, and toxic/pesticide monitoring. This includes the development and maintenance of reference standards, preparation of performance evaluation materials, and the conduct of performance audits for EPA as well as other federal, state, and local laboratories.

Under a Memorandum of Understanding with the Department of Energy, the Laboratory collects radiological surveillance data and performs pathways research to determine the actual and potential radiation exposure to man and his environment from past and present testing of nuclear devices.

Office of Environmental Engineering and Technology Demonstration



Alfred W. Lindsey is the Director of the Office of Environmental Engineering and Technology Demonstration. He has been the Deputy Director of the Office of Environmental Engineering and Technology Demonstration and the Hazardous and Industrial Waste Division, Office of Solid Waste. He has held various hazardous waste management positions in EPA. Before coming to EPA, he held positions dealing with pollution control, quality control, process engineering, and product development. He received a Bachelor's degree in Pulp and Paper Technology from North Carolina State University and did graduate work at Drexel University in Environmental Engineering and at George Washington University in Environmental Management.



Office of Environmental Engineering and Technology Demonstration

Functions

The Office of Environmental Engineering and Technology Demonstration (OEETD) is responsible for planning, managing, and evaluating a comprehensive program of research, development, and demonstration of cost effective methods and technologies to:

- Control and manage hazardous waste generation, storage, treatment and disposal;
- Provide innovative technologies for response actions under Superfund and technologies for control of hazardous waste spills;
- Control environmental impacts of public sector activities including publicly-owned waste water and solid waste facilities;
- Improve drinking water supply and system operations, including improved understanding of water supply technology and water supply criteria;
- Characterize, reduce, and mitigate indoor air pollutants including asbestos and radon; and
- Characterize, reduce, and mitigate acid rain precursors and other air pollutants from stationary sources.

OEETD is also responsible for the development of engineering data needed by the Agency in reviewing pre-manufacturing notices relative to assessing potential release and exposure to chemicals, treatability by waste treatment systems, containment and control of genetically engineered organisms, and the development of alternatives to mitigate the likelihood of release and exposure to existing chemicals.

In carrying out these responsibilities, the Office:

- Develops program plans and manages the resources assigned to it;
- Implements the approved programs and activities;
- Assigns objectives and resources to the OEETD laboratories;
- Conducts appropriate reviews to ensure the quality, timeliness, and responsiveness of outputs; and
- Conducts analyses of the relative environmental impacts of engineering methods and control technologies and strategies.

The Office of Environmental Engineering and Technology Demonstration is the focal point within the Office of Research and Development for providing liaison with the Department of Energy on issues associated with clean coal and energy development. It is also the focal point within the Office of Research and Development for liaison with the rest of the Agency on issues relating to engineering research and development, and control of pollution discharges.

Program Activities

Air

- SO_x and NO_x control technologies (LIMB, ADVACATE, REBURNING)
- Hazardous air pollutant control technologies
- Indoor air source characterization and control technologies
- Ozone attainment – control of VOC emissions from products
- Global Climate – Stratospheric Modification

Water Quality

- Municipal sewage innovative and alternative wastewater and sludge technologies
- Toxicity treatability protocols for wastewater treatment processes
- Storm and combined sewer overflow control technologies

Drinking Water

- Disinfection technologies, including evaluation of by-products
- Water quality problems in distribution systems, e.g., lead solder
- VOCs, pesticides, and radionuclides treatment technologies

Hazardous Wastes/Superfund

- Pretreatment technologies for land disposal
- Waste minimization technologies and clearinghouse
- Land disposal technology, including air emissions
- Incineration of hazardous wastes and municipal solid wastes
- Cleanup technologies for leaking underground storage tanks

Office of Environmental Engineering and Technology Demonstration

- Superfund Innovative Technology Evaluation program (SITE)
- Evaluate cleanup technologies for Superfund sites
- Municipal solid waste and sludge innovative technology evaluations (MITE)
- Evaluate technologies for sludge and municipal solid waste disposal

Pesticides

- Personal protection technology for applicators

Radiation

- Radon mitigation technologies for schools and homes

Toxic Substances

- Toxicity assessment methodology for pre-manufacturing notices
- Asbestos abatement technologies for schools and tall buildings
- Risk management for genetically engineered microorganism manufacturers

Issues

Municipal Solid Waste Research Redirection

The nation's mounting problem of how to manage municipal solid waste (MSW) requires reevaluation of MSW practices and identification of new, innovative technologies for management of waste material. A major challenge in the near future will involve determining how to effectively incorporate these needs in reauthorization legislation for RCRA. It is clear, however, that the law must encourage the evaluation of alternative MSW practices relating to source reduction and recycling which can reduce the amount of residuals for disposal, and to conserve raw materials and land disposal capacity. New technologies for waste management associated with combustion and composting also need to be investigated. Technical information and guidance for use by municipal officials, designers, engineers, and owners and operators responsible for solid waste management need to be developed.

To accomplish these goals, EPA has begun the Municipal Waste Innovative Technology Evaluation (MITE) program, which is evaluating new, privately developed technologies. Goals for the MITE program are to foster development of improved product substitution, provide up-to-date cost/effectiveness information on innovative new

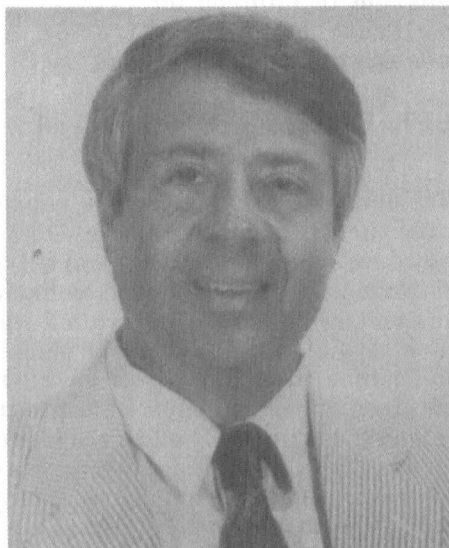
equipment and techniques for managing wastes, and accelerate commercialization of these techniques and technologies.

Superfund Innovative Technology Evaluation (SITE) Demonstration Program

The SITE demonstration program represents a unique partnership between the USEPA and technology developers. The objective of this program is to encourage the use of improved technologies for the permanent remedy of uncontrolled hazardous waste sites through development of objective cost and performance information on developing and emerging cleanup technologies. The program has focused along three lines: (1) a full-scale demonstration program; (2) an emerging technologies development program; and (3) innovative technologies development within the USEPA. Thirty-eight technologies have been selected for demonstration, fourteen of which are completed. An additional ten or more new technologies will be selected in 1991. The emerging technologies program has selected fifteen technologies that are currently undergoing testing. A third solicitation has been made, and 17 technologies are undergoing review. As part of the innovative technologies program, three technologies developed by EPA have been selected for transfer to commercial use that will benefit both the hazardous waste industry and the American public. EPA will enter into a partnership with commercial users to further develop and commercialize these systems. A major focus of the SITE program is the rapid dissemination of demonstration results to the EPA regions and states via the Superfund Clearinghouse.

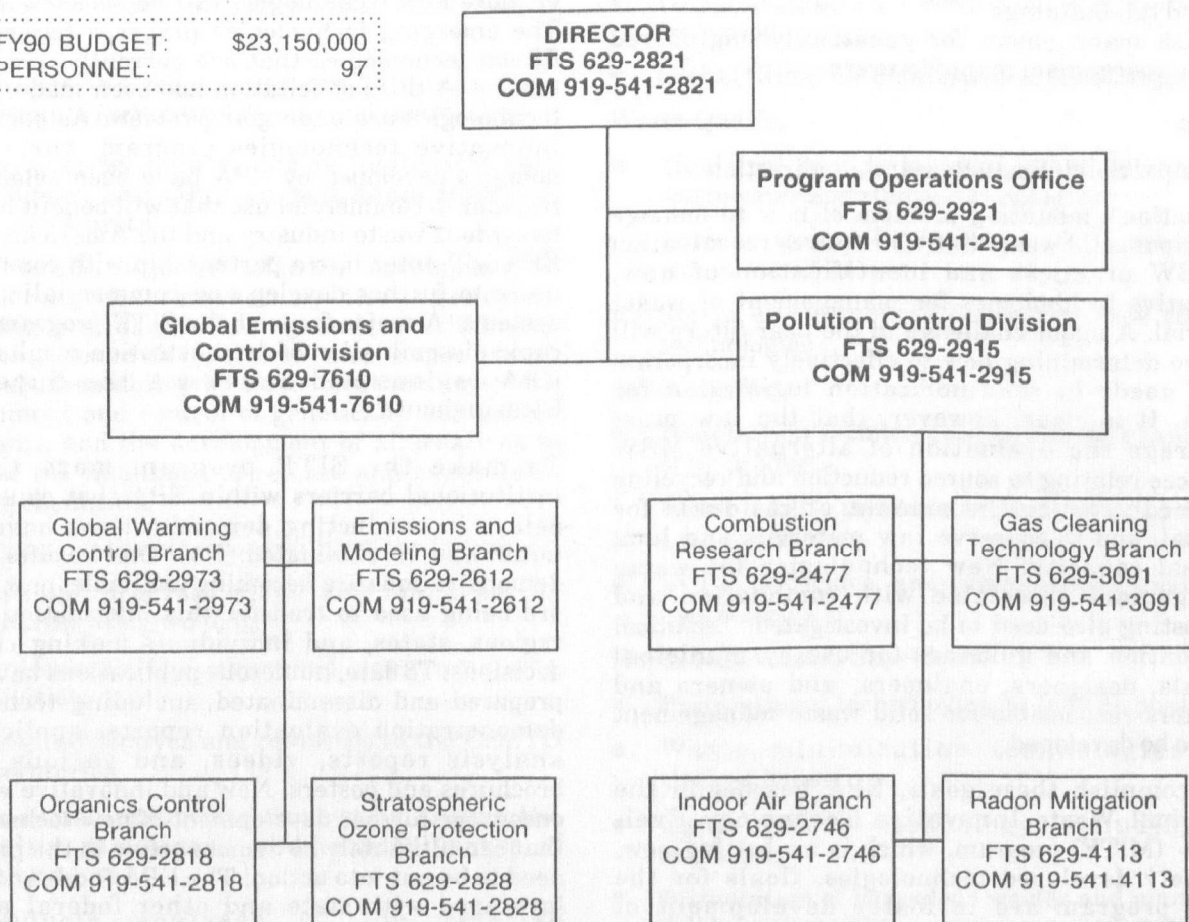
To make the SITE program more timely, institutional barriers within EPA that cause time delays in conducting demonstrations have been minimized or eliminated. Now that results of the demonstrations are becoming available, new means are being used to transfer this information to the regions, states, and individuals making cleanup decisions. To date, numerous publications have been prepared and disseminated, including technology demonstration evaluation reports, applications analysis reports, videos, and various other brochures and posters. New and innovative ways to encourage further development of new technologies that can ultimately be demonstrated in the program need to be put into action. The EPA funds should be leveraged with state and other federal agency programs in order to attract more technologies at a lower cost to EPA.

Air and Energy Engineering Research Laboratory



Frank T. Princiotta is the Director of the Air and Energy Engineering Research Laboratory (AEERL), Research Triangle Park, NC. He has served as a Division Director of ORD's Office of Environmental Engineering and Technology Demonstration. Prior to going to EPA Headquarters in 1975, he was Chief of AEERL's Engineering Test Section. Princiotta's career includes engineering positions with Hittman Associates and the U.S. Atomic Energy Commission's New York Operations. EPA has awarded him a Gold Medal, three Bronze Medals and the President's Rank of Meritorious Executive. Princiotta has a Bachelor's degree in Chemical Engineering from City College of New York.

FY90 BUDGET:	\$23,150,000
PERSONNEL:	97



Air and Energy Engineering Research Laboratory

Functions

The mission of the Air and Energy Engineering Research Laboratory (AEERL) is to research, develop and demonstrate methods and technologies for controlling air pollution from stationary sources. Among these stationary sources are electric power plants, manufacturing and processing industries, and incinerators. The Laboratory does not deal with pollution from mobile sources, or nuclear power plants.

Staffed primarily by engineers, the Laboratory creates and improves air pollution control equipment, seeks means of preventing or reducing pollution through changes in industrial processes, develops predictive models and emissions inventories, identifies and assesses the importance of air pollution sources, and conducts fundamental research to define the mechanisms by which processes, equipment, and fuel combustion produce air pollution.

Currently, AEERL is concentrating its efforts in eight main program areas, which are described briefly below.

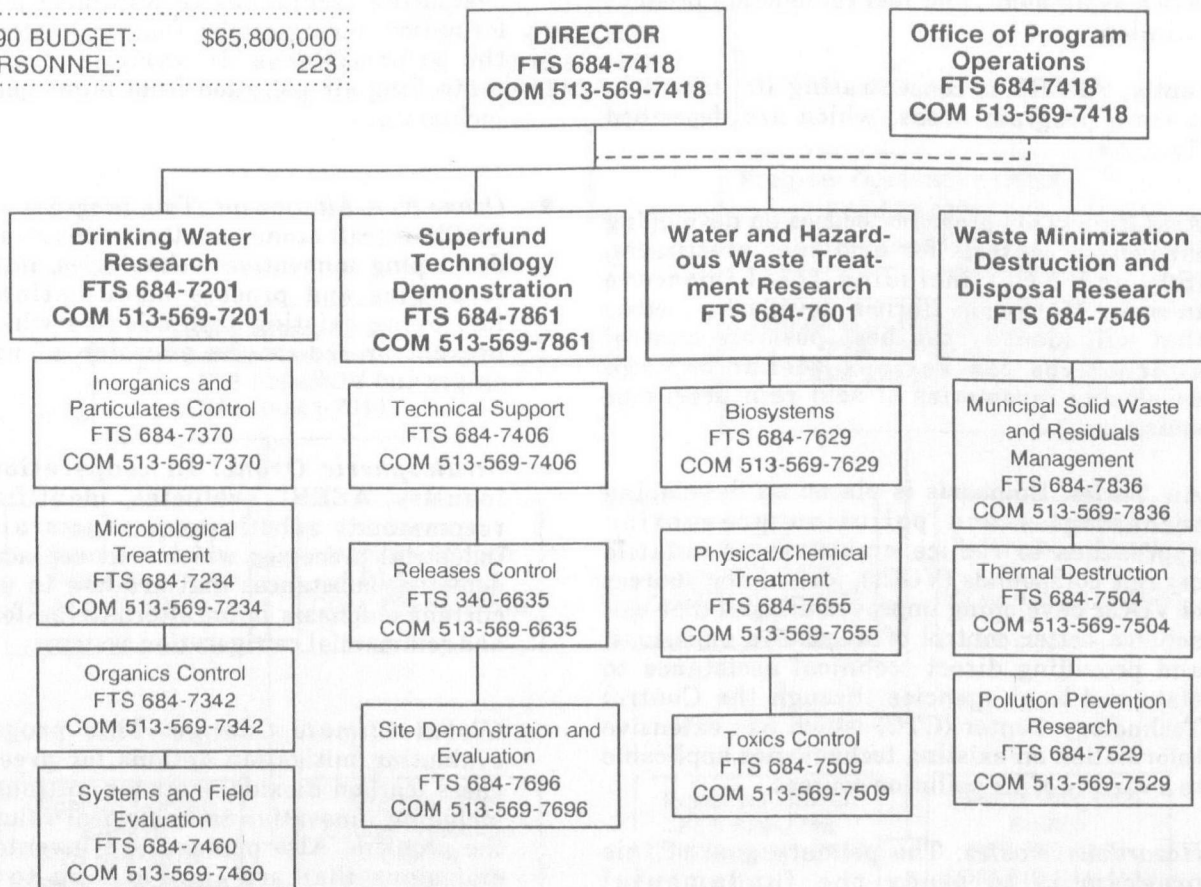
- *Acid Rain:* This program focuses on developing innovative controls for acid rain precursors, (SO_2 and NO_x) including the Limestone Injection Multistage Burner; developing models that will identify the best possible control alternatives for various scenarios, and developing inventories of acid rain precursor emissions.
- *Air Toxics:* Emphasis is placed on developing technologies and pollution prevention approaches to reduce emissions of volatile organic compounds (VOCs); identifying sources of VOCs; developing improved designs that will achieve better control of woodstove emissions; and providing direct technical assistance to state and local agencies through the Control Technology Center (CTC) which has extensive information on existing technologies applicable to a variety of air pollution sources.
- *Hazardous Wastes:* The primary goal of this program is to study the fundamental combustion mechanisms that influence thermal destruction of hazardous wastes. Included are studies of metal aerosols from waste incineration, failure modes in a small pilot-scale rotary kiln, and small pilot-scale studies of fluidized-bed incineration.
- *Indoor Air Quality/Radon:* Research is currently concentrating on (1) developing and demonstrating technologies for reducing the entry of naturally-occurring radon into houses, schools and other public buildings; (2) studying building materials and consumer products as sources of indoor air pollution; and (3) evaluating indoor air control options.
- *Municipal Waste Combustion:* Work focuses on evaluating techniques to minimize pollutant formation during combustion, and determining the effectiveness of various devices in controlling air pollution from municipal waste incinerators.
- *Ozone Non-Attainment:* This program supports ORD's overall ozone nonattainment strategy by developing innovative technologies, mitigation strategies and process modifications, and improving existing technologies which will prevent or reduce the emission of nitrogen oxides and VOCs.
- *Stratospheric Ozone:* In cooperation with industry, AEERL evaluates, identifies, and recommends substitute products and new industrial processes which will replace ozone depleting substances that are now in use. The current emphasis is on alternatives for home and commercial refrigeration systems.
- *Global Climate Change:* This program is evaluating mitigation options for greenhouse gases (carbon dioxide, methane, nitrous oxide) including innovative technological solutions to the problem. Also planned are inventories of emissions that are contributing to global climate change.

Risk Reduction Engineering Laboratory



E. Timothy Oppelt is the Director of the Risk Reduction Engineering Laboratory. Mr. Oppelt has held managerial positions in EPA since 1979 in such diverse components as the Municipal Environmental Research Laboratory, Hazardous Waste Engineering Research Laboratory and the Waste Management Division of Region V EPA. Mr. Oppelt's academic degrees are: Bachelor's in Civil Engineering and Master's in Sanitary Engineering from Cornell University; and a MBA from Xavier University, Cincinnati, Ohio. He holds EPA's Bronze and Silver Medals.

FY90 BUDGET: \$65,800,000
PERSONNEL: 223



Functions

The mission and function of the Risk Reduction Engineering Laboratory (RREL) is to provide an authoritative, defensible, engineering basis in support of the policies, programs and regulations of the U.S. Environmental Protection Agency with respect to drinking water, hazardous wastes, pesticides, Superfund, toxics, and wastewater. Research and technical assistance/support are conducted in the following specific areas:

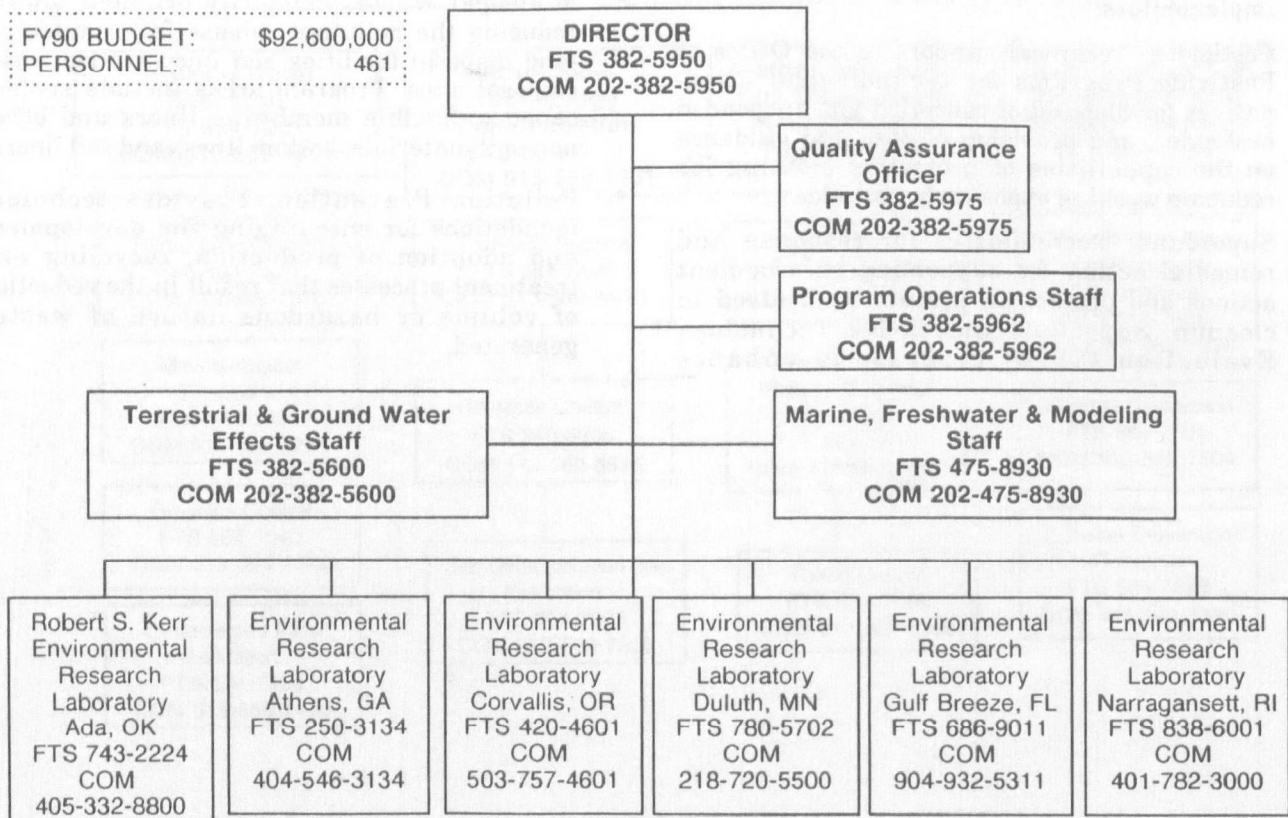
- **Drinking Water:** Engineering solutions for the treatment, distribution, and preservation of public drinking water supplies.
- **Hazardous Wastes:** Research in incineration, land disposal practices, and determining existing and emerging alternatives for treating, detoxifying, volume reduction and waste minimization of hazardous materials and municipal solid wastes.
- **LUST Trust Fund Technical Support:** Technical assistance on corrective action on sites assessment, decision tools and cleanup technologies to LUST Trust Fund administrators and implementors.
- **Pesticides:** Technical support to the Office of Pesticide Programs for technological alternatives for disposal of cancelled and suspended pesticides, and provision of data and guidance on the capabilities of protective clothing for reducing working exposure to pesticides.
- **Superfund:** Technologies for response and remedial action for supporting enforcement actions and protecting personnel involved in cleanup. Superfund Innovative Technology Evaluation (SITE) program to enhance development and demonstration of innovative technologies as alternatives to containment. The Superfund Technical Assistance Response Team (START) provides engineering and scientific assistance to regional offices, program offices, and others on the cleanup of hazardous wastes, particularly those associated with Superfund sites.
- **Toxics Chemical Testing and Assessment:** Alternatives for regulating the manufacture and use of existing chemicals (including asbestos); assessing release and exposure in review of Premanufacturing Notices (PMNs) for new chemicals; and techniques and devices to contain and destroy genetically engineered organisms.
- **Wastewater (Municipal and Industrial):** Cost-effective methods for the prevention, treatment, and management of municipal wastewater and sludges, urban runoff, and industrial processing discharges.
- **Municipal Waste:** Primarily oriented toward reducing the pollutant release from municipal land disposal facilities and uncontrolled waste disposal sites. Program areas include surface capping, flexible membrane liners and other non-soil materials; bottom liners and soil liners.
- **Pollution Prevention:** Provides technical foundations for encouraging the development and adoption of production, recycling and treatment processes that result in the reduction of volume or hazardous nature of wastes generated.

Office of Environmental Processes and Effects Research



Courtney Riordan is the Director of the Office of Environmental Processes and Effects Research. His prior experience with EPA includes Director, Office of Acid Deposition, Environmental Monitoring and Quality Assurance; Acting Assistant Administrator, Office of Research and Development; Director, Office of Monitoring Systems and Quality Assurance; Associate Director, Office of Air, Land, and Water Use. Mr. Riordan received a Bachelor's degree in Civil Engineering from Northeastern University in Boston, a Ph.D. in Regional Planning and Systems Analysis from Cornell University in Ithaca, New York, and a J.D. from George Washington University.

FY90 BUDGET: \$92,600,000
PERSONNEL: 461



Office of Environmental Processes and Effects Research

Functions

The Office of Environmental Processes and Effects Research (OEPER) is responsible for the administration of a broad range of ecological research programs. These programs are structured to provide the scientific data and technological methods necessary to understand, predict, and control the entry and movement of pollutants into the environment and to determine the effects of such substances on organisms and ecosystems. The information and research products resulting from these programs are directly applicable to fulfilling the Agency's regulatory responsibilities.

Research is conducted within the full realm of environmental media—atmosphere, soil, ground water, surface water, and coastal and marine waters. Major areas of study include toxic substances, hazardous waste, pesticides, acid deposition, biotechnology, global climate change, stratospheric ozone, wetlands, water quality, ecological risk assessment, and status of critical ecological resources—particularly coastal ecosystems. The office actively provides technical support in environmental science and technology to regions and states in order to assist in problem solving and to transfer information and technology to local users.

Program Activities

- **Global Warming** – The potential effects of a global warming induced by radiatively important trace gases are both drastic and uncertain. The range of consequences may well affect all factors of human existence, including air and water quality, distribution or even survival of vegetation types and wildlife, shifts or loss of marine and freshwater fisheries, and productivity of agricultural and forested lands. The Global Climate Change Research Program will investigate and estimate the likely magnitude, timing and regional expressions of these effects, including their relationships to sources and sinks of the trace gases associated with climate change.
- **Stratospheric Ozone** – For the newly ratified Montreal Protocol on Substances that Deplete the Ozone Layer to be successful on a global scale, it is essential that EPA provide scientifically credible input into the risk characterization and scientific assessment mandated by the Protocol and supported by the United States. The Agency's research and development program

plays a vital role in generating the scientific information that is critically important for the risk assessments and regulations being promulgated by policy-makers both domestically and internationally.

- **Water Quality Based Approach** – In the transition from a technology-based control of toxics to a Water Quality Based Approach (WQBA), many problems/issues have been addressed but others still remain. The research supporting the WQBA to the permitting of pollutant discharges into freshwater, estuarine and marine aquatic environments has two major approaches: (1) developing water quality criteria for individual contaminants, adapting the criteria to site-specific conditions, and developing modeling techniques to relate criteria to allowable discharges; and (2) developing methods for evaluating the toxic components of complex effluents and predicting maximum safe chronic contaminant levels using environmental endpoints.
- **Marine, Estuaries and Great Lakes** – Methodologies and information are needed for the development of responsive and scientifically valid ocean disposal (ocean dumping and discharge through outfalls), estuarine and Great Lakes programs. Research focuses on developing methodologies for predicting contaminant movement and fate, exposure, and effects of contaminants on organisms, communities, and ecosystems for sediment, freshwater, marine, and estuarine environments to permit better evaluation of pollutant impacts and make regulatory decisions.
- **Ground Water** – There is much uncertainty as to the exposure and the effects on humans and to contaminated groundwater. Contaminants that pose a hazard to human health and the environment are being identified and analyzed as an ongoing activity; studies on the fate and transport of contaminants will also continue. There is a continuing need to understand the relationship of ground-water contamination to the human and ecological health issues to decrease the uncertainties linking contaminants to health.

The clean-up and restoration of contaminated ground water is an issue of prime importance. One mode of clean-up uses natural processes, such as bacterial degradation of contaminants. The successful manipulation of natural processes

Office of Environmental Processes and Effects Research

for ground water clean-up requires ongoing research and development.

- **Waste Characterization** – This research, conducted under the hazardous waste program, is designed to produce fully integrated suites of waste test methods, chemical component transformation and transport property data bases and multimedia pollutant fate and exposure models such that defensible “risk-based” (either human or environmental) decisions as to listing/delisting or land disposal restrictions can be made, e.g., the recent Toxicity Characteristic Leaching Procedure (TCLP) promulgation for defining hazardous wastes. Research results are also directly applicable to the development and evaluation of RCRA site closure and cleanup strategies as well as Superfund site remediation planning and evaluation.
- **Ecological Systems**

Field Validation: Field validation studies are conducted to determine if laboratory methods, results and simulation models reflect the true impacts of pesticides and toxic substances in natural situations. These studies in marine/estuarine, freshwater and terrestrial habitats, incorporate data on biotic responses, interactions and on ecological processes that prove or disprove laboratory approaches and findings and form the basis for suggestions on alternative or modified evaluative approaches.

Ecotoxicity: To evaluate toxic substances under TSCA and to register pesticides under FIFRA it is necessary to understand how the toxicant moves into or through the biotic and the physical portion of an ecosystem, the duration of exposure of the biota, the mode of toxicological action, the residues, the response of the receptor biota, ecosystem composition and processes and the eventual dispersion of the toxicant in the general matrix where the biota reside. The components of the research program that address these problems are development of testing schemes and protocols, physiological experimentation, exposure studies, and comparative toxicological and ecosystem level studies.

Risk Assessment: When pesticides or toxic substances are used or accidentally released into the environment there is a need to be able to evaluate the risks to our ecosystems. Research is providing validated methods, predictive

mathematical models, exposure and effects data, applications and consultations. Using these tools, quantitative assessments can be conducted for a given situation that indicate the degree of risk that can be expected. This information factors into Agency regulatory decisions.

Reducing Uncertainties in Risk Assessment (RURA): There is a need for improved risk assessments across many programs. This research proposes to incorporate monitoring and trend status with ecological evaluations of selected critical ecosystems and thus be able to predict the impacts (risk) of cumulative and multiple contaminant sources on ecosystem structure and function. Presently, only risk for portions of systems can be determined or predicted. To ensure that predictions and findings are reliable, extensive lab and field studies must be started to quantify the uncertainties in the key components of risk assessments such as hazard exposure and response assessment and risk characterization. Major future focus and improvements must be at the ecosystem level.

Biotechnology Risk Assessment: The development of the biotechnology industry has raised many questions about potential adverse effects on ecology and ecosystems as a result of industrial utilization and release of genetically engineered organisms. The Agency is presently involved in establishing regulations for use of such organisms under TSCA and FIFRA. The research program is providing the Agency with methods for assessing the potential risk resulting from introducing engineered microorganisms into the environment. The three program areas being investigated are: (1) exposure – detection and enumeration under field conditions, transport in the environment, survival and colonization, genetic exchange; (2) effects on ecosystem processes, on higher organisms (animals and plants); and (3) risk control – design of field release, mitigation of adverse effects in field situations.

Environmental Monitoring and Assessment Program (EMAP): To prevent unwanted or irreversible damage to our ecosystems, EPA must know their current status, be able to determine trends in their health, and be in a position to manage these systems to realize continued benefits. Research is proposed that will classify, characterize and monitor status and trends of

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important ecosystems and their subclasses. Additionally, ecological research will commence on agricultural, forest, freshwater wetlands, near coastal and water quality limited stream/lake systems. Studies would include selecting systems and critical indicator endpoints, identifying hazards, assessing exposure, and applying state-of-the-art approaches for risk evaluations and reduction at regional levels. This information, augmented by other data bases, may be applied to determine management options.

- **Structure Activity Relationships (SARs)** – Chemical evaluations of chemicals for TSCA and FIFRA can require extensive time and resources. An alternate, more rapid approach is to compare the chemical with those of its chemical class having known similar molecular structure and chemical activity. Using a computerized data base and SAR models has proven to be of great value for the Agency. The data base and the system are undergoing expanded application to accommodate increasing numbers of new chemicals, reevaluation of old chemicals and enhancements to handle complex SARs for evaluating the fate and toxicity of chemicals in the environment. Many of the models will be available to States and Regional EPA offices in the coming year over the Office of Information Resource Management Network. A new program for the development of advanced SAR techniques, particularly in the area of quantitative molecular similarity analysis, is being planned to further decrease the man-hours involved in chemical evaluations.
- **Acid Deposition** – EPA's Acid Deposition Research Program includes research to 1) estimate emissions from manmade sources, 2) understand atmospheric processes, 3) establish deposition monitoring data bases, 4) understand and quantify aquatic effects, 5) understand and quantify terrestrial effects, 6) understand and quantify the effects on materials, and 7) evaluate control technologies (to fulfill the needs expressed in the Energy and Security Act of 1980, Title VII).

In 1990, EPA in conjunction with the National Acid Precipitation Assessment Program (NAPAP), an interagency research coordination and assessment group chaired by the Administrator of EPA, will produce a final assessment of the sources, extent, and magnitude of environmental effects due to acid deposition, and

the scientific uncertainties associated with acid deposition cause-effect relationships. The 1990 assessment will provide a better basis upon which to evaluate the needs for as well as the effectiveness and efficiencies of proposed abatement and control programs (in accordance with the Acid Precipitation Act of 1980, P.L. 96-294).

Issues

Stratospheric Ozone

For the Montreal protocol to be successful on a world-wide basis, it must be demonstrated to China, India, and other non-signatory, newly industrialized and lesser developed countries that depletion of stratospheric ozone will have an impact on their citizens and that reasonable cost alternatives to harmful chlorofluorocarbons (CFCs) are available. Some depletion of the ozone layer has already occurred, and the level of depletion may increase even if a total phase-out of regulated CFCs occurs. Research is required to provide impact scenarios for mitigative options, to develop technological options for CFC substitutes, and to assess the environmental risk associated with CFC substitutes.

Global Warming

Although research to date has suggested that a rise in the earth's temperature will occur, we only know what the average change may be. We must develop the ability to predict climatic changes on regional levels. In addition, changes of the magnitude predicted will have dramatic effects on air and water quality. We must develop a sound scientific understanding of the mechanisms and subsequent potential implications of global climate change so that we can prepare to adjust both our regulatory and non-regulatory strategies to be responsive to different fundamental environmental conditions.

As a major partner in the Committee on Earth Sciences, EPA has the responsibility for guiding the development of the ecological and environmental response component at the Federal Global Change Research Program. Its laboratories must play a strong leadership role in this effort.

Ground Water Research

The Department of Agriculture and the U.S. Geological Survey have joined in a coordinated research program to understand and evaluate how

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agricultural management systems and natural factors affect ground-water contamination. EPA has been invited to join this cooperative program; our involvement will depend on the levels of funding.

The Agency needs to make sure that improved cleanup technologies resulting from ongoing research are implemented as soon as possible. Currently, millions of dollars are being spent annually on cleaning up contaminated ground water by pumping out the liquid and treating it chemically, physically, or biologically on the surface. Not only is this expensive, but recent studies have indicated how ineffective this technique can be. Many organic contaminants bind tightly to soil particles and resist removal when the contaminated ground water is pumped.

Pollution situations such as these might best be remedied by treating the contaminants in situ, that is, right in the soil matrix without attempts at excavation or pumping, by using microorganisms for biodegradation. Such bioremediation techniques are potentially applicable to hazardous waste and Superfund sites and to leaking underground storage tank contamination situations. In-situ bioremediation process development using natural and possibly engineered organisms someday, should be a major new research thrust of the Agency.

Waste Characterization

Waste characterization research of the future must be carefully coordinated with the Office of Solid Waste and Emergency Response (OSWER) needs such that both organic and metallic components of wastes are adequately considered, that combined, multiple chemical pollutant risks are appropriately factored into the "characteristics" definition process and that an appropriate suite of endpoints upon which to base the risk-driven "characteristics," e.g., human cancers, non-cancerous human impacts, and ecological impacts, efforts for waste management are established.

Ecological Systems

The successful determination of the ecological status and future trends in biological systems requires a management commitment of resources for periods of 10 or more years. This commitment is necessary because perturbations in biological systems often are of long-term developmental duration. In order to accomplish these objectives, extramural assistance from other governmental

programs and academic institutions will be required. This will be compatible with EPA research efforts being coordinated through EMAP.

Marine Estuaries and Great Lakes

The current ocean disposal research program responds to program office and regional needs as they relate to ocean dumping and to needs associated with discharges through ocean outfalls. Congress passed a ban on the ocean dumping of sewage sludge and industrial wastes. Although this ban does not impact the ocean dumping of dredged material, ocean dumping monitoring activities, or activities associated with the discharge of wastes through ocean outfalls, it is expected that additional attempts will be made to reduce ORD's entire ocean disposal research program.

Water Quality Based Approach

Recent amendments to the Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA) have required EPA to expand or start new programs and regulatory efforts. These requirements will place many demands on the associated research programs, and some of these demands will not be met. For example, the CWA Amendments require significant involvement in non-point sources (NPS) of pollution. Currently, ORD does not have a NPS research program. This will continue to be an important issue.

Acid Deposition

The question of acid rain control has been a major environmental issue during the 1980's, with significant implications relative to U.S. - Canadian relationships. Significant research progress has been made on this issue, most notably a 10-year U.S. interagency effort--the National Acid Precipitation Assessment Program (NAPAP)--scheduled for completion in 1990. We know more about this issue now than we have known in the past. The most comprehensive assessment will be the 1990 NAPAP assessment. Significant environmental and economic implications are involved in any decisions of how to control acid deposition. However, in order to obtain maximum environmental benefits from minimal costs, acid rain research will need to be continued even after a national acid rain control program is implemented. Such research will need to address:

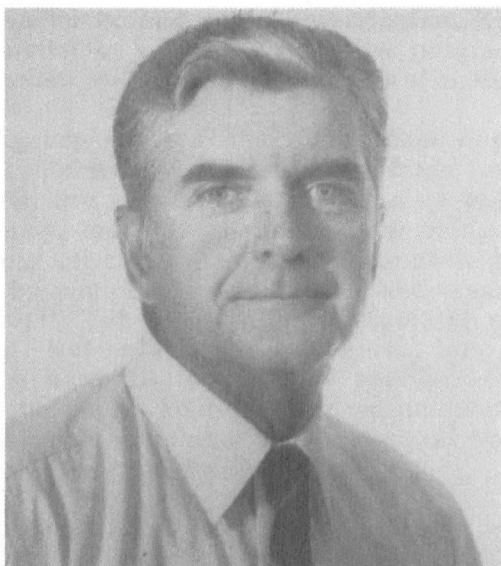
Office of Environmental Processes and Effects Research

- updates of emissions inventories
- verification, maintenance and application of emissions, deposition, and effects models
- deposition and environmental effects and trends monitoring.

Biotechnology Risk Assessment

The use of bioengineered organisms is a unique and rapidly evolving technology, and the research program has evolved correspondingly to meet the Agency's need in evaluating a diverse array of biotechnology products. With the introduction of transgenic plants (genes from a wide variety of organisms are being inserted into crop plants), questions of human health and impact on ecosystems arise necessitating continued cooperation among regulatory agencies.

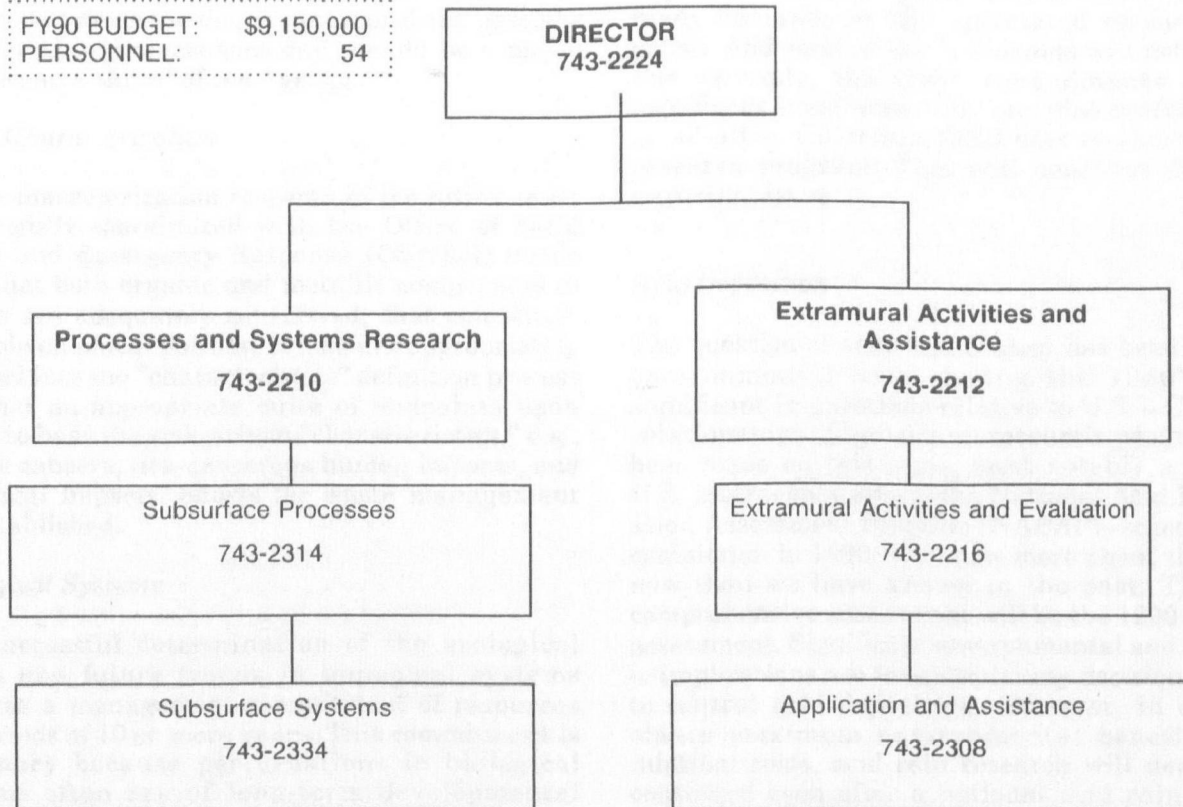
Robert S. Kerr Environmental Research Laboratory



Clinton W. Hall is the Director of the Environmental Research Laboratory, Ada, Oklahoma, in which capacity he has served since 1980. From 1971 to 1979, Mr. Hall served in many Agency programs. Before joining EPA, he was a hydrologist for the Defense Intelligence Agency. He received a Bachelor's degree from the University of Delaware and a Master's degree in Groundwater Geology from the University of Connecticut. He participated in Advanced Graduate Study in Geophysics/ Geochemistry at Florida State University. He was awarded the EPA Bronze Medal in 1978.

Telephone numbers are FTS.
The commercial number for all
sections is 405-332-8800.

FY90 BUDGET: \$9,150,000
PERSONNEL: 54



Robert S. Kerr Environmental Research Laboratory

Functions

The Robert S. Kerr Environmental Research Laboratory (RSKERL) serves as U.S. EPA's center for ground-water research, focusing its efforts on studies of the transport and fate of contaminants in the subsurface, development of methodologies for protection and restoration of ground-water quality, and evaluation of the applicability and limitations of using natural soil and the subsurface processes for the treatment of hazardous wastes. The Laboratory has a long history of research responsibilities related to the use of soils and subsurface for waste treatment and to the protection of the soil, ground water and surface water. These responsibilities have included the development and demonstration of cost-effective methods for land treatment of municipal wastewaters, animal production wastes, and petroleum refining and petrochemical wastes, as well as the development of technologies for the protection of ground-water quality.

RSKERL carries out research through in-house projects and cooperative and interagency agreements with universities, national laboratories, and other agencies. RSKERL currently has over 40 ongoing or planned extramural projects at approximately 25 research institutions in 20 states.

An examination of the environmental legislation that relates to ground-water quality protection

reveals four common regulatory or management requirements:

- Establishment of criteria for location, design, and operation of waste disposal activities to prevent contamination of ground water or movement of contaminants to points of withdrawal or discharge.
- Assessment of the probable impact of existing pollution on ground water at points of withdrawal or discharge.
- Development of remediation technologies which are effective in protecting and restoring ground water quality without being unnecessarily complex or costly, and without unduly restricting other land use activities.
- Regulation of the production, use, and/or disposal of specific chemicals possessing an unacceptably high potential for contaminating ground water when released to the subsurface.

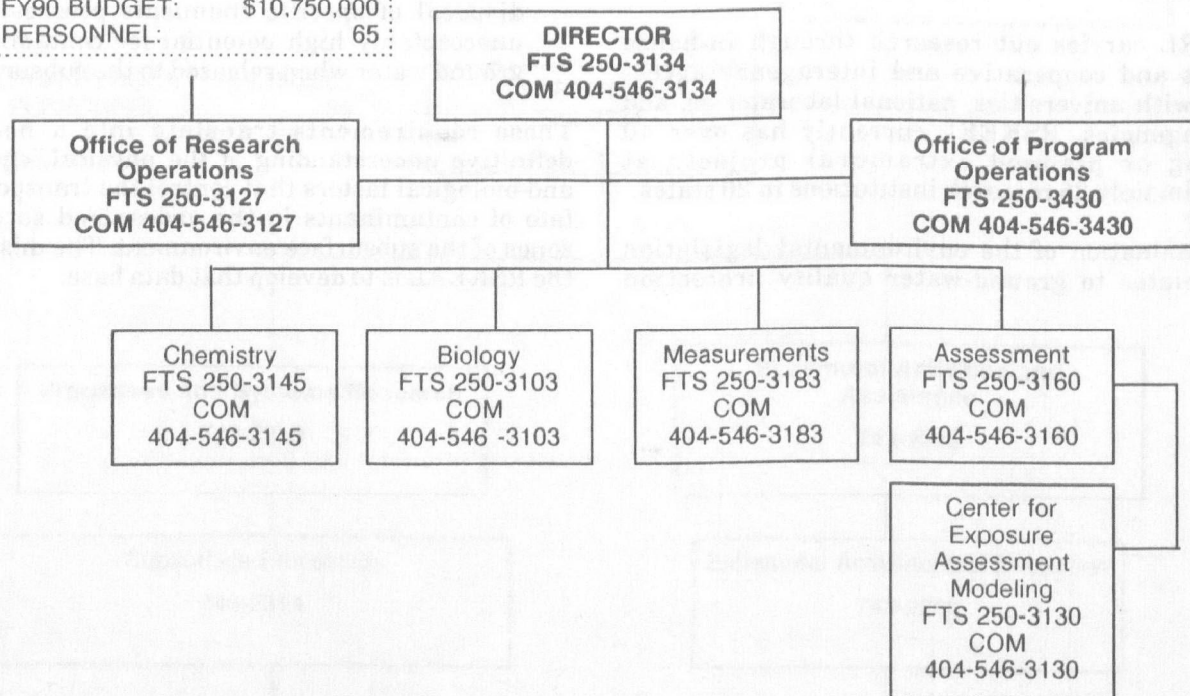
These requirements translate into a need for definitive understanding of the physical, chemical and biological factors that control the transport and fate of contaminants in the vadose and saturated zones of the subsurface environment. The mission of the RSKERL is to develop that data base.

Environmental Research Laboratory - Athens



Rosemarie C. Russo is the Director of the Environmental Research Laboratory at Athens, GA. She started with the Agency in 1978 as a Research Chemist at Duluth and later became Associate Director for Research Operations. Her career includes: Adjunct Professor of Chemistry and Associate Director of Fisheries Bioassay Laboratory at Montana State University; Senior Research Chemist, Colorado State University; Assistant Professor, Gettysburg College; and Instructor, University of Minnesota-Duluth. She received her Bachelor's degree in Chemistry from the University of Minnesota-Duluth and her Ph.D. in Inorganic Chemistry from the University of New Hampshire.

FY90 BUDGET: \$10,750,000
PERSONNEL: 65



Environmental Research Laboratory - Athens

Functions

The Environmental Research Laboratory at Athens conducts and manages fundamental and applied research to predict and assess the human and ecological exposures and risks associated with conventional and toxic pollutants in water and soil. The research focus is predictive ecological science.

This research identifies and characterizes the natural biological and chemical processes that affect the environmental fate and effects of specific toxic substances, such as pesticides or metals. The results are applied in state-of-the-art mathematical models for assessing and managing environmental pollution problems.

Lab-developed data and assessment techniques support EPA's major programs in hazardous waste, pesticides, toxics, Superfund, and water quality. Staff expertise includes chemistry, computer science, ecology, engineering, and microbiology.

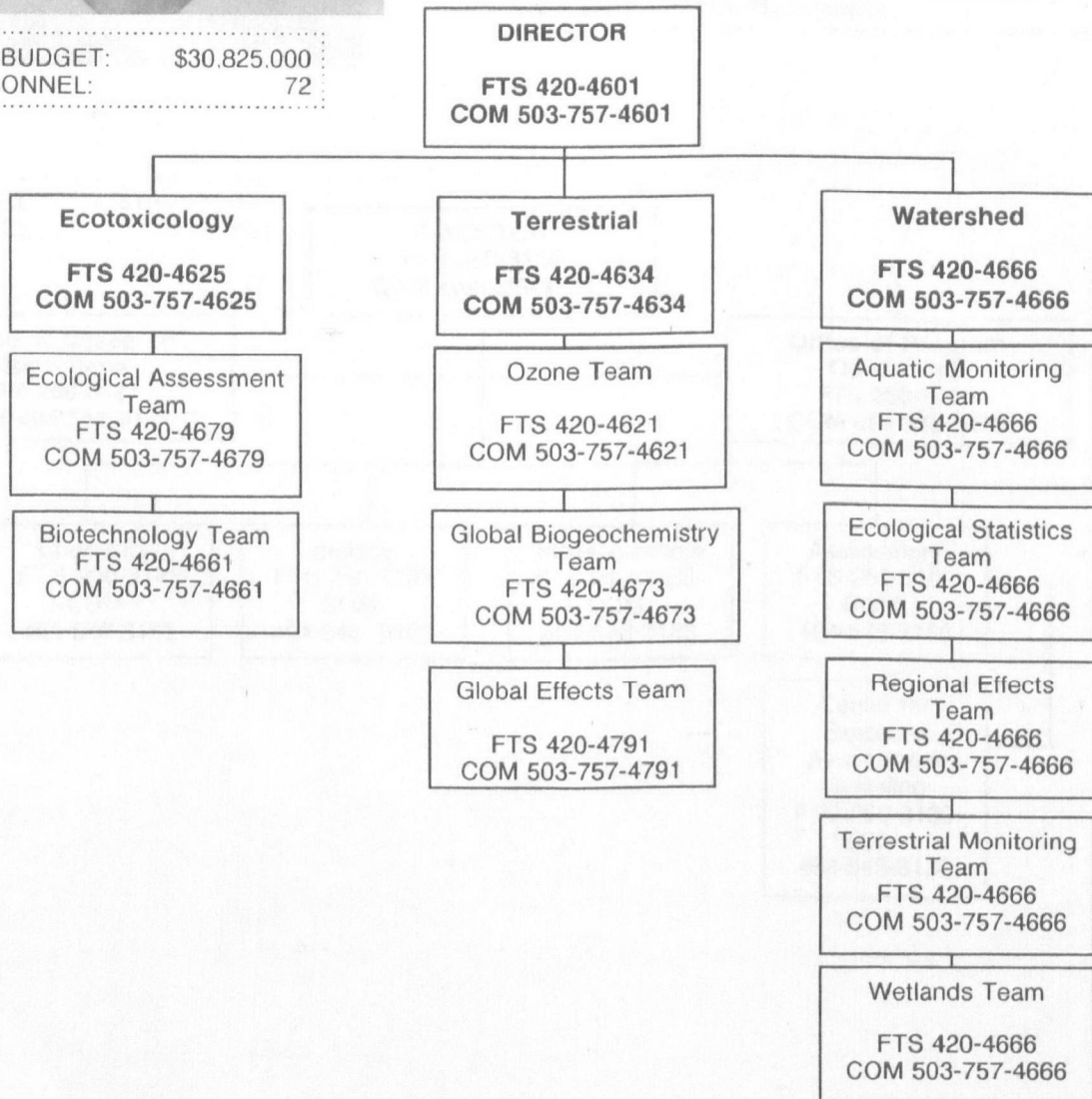
EPA's Center for Exposure Assessment Modeling (CEAM), an internationally known center of modeling expertise located at the Athens Lab, provides models, training, and support in exposure evaluation and ecological risk assessment. CEAM assists the Agency and states in environmental risk-based decisions concerning the protection of surface water, soil, groundwater and air.

Environmental Research Laboratory - Corvallis



Thomas A. Murphy is the Director of the Environmental Research Laboratory at Corvallis, Oregon. He has been in Agency programs since 1970, including Nonpoint Source Division and Air, Land, Water Use. From 1967-1970 he was with the Federal Water Quality Administration. He received a Master's degree in Zoology and a Ph.D. degree in Biology from Yale. He received a Bachelor's degree in Biology and Chemistry from Knox College, and a certificate in animal physiology from Glasgow University.

FY90 BUDGET: \$30,825,000
PERSONNEL: 72



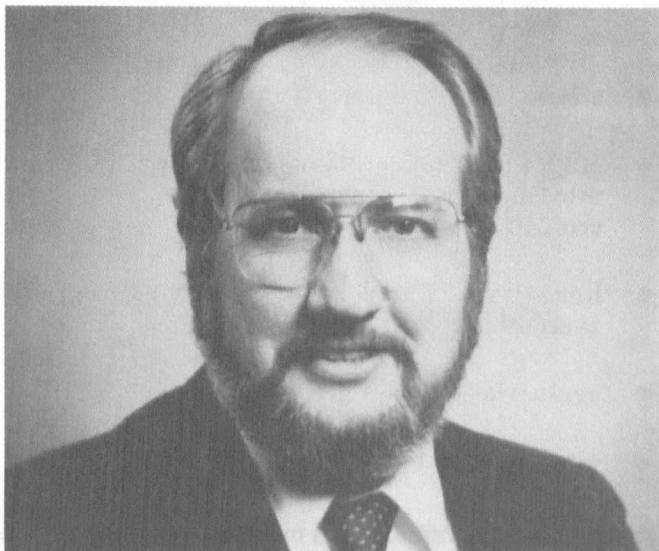
Environmental Research Laboratory - Corvallis

Functions

The Corvallis Laboratory conducts research and assessment on the effects of pollutants and other human stresses on inland ecological systems that include: plant and wildlife populations; soils and other microbial systems; forests, grasslands and agricultural systems; wetlands; watersheds; and regional landscapes. It also develops and evaluates methods for mitigating effects on and restoring inland ecological systems. The Laboratory provides the Agency's primary scientific expertise in terrestrial ecotoxicology and terrestrial, watershed and regional ecology. Current Laboratory activities include:

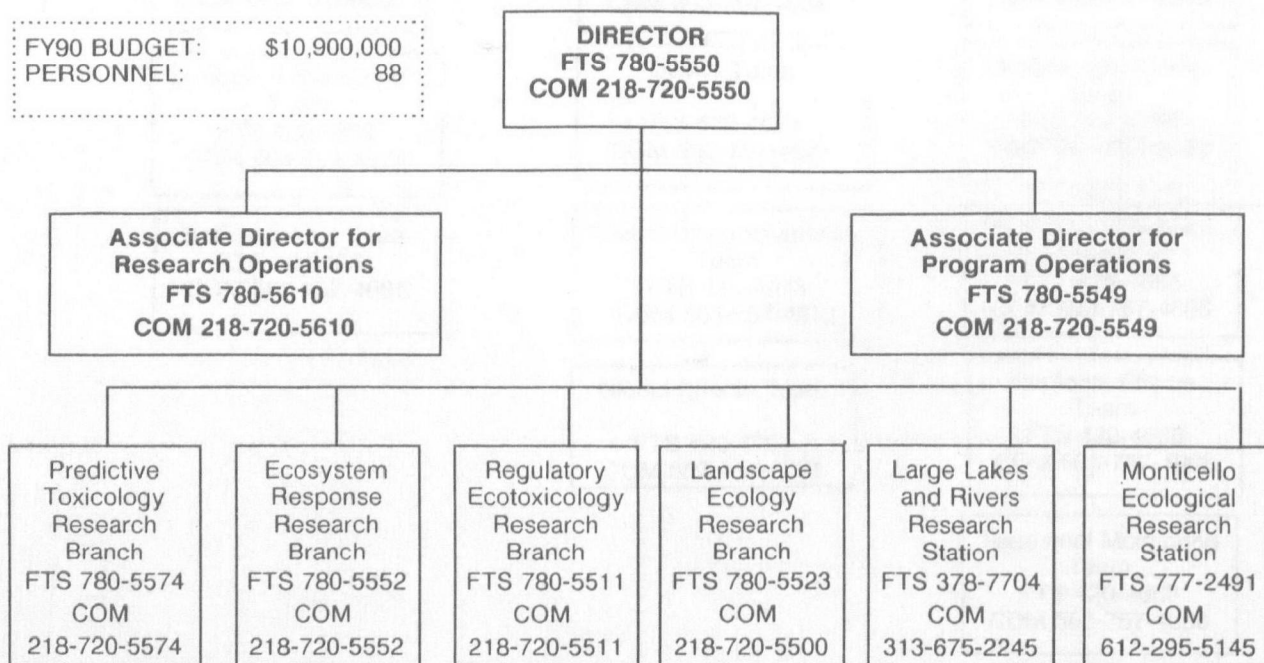
- effects of atmospheric pollutants, such as ozone, acid rain and air toxics on forests, crops, watersheds, and surface waters
- effects of global climate change and stratospheric ozone depletion on ecological systems
- effects of toxic chemicals on wildlife and plants
- effects of genetically engineered organisms and microbial pest control agents on terrestrial ecological systems
- hazardous waste site ecological impact evaluation
- evaluation of cumulative wetland loss
- mitigation of wetland loss
- uptake, movement and metabolism of chemicals in plants
- regional analysis of ecosystem conditions and trends

Environmental Research Laboratory – Duluth



Gilman D. Veith has been the Director of the Environmental Research Laboratory at Duluth (ERL-D) since 1987. He was Associate Director of Research from 1984 to 1987; Chief, Toxic Substances Research Branch, from 1981 to 1984; and Research Chemist from 1972 to 1981. He began his career as an Assistant Professor of the Water Chemistry Program at the University of Wisconsin, Madison, Wisconsin. He currently serves on the Agency Risk Assessment Council, The Science Career Review Board, the Council of Great Lakes Managers, and the OECD Hazard Assessment Advisory Board. Mr. Veith received his Bachelor's degree in Chemistry from Augustana College and his Ph.D. in Water Chemistry from the University of Wisconsin. He has authored or co-authored over 50 scientific papers in analytical chemistry and predictive toxicology.

FY90 BUDGET: \$10,900,000
PERSONNEL: 88



Environmental Research Laboratory – Duluth

Functions

The Environmental Research Laboratory at Duluth (ERL-D) conducts research to advance our fundamental understanding of aquatic toxicology and freshwater ecology. Its mission is to develop a scientific basis for EPA to create environmental policies concerning the use of freshwater resources. To accomplish this, ERL-D has a lead role in a wide variety of key research programs.

ERL-D developed the methods and guidelines and wrote all of EPA water quality criteria. Recognizing that criteria lag far behind the number of toxic chemicals in the environment, ERL-D created the toxicity-based permit process which is now implemented nationwide. Our regulatory ecotoxicologists have recently accented the lead role in the design of sediment quality criteria.

The ecosystem response group seeks to quantify dose-response relationships and indirect effects of stresses on freshwaters. Specialized methods involving microcosms, mesocosms, streams, ponds, wetlands, and small lakes are used to provide the basis for models and extrapolation techniques. The knowledge has been incorporated into testing protocols for pesticides registration.

Our landscape ecology program specializes in the diagnosis of ecosystem dysfunction and developing indicators of ecosystem health. As EPA moves closer to programs for better management practices from a watershed perspective, we expect to provide much of the guidance to protect and improve water quality. The Great Lakes Research Program managed by ERL-D has turned completely to science for lake-wide management planning.

Chemical safety evaluations in the form of risk assessment remains the focus of our predictive toxicology program. A complete array of computerized models for structure-toxicity relationships, pharmacokinetic extrapolations, dynamic toxic effects, and mixture toxicity are being developed.

Studies to determine the ecological significance and adequacy of existing laboratory-derived hazard assessments for protecting aquatic life are being conducted. A new thrust seeks to validate low-cost fish models in the classification of chemical carcinogens.

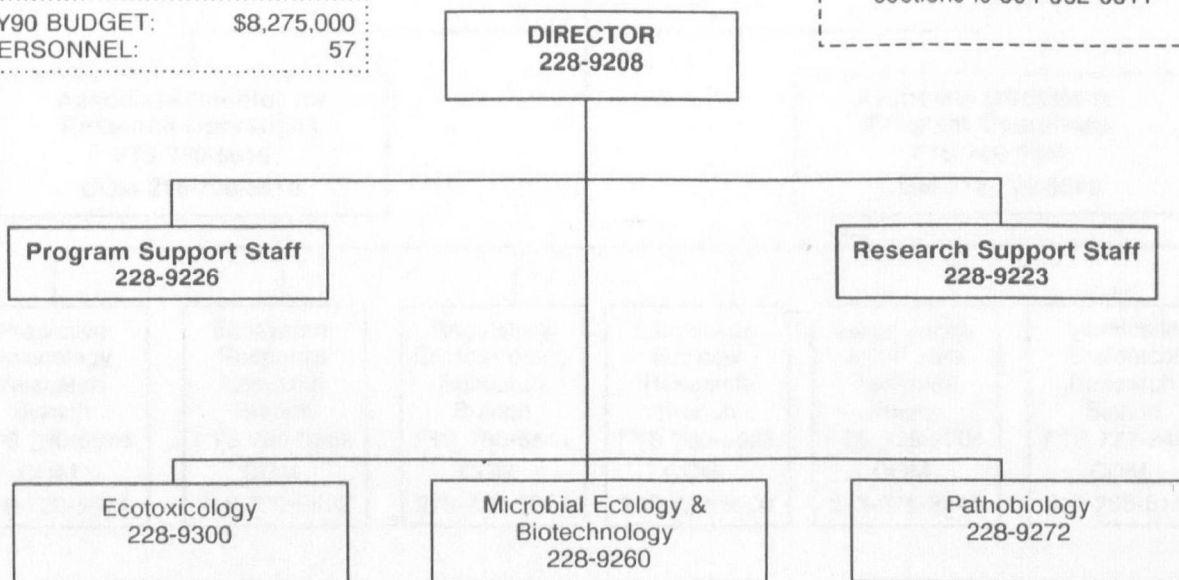
Environmental Research Laboratory - Gulf Breeze



Robert Everett Menzer was named Director of the Environmental Research Laboratory at Gulf Breeze in November 1989. Before this appointment he had served as Professor and Director of the Graduate Program in Marine-Estuarine-Environmental Sciences and Director of the Water Resources Research Center at the University of Maryland, College Park. Mr. Menzer's research has focused on the metabolism and environmental fate of pesticides, particularly organophosphorus compounds. He received his Bachelor's degree in Chemistry from the University of Pennsylvania, Master's degree in Entomology from the University of Maryland, and Ph.D. in Entomology and Biochemistry from the University of Wisconsin.

FY90 BUDGET: \$8,275,000
PERSONNEL: 57

Telephone numbers are FTS.
The commercial number for all sections is 904-932-5311



Environmental Research Laboratory - Gulf Breeze

Functions

The Environmental Research Laboratory at Gulf Breeze develops and analyzes scientific data on the impact of toxic and hazardous materials released in marine, estuarine, and near-coastal environments. Scientific investigations primarily involve chemical compounds and biological products regulated by EPA's Office of Pesticides and Toxic Substances, the Office of Water Programs, and the Office of Solid Waste and Emergency Response.

Laboratory scientists conduct research to develop principles and applications of ecotoxicology, including measurement and prediction of fate and effect of chemicals on species and ecosystems; to evaluate and define mechanisms that affect biodegradation and accumulation of toxicants in aquatic food webs; and to determine effects of carcinogens, mutagens, and teratogens in aquatic species. This research leads to the development and evaluation of test systems and biological indicators

in the marine and estuarine environments. The definition of procedures and evaluation of protocols for biological treatment of hazardous wastes are also a part of the Laboratory's research. Methods are under development to apply laboratory observations to field situations and to evaluate potential risks from the release of biotechnological products in the marine environment. An important aspect of the Laboratory's research is to define the health status of bays, estuaries, and wetlands in the Gulf of Mexico and Southeastern United States.

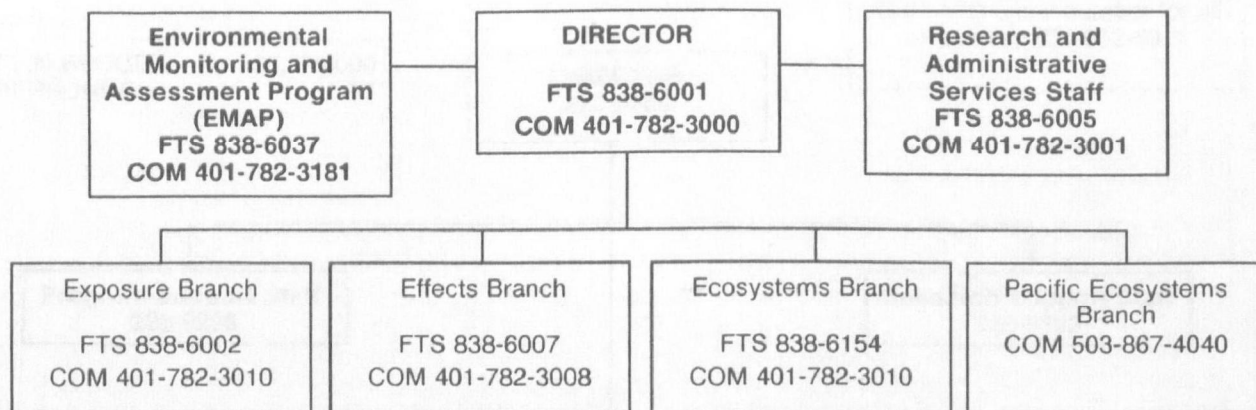
Information from laboratory research is used to establish guidelines, standards, and strategies for management of hazardous materials in the near-coastal marine environment, to define and predict its ecological health, and describe cause(s) of aberrant conditions or changes in its ecological status.

Environmental Research Laboratory - Narragansett



Norbert A. Jaworski has been the Director of the Environmental Research Laboratory in Narragansett, Rhode Island, since 1986. From 1970 to 1985, he was the director of several Agency research laboratories, including Corvallis, OR; Research Triangle Park, North Carolina; and Duluth, Minnesota. Before joining the Agency, he was a deputy director in the Department of Interior. He received a Ph.D. degree in Water Resources Management from the University of Michigan and Bachelor's and Master's degrees in Civil Engineering from the University of Wisconsin (Madison). He has written over 50 publications and technical reports. He has received an EPA Gold Medal and the Presidential Rank of Meritorious Executive.

FY90 BUDGET: \$13,250,000
PERSONNEL: 71



Environmental Research Laboratory - Narragansett

Functions

The Environmental Research Laboratory at Narragansett, Rhode Island, along with its Pacific Coast laboratory in Newport, Oregon, is the Agency's National Marine Environmental Quality Research Laboratory. The Laboratory's research supports primarily the EPA Office of Water, Office of Emergency and Remedial Response, and the Office of Air and Radiation. The Laboratory's efforts respond to legislative requirements of the Clean Water Act, the Marine Protection, Research and Sanctuaries Act, and the Superfund Reauthorization Act. Major emphasis is placed on providing the scientific base for environmental criteria, waste disposal practices, environmental analysis/impacts, assessments, and marine and estuarine risk assessments for regulatory activities of responsible offices.

The Laboratory's principal themes are: Environmental Chemistry, Transport and Fate, Biological and Ecological Effects, Biomonitoring, Ecological Risk Assessment, and Multidisciplinary Information Management.

The Laboratory is responsible for the following research program areas: (1) marine and estuarine disposal, discharge of (and recovery from) complex wastes, dredged material, and other wastes; (2) water use designation and derivation of criteria for marine and estuarine water and sediment; (3) environmental assessment of ocean disposal and discharges of waste and wastewaters; (4) technical and research support for evaluating remediation options at proposed and designated marine/estuarine superfund sites; and (5) research on the effects of global warming and the depletion of stratospheric ozone on marine systems. Technical assistance, technology transfer, and investigations of an emergency nature, e.g., spills of toxic materials, also are provided to aid EPA offices in evaluating environmental threats posed by toxicants, other pollutants, and physical modifications along the Mid- and North Atlantic Coast, the West Coast, and other geographic locations. Technical assistance is also provided to other federal agencies, states, municipalities, and industry.

Office of Health Research



Ken Sexton received a Bachelor's degree from the U.S. Air Force Academy and a Master's degree in both Environmental Engineering and Sociology from Washington State University and Texas Tech University, respectively. His Sc.D. in Environmental Health Sciences is from Harvard University. From 1983 to 1985, Mr. Sexton was Director of the Indoor Air Quality Program for the State of California, and from 1985 to 1987, he was Director of Scientific Review at the Health Effects Institute in Boston, MA. He has published extensively in the scientific literature on human exposures to air pollution.

FY90 BUDGET: \$57,525,000
PERSONNEL: 297



Office of Health Research

Functions

The Office of Health Research (OHR) is responsible for planning, implementing, and evaluating a comprehensive, integrated human health research program. This program:

- documents adverse effects to man from environmental exposure to pollutants which ORD uses to support the Agency's regulating activities;
- develops test systems, methods, and protocols;
- conducts laboratory and field research studies;
- develops interagency programs which effectively use pollutants;
- offers technical assistance to the regions and program offices;
- develops health science policy for the Agency; and
- provides a focal point for the effects of human exposure to environmental pollutants.

The Program Operations Staff:

- administers the ORD planning, reporting and review system;
- develops management systems necessary to support programs, personnel and budgets of the office and associated laboratories;
- reviews plans, progress, and resources for compliance with ORD, Agency and legislative requirements; and
- recommends planning and programming activities of the office to the Office of Administration and Resources Management and the Office of Policy, Planning and Evaluation.

The Environmental Health Research Staff:

- plans, manages, and evaluates research programs dealing with health impacts of exposures to criteria and non-criteria air pollutants, emissions from mobile sources, drinking water, and ambient water pollutants,

solid and hazardous wastes and toxic chemical substances (including pesticides) and Superfund;

- develops health research policy, priorities and program plans;
- determines resource allocations to carry out the health research program;
- provides program implementation guidelines to the Health Effects Research Laboratory;
- assures effective integration of all laboratory health research activities; and
- reviews laboratory management practices and research activities to determine progress toward program objectives.
- provides health research information and advice to steering committees, regulation review committees, interagency committees, and domestic and international organizations which request such assistance.

Program Activities

The Office of Health Research (OHR) supports a research program that has three main goals: 1) Develop, improve and validate toxicological test methods for use by the Agency's programs, 2) Produce dose-response data that will allow the Agency to perform the necessary risk assessments, and 3) Conduct a research program to improve the Agency's ability to assess health risks from environmental exposures. These three goals serve as the core around which each of the media specific programs are planned and implemented. Below is a brief description of the health issues which are being addressed in OHR's research program.

Air

- In the air health research program major efforts are being directed at providing dose-response data for use in quantifying the health risk resulting from exposure to the criteria pollutants. This research is being conducted using animal toxicology studies and both human clinical and epidemiological studies and both human clinical and epidemiological studies

Office of Health Research

and develops data describing the effects of exposure to these pollutants on pulmonary function, changes in host defense functions (immunotoxicity), cardiovascular disease, and neurological function. Research is also developing better methods to determine the deposition of pollutants in the lung in order to improve our risk assessment capabilities. Research on hazardous air pollutants is focused on determining the potential mutagenic and carcinogenic hazard of VOC's and mixtures of air pollutants. The indoor air health effects research program is focusing on developing methodology and data to evaluate the effects, both cancer and non-cancer, from exposure to combustion emissions from kerosene heaters, wood stoves, environmental tobacco smoke, and other sources of indoor air pollution.

Water

- The drinking water health effects research program primary focus is to determine the health effects from the use of various drinking water disinfectants (chlorine, chloramine, ozone). Epidemiology studies are being planned and conducted to determine the relationship between water disinfection and both cancer and reproductive effects. These methods are used to identify and isolate the biologically active components or chemicals from drinking water concentrates for further in depth health characterization. Dose-response studies are also

being conducted on drinking water disinfection by-products to support the development of drinking water standards.

Pesticides and Toxics

- The pesticides and toxic substances research program develops test methods for determining the health effects from pesticides and commercial chemicals, developing both animal and human biomarkers to improve our understanding of exposure-dose relationships and to apply these methods in biochemical epidemiology studies, research to determine the potential health effects from microbial pesticides and genetically engineered organisms and research to develop structure activity relationship models to support TSCA section 5.

Hazardous Waste/Superfund

- The hazardous waste health research program is developing a test methodology for comparing the potential cancer and non-cancer health risks from hazardous waste incineration and municipal waste combustion.

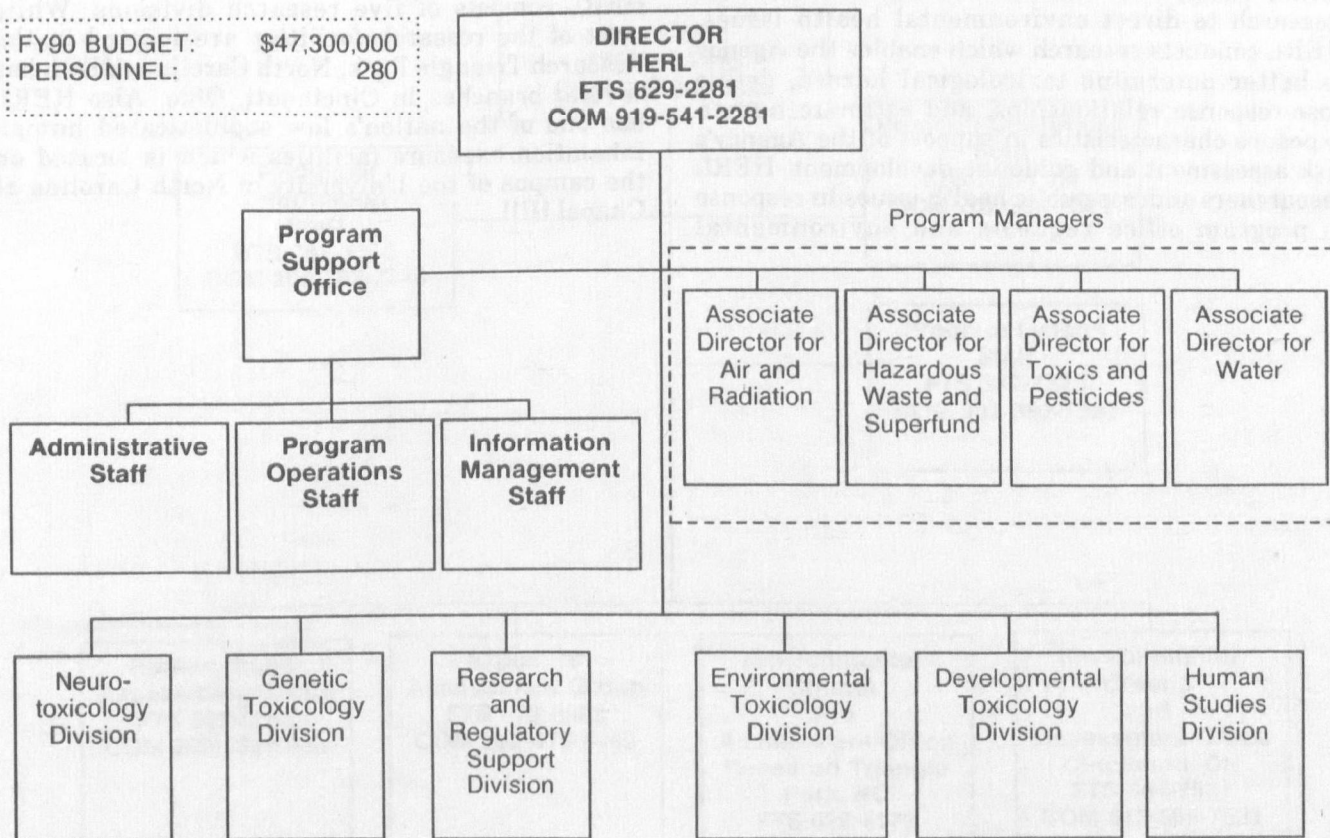
Finally, the health effects Superfund research program is conducting research to develop test methods to screen and evaluate the potential health hazard from exposure to waste mixtures.

Health Effects Research Laboratory



Lawrence W. Reiter has been the Director of the Health Effects Research Laboratory since April 1988. Prior to being named Director of the Laboratory, Mr. Reiter was Director of HERL's Neurotoxicology Division. Earlier in his career, he was responsible for centralizing the neurotoxicology research program for the Agency and received an EPA Bronze Medal in 1979 for his role in this effort. Mr. Reiter has also received two Special Achievement Awards and the Agency's Scientific and Technological Achievement Award. Mr. Reiter serves on the editorial board of three professional journals and is an internationally recognized neurotoxicologist who has been involved in a variety of activities to define and implement national priorities for environmental health research in this area. He earned his Ph.D. in Neuropharmacology from the University of Kansas Medical Center in Kansas City. Before joining EPA in 1973 as a research pharmacologist, he was post-doctoral fellow and lecturer in environmental toxicology at the University of California-Davis.

FY90 BUDGET: \$47,300,000
PERSONNEL: 280



Health Effects Research Laboratory

Functions

The Health Effects Research Laboratory (HERL) investigates human health effects resulting from exposure to environmental pollutants. Staffed by health scientists with expertise in environmental medicine, physiology, epidemiology, statistics, biochemistry, neurotoxicology, reproductive toxicology, teratology, perinatal toxicology, geriatric toxicology, pulmonary toxicology, immunotoxicology, cardiovascular toxicology, genotoxicology, hepatotoxicology, and other target organ toxicologies, HERL is the focal point for toxicological, clinical, and epidemiological research within EPA. HERL establishes cooperative research projects with academic and other scientific institutions which facilitate EPA's efforts in understanding health effects of environmental pollutants. This research program develops and applies biological assays, predictive models, and extrapolation methods which are the basis for the Agency's health risk assessments.

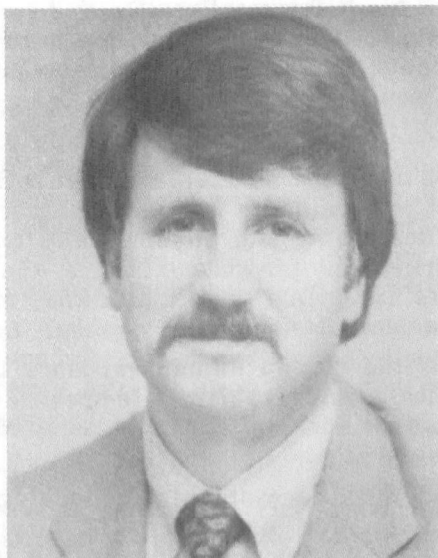
The HERL research program anticipates Agency future needs and enables the Office of Health Research to direct environmental health issues. HERL conducts research which enables the Agency to better determine toxicological hazard, define dose-response relationships, and estimate human exposure characteristics in support of the Agency's risk assessment and guideline development. HERL researchers address public health issues in response to program office requests and environmental

emergencies. HERL gives advice on its research results to offices for criteria development and scientific assessments in support of regulatory and standard setting activities.

HERL interprets and integrates scientific information used in the determination of human health risks to the Agency. It responds to changing requirements for technical assistance to other ORD offices, program offices, regions, senior Agency managers, Agency workgroups, and interagency task forces. Through the active involvement of its scientific staff with Agency research and advisory committees, other Agency offices, and through interaction with academic and other independent scientific bodies, the laboratory assists in the formulation of health science policy for the Agency. HERL provides the leadership in the development of national and international environmental health research efforts.

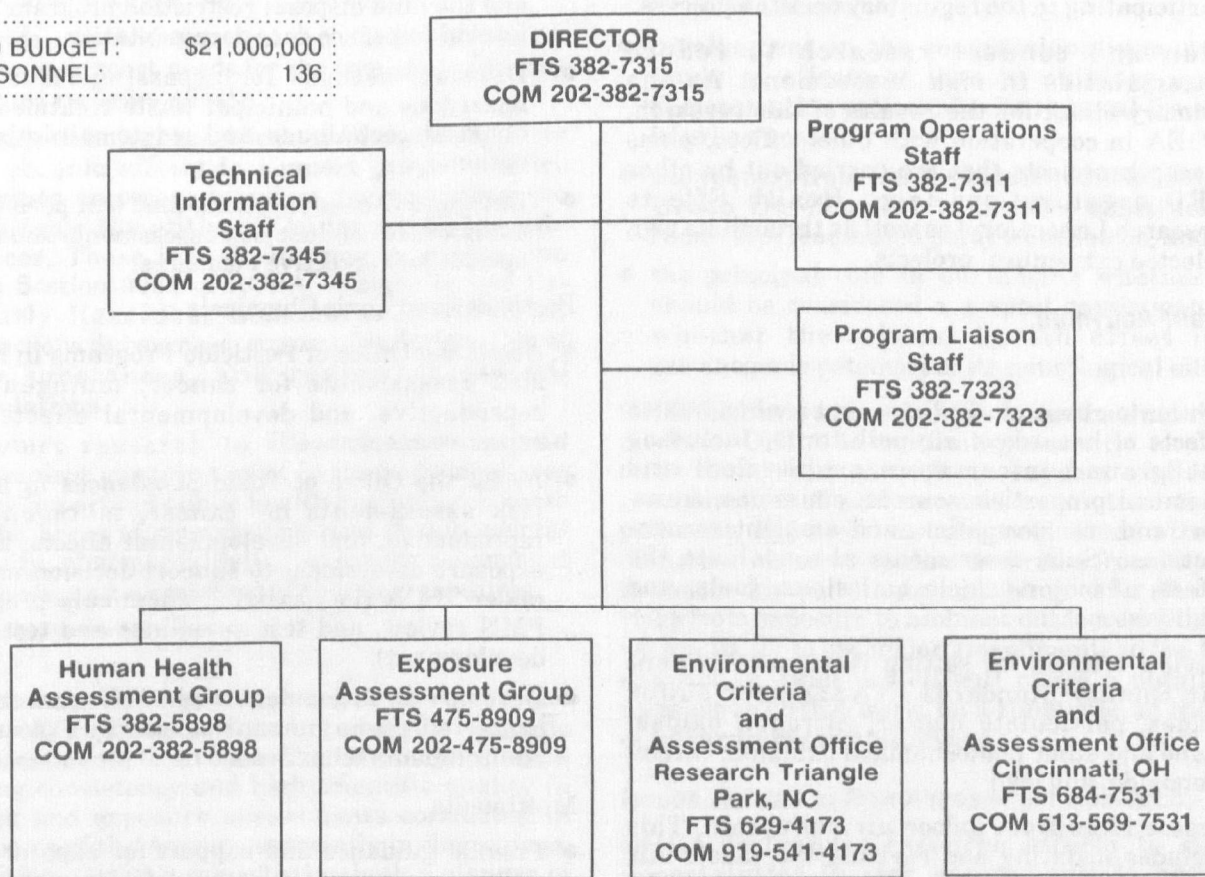
HERL consists of five research divisions. While most of the research facilities are located in the Research Triangle Park, North Carolina, HERL has several branches in Cincinnati, Ohio. Also HERL has one of the nation's few sophisticated human inhalation exposure facilities which is located on the campus of the University of North Carolina at Chapel Hill.

Office of Health and Environmental Assessment



William H. Farland is the Director of the Office of Health and Environmental Assessment. He has been with EPA since 1979, and served as Deputy Director, Health and Environmental Review Division, Office of Toxic Substances, before joining ORD in 1986 as Director of the Carcinogen Assessment Group. He received a Ph.D. and Master's degree from the University of California, Los Angeles, and a Bachelor's degree in Biology from Loyola University. He was a National Cancer Institute Postdoctoral Fellow (National Research Service Awardee), at the University of California, Irvine, California, and Brookhaven National Laboratory, Upton, New York.

FY90 BUDGET: \$21,000,000
PERSONNEL: 136



Office of Health and Environmental Assessment

Functions

The Office of Health and Environmental Assessment (OHEA) is EPA's focal point for the scientific assessment of the degree of risks imposed by environmental pollutants in varying exposure situations on human health and ecological systems. OHEA occupies a critical position in the Office of Research and Development (ORD) between: (1) the researchers in other ORD components who are generating new findings and data, and (2) the regulators in the EPA program offices and regions who must make regulatory, enforcement, and remedial action decisions. In support of its mission to provide the Agency with assessments of risk to human health and the environment, OHEA carries out three functions:

- Prepare human health risk assessments that serve as the scientific basis for regulatory and enforcement decisions within the Agency.
- Help promote Agency-wide coordination and consistency of risk assessments through the preparation of guidelines; by providing expert advice, reviews, and data analysis; and by participating in the regulatory decision process.
- Plan and conduct research to reduce uncertainties in risk assessment. As the primary client for the results of this research, OHEA in cooperation with other offices, plans research projects that are carried out by other ORD organizations (e.g., Health Effects Research Laboratory) as well as through its own selected extramural projects.

Program Activities

Air

- Evaluate research findings concerning health effects of hazardous air pollutants, including background information on physical and chemical properties, sources, emissions, transport and transformation, and ambient concentrations. Such assessments also evaluate the effects of motor vehicle emissions, fuels, and additives.
- Review criteria for setting National Ambient Air Quality Standards (NAAQS) for sulfur oxides, particulate matter, nitrogen oxides, ozone and other photochemical oxidants, carbon monoxide, and lead.
- Assess risks from indoor air pollutants. This includes updating and revising the Indoor Air Pollution Information Assessment and the

Indoor Air Reference Data Base; determining the extent of population exposure to indoor air pollutants; and developing biological contaminant measurement methods.

Water

- Assess the health effects of exposure to drinking water contaminants by evaluating scientific data describing the physical and chemical properties, the pharmacokinetics, the health effects in animals and humans, and the mechanisms of toxicity.
- Assess the risk of human exposure to toxic chemicals, and evaluate site-specific health hazards for ambient waters as required by the states and EPA.
- Provide risk assessment methodologies for chemicals and pathogens in support of regulatory decision making on the use and disposal of municipal sludge.

Hazardous Waste

- Provide health and environmental effects documents to support RCRA 3001 listing decisions and the land disposal restriction program in the form of reference dose documentation.
- Develop methods for assessing risks from hazardous and municipal waste treatment and disposal techniques and waste minimization options.
- Develop PC-based systems that will permit risk assessors to conduct risk assessments and assess options for corrective measures.

Pesticides and Toxic Chemicals

- Assist the Office of Pesticide Programs in health risk assessments for cancer, mutagenicity, reproductive, and developmental effects, and exposure assessment.
- Assist the Office of Toxic Substances in health risk assessments for cancer, mutagenicity, reproductive, and developmental effects, and in exposure assessment to support decision-making under TSCA (i.e., existing chemicals program, PMN review, and test guidelines and test rules development).
- Develop risk assessment methods for cancer/ non-cancer effects in humans caused by exposure to environmental chemicals.

Multimedia

- Provide guidance and support for exposure and risk assessment regulatory decision-making by

Office of Health and Environmental Assessment

EPA through risk assessment guidelines, the Risk Assessment Forum, and the Integrated Risk Information System (IRIS).

- Plan and fund extramural research to reduce uncertainty in risk assessments through the validation of assumptions about route-to-route and species-to-species extrapolations, dose-rate effects, dose-response models, biomarkers, and gender equivalence, and by evaluating methods for improving carcinogen risk assessment.
- Manage Agency-wide workgroups that provide consensus information on Reference Doses (RfDs) or Agency agreed-upon Risk Estimates of Carcinogenicity (RECs) for IRIS.

Superfund

- Review site-, chemical-, and situation-specific risk assessments to assist the program offices and regions in evaluating Superfund alternative courses of action.
- Operate the Technical Support Center for health and risk assessments to provide guidance and information to regional and state offices associated with the Superfund program.
- Provide site- and chemical-specific health assessments to support needs for the remedial planning and cost recovery efforts.
- Provide chemical-specific data on carcinogenicity and chronic effects to support program office activities necessary to adjust, by regulation, the Reportable Quantities (RQs) for hazardous substances. These include listings in association with Section 3001 of RCRA, designation of Extremely Hazardous Substances as CERCLA Hazardous Substances, support for designation of new substances, and review of old RQ calculations.
- Conduct research to fill information and assessment gaps that exist in the various phases of the Superfund public health evaluation process in the areas of reproductive and developmental toxicity, pharmacokinetics, exposure assessment methods, and assessment of chemical mixtures.

Issues

OHEA's role has been evolving from being the primary EPA office performing chemical-specific risk assessments to an office that is a major force in assuring consistency and high scientific quality in the risk and exposure assessments conducted in other parts of the Agency, especially in the regions. In addition, OHEA's role of being both a planner of

and a client for risk assessment-related research conducted throughout EPA has been expanding. The risk assessments prepared by OHEA are becoming multi-media, multi-effect documents. This evolution will continue, and OHEA must seek ways of successfully fulfilling these broader responsibilities in order to help keep EPA in the forefront of this developing field of science.

Issues Related to Conducting Risk Assessments

OHEA's initial assessment of **lead** developed as part of the office's mandate to prepare Criteria Documents for the National Ambient Air Quality Standards Program. From that work we began to recognize that the adverse effects of lead on neurological and intellectual development can be seen at lower and lower doses--to the point that lead can be considered a non-threshold pollutant for those effects. OHEA's work on the lead criteria document brought about its involvement in several other areas such as:

- the development of the Maximum Contaminant Level in drinking water for the Drinking Water Criteria Document,
- involvement in the congressionally-mandated study of effects of lead in children and in demonstration projects for its removal from soils in urban areas,
- the request from the Department of Housing and Urban Development to provide assistance in removal of lead-based paint from homes, and
- the principal role in evaluating whether lead should be considered a suspect carcinogen, and whether the critical health effect is its carcinogenic potential or its neurological effects.

OHEA is likely to see changes in emphasis in the air medium. OHEA is continuing work on assessing risks from acid aerosols in support of OAQPS' consideration of acid aerosols as another criteria pollutant. More work is being requested in the area of **indoor air** as we realize that risks from exposure to indoor air pollutants may be greater than the risks from exposure to ambient outdoor air. Finally, we are likely to see major amendments to the Clean Air Act in 1990, which will cause a significant increase in OHEA work, on a timetable, in the area of **hazardous air pollutants**.

Issues Related to Risk Assessment Research

OHEA influences research efforts to reduce uncertainties in risk assessment. It provides

Office of Health and Environmental Assessment

direction to such research and must work with other ORD offices to incorporate research results into its ongoing agenda of risk assessment documents, its assessment guidelines, and the databases used throughout the Agency. ORD is pursuing research efforts in understanding ecological risk and in improving exposure assessment. Pharmacokinetics, model validation, and reducing the uncertainty in exposure assessment are areas of future research.

OHEA pursues research to understand the effects and interactions of chemical mixtures and complex exposures and is using this information to develop techniques for assessing risks from such mixtures and exposures. We are cooperating with other ORD offices in assessing environmental risk and developing techniques for comparing risks of different remedial strategies and risk reduction techniques across media, and across different health and environmental effects.

OHEA is an important client for research conducted by the other ORD offices and seeks to be effective in helping to plan needed research to be conducted by ORD. The ultimate result of such enhanced planning will be research findings that are better targeted to the needs of the risk assessors.

Issues Related to Providing Guidance and Consistency to Agency Risk Assessment Activities

OHEA has provided scientific leadership to Agency workgroups developing **risk assessment guidelines** under the Risk Assessment Forum. Five guidelines were published in 1986. Still underway are: additions and amendments to the existing guidelines (exposure measurement, developmental toxicity amendments, carcinogen guideline revisions), and new efforts in reproductive toxicity, neurotoxicity, quantitative assessment of chronic effects, and development of guidelines for assessing ecological risk.

The conduct of risk assessment has become more and more decentralized as many of the remedial and regulatory programs have shifted to site-specific concerns, e.g., hazardous waste facilities and Superfund site cleanups. As a result, a critical issue is **managing the flow of risk assessment information**. Five such activities are illustrative:

- OHEA manages the **Integrated Risk Information System (IRIS)** which provides consensus risk assessment information to those conducting risk assessments. That management has included chairing the **Reference Dose (RfD)**

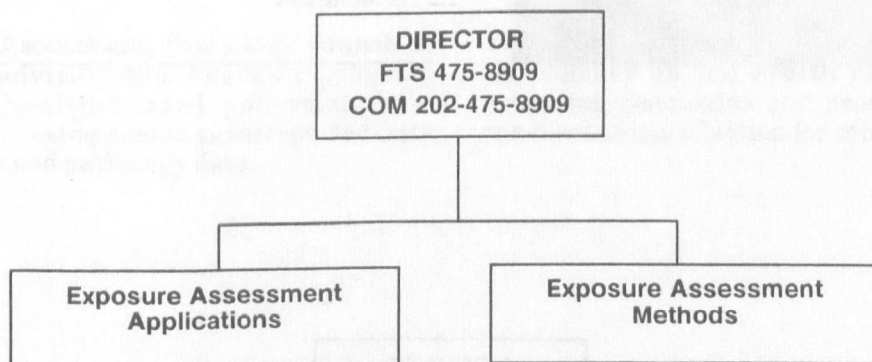
and **Cancer Risk Assessment Verification Endeavor (CRAVE) Workgroups**, which verify the information, develop the consensus profiles, and support users. A workgroup has been established to develop methods for, and begin verifying inhalation Reference Concentrations (RfCs). The IRIS database started as an E-Mail based system, was recently made available on TOXNET (the National Library of Medicine's Toxicology Data Network), and is being converted to a PC-based system. Currently, there are about 400 different chemicals on the system.

- OHEA works with OAQPS in managing the **Air Risk Information Support Center (AirRISC)**. AirRISC assists state and local air pollution control agencies and EPA regional offices on technical matters pertaining to health, exposure, and risk assessment for toxic air pollutants. Its primary goal is to obtain information and, provide assistance in the review and interpretation of that information.
- OHEA chairs the governmental advisory group to, and is the major source of funding for, the National Academy of Sciences' **Committee on Risk Assessment Methodology (CRAM)**. CRAM will address the inconsistencies, limitations, and uncertainties in risk assessments conducted by different government agencies by using NAS' auspices to resolve key scientific issues, uncertainties, and problems in using risk assessment at the highest level of scientific credibility.
- OHEA has provided the lead on the **Developmental and Reproductive Toxicology (DART) Database**, a literature database that includes citations from reproductive and developmental toxicology. The database is an outgrowth of a narrower one on teratology alone (the Environmental Teratology Information Center at Oak Ridge National Laboratory), and is accessible through the National Library of Medicine's TOXNET system.
- OHEA is starting up a new **Technical Support Center for Health and Risk Assessment** for Superfund to provide a contact point for dissemination of health and risk assessment information to regional and state officials and private organizations involved in Superfund. It is one of five such centers ORD operates.

Exposure Assessment Group



Michael A. Callahan has been the Director of the Exposure Assessment Group since 1986. His prior experience at EPA includes positions in the Office of Toxic Substances and the Office of Water. He began his career as a chemist with the U.S. Army Research and Development Center. He has been awarded three EPA Bronze Medals for Commendable Service. He received a Master's degree in Organic Chemistry from George Washington University and a Bachelor's degree in Chemistry from Northwestern University.



Functions

The Exposure Assessment Group provides advice on the exposure characteristics and factors of agents that are suspected of causing detrimental health effects; provides state-of-the-art methodology, guidance, and procedures for exposure determinations; and prepares independent assessments of exposure and recommendations concerning the exposure potential of specific agents.

The Exposure Assessment Group consists of two branches:

The Exposure Assessment Application Branch is responsible for performing exposure assessments, applying exposure assessment methods to site-specific cases, reviewing

Regional Superfund risk assessments, and reviewing exposure assessments prepared by other organizations.

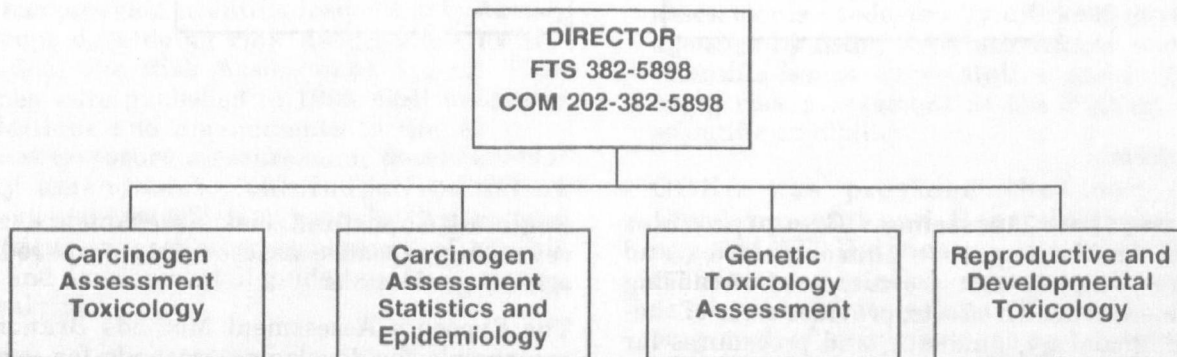
The Exposure Assessment Methods Branch is responsible for developing methods for use in exposure assessments, chairing Agency-wide work groups on subjects such as guidelines development and related Risk Assessment Forum topics, performing exposure assessments, and reviewing exposure assessments prepared by other organizations.

These branches provide state-of-the-art methodology, guidance, and procedures as well as plan and execute research in the area of exposure assessment.

Human Health Assessment Group



In February 1990, **Hugh West McKinnon** was appointed the Director of the Human Health Assessment Group, where he had been serving as Acting Director since August 1989. He received his medical degree from the University of Virginia in 1977. From July 1987 to June 1989, he was a General Preventive Medicine Resident in the School of Hygiene and Public Health at the Johns Hopkins University in Baltimore and received a Master of Public Health degree from that university in 1988. He was appointed as Medical Officer in the Office of Health Research in 1978 and served as the Acting Director of that office from November 1985 to May 1987. He has professional memberships in the American Public Health Association, the Association of Preventive Medicine Residents, and the Federal Physicians Association.



Human Health Assessment Group

Functions

The Human Health Assessment Group provides state-of-the-art methodology, guidance, and procedures for the evaluation of carcinogenic, mutagenic, reproductive, and developmental effects; assures quality and consistency in the Agency's scientific risk assessments; makes recommendations on testing requirements (research) needed for adequate risk assessments; prepares independent assessments of risk and makes recommendations concerning the nature and extent of health hazards associated with specific substances; and, plans and executes research in the areas of carcinogenicity, mutagenicity, and reproductive and developmental effects.

The Group is composed of four branches:

The Carcinogen Assessment Toxicology Branch is responsible for advising the Agency's program offices on the health-hazard potential from suspected cancer-causing agents as interpreted from animal toxicology and pathology data.

The Carcinogen Assessment Statistics and Epidemiology Branch advises the Agency on the health-hazard potential from suspected cancer-causing agents as interpreted from epidemiology data and defines and interprets dose-response relationships from both epidemiologic and animal data.

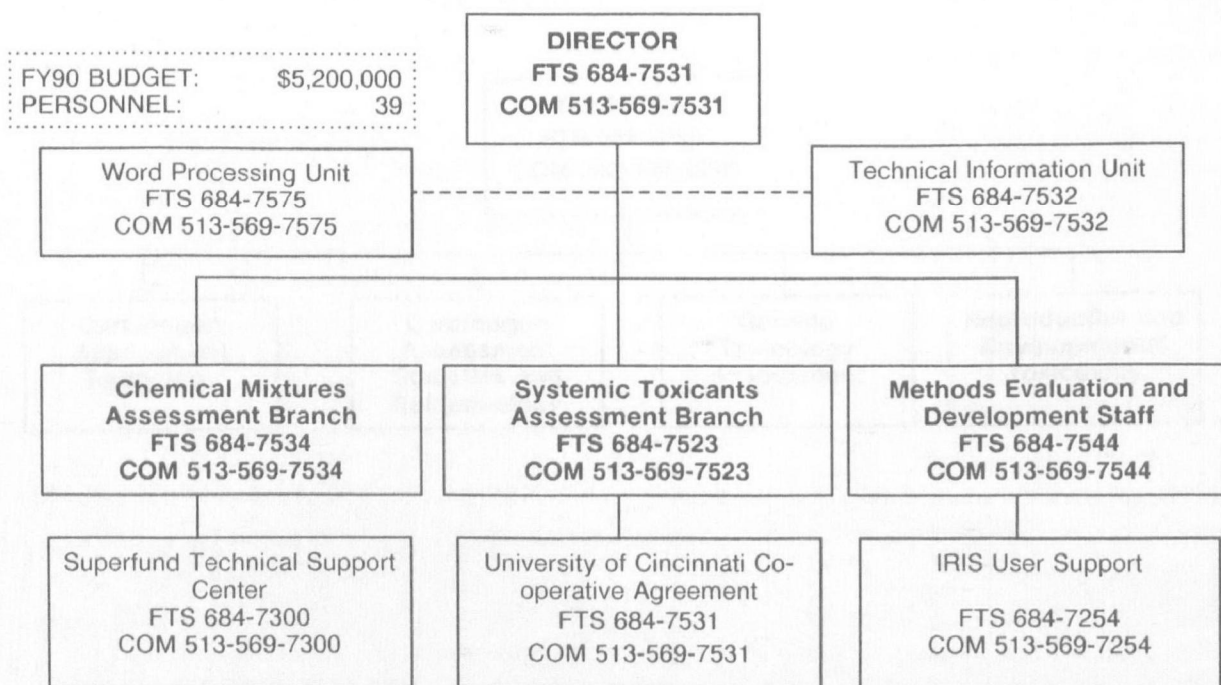
The Reproductive and Developmental Toxicology Branch is responsible for advising the Agency on the health risks associated with suspected reproductive and developmental toxicants as interpreted from *in vitro* experimental animal and human data.

The Genetic Toxicology Assessment Branch advises the Agency on the health risks associated with suspected genotoxins and provides assessments of the mechanism of action for other branches.

Environmental Criteria and Assessment Office - Cincinnati



Christopher T. DeRosa is the Acting Director of the Environmental Criteria and Assessment Office in Cincinnati, OH (ECAO). He previously served as Group Leader, Acting Branch Chief and Branch Chief of the Chemical Mixtures Assessment Branch of ECAO from 1984 to 1989. After receiving his Ph.D in biology from Miami University, Oxford, OH, he served as an instructor and then Assistant Professor at the University of Virginia until 1980 when he joined ECAO due to a growing interest in the applied aspects of ecologic and environmental health research. From 1982 to 1984 he briefly returned to teaching as Assistant Professor of botany and zoology at the University of Maine. He has been the recipient of the Bronze Medal three times, and many special achievement awards for continued superior performance, and is a member of numerous professional organizations including the Society for Risk Analysis and the Ecological Society of America.



Environmental Criteria and Assessment Office - Cincinnati

Functions

The Environmental Criteria and Assessment Office (ECAO) is responsible to the Office of Health and Environmental Assessment (OHEA) primarily for preparing criteria and assessment documents and developing risk assessment methodology and guidelines in support of program needs and schedules in the conduct of Agency regulatory activities. The ECAO serves as an ORD focal point to collect, evaluate, and assess literature generated by researchers (nationally and internationally) and to provide research information of the best possible quality to those in EPA and those in Congress charged with the responsibility for making regulatory and legislative decisions regarding control of environmental pollution in the United States.

The primary function of the ECAO consists of (1) preparation and publication of new or revised criteria documents when needed as input for setting environmental standards, (2) preparation and publication of scientific assessment documents/health risk assessment reports, which will serve as a basis for decisions by the EPA Administrator regarding the listing of pollutants for standards and control under various legislative authorities, and (3) the development of risk assessment methods, which provide guidance for evaluating potential risks to human health from exposure to environmental pollutants.

- *The Chemical Mixtures Assessment Branch (CMAB)* provides support for the development of background documentation and technical support necessary in the formulation of human health risk assessment activities for Agency program offices as mandated by both CERCLA and RCRA. These assessments establish the basis for regulatory activities associated with the potential human exposure to environmental pollutants, particularly chemical mixtures.
- *The Systemic Toxicants Assessment Branch (STAB)* provides support for the development of background documentation necessary in the formulation of human health risk assessment activities for Agency program offices as mandated by CWA, SDWA, and CAA. These assessments establish the basis for regulatory

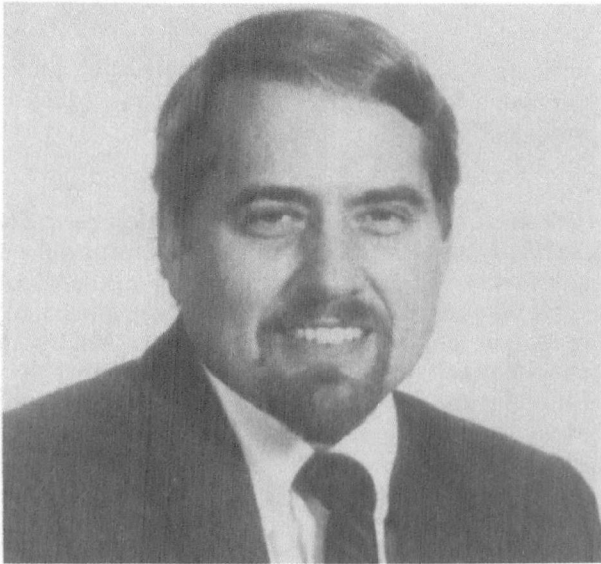
activities associated with the potential human exposure to environmental pollutants, particularly systemic toxicants.

- *The Methods Evaluation and Development Staff (MEDs)* coordinates the development of risk assessment methods for chemical mixtures and systemic toxicity and reviews new methods in response to identified Agency needs. MEDs also coordinates the Agency's Integrated Risk Information System (IRIS). This activity helps ensure that the Agency's risk assessments remain credible and that state-of-the-art methods are continuously evaluated.

ECAO research efforts address risk characterization that assimilates information derived from all areas of risk assessment. Risk characterization conclusions are then used by the program offices in making risk-based management conclusions. The current risk assessment techniques are incorporated into the decision-making process. In addition, new methods for risk assessment or improvements to existing methods are needed by program offices because more sophisticated risk management questions are being asked. Further, ECAO provides the scientific basis and rationale for many of the Agency's criteria and standards, thereby relating directly to the priorities of the program offices. By synthesizing all existing scientific information into estimates of risk, the research needs and priorities of the program offices are better defined.

During the next 3 to 5 years, ECAO will initiate efforts to more accurately describe the health effects of chemicals or mixtures of chemicals in understandable and accessible documentation; credibly estimate the health risk of such chemicals or mixtures at expected environmental exposures; improve the current risk assessment techniques and develop new methods for risk assessment based in part on program office needs; and offer technical assistance to federal, state or local governments, academia, foreign organizations or the general public as applicable.

Environmental Criteria and Assessment Office - Research Triangle Park



Lester D. Grant has been the Director of the Environmental Criteria and Assessment Office in Research Triangle Park (ECAO-RTP) since 1978. While with EPA, he has been awarded two EPA Bronze Medal awards and one EPA Gold Medal award. From 1970 to 1980, he rose from Instructor to Associate Professor in the Department of Psychiatry and Anatomy at the University of North Carolina School of Medicine, where he also served as Associate Director of the Neurobiology Program and as Co-Director of a major environmental toxicology research program. His educational background includes a Bachelor's degree (Social Psychology/ Pre-medicine) from the University of Pittsburgh and Masters/Ph.D. degrees (Organizational/ Physiological Psychology) from Carnegie-Mellon University. Mr. Grant received specialty training in neurobiology before joining the University of North Carolina faculty.

FY90 BUDGET: \$5,250,000
PERSONNEL: 29

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Environmental Criteria and Assessment Office - Research Triangle Park

Functions

The Environmental Criteria and Assessment Office at Research Triangle Park is primarily responsible for preparing criteria and other assessment documents for use in Agency regulatory activities. The primary activities consist of preparing and publishing (1) revised or new criteria documents when prescribed by legislation or requested by national decision-makers, (2) health and environmental assessment documents that serve as a basis for decisions by the EPA Administrator regarding the regulation and control of pollutants, and (3) special health-related reports as required by the Agency's various legislative activities or as especially requested by other governmental authorities. The office also has the lead responsibility for managing the integrated ORD Indoor Air Research Program. The ECAO-RTP carries out these functions through its Environmental Media Assessment Branch, Hazardous Pollutant Assessment Branch, and Technical Services Staff.

The Environmental Media Assessment Branch develops broad (usually multi-disciplinary) assessments of widespread pollutants or classes of pollutants. These assessments require substantial evaluation and integration of information not only on health effects, but also on ecological or other environmental effects. Additionally, they include background information on sources, emissions, transport and fate, and exposure aspects. Activities include the preparation of air quality criteria documents and the preparation or review of cross-media pollutant assessments.

The Hazardous Pollutant Assessment Branch conducts detailed assessments of health effects associated with air pollutants. A principal activity

is the development of inhalation reference concentrations (RfCs) for air pollutants subject to regulation by the Clean Air Act, the Superfund Amendment and Reauthorization Act, states, and regions. An inhalation reference concentration is an estimate of continuous exposure to the human population that is likely to be without appreciable risk of deleterious effects during a lifetime. The HPAB also exercises a leadership role in the Air Risk Information Support Center (Air RISC) jointly supported by OIHEA and OAQPS which provides a hotline and technical assistance to regions, states, and local agencies needing toxicological or risk assessment information quickly. Primary HPAB research interests are reduction of uncertainty in the RfC methodology.

The Technical Services Staff provides literature searches and retrieval, reference verification, and bibliographic database management; editing and graphics services; information and records management support; conference support services, and distribution and printing. TSS also maintains docket and project files, and assures ECAO-RTP conformance to Agency and ORD policies for peer and administrative review, ADP and quality assurance.

Management of the ORD Indoor Air Research Program consists of coordinating related research activities within ORD and those of other federal agencies. Included is the preparation of various materials in conjunction with the Office of Air Programs such as the Report to Congress and indoor air public awareness documents. Specific activities within ECAO include the development of a risk characterization methodology and the indoor air Reference Bibliography with over 4400 citations.