



Decision Series



Who's Who V

the

Interagency Energy/Environment R&D Program Directory & Index



The Energy/ Environment R&D Decision Series

Some of the basic problems facing our society today involve the use of our energy resources and the consequent effects on our environment. These problems affect everyone, and everyone has an interest in their resolution. But the technical aspects of these problems make it difficult for a major portion of the interested public to understand and participate in the decision-making process. This volume contributes to the bridging of this information gap.

The Energy/Environment R&D Decision Series was inaugurated late in 1976. The series presents, in an easily understood and informative manner, selected key issues and findings of the Federal Interagency Energy/Environment Research and Development Program, which was initiated in fiscal year 1975. Planned and coordinated by the Environmental Protection Agency (EPA), the Interagency Program sponsors more than 1,000 research projects ranging from the analysis of health and environmental effects of energy systems to the development of pollution control technologies.

If you have any comments, please write to Editor, RD-681, US EPA, Washington, DC 20460. This document is available through the National Technical Information Service, Springfield, VA 22161. Mention of trade names and commercial products herein does not constitute EPA endorsement or recommendation for use. We welcome your suggestions.

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|---------------------------|-----------------------|
| Editor: | FRANCINE SAKIN JACOFF |
| Design & Text: | GARY M. SITEK |
| Text: | DARYL L. KAUFMAN |
| | KATHLEEN E. DIXON |

Who's Who V
the
Interagency
Energy/Environment
R&D Program
Directory & Index

United States Environmental Protection Agency
Office of Research and Development
Office of Environmental Engineering and Technology

January, 1980

The Interagency Energy/Environment Research and Development Program was created to provide a means of communication among the Federal research community, policy-level decisionmakers and the interested public. This type of a communication network has proven to be a most effective way to coordinate the Federal research effort and assure that appropriate energy/environmental research is being conducted without duplication of effort and funding.

Traditionally, Interagency Program research results have been communicated via project-specific reports, seminars and conferences. The *Who's Who* document consolidates, in directory format, representative research being performed by participating agencies, as well as by individuals and organizations outside the program who are involved in related work.

We hope that this edition of *Who's Who* will not only provide the most up-to-date energy/environment research information, but also encourage those personal communications which have, over the years, made the Interagency Program so successful.

In the early 1970's, energy independence and environmental integrity emerged as charters for future energy/resource development.

Now as we are striving to reduce the Nation's dependence upon scarce, clean fuels — most notably, foreign petroleum — the development of domestic energy resources poses a variety of threats to environmental quality. The increased use of coal, for example, engenders environmental issues and problems affecting land, water, air, and human health. Effective control of potential environmental impacts due to changes in domestic energy systems must be based on a sound understanding of the course of future energy development. The Interagency Energy/Environment R&D Program is designed to provide the technical information necessary to ensure that sound decisions will be made.

More than a dozen Federal agencies and departments participate in the Interagency Program. In pursuing their mandate, programs and responsibilities, each agency must have awareness and access to ongoing research on the environmental effects of energy development while performing the research necessary to provide needed additional data. EPA coordination of the Interagency Program minimizes the overlap of research programs to assure comprehensive coverage of all energy/environment questions.

In addition, the results of the multiagency research program are disseminated and reviewed through a system of publications, joint conferences and symposia coordinated by EPA's Office of Environmental Engineering and Technology. *Who's Who* is a representative publication of this system. *Who's Who V* is by no means all-inclusive; it is designed to identify representative current research projects, policymakers, researchers, research managers, and others involved in the Interagency Program. It also includes some of the many individuals and organizations outside the Program who are involved in related work.

Who's Who V is designed to be used in conjunction with three companion documents, each of which explores different facets of the Interagency Energy/Environment R&D Program.

The Interagency Energy/Environment R&D Program Status Report. The Status Report covers, in executive summary format, the entire scope of the Interagency Program. Included are descriptions of the program today, its history, and its future goals and directives.

Fiscal Year 1977 Research Program Abstracts of the Interagency Energy/Environment Program. This report contains the project descriptions of the \$96 million in FY 1977 R&D projects funded and coordinated by the Interagency Program. Project descriptions not only represent past and present research and development, but also illustrate the full range of the Program's energy-related research.

Bibliography of the Interagency Energy/Environment R&D Program. This document contains publications covering current R&D as well as technical publications dating back to 1976.

All four documents are intended to serve the Interagency Program's goal of formulating a technical information system that provides access and communication among researchers, decisionmakers and the interested public.



Steven R. Reznick
Deputy Assistant Administrator
Office of Environmental Engineering
and Technology

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Program Description. This directory provides a means of access to information on specific project areas currently underway within the Federal Interagency Energy/Environment Research and Development Program. The Program, designed to determine the environmental implications and effects of the Nation's energy development efforts, is divided into two broad segments:

The Health and Environmental Effects Program consists of the research activities associated with the behavior and effects of energy-related pollutants once they are in the environment. Four subprograms are involved:

- Measurement Systems and Instrumentation
- Transport and Fate
- Health Effects
- Ecological Effects

The Control Technology Program is designed to provide information on the types and quantities of pollutants released by energy supply activities and to develop or stimulate the development of control options where necessary. This program consists of six subprograms:

- Fuel Extraction
- Fuel Processing, Preparation, and Advanced Combustion
- Environmental Impacts of Conventional and Advanced Energy Systems
- Flue Gas Sulfur Oxide Control
- Nitrogen Oxide Control
- Flue Gas Particulate Control

Project Areas are listed by descriptive title under each category. Listings include selected research projects from the total Interagency Program.

The Project Contact is responsible for implementing the project and/or having cognizance of its technical scope and status. The name of the project contact, as well as his affiliation, appears bracketed, in bold-face type, after each project title. Where applicable, grantee or contractor project funding is indicated as follows:

[John Doe
(Project Contact)

UCLA,
(Affiliation)

via USDA/SEA/CR]
(Funding Source)

The Agency Coordinator is the policy-level individual within the performing agency who has overall supervisory responsibility for the projects. The following listing contains the names of the agency coordinators, the agency they represent, and the federal agency abbreviations used throughout this directory.

| | |
|--------------------------------|---|
| DR. STEVEN R. REZNEK | Environmental Protection Agency (EPA) |
| DR. RUTH CLUSEN | Department of Energy (DOE) |
| DR. GREGORY T. O'CONOR | Department of Health, Education, and Welfare (HEW) |
| DR. DAVID P. RALL | National Institute of Environmental Health Sciences (NIEHS) |
| DR. KENNETH BRIDBORD | National Institute of Occupational Safety & Health (NIOSH) |
| DR. DONNA SHALALA | Department of Housing and Urban Development (HUD) |
| DR. LAWRENCE R. GREENWOOD | National Aeronautics and Space Administration (NASA) |
| DR. H. G. MOORE | Tennessee Valley Authority (TVA) |
| HARRY BROWN | US Department of Agriculture (USDA) |
| C. W. CARLSON | Agricultural Research Service (SEA/AR) |
| DR. EILIF V. MILLER | Science and Education Administration, Cooperative Research (SEA/CR) |
| | Regional Coordinators for University Projects: |
| | Northeast - D. W. ZINN South - C. O. LITTLE |
| | North Central - S. ALDRICH West - J. ASLESON |
| DR. KENNETH R. FARRELL | Economics, Statistics And Cooperative Service (ESCS) |
| D. THORUD | Forest Service (FS) |
| ROBERT MacLAUCHLAN | Soil Conservation Service (SCS) |
| JERRY JASINOWSKI | US Department of Commerce (USDC) |
| R. KAMMER | National Bureau of Standards (NBS) |
| J. P. WALSH | National Oceanic & Atmospheric Administration (NOAA) |
| DR. SIDNEY GALLER | Office of Environmental Affairs (OEA) |
| BRUCE BLANCHARD | US Department of the Interior (USDI) |
| DR. LINDSAY NORMAN, JR. | Bureau of Mines (BOM) |
| HERBERT B. QUINN, JR. (Acting) | Fish and Wildlife Service (FWS) |
| GEORGE H. DAVIS | United States Geological Survey (USGS) |

An alphabetical, cross-referenced listing of all the project contacts, EPA program managers, agency coordinators, and other information sources follows the listing of projects and additional sources. Included are mailing addresses and commercial and, where applicable, FTS telephone numbers.

The health and environmental effects program within the Federal Interagency Energy/Environment Research and Development Program is designed to identify the mechanisms of pollutant movement within the environment and the resulting effects on human, animal, and plant populations which are associated with energy-related activities. The goal of the program is to compile and evaluate information to support decisions relative to the protection of natural biota, human health, welfare, and social goals.

The EPA Program Manager is the individual in EPA's Office of Environmental Processes and Effects Research responsible for coordinating project activities in these areas. The following is a listing of the EPA program managers for the health and environmental effects subprograms:

- | | |
|--|-----------------------|
| • Director, Energy Effects Division, OEPER | W. FRIETSCH, III |
| • Measurement Systems and Instrumentation | J. STEMMLE |
| • Transport and Fate | D. GOLOMB |
| • Health Effects | C. NAUMAN |
| • Ecological Effects | A. GALLI, D. WEBER |

This program is directed toward identifying and quantifying ambient pollutants associated with expanding energy development and toward development of associated pollutant measurement capabilities. The major objectives of the program are to establish a baseline of environmental data so that the multimedia impact on environmental quality from anticipated energy development can be quantitatively established. Also involved is the development of validated sampling and analytical methods and procedures to ensure a measurement capability for pollutants from emerging energy technologies.

- Western energy/environment monitoring study
 - Western regional air and water monitoring and data analysis [D. McNelis EPA]
 - Northern Great Plains energy/air quality baseline information [T. Thoem - EPA]
 - Western air monitoring quality assurance support [S. Bromberg EPA]
 - Atmospheric and meteorological studies of pollutants from energy production in the western United States [R. Pueschel NOAA]
 - Meteorological interpretation and prediction of air quality related to energy activities in the western United States [L. Machta NOAA]
 - Western water monitoring quality assurance support [D. Ballinger EPA]
 - Western groundwater monitoring and techniques development [L. McMillion EPA]
 - Western overhead surface monitoring and techniques development [R. Landers EPA]
 - Energy-related surface and groundwater monitoring studies/western region [H. Hudson USGS]
 - Technical support for western energy-related environmental assessment/overhead monitoring method development [H. Melfi NASA]
- Eastern energy-related environmental assessment [H. Melfi NASA]
- Energy-related radiological monitoring and techniques development [E. Bretthauer EPA]
- Energy-related radiological monitoring quality assurance [A. Jarvis EPA]
- Energy-related air pollutant measurements and instrumentation development [A. O'Keeffe EPA]

- Development of energy-related air measurements, instrumentation, and analytical methods [G. Goldstein - DOE]
- Energy-related air and water pollutant analysis method development [C. Gravatt - NBS]
- Energy-related air and water pollutant standard reference materials [C. Gravatt - NBS]
- Radiological pollutant standard reference materials [C. Gravatt - NBS]
- Development of instrumentation and devices for the measurement of hazardous agents in the occupational environment associated with energy use [W. Wagner - NIOSH]
- Development and evaluation of an integrated approach to the optimization of nuclear power plant radiological surveillance programs [E. A. Belvin - TVA]
- Remote sensing of SO₂ effects on vegetation [H. C. Jones III - TVA]
- Design of a service assessment sampling system [A. B. Craig, J. Dorsey - EPA]
- Development of particulate measurement technique for process evaluation [A. B. Craig, J. Dorsey - EPA]
- Inorganic sampling and analysis of process streams [A. B. Craig, J. Dorsey - EPA]
- Development of process measurements for POM and other organic compounds [A. B. Craig, J. Dorsey - EPA]
- Development of high pressure, high temperature sampling [A. B. Craig, J. Dorsey - EPA]
- Development of fugitive emission measurement techniques [A. B. Craig, J. Dorsey - EPA]
- LIDAR techniques for measuring particulate pollutants from energy production and transport and dispersion processes [V. Derr - NOAA]
- Remote monitoring for energy-related pollutants and effects techniques development [D. McNelis - EPA]
- Energy-related water pollutant monitoring techniques development [D. Ballinger - EPA]

- Energy-related low-level trace contaminant identification, measurement and analysis of solid waste and effluent water [**W. Donaldson - EPA**]
- Water monitoring field instrumentation development [**P. Greeson USGS**]
- Energy-related surface and groundwater studies/eastern region [**F. Kilpatrick USGS**]
- Development of aqueous effluent analytical methods for energy-related sources [**G. Goldstein - DOE**]
- Energy-related remote sensing instrumentation development [**J. P. Mugler, Jr. NASA**]
- Isolation and identification of waterborne pollutants associated with the power industry (steam electric power generation) [**C. W. Holley TVA**]
- Marine measurement quality assurance [**M. A. Basileo NOAA**]
- Ocean oil spill concentration and trajectory forecast [**C. S. Barrientos NOAA**]

The transport processes area traces the transmission by air, water, and soil of pollutants emitted from energy operations from their sources to their destination in man and the environment. Additionally, it covers the physical and chemical changes that the pollutants undergo during their transport. Emphasis in air transport research is on conversion (mainly by coal-burning power plants) of sulfur and nitrogen oxides. Formation and transport of photochemical oxidants from various energy sources is also emphasized.

- Fate of specific pollutants in freshwater [**W. M. Sanders, III EPA**]
- Transport and fate of energy-related pollutants in groundwater [**W. Galegar EPA**]
- Determination of transformation pathways, physical and chemical perturbation, and toxicity of crude oil to freshwater organisms in Arctic lakes [**B. Reid - EPA**]
- Determination of mechanisms of transformation, degradation, fate, and effect of crude oil in stream ecosystems [**B. Reid EPA**]
- Determination of transport pathways, transfer rates, and fate of pollutants and degradation products of crude oil in soil and active layer of permafrost terrain [**B. Reid EPA**]
- Extension of multi-layer, two-dimensional (horizontal) model of circulation to accept a heated discharge as a pollutant [**R. Callaway EPA**]
- Subacute effects of petroleum processing discharges on marine organisms of the West Coast [**D. J. Baumgartner EPA**]
- Identification of by-products from biocides used in coastal marine power plants, and effects upon marine organisms/communities, and quality of coastal ecosystems [**W. P. Davis EPA**]
- Development of community assessment testing, procedures for biocides/natural process interactions and effects [**W. P. Davis EPA**]
- Chemical, physical, and meteorological studies of energy-related pollutants in the atmosphere [**P. Altshuller EPA**]
- Evaluation of models for predicting radiological impact of gaseous releases from nuclear power plants [**E. A. Belvin TVA**]
- Determination of atmospheric transport and transformation of emissions from coal-fired power plants [**H. C. Jones III TVA**]

- Development of simulation models of thermal dispersion and fluid mechanics at critical locations in streams and reservoirs [**R. J. Ruane** TVA]
- Strip mine drainage water quality with emphasis on toxic substances [**R. P. Betson** TVA]
- Radionuclide waste management monitoring [**A. Wallace, C. Strojan** U. of CA via DOE]
- Determination of the transport and fate of fuel wastes through soil and solid waste sites [**R. L. Watters** DOE]
- Oil spill persistence in tundra and impacts in subsurface Arctic ecosystems [**R. L. Watters** DOE]
- Determination of organic pollutant load and dynamics of resulting refinery wastes into marine waters [**H. McCammon** DOE]
- Determination of the load and dynamics of oil refinery wastes in Lake Michigan [**H. McCammon** DOE]
- Transport, transformation, fate, and effects of toxic metals and petroleum hydrocarbons in selected marine ecosystems [**D. A. Wolfe** NOAA]

The health effects research program is devoted to determining the long-term adverse health impacts that can ensue as a consequence of implementing a particular energy policy. Of major concern are those health effects which may result as a consequence of long-term, low-level exposures and that manifest themselves only after a long period of time—carcinogenicity, teratogenicity, mutagenicity and system dysfunction such as cardiopulmonary system disorders. The necessary data are obtained through a coordinated program of clinical, epidemiological, and toxicological studies, and through the development and use of more rapid and sensitive bioscreening techniques.

- Water exposures and effects: heavy metals and toxic organic chemicals [W. Grube - EPA]
- Epidemiological studies of human exposure to pollutants emitted in ambient air as a result of coal conversion and utilization [C. Hayes - EPA]
- Assessment of human exposure-effects relationships [R. Stacy EPA]
- Development and application of *in-vitro* bioassays for mutagenesis, presumptive carcinogenesis, and related toxic effects resulting from exposure to pollutants associated with energy development [M. Waters, R. Bull EPA]
- Studies of carcinogenesis of pollutants from energy sources [D. L. Coffin - EPA]
- Neurobiology and behavioral toxicology [L. Reiter EPA]
- Inhalation toxicology studies of energy-related pollutants [D. Gardner EPA]
- Epidemiological studies of human exposure to pollutants as a result of coal mining [D. Greathouse EPA]
- Identification of the most potent carcinogens, mutagens, teratogens, and physiologically detrimental agents in process streams, products and by-products, and effluents from major fossil fuel extraction and conversion technologies [G. Stapleton DOE]
- Development of cytological and biochemical indicators to estimate toxicity from oil and coal extraction, conversion, and utilization [D. Smith DOE]
- Determination of effects and organ distribution of hazardous trace metals and polycyclic hydrocarbons associated with coal and oil shale extraction, conversion, and utilization [D. Craig DOE]
- Assessment of the hazards of trace and heavy metals and organic agents of non-nuclear energy technologies using chromosome aberration, isozyme patterns, and teratogenic effects on mammalian embryos as indicators [G. Duda DOE]
- Pharmacologic effects [L. Hart NIEHS]

- Identification of damage to cells and cell components resulting from pollutants from non-nuclear energy technologies [L. Hart NIEHS]
- Assessment of the metabolism, fate, and toxicology of particulates and organic compounds associated with non-nuclear energy technologies [L. Hart NIEHS]
- Dose-effect relationship for biological effects of toxic agents in non-nuclear energy technologies [R. Dixon - NIEHS]
- Mechanisms of incorporation, metabolism, deposition, and turnover of toxic agents associated with energy-related hazardous materials [R. Dixon NIEHS]
- Teratogenic and reproductive effects [R. Dixon - NIEHS]
- *Development and testing of models and concepts for extrapolation of cellular and animal data to man, using toxic agents from energy technologies* [D. Hoel - NIEHS]
- Extrapolation and risk assessment [D. Hoel NIEHS]
- Determination of dose effect relationships for mutagenic agents associated with non-nuclear energy technologies [H. Malling NIEHS]
- Development of physiological indicators of damage from toxic agents [H. Malling NIEHS]
- Subcellular, cellular, and organ toxicity [C. F. Chignell - NIEHS]
- Inhalation toxicity and pulmonary effects [P. Nettesheim NIEHS]
- Behavioral and neurotoxic effects [C. L. Mitchell NIEHS]
- Mutagenic effects [F. J. de Serres NIEHS]
- Occupational health effects research associated with energy technologies [A. Thomas NIOSH]

This program has the overall goal of assessing the environmental effects of present and proposed energy development activities on fresh surface and groundwater, marine and estuarine waters, and atmospheric/terrestrial ecosystems. The program includes research on (1) the nature and effects of energy-related pollutants resulting from extraction of raw fuels on the terrestrial ecosystem; (2) the determination of background contamination levels, in both the marine and estuarine environments, resulting from oil and gas drilling operations; and (3) the accumulation of baseline information needed to predict the impacts of heat on the freshwater ecosystems of lakes, rivers, and ponds.

- Development of models for comparison of pollutant impact on population dynamics of fishes [E. Schneider EPA]
- Determination of toxicological effects of pollutants from petroleum extraction and fossil-fueled refineries and power plants on marine and estuarine organisms and ecosystems [D. Baumgartner EPA]
- Determination of thermal and thermal-metal synergistic effects on marine organisms [E. Schneider EPA]
- Determination of dose-response relations of pollutants on selected western arid and grassland species from coal and oil shale processes [E. Preston EPA]
- Determination of the nature, loading, distribution, and long-term effects of crude oil in the Gulf of Alaska marine and estuarine ecosystem [B. Reid EPA]
- Determination of toxicity to marine organisms of petrochemicals and energy-related organic solvents from offshore activities and ocean dumping [T. Duke EPA]
- Effects of aqueous effluents from *in situ* fossil fuel processing technologies on aquatic systems [L. H. Mueller EPA, D. Farrier DOE]
- Chemical and biological characterization of oil shale processing and coal conversion effluents [L. H. Mueller EPA]
- Evaluation of the environmental impact of energy-related organic compounds on aquatic organisms [J. I. Teasley EPA]
- Dispersal of coal dust from trans-shipment and power plant storage facilities [K. E. Biesinger EPA]
- Assessment of energy-related toxicant stress to aquatic ecosystems in channels [T. Roush EPA]
- Evaluation of human and environmental exposure to air and water pollutants from coal-fired steam plants [G. E. Glass EPA]

- Determination of the overall environmental effects of atmospheric fallout on aquatic ecosystems [G. E. Glass EPA]
- Critical review and evaluation of research on the impact of energy-related wastes on the aquatic environment [K. E. Biesinger EPA]
- National coordination of ecological damage assessment programs for spills of oil and hazardous materials in marine and fresh waters [P. Lefcourt EPA]
- Biological monitoring of mollusks as sentinel organisms for pollutants in coastal waters of the U.S. [E. Schneider, F. G. Lowman - EPA]
- Coastal ecosystems characterization [D. Woodard - USDI]
- Assessment of water quality in strip-mined areas as it relates to habitat for aquatic organisms and wildlife species associated with these water bodies [D. Thorud - USDA]
- Assessment of the redeposition and stabilization of mine spoils and identification of technologies that will enhance water quality for associated aquatic life [D. Thorud USDA]
- Assessment of effects of mining-related transportation systems in water, air, soil, plant, animal, and aesthetic resources [D. Thorud USDA]
- Development of operational technical information system for reclamation of lands affected by mining [D. Thorud USDA]
- Development of pre-operational mining reclamation plans [R. Follett USDA/AR]
- Determination of effect of strip-mining and reclamation processes on effluent water quality and quantity [R. Follett - USDA/AR]
- Determination of effect of strip-mine reclamation practices on the nutritional quality of forages or other crops grown on reclaimed area [R. Follett - USDA/AR]
- Evaluation of species and seed sources for revegetation of energy resource extraction areas with native plants [R. Follett USDA/AR]
- Determination of soil characteristics developing on spoils of varying ages relating to root growth and biological productivity [R. Follett USDA/AR]

- Environmental effects of energy development [E. V. Miller - USDA/SEA/CR]
 - Water relations and root development [R. Smith - U. of WV via USDA/SEA/CR]
 - Hydrologic management in strip-mining [D. Kirkham - IA St. U. via USDA/SEA/CR]
 - Crops productivity [R. Hanson - U. of MO via USDA/SEA/CR]
 - Resource inventory systems [W. Nelson - ND St. U. via USDA/SEA/CR]
 - Drainage requirements [C. E. Anderson - IA St. U. via USDA/SEA/CR]
 - Remote-sensing applications [C. Johannsen - U. of MO via USDA/SEA/CR]
 - Ground truth for remote-sensing [C. Johannsen - U. of MO via USDA/SEA/CR]
 - Acid-forming minerals [L. Hossner - TX A&M via USDA/SEA/CR]
 - Model of hydrology [B. Barfield - U. of KY via USDA/SEA/CR]
 - Forest site preparation [R. Hay - U. of TN via USDA/SEA/CR]
 - Hydrologic effects [V. Shanholtz - VPI via USDA/SEA/CR]
 - Soil genesis and biota [D. Dollhopf - MT St. U. via USDA/SEA/CR]
 - Germination and seed development [L. Wiesner, G. Brown - MT St. U. via USDA/SEA/CR]
 - Tree-mycorrhizal associations [C. Reid - CO St. U. via USDA/SEA/CR]
 - Precipitation management [W. Hall - CO St. U. via USDA/SEA/CR]
 - Vegetation-environment [C. Bonham - CO St. U. via USDA/SEA/CR]
 - Salt translocation [R. Hodder - MT St. U. via USDA/SEA/CR]
 - Mine spoil microbiology [W. Lindemann - NM St. U. via USDA/SEA/CR]
 - Impacts of development [J. Jacobs - U. of WY via USDA/SEA/CR]
 - Minesoils, Powder River basin [G. Nielsen - MT St. U. via USDA/SEA/CR]

- Summarization of results of research on the physiological, toxicological, and ecological effects of oil, primarily on ducks [L. Stickle USFWS]
- Description of guidelines and methodology for the development, synthesis, analysis, and interpretation of complex information relative to major coastal ecosystems [H. Tait - USFWS]
- Preparation of reports on three coastal regions subject to energy development; emphasis on value of resources subject to human-induced environmental alternatives [H. Tait - USFWS]
- Identification and demonstration of rapid and reliable method of inventorying and characterizing wildlife habitat; emphasis on requirements for food, cover, breeding [R. Stewart, Jr. - USFWS]
- Development of methods for estimating impacts of power plants on fish and shellfish [E. S. Fritz USFWS]
- Development of in-stream flow methodologies to determine flow requirements for biological/ fisheries stability in areas affected by increased energy development—both east and west [H. Doerksen USFWS]
- Development of mechanisms to identify and monitor the activities of endangered species in areas under stress from energy development [H. Doerksen USFWS]
- Determination of water quantity requirements of fish and wildlife in the upper Colorado and upper Missouri River basins [H. Doerksen USFWS]
- Compensation in fish populations [C. P. Goodyear USFWS]
- Effects of entrainment in cooling systems on fish eggs and larvae [D. Hamilton, Jr. DOE]
- Ecological effects of cooling systems [D. Hamilton, Jr. - DOE]
- Impact of condenser passage on plankton [D. Hamilton, Jr. - DOE]
- Effects of oil spills on tundra and thaw ponds [R. L. Watters - DOE]
- Effects of construction and operations of Alaska pipeline on aquatic habitats [R. L. Watters DOE]
- Long-term effects of hydrocarbons on selected ecosystems and associated organisms [H. McCammon DOE]
- Surveys on oil extraction and transport and related effects on coastal ecosystems [H. McCammon DOE]

- Effects of trace metals on crop and forest ecosystems [R. A. Lewis DOE]
- Intake of metals by marine organisms [L. G. Hart - NIEHS]
- Comparison of pharmacokinetics and toxicity in mammals of metals consumed in diet through shell-fish vs drinking of water [L. G. Hart - NIEHS]
- Synergistic action of temperature with other pollutants on marine species [L. G. Hart NIEHS]
- Relationship between toxic fractions of crude oil and petroleum products and tumor formation in marine species [L. G. Hart - NIEHS]
- Relationships of atmospheric pollutants ($\text{SO}_x + \text{NO}_x$) from coal-fired power plants on terrestrial ecosystems [H. C. Jones III TVA]
- Thermal effects from mechanical draft cooling towers on vegetation and soil [H. C. Jones III - TVA]
- Development of baseline information and identification, characterization and quantification of transfer and fate and effects of coal-fired power plant emissions in terrestrial ecosystems [H. C. Jones III TVA]
- Response of freshwater systems to electric power production [B. G. Isom TVA]
- Production of anthropod pests and vectors in strip-mine pools [B. G. Isom TVA]
- Ecological recovery after reclamation of toxic spoils left by coal surface mining [T. G. Zarger TVA]
- Environmental assessment of northern Puget Sound and Strait of Juan De Fuca [H. S. Harris NOAA]
- Comparison/analysis of an existing marine ecosystem under stress of an active oil field with a similar ecosystem in an undisturbed area [E. F. Klima NOAA]
- Design, establishment, operation, and evaluation of a data management system for interagency energy-related marine and meteorological programs [K. Hughes NOAA]

The Control Technology Program is designed to provide information on the types and quantities of pollutants released by energy supply activities and to develop or stimulate the development of control options where necessary. This technology research program is further divided to group research on the activities associated with fuel extraction and processing separately from that research on energy conservation and utilization. The following is a listing of the EPA program managers who oversee the control technology programs:

- Director, Control Technology Program F. PRINCIOTTA
- Fuel Extraction W. BLOCH
- Fuel Processing, Preparation & Advanced Combustion M. ALTSCHULER
 - Fluidized Bed Combustion M. ALTSCHULER
 - Coal Cleaning W. McCARTHY
 - Synthetic Fuels K. JAKOBSON (Oil Shale)
M. ALTSCHULER (Coal)
- Environmental Impact of Conventional and Advanced Energy Systems D. BERG
 - Integrated Technology Assessment L. SMITH
P. SCHWENGELS
 - Waste Heat/Waste Products K. JAKOBSON
 - Conventional Combustion Environmental Assessment D. BERG
 - Advanced Energy Systems and Conservation B. HEILER
- Flue Gas Sulfur Oxide Control R. STATNICK
- Nitrogen Oxide Control R. STATNICK
- Flue Gas Particulate Control G. REY

The fuel extraction program deals with environmental quality problems associated with the technologies and processes for obtaining fuels, oil or natural gas extraction, oil shale development, and coal mining. The major purposes of the research program are (1) to assess the existing and potential adverse environmental impacts from active and planned oil and gas production, storage, and transportation; (2) to develop methods, technology, and equipment to prevent, control, and abate environmental pollutants from these operations including spill clean-up; and (3) to document the technical/operational feasibility and cost effectiveness of environmental control options.

- Oil and Gas Production [**I. Wilder, J. S. Farlow EPA**]
 - Control and clean up oil spills, including limiting extent of contamination and mitigating adverse environmental effects
 - Protect and restore shorelines contaminated by oil
 - Evaluation of effectiveness of 1973 oil spill prevention regulation (40 CFR, Part 112) in reducing the number of spill incidents
 - Minimizing adverse environmental impacts from the installation and operation of oil and gas production facilities (onshore and offshore)
 - Cost-effective methods for treating bilge and ballast water at shore reception facilities
- Solid fossil fuels [**R. Hill, E. Harris EPA**]
 - Control of environmental damages from active and abandoned western U.S. coal surface and underground mines and associated surface disturbances
 - Control of environmental damages from oil shale and tar sands extraction disposal of spent waste from beneficiation
 - Control of environmental damages (except radiation) from active and abandoned uranium extraction and beneficiation operations
 - Control of environmental damages from the transportation of solid fuels
- Reduction of adverse environmental effects from uranium mill wastes [**R. Kennedy DOE**]
- Eastern coal surface mining: vegetative methods and materials [**D. Thorud - USDA**]
- Western coal and oil shale mining: vegetative methods and materials [**R. MacLauchlan USDA/SCS**]

- Surface manipulations for enhanced coal and oil shale mine vegetation [R. F. Follett USDA/SEA/AR]
- Mineland reclamation
 - Mineland reclamation [D. McCormack USDA]
 - Abandoned mineland reclamation [H. B. Montgomery USDI, D. J. O'Bryan, Jr. - USDI]
 - Reclamation use of containerized seedlings [R. Hutnik PA St. U. via USDA/SEA/CR]
 - Classifying minesoils [R. M. Smith U. of WV via USDA/SEA/CR]
 - Waste application in revegetation [R. Keefer U. of WV via USDA/SEA/CR]
 - Weathering of overburdens [C. Roth Purdue via USDA/SEA/CR]
 - Use of sewage sludge and topsoil [F. Haghiri St. of OH via USDA/SEA/CR]
 - Reclamation of surface-mined land [C. Barnhisel - U. of KY, I. Jansen - U. of IL via USDA/SEA/CR]
 - Overburden criteria for plant growth [W. Byrnes Purdue via USDA/SEA/CR]
 - Geologic criteria in revegetation [C. Barnhisel - U. of KY via USDA/SEA/CR]
 - Rehabilitation of oil shale and coal lands [C. McKell - UT St. U. via USDA/SEA/CR]
 - Belowground biology [D. Coleman CO St. U. via USDA/SEA/CR]
 - Legumes in revegetation [W. Campbell UT St. U. via USDA/SEA/CR]
 - Forage production model [T. Sammis NM St. U. via USDA/SEA/CR]
 - Amendments for sodic and coaly spoils [W. Gould - NM St. U. via USDA/SEA/CR]
 - Coal surface mining reclamation and mining [D. Maneval - USDI]
 - Reclamation of *in situ* oil shale projects or development sites [M. Smith, Q. Skinner - U. of WY via DOE]

This program participates in the development of advanced technologies for fossil fuel processing by providing environmental assessments, bench-scale research, technology assessments and guidance in process control technology. There is close cooperation with the Department of Energy process development and environmental programs to identify and quantify all residuals from fluidized bed combustors, synthetic fuels, oil shale development, and coal cleaning. Comprehensive environmental assessments are performed for these technologies to anticipate the severity of each environmental threat and corresponding means for control.

Fluidized Bed Combustion

The Interagency Program for direct combustion involves (1) environmental assessment of direct combustion technology, (2) development of environmental control technology for FBC, and (3) chemically-active fluidized bed (CAFB) oil gasification/clean-up combustion processes development.

- Multimedia pollutant assessment for conventional combustion systems [E. Plyler, W. Ponder EPA]
- Environmental assessment of stationary combustion control technology [R. Hall, J. Bowen EPA]
- Characterization of emissions from conventional combustion systems [W. Ponder, W. Peters EPA]
- Environmental assessment of residual oil processing [S. Rakes EPA]
- Environmental assessment of wastewater effluents [M. C. Osborne EPA]
- Characterization of effluents from coal-fired utility boilers [H. B. Flora II TVA]
- Fly ash characterization and disposal [H. B. Flora II TVA]
- Environmental assessment and systems analysis of combustion modification for stationary sources [R. Hangebrauck, J. Bowen EPA]

- Long-term performance and corrosion testing of combustion modifications for coal-fired utility boilers [**D. Lachapelle** EPA]
- Development of combustion controls for stationary reciprocating internal combustion engines and gas turbines [**J. Wasser, W. S. Lanier** EPA]
- Development and application of improved burner designs and advanced processes for NO_x emissions control [**G. B. Martin** EPA]
- Development of combustion modification technology for industrial and commercial boilers and residential systems [**G. B. Martin, R. Hall** EPA]
- Environmental assessment and control technology study of industrial process combustors and afterburners [**J. Wasser** - EPA]
- Fundamental combustion research for pollution control [**W. S. Lanier** - EPA]
- FBC environmental assessment [**D. B. Henschel** - EPA]
- Environmental assessment applications testing of combustion modification technology for stationary sources [**R. Hangebrauck** EPA]
- Development of control technology for pollutants and processes with fluidized bed combustion [**D. B. Henschel** EPA]
- Environmental assessment of fluidized bed combustion technology [**D. B. Henschel** EPA]

The primary objective of the physical and chemical coal cleaning research and development program is to develop commercially available processes to remove the ash, inorganic sulfur, and as much of the organic sulfur as possible from coal, thus making an increased quantity of coal acceptable for use in areas where air quality regulations allow the combustion of medium (one or two percent) sulfur coals.

- Environmental assessment of coal cleaning technologies, storage and transportation [**J. Kilgroe, R. Hangebrauck, K. Janes EPA**]
- Investigation, testing, evaluation, and development of coal cleaning technology and process controls [**D. Tamny EPA**]
- Development of control technology for potentially harmful trace elements in coal cleaning wastes [**E. Wewerka DOE, D. Kirchgessner EPA**]
- Evaluation of the cleanability studies on U.S. coals [**J. Kilgroe EPA**]
- Investigation of coal preparation, plant pollution, control techniques [**R. M. Cole, J. Kilgroe EPA**]

The Interagency Program for synthetic fuels seeks to assure that commercial application of synthetic fuel production and utilization can be achieved within tolerable environmental limits. The program's approach involves three principal efforts: assessing environmental effects of synthetic fuels technology, establishing control objectives through standards-of-practice manuals and support of standard-setting, and developing control technology as necessary.

- Environmental assessment of potential pollutants from synthetic fuel processes (coal gasification and liquefaction) [**W. Rhodes** EPA]
- Development of multimedia pollution control technology for synthetic fuel processes [**M. Gottlieb** DOE]
- Chemically active fluidized bed [**S. Rakes** EPA]
- Identification of potential pollutants from developing oil shale processes [**W. McCarthy** - EPA]
- Development of wastewater control technology for oil shale processes [**W. McCarthy** - EPA]
- Development of air control technology for oil shale industry [**R. Thurnau** EPA]
- Development of control technology monitoring methodology [**P. Fox** LBL, **P. Mills** EPA, **R. Magee** Radian]
- Identification of potential pollutants and development of control technology for noncoal synthetic fuel processes [**T. Powers**, **R. Thurnau** EPA]

Research in this program is designed to: assess environmental risks; conduct bench-scale system and/or control technology research; and identify environmentally, socially, and economically acceptable alternatives for modified conventional energy systems, advanced energy supply concepts, and energy conserving techniques. The program, which will assist EPA in selecting policies and in setting environmental standards, comprises comprehensive environmental assessments of energy systems. These integrated technology assessments quantify the cost/risk/benefit tradeoffs of energy systems and pollution control alternatives. A comprehensive assessment of unregulated and regulated residuals from conventional combustion sources is one major project of this program. Other environmental assessments included in this program will examine industrial energy conservation, wastes as fuel, solar energy, energy-related solid and waterborne residuals, geothermal energy, waste heat recovery, and advanced energy cycles.

Integrated Technology Assessment

The overall objective of the integrated technology assessment (ITA) program is to identify environmentally, socially, and economically acceptable alternatives for meeting national energy objectives and to assist in the selection of "optimum" policies for the attainment of associated environmental quality goals.

- Information support for Montana state officials, using appropriate federal, state, and local information sources [A. Lefohn EPA]
- Federal non-nuclear energy, research, and development program (Section 11) [G. Ondich EPA]
- Technology assessment of western energy resource development [M. Devine U. of OK via EPA]
- Integrated technology assessment of energy development in the Appalachian region [V. Jelen EPA]
- Electric utility simulation and industrial coal use studies [A. Van Horn TEKNEKRON via EPA]
- Ohio River Basin Energy Study [J. Stukel, B. Keenan - ORBES]
 - Water supply and energy development effects on water quality, land use, public health
 - Coal industry and labor force structure and impacts of energy development

- Projection of population size and demographic characteristics (1977-2000)
- Government regulations and public participation in energy development
- Demand for energy, capital availability
- Regional economic analysis
- Integrated assessment of Texas lignite development [D. White TX Energy Adv. Coun. via EPA via DOE]
- Regional scale transport and transformation of sulfur pollutants in the atmosphere [L. Smith - EPA]
- Environmental sulfur budget for the eastern U.S. [R. Husar WA U. via EPA]
- Cost/benefit analysis of LWR fuel reprocessing [R. Husar WA U. via EPA]
- New source performance standard development support activities [L. Smith -EPA]
- Methodology development for the technology assessment modeling project [L. Smith - EPA]
- Integrated assessment of petroleum transportation [J. Stemmler EPA]
- Coal technology assessment [G. Hereford EPA]
- Consequences of alternative public policies on inter-regional patterns of coal development [J. Barse USDA]
- Economic impact of coal development in the Northern Great Plains [L. Bender USDA]
- Development of a cost/risk/benefit methodology for western energy development [A. Ford DOE]
- Development of energy/environment economic projection models for multi-county areas [H. Hinote TVA]
- Application of computer graphics for regional integrated assessment of power systems [H. R. Hickey TVA]

The overall objective of this activity is the identification, characterization, and assessment of liquid and solid effluents (including waste heat) from electric-generating facilities, and development, where appropriate, of control technology for the environmentally acceptable disposal of these effluents. The efforts conducted are designed to identify potential environmental effects and to define and reduce the costs of power plant waste disposal options.

Primary emphasis is focused on developing the data required to promulgate effluent guidelines required by the Federal Water Pollution Control Act and on providing the background information required to promulgate regulations required by the Resource Recovery and Conservation Act for the disposal of wastes generated by the utility industry.

- Advanced waste heat control [**H. B. Flora II** TVA]
- Waste heat utilization [**B. J. Bond** TVA]
- Evaluation of performance and economics of advanced cooling technology [**E. Plyler** EPA]
- Utilization of waste heat and water from utility and industrial plants [**M. Maxwell, T. Brna** EPA]
- Evaluation of potential and limitations of ocean disposal as a radioactive waste management alternative [**R. Dyer** EPA]
- Hydrogeologic aspects of low-level radioactive waste disposal [**G. D. De Buchananne** USGS]
- Management of Federal low-level waste [**G. H. Daly** - DOE]
- Beneficial use of reactor by-product isotope Cesium-137 for the disinfection of municipal sludge for recycle to agribusiness [**W. Remini** - DOE]
- Development of processes for disposal of flue gas cleaning wastes [**J. W. Jones** - EPA]
- Development of techniques for disposal or use of waste pollutants from combustion sources and associated control processes [**J. W. Jones** EPA]

The objective of this program is the comprehensive assessment of the environmental, economic, and energy impacts of multimedia emissions of pollutants from stationary industrial, utility, residential, and commercial conventional combustion processes. Primary emphasis is on identifying and evaluating (1) the relationships between various emissions and residuals from conventional combustion, (2) multi-pollutant synergistic impacts, (3) cross-media impacts, (4) environmental impact tradeoff as relative emission levels of individual pollutants are adjusted by control systems, and (5) unregulated pollutant emissions, impacts, and control methods.

- Long-term implications of radioactive waste management (**J. Swift - EPA**)
- Assessment of environmental impact of shallow land burial of low-level radioactive waste [**L. Meyer EPA**]
- R&D to support development of regulatory standards for low-level radioactive waste disposals [**J. Davis NRC**]
- Advanced energy conversion environmental assessment and research [**A. Christianson, H. Bostian, W. Cain EPA**]
- Indoor air quality assessment and control of pollutants [**W. Cain EPA**]
- Assessment and development of air pollution control technology for waste-as-fuel processes [**R. Olexsey EPA**]
- Assessment and development of water pollution control technology for waste-as-fuel processes [**R. Olexsey EPA**]
- Assessment of existing processes for the separation of recoverable materials from solid waste [**R. Stenborg EPA**]
- Assessment of existing processes for preparing refuse-derived fuels and feedstocks [**R. Stenborg EPA**]
- Assessment of the co-incineration of sewage sludge with waste [**R. Stenborg EPA**]

The general objectives of this program are to develop environmental assessments of energy conservation methods and advanced energy systems and to contribute to the development of pollution control technologies for resource recovery, energy-conserving industrial processes, advanced energy conversion cycles, and advanced energy systems—solar and geothermal energy. Techniques and technologies are under development by the Department of Energy, the Department of Housing and Urban Development, and other agencies in these areas, and by the EPA in the resource recovery area. Outputs will support two interagency working groups—the Interagency Task Force on Energy Conservation in Buildings and the Interagency Task Force on Energy Conservation in Industry, as well as EPA regulatory responsibilities assuring the environmental compatibility of techniques and technologies in each subject energy area.

- Pollution control problems and benefits of improved energy management [R. Mournighan, C. C. Lee EPA]
- Characterization of multimedia pollutants resulting from using wastes as fuel [H. Freeman EPA]
- Identification and characterization of industrial waste streams [A. Christianson, G. Huffman EPA]
- Evaluation of major processes for co-firing waste with coal or other wastes [R. Olexsey - EPA]
- Development of processes for co-firing with oil [R. Olexsey EPA]
- Evaluation processes for thermochemical conversion of waste [W. Liberick EPA]
- Development of criteria for pollutants resulting from wastes-as-fuel processes [R. Stenborg - EPA]
- Waste stream surveys for non-industrial waste sources [R. Stenborg EPA]
- Evaluation of major bioconversion waste-to-energy processes [R. Stenborg - EPA]
- Geothermal environmental impact assessment: surface and groundwater monitoring for contaminants [D. Gilmore EPA]
- Geothermal energy resources and control technology assessment and research [R. Hartley, A. Christianson EPA]
- Solar energy environmental assessment and research [C. C. Lee, A. Christianson EPA]
- Resource observation [P. Thome NASA]
- New techniques for improving mineral and energy resource exploration strategy [B. B. Schardt NASA]

This program includes sulfur oxide pollution control research and development relating to electric utility and industrial power generation. Major efforts are directed towards flue gas desulfurization (FGD) technology development and assessment; assessment of the capital and operating costs of FGD systems; increasing FGD system reliability and reducing sulfur oxide emission levels with little or no cost impact, and transferring technological innovations to the public sector. Selected projects include:

- Development and demonstration of several processes for regenerable flue gas desulfurization [R. Stern EPA]
- Enhancement of flue gas desulfurization technology transfer [R. Stern EPA]
- Development and demonstration of non-regenerable flue gas desulfurization technology [E. Plyer, M. Maxwell EPA]
- Marketing evaluation of by-products from flue gas desulfurization processes [W. O'Brien TVA]
- Information, technology transfer, computer economics [R. L. Torstrick TVA]
- Development of management techniques for the revegetation of SO₂ waste disposal products [J. L. Crowe, J. C. Duggan - TVA]
- Development of flue gas desulfurization technology—pilot plant studies of magnesium oxide scrubbing [K. Schuppert, W. Wells TVA]
- Development of flue gas desulfurization technology—Shawnee lime/limestone scrubbing program [G. A. Hollinden, J. L. Crowe, H. L. Faucett TVA]
- Energy requirement conservation study of selected processes for removing SO₂ from power plant gases [G. G. McGlamery TVA]
- Development of comparative economics of SO₂ emission control processes [G. G. McClamery TVA]

The purpose of this program is to develop the best practicable combustion technology for the control of NO_x emissions from the leading categories of stationary sources and diesel engines. Stationary source categories include utility boilers, commercial/industrial boilers, residential heating systems, stationary engines, and advanced combustion processes. Advanced combustion processes such as advanced coal burners and coal burner systems are being studied and fundamental engineering and analytical support studies are also being conducted to evaluate the potential of these advanced methods of NO_x emission control and energy conservation. The research on controlled combustion also includes fuel conditioning for sulfur oxide removal.

- Develop comparative economics of NO_x emission control processes [T. Tarkington, J. D. Maxwell, T. A. Burnett TVA]
- Environmental impact assessment of NO_x flue gas treatment technology [R. Stern EPA]
- Development and assessment of state-of-the-art technology for NO_x flue gas treatment [R. Stern EPA]
- Development of criteria for extension of applicability of low-emission high-efficiency coal burners [G. B. Martin EPA]
- Environmental assessment of stationary source NO_x control technologies [J. S. Bowen EPA]
- Field testing application of improved combustion technology to power generation combustion systems [R. E. Hall EPA]
- Advanced combustion systems for stationary gas turbine engines [W. S. Lanier EPA]
- Pilot scale evaluation of advanced combustion control techniques for fossil and waste fuels [D. G. Lachapelle EPA]
- Effects of fuel properties and atomization parameters on NO_x control for heavy liquid fuel-fired package boilers [W. S. Lanier EPA]
- Development of catalyst and system design criteria for catalytic combustors with application to stationary sources [G. B. Martin EPA]
- Characterization of emission and combustion performance of alternate fuels [G. B. Martin EPA]
- Characterization and design evaluation for commercial combustion systems [R. E. Hall EPA]
- Bench-scale evaluation of simultaneous NO_x/SO_x flue gas treatment technology [J. D. Mobley EPA]

- Bench-scale evaluation of NO_x flue gas treatment technology [J. D. Mobley EPA]
- Long-term optimum performance/corrosion tests of combustion modification for utility boilers [D. G. Lachapelle EPA]

This program identifies and develops effective practicable technology to control aerosol emissions from manmade sources. Source categories addressed include industrial combustion and energy processes. Major research efforts in the program are assessment and extension of the capability of conventional systems (electrostatic precipitators, scrubbers, or fabric filters) for abating aerosol emissions, exploration of new and improved methods of control, and bench-scale investigation of specific control methods for major problem sources (low-sulfur coal combustion, new fuels, power production, and selected industrial processes).

- Development of control technology for removing fine particulates from waste gases [**J. Abbott EPA**]
- Development of technology for high temperature/pressure particulate control for advanced energy systems [**D. Drehmel EPA**]
- Effect of temperature, oxidation conditions - distribution of metals in various particle fractions of sludge and char [**H. Wall EPA**]
- Fine particle control at high temperature and pressure [**D. C. Drehmel EPA**]
- The use of electrostatically-charged fog for control of dust from open sources [**D. C. Drehmel EPA**]
- Field testing application of improved combustion technology to power generation combustion systems [**R. E. Hall EPA**]
- Characterization and design evaluation for commercial combustion systems [**R. E. Hall EPA**]
- Particulate sampling and support [**B. Harris EPA**]
- Demonstration of baghouses for collection of fly ash from low-sulfur coal [**D. L. Harmon EPA**]
- Demonstration of sodium conditioning of fly ash to reduce electrical resistivity [**L. E. Sparks EPA**]
- Engineering evaluation of fine particle resistivity/high resistivity electrostatic precipitators [**L. E. Sparks EPA**]
- Transport diagnosis of high resistivity fly ash in electrostatic precipitators by LASER Doppler instrumentation [**L. E. Sparks EPA**]
- Investigation of the effect of electrostatic precipitators, scrubbers, and baghouses on in-stack opacity [**L. E. Sparks EPA**]
- Effects of conditioning agents on emissions from coal-fired boilers [**L. E. Sparks EPA**]

This directory of additional information sources represents only some of the many agencies and organizations involved in energy/environment R&D. Those listed here are directly related to concerns addressed by the Interagency Program.

PROGRAM PLANNING AND DEVELOPMENT

- Environmental Protection Agency

Office of Research and Development

Office of Environmental Engineering and Technology

— Energy Processes Research

— Industrial and Extractive Processes

— Research Laboratories

IERL/RTP

IERL/Cincinnati

MERL/Cincinnati

Office of Environmental Processes and Effects Research

— Health and Environmental Effects

— Research Laboratories

ESRL/RTP

ERL/Narragansett

ERL/Gulf Breeze

ERL/Corvallis

ERL/Duluth

ERL/Athens

RSKERL/Ada

DR. STEPHEN J. GAGE

DR. STEVEN R. REZNEK

FRANK PRINCIOTTA

CARL SCHAFER

DR. JOHN K. BURCHARD

DR. DAVID G. STEPHAN

FRANCIS T. MAYO

DR. ALAN HIRSCH

WILLIAM FRIETSCH, III

DR. ALFRED H. ELLISON

DR. TUDOR DAVIES

DR. HENRY ENOS

DR. THOMAS A. MURPHY

DR. J. DAVID YOUNT

DR. DAVID W. DUTTWEILER

WILLIAM C. GALEGAR

- Department of Energy:
 - Energy Technology EMILIA L. GOVAN
 - Energy Research JOHN DEUTCH
 - Resource Applications ELLISON BURTON
 - Program Coordination GEORGE R. SHEPHERD
 - Management Support JOHN C. WHITNAH
 - Environmental Compliance and Overview ROBERT J. CATLIN
 - Technology Impacts PETER W. HOUSE
 - Health and Environmental Research W. W. BURR, JR

- Department of Commerce, National Oceanic and Atmospheric Administration:
 - Ocean energy, natural gas conservation and usage forecasting, and nuclear waste management DR. RICHARD LEHMAN
 - National weather modification monitoring and program monitoring of weather modification for NOAA DR. RONALD L. LAVOIE

- U.S. Department of the Interior:
Fish and Wildlife Service
 - Land and water resource development planning TOM BOND

- National Bureau of Standards:
 - Reduced energy waste for energy use and conversion efficiency improvement DR. JACK E. SNELL

- U.S. Department of Agriculture:
 - Conservation of energy, renewable or noncritical energy sources use; physical and socioeconomic consequences of alternatives for energy production availability and use DR. KEITH R. SHEA,
DR. LANDY B. ALTMAN

- Office of Energy

DR. WELDEN BARTON,
HARRY E. BROWN

- National Aeronautics and Space Administration:

- Application of space-environment characteristics to energy-related problems on earth

DONALD A. BEATTIE

- U.S. Department of Justice:

- Legal actions relating to control and abatement of pollution sources, and wetlands preservation

ANGUS MACBETH

- U.S. Department of Transportation, Federal Aviation Administration:

- Stratospheric and lower atmospheric pollution problems

JOHN E. WESLER,
N. SUNDARARAMAN

- Aviation standards and regulations

ANTHONY J. BRODERICK

- National Science Foundation :

- Problem focused research applications

DR. CHARLES C. THIEL, JR.

- Ecology, ecosystem studies, and systematics

DR. JOHN BROOKS

- Policy studies in environment, energy and resources

DR. FRANK HUBAND

RESEARCH INFORMATION SYSTEMS

- U.S. Environmental Protection Agency:

- Interagency Technical Information Coordination

FRANCINE SAKIN JACOFF

- Office of Research and Development Technical Information Coordinator

RICHARD M. LASKA

- Office of Research and Development Information System (CRDIS)

ALBERT PINES

- Technology Transfer Program
Environmental Protection Agency Project-level technical reports

ROBERT E. CROWE

- U.S. Department of Energy:
 - Inventory of Federal energy-related environment and safety research SUSAN ROSE
 - Director, Office of Program Coordination DR. GEORGE SHEPHERD
 - Office of Energy Information Services JOHN DANIELS
General inquiries on energy issues, provides answers or refers to appropriate Department of Energy Office
 - Office of Energy Research DR. JAMES LEISS
- U.S. Department of Agriculture:
Office of Energy Liaison for energy concerns
 - Program and policy coordination WELDON BARTON
- National Oceanic and Atmospheric Administration:
 - National Environmental Satellite Service JERRY C. GLOVER
 - Environmental Data Services DR. THOMAS S. AUSTIN
- Oak Ridge National Laboratories Inventory of Energy R&D:
 - Project information DR. GLORIA M. CATON
- Library of Congress:
 - Energy bibliographies CONSTANCE CARTER
- Smithsonian Science Information Exchange: SAMUEL LIEBMAN
Project level energy information on Federally funded R&D

PUBLICATIONS SERVICES

- Environmental Protection Agency/Office of Research and Development:
 - Technical information publications LINDA K. SMITH

- National Technical Information Service:

- Clearing-house for Government funded reports
- General energy
- Solid waste
- Energy
- Air
- Water pollution

EDWARD LEHMANN

AUDREY HUNDEMANN

AUDREY HUNDEMANN

DIANE CAVAGNARO

ROBENA BROWN

QUALITY ASSURANCE

- National Bureau of Standards:

- Analytical chemistry standard reference methods for organic and inorganic pollutants, particulates, and gases
- Radioactivity standards and measurement methods applied in neutral environmental matrices
- Atmospheric pollution measurements and standard reference materials
- Trace analysis for identification of pollutants in water; development of standard reference materials for instrument calibration of water pollution measurements; characterization of flow properties for sample collection

DR. PHILIP LaFLEUR

DR. CHRIS KUYAPT

DR. W. ZIELINSKI, JR.

DR. L. McCLENDON

ENERGY EFFICIENCY

- National Aeronautics and Space Administration:
Application of space experience to energy-related problems on earth

- Advanced aerodynamics and active controls systems development for energy-efficient transport
- Advanced propulsion systems development
- Development of composite structures for weight savings to fuel economy

KENNETH E. HODGE

FREDERICK P. POVINELLI

DR. MICHAEL SALKIND

- Department of Commerce:
 - Energy-conserving pollution standards for manufacturing and electric generating industries ROBERT GRANT
- Department of Transportation:
 - Accessible transportation environment for the handicapped and elderly; Historic preservation; Air Quality/Transportation planning interface; Transportation and the urban environment MARTIN CONVISSER
- DOT/National Highway Traffic Safety Administration:
 - National Energy Efficient Driving System: *Train and inform drivers to conserve fuel* JOHN EBERHARD
 - Voluntary truck and bus fuel economy improvement program W. HARRY CLOSE
 - Research and analysis of automotive fuel economy SAMUEL F. POWEL, III
 - Automotive fuel economy standards development DR. RICHARD STROMBOTNE
 - Periodic Motor Vehicle Inspection Program: *Impact of currently used vehicles on the environment* JOSEPH P. GRILLO
 - Vehicle in-use inspection standards JOSEPH INNES

ENERGY SUPPLY AND DEMAND FORECASTS

- Department of Commerce:
 - Supply and demand forecasts by states, by fuels, for the rest of the century JOSEPH F. GUSTAFERRO

OIL SPILLS

- U.S. Coast Guard:
 - Environmental Technology Branch: *Containment and cleanup of oil spills* CDR TED LEIGH

- Chemistry Branch:
Oil fingerprinting-analyzing oil samples to determine
source composition DR. G. KLEINEBERG
- *Planning and Special Projects:*
Research on oil spill prevention technologies
and techniques CDR J. H. PARENT
- Oil spill statistics DR. CHARLES C. BATES
- Marine Environmental Protection Division:
Federal response to oil spills CAPT JOHN R. KIRKLAND

HEALTH AND URBAN ENVIRONMENT

- Environmental Protection Agency:
 - Health and ecological effects research DR. WILLIAM MURRAY
- U.S. Department of Housing and Urban Development:
 - Lead exposure in the urban environment and general
urban environmental research IRWIN BILLYCK
 - Noise, air pollution, and general environmental quality
in the urban environment GEORGE WINZER
 - Housing and community-development-related problems in
environmental and energy areas GEORGE KARAS
- National Institute of Occupational Safety and Health:
 - Occupational safety and health questions related to energy
production and use JACK HARDESTY
- Electric Power Research Institute:
 - Impact of electrical supply systems on health and
environment DR. RALPH PERHAC
 - Health effects DR. JAMES McCARROLL

- Biomedical studies DR. LEONARD SAGAN
- Bituminous Coal Research, Inc.:
 - Assessments of health and environmental effects from coal mining and coal utilization JAMES GARVEY
JAMES BOYER
EARLE DIEHL
- American Petroleum Institute: Environmental Hygiene
 - Biomedical Studies DR. NEILL WEAVER
 - Non-health-related studies: DR. GEORGE PATTON
 - Air and water quality; Mobile and stationary sources; Solid waste; Fate and effect of oil spills
- National Cancer Institute: DR. H. F. KRAYBILL
 - NCI/EPA collaborative program—environmental cancer; air, water, energy technologies DR. H. F. KRAYBILL,
DR. J. I. MUNN
 - NCI/NIOSH collaborative projects—occupational exposures to carcinogens DR. T. P. CAMERON
 - Bioassays for carcinogenesis DR. RICHARD GRIESEMER
 - Cancer cause and prevention DR. H. F. KRAYBILL
 - Policy DR. GREGORY T. O'CONOR
 - NCI Clearinghouse DR. JAMES SONTAG

ALTERNATIVE ENERGY SOURCES

- National Aeronautics and Space Administration:
 - Wind power storage RALPH LaROCK
 - Photovoltaics JOHN LORIA
 - Solar and thermal electricity ROBERT WASEL

- Department of Energy:
 - Conservation and solar applications

DR. MAXINE SAVITZ

REGIONAL PROGRAMS

- Department of Energy:
 - Information on and coordination of all energy/power projects in western area
- Western Interstate Energy Board:
 - Information and research on all phases of energy for sixteen western states
- Old West Regional Commission:
Environmental and socioeconomic impact on communities involved in coal development
 - Technical information publications
- Four Corners Regional Commission:
 - Water conservation, environmental impact, alternative energy sources, and socioeconomic impacts
- Economic development programs and funding of projects related to energy conservation and environmental protection:
 - Upper Great Lakes Regional Commission
 - Ozarks Regional Commission
 - Southwest Border Regional Commission
 - Pacific Northwest Regional Commission
 - Appalachian Regional Commission
- New England Regional Commission:
 - Energy policy analysis, regional energy data base, financial support to regional energy offices; outer continental shelf pipeline corridors, alternative/renewable energy resources

ROBERT L. McPHAIL

JOHN L. WATSON

GEORGE D. McCARTHY

NORRIS C. ELLERTSON

WILLIAM R. BECHTEL

JOHN SCOTT

ROBERT G. TOBERMAN

ARTHUR JOHNSON

SALIM KUBLAWI

W. ROBERT KEATING

- Coastal Plains Regional Commission:
 - Evaluation and analysis of water resources for the coastal plains region, and exchange of information on treatment and disposal for regional economic development

DR. CLAUD ANDERSON,
McIVER WATSON

INTERNATIONAL PROGRAMS

- United Nations Environment Program:
 - Liaison for inquiries and information
- Organization for Economic Cooperation and Development
- U.S. Department of State:
 - Office of Environmental Affairs: Liaison for international and domestic energy/environment R&D
 - Office of Oceans and International Environmental and Scientific Affairs:

DR. NOEL J. BROWN

DR. MILTON KLEIN

DR. DONALD R. KING

Senior Deputy Assistant Secretary
Deputy Assistant Secretary, Environment
Deputy Assistant Secretary, Energy

LES BROWN
W. ALSTON HAYNE
LOUIS V. NOSENZO

INDUSTRIAL PLANNING AND REGULATION

- U.S. Department of Commerce:
 - Industrial regulatory analysis
 - Advise the Secretary of Commerce on energy matters
- U.S. Department of Interior:
 - Mining regulatory functions and energy/environmental research
 - Review and preparation of Environmental Impact Statements

DR. EDWIN B. SHYKIND

ORCUTT P. DRURY

MICHELE ZARUBICA

LEONARD SHAW

- Surface mining regulations and information
 - Federal Energy Regulatory Commission:
 - Environmental studies for natural gas and oil pipeline certification; program review for rates
 - Regulatory Policy Analysis
 - Licensing hydro-electric plants
 - Electric Power Research Institute:
 - Air quality control for coal combustion systems
 - Water quality control, heat rejection, and solid waste disposal for coal combustion systems
 - Identification, characterization, monitoring; transport and interactions; alternative land and water use; advanced technologies for fossil-fueled power plants
 - Ecological effects of energy technologies
 - Coal combustion systems: air and water quality control, coal cleaning, fluidized combustion
 - Integrated assessment
 - Desulfurization processes
 - Energy analysis and environment
 - Gas Research Institute:
 - Liquid Natural Gas Safety
 - Operations/distribution
 - Environment
- MONA SMITH
- BARRY HAASE
- DR. HASKELL P. WALD
- DR. WILLIAM LINDSAY
- DONALD TEIXEIRA
- JOHN S. MAULBETSCH
- DR. RALPH PERHAC
- DR. ROBERT W. BRÖCKSEN
- KURT YEAGER
- DR. RONALD WYZGA
- DR. GEORGE PRESTON
- DR. MICHAEL TINKLEMAN
- SAM BOORAS

- National Coal Association:

- Air and water quality monitoring and assessment of effects of coal mining and use
- Identification of R&D needs and priorities for coal mining operations, occupational health and safety and environmental effects

JOSEPH MULLAN,
CHARLES DREVNA

DR. JOSEPH YANCIK

DEPARTMENT OF DEFENSE

Energy/environment research, development, and demonstration for DOD-related areas and concerns.

- Energy Programs and Policy:

- Deputy Assistant Secretary of Defense (Energy, Environment and Safety)
 - Director, Energy Program
 - Technology Application
 - Petroleum
 - Information and Program Management
 - Conservation

GEORGE MARIENTHAL

WILLIAM J. SHARKEY, JR.
WALTER C. CHRISTENSEN
WILLIAM J. HORTON
WILLIAM F. VANCE
COL JOHN E. WAGNER

- Energy Research and Development:

- Deputy Under Secretary of Defense (R&E)
 - Director for Engineering Technology
 - Director of Research

DR. RUTH M. DAVIS
G. R. MAKEPEACE
DR. G. GAMOTA

- Army-Special Assistant for Energy

LTC R. L. KAIL &
ERIC A. ORSINI

- Navy-Special Assistant for Energy

DR. THEODORE JACOBS

- Air Force-Director of Maintenance and Supply

BGEN WAYMOND C. NUTT

- Defense Fuel Supply Center:

- Director, Office of Planning and Management CAPT CHARLES E. CUSON
- Chief, Environmental Control Office CALVIN J. MARTIN
- Environmental Program and Policy:
 - Deputy Assistant Secretary of Defense (Energy, Environment and Safety) GEORGE MARIENTHAL
 - Director, Environment Policy
 - Air and Water Program COL C. D. SADLER
 - Solid Waste Management and Resource Recovery CDR DAVID A. REIN
 - Pesticides, Toxic and Hazardous ARTHUR W. WAMMEL
 - Radioactive Wastes GEORGE W. SIEBERT
- Environment Research and Development:
 - Deputy Under Secretary of Defense (R&E)
 - Director, Environment and Life Sciences DR. RUTH M. DAVIS
 - Environment and Life Science Programs COL E. W. FRIDAY, JR.
- Army-Deputy for Environment, Safety and Occupational Health: BRUCE HILDEBRAND
 - Asst. Director of Civil Works for Environmental Programs (Corps of Engineers) LTC GEORGE F. BOONE
- Navy-Principal Deputy Assistant Secretary (Logistics) EVERETT PYATT
- Air Force-Deputy for Environment and Safety DR. CARLOS STERN
- Defense Logistics Agency:
 - Special Assistant for Environmental Protection JOSEPH W. URBANEK

WHITE HOUSE OFFICES

- Council on Environmental Quality: Energy Programs
 - DR. JAMES MACKENZIE
 - GERALD L. BRUBAKER
 - JOHN DAVIDSON

- Office of Management and Budget:

- Review of Federal energy/environment research budgets

JIM J. TOZZI
HUGH LOWETH

- Management and Government Reorganization

WILLIAM W. HARSCH

SENATE COMMITTEES

- Agriculture, Nutrition, and Forestry
Senator HERMAN E. TALMADGE, Chairman

NELSON DENLINGER
Chief Clerk

HENRY CASSO
Staff Director

- Subcommittee on Agricultural Research and
General Legislation
Senator DONALD W. STEWART, Chairman

CARL ROSE
General Counsel

- Subcommittee on Environment, Soil Conservation,
and Forestry
Senator JOHN MELCHER, Chairman

JAMES GILTMIER
Professional Staff Member

- Commerce, Science, and Transportation
Senator HOWARD W. CANNON, Chairman

AUBREY L. SARVIS
Staff Director and
Chief Counsel

- Subcommittee on Aviation
Senator HOWARD W. CANNON, Chairman

CHARLES M. BARCLAY
Staff Counsel

- Subcommittee on Merchant Marine and Tourism
Senator DANIEL K. INOUE, Chairman

JOHN D. HARDY
Professional Staff Member

- Subcommittee on Science Technology and Space
Senator ADLAI E. STEVENSON III, Chairman

JOHN G. STEWART &
JAMES J. GEHRIG
Professional Staff Members

- National Oceans Policy Study
Senator HOWARD W. CANNON, Chairman
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 - Senator ERNEST F. HOLLINGS, Vice Chairman

DEBORAH J. STIRLING
Staff Counsel

- Energy and Natural Resources
Senator HENRY M. JACKSON, Chairman

DR. DANIEL DREYFUS
Staff Director

RICHARD D. GRUNDY
Senior Professional
Staff Member Energy

MICHAEL HARVEY
Chief Counsel

- Subcommittee on Energy Regulation
Senator J. BENNETT JOHNSTON, Chairman

DR. BENJAMIN COOPER
Professional Staff Member

- Subcommittee on Energy Resources and
Materials Production
Senator WENDELL H. FORD, Chairman

THOMAS LAUGHLIN
Professional Staff Member

- Subcommittee on Energy Research and Development
Senator FRANK CHURCH, Chairman

DR. WILLIS SMITH
Professional Staff Member

- Environment and Public Works
Senator JENNINGS RANDOLPH, Chairman

JOHN W. YAGO, JR.
Staff Director

- Subcommittee on Environmental Pollution
Senator EDMUND MUSKIE, Chairman

DR. KARL BRAITHWAITE
Professional Staff Member

- Subcommittee on Resource Protection
Senator JOHN C. CULVER, Chairman

KATHI KORPON
Professional Staff Member

- Subcommittee on Water Resources
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THOMAS F. DONNELLY
Professional Staff Member

- Subcommittee on Nuclear Regulation
Senator GARY W. HART, Chairman

THOMAS MOORE
Professional Staff Member

- Finance
Senator RUSSELL LONG, Chairman

MICHAEL STERN
Staff Director

- Subcommittee on Energy and Foundations
Senator MIKE GRAVEL, Chairman

JERRY GAUCHE
Legislative Assistant

- Subcommittee on Health
Senator TED KENNEDY, Chairman

NANCY MacWOOD
Legislative Assistant

- Foreign Relations
Senator FRANK CHURCH, Chairman
 - Subcommittee on Arms Control, Oceans, and International Environment
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- Governmental Affairs
Senator ABRAHAM A. RIBICOFF, Chairman
 - Subcommittee on Energy, Nuclear Proliferation, and Federal Services
Senator JOHN GLENN, Chairman
- Human Resources
Senator HARRISON A. WILLIAMS, JR., Chairman
 - Subcommittee on Health and Scientific Research
Senator EDWARD M. KENNEDY, Chairman

DAVID KEANEY
Professional Staff Member

ROBERT FOUST
Legislative Aide Energy

ELLEN S. MILLER
Professional Staff Member

DR. LEONARD WEISS
Staff Director

STEVEN PARADISE
General Counsel &
Staff Director

DR. LAWRENCE HOROWITZ
Staff Director

HOUSE COMMITTEES

- Agriculture
Congressman THOMAS S. FOLEY, Chairman
 - Subcommittee on Department Investigations, Oversight, and Research
Congressman E. de la GARZA, Chairman
- Government Operations
Congressman JACK BROOKS, Chairman
 - Subcommittee on Environment, Energy, and Natural Resources
Congressman A. TOBY MOFFETT, Chairman

FOWLER C. WEST
Staff Director

BERT PENA
Consultant

WILLIAM JONES
General Counsel

JOHN MOORE
Staff Director

DAVID SCHUENKE
Staff Director

- Interior and Insular Affairs
Congressman MORRIS UDALL, Chairman
 - Subcommittee on Energy and the Environment
Congressman MORRIS K. UDALL, Chairman
- Interstate and Foreign Commerce
Congressman HARLEY STAGGERS, Chairman
 - Subcommittee on Energy and Power
Congressman JOHN D. DINGELL, Chairman
 - Subcommittee on Health and the Environment
Congressman HENRY WAXMAN, Chairman
- Merchant Marine and Fisheries
Congressman JOHN MICHAEL MURPHY, Chairman
 - Subcommittee on Fisheries and Wildlife
Conservation and the Environment
Congressman JOHN BREAU, Chairman
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- Public Works and Transportation
Congressman HAROLD T. JOHNSON, Chairman
 - Subcommittee on Water Resources
Congressman RAY ROBERTS, Chairman
- Science and Technology
Congressman DON FUQUA, Chairman
 - Subcommittee on Natural Resources and
Environment
Congressman JEROME A. AMBRO, Chairman

CHARLES CONKLIN
Staff Director

CARLA KISH
Staff Consultant

W. E. WILLIAMSON
Staff Director &
Chief Clerk

FRANK POTTER, JR.
Staff Director & Counsel

ELLIOT SEGAL
Staff Director

PETER KYROS
Counsel

NED EVERETT,
R. D. THORNTON
Counsels

GEORGE MANNINA
Professional Staff Member

RICH NORLING
Staff Director

BOB DAWSON
Administrator

ERROL TYLER
Counsel

HAROLD GOULD
Executive Director

IAN MARCEAU
Staff Director

RAD BYERLY
Counsel

- Subcommittee on Energy Research and Production
Congressman MIKE McCORMACK, Chairman
- Subcommittee on Energy Development and
Applications
Congressman RICHARD OTTINGER, Chairman
- Small Business
Congressman NEIL SMITH, Chairman
- Subcommittee on Energy, Environment
Safety and Research
Congressman THOMAS A. LUKEN, Chairman

STEVE LANES
Staff Director

JAMES W. SPENSLEY
Science Consultant
and Staff Director

THOMAS G. POWERS
General Counsel

STEVE ENGELMYER
Counsel

JOINT COMMITTEES

- Environmental Study Conference
Congressman RICHARD L. OTTINGER, Chairman
- Congressional Budget Office
Natural Resources and Commerce Division

MIKE McCABE
Staff Director

DR. ALICE RIVLIN
Director

DR. RAYMOND SCHEPPACH
Assistant Director

Interagency Program Directory and Index

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The following abbreviations are used in this index:

| | | | | | |
|-----|---|--|------|---|--|
| CEQ | — | Council on Environmental Quality | OMTS | — | Office of Monitoring and Technical Support |
| DOE | — | ECT — Environmental Control Technology | ORD | — | Office of Research and Development |
| | | LASL — Los Alamos Scientific Laboratory | ORP | — | Office of Radiation Programs |
| | | LETC — Laramie Energy Technology Center | ORPM | — | Office of Research Program Management |
| | | OHER — Office of Health and Environmental Research | QAD | — | Quality Assurance Division |
| DOT | — | Department of Transportation | TIO | — | Technical Information Office |
| | | FAA — Federal Aviation Administration | HEW | — | NCI — National Cancer Institute |
| | | NHTSA — National Highway Traffic Safety Administration | NIH | — | National Institutes of Health |
| EPA | — | CERI — Center for Environmental Research Information | OECS | — | Office of Extramural Coordination and Special Projects |
| | | EMSL — Environmental Monitoring and Support Laboratory | NASA | — | ERL — Earth Resources Laboratory |
| | | ERL — Environmental Research Laboratory | NOAA | — | EDIS — Environmental Data and Information Service |
| | | ESRL — Environmental Sciences Research Laboratory | | | ERL — Environmental Research Laboratories |
| | | HERL — Health Effects Research Laboratory | | | NODC — National Oceanographic Data Center |
| | | IERL — Industrial Environmental Research Laboratory | | | NWS — National Weather Service |
| | | MERL — Municipal Environmental Research Laboratory | | | TDL — Techniques Development Laboratory |
| | | OEET — Office of Environmental Engineering and Technology | | | TEL — Test and Evaluation Laboratory |
| | | OEPER — Office of Environmental Processes and Effects Research | NTIS | — | WPL — Wave Propagation Laboratory |
| | | OHR — Office of Health Research | ORBS | — | National Technical Information Service |
| | | | TVA | — | OACD — Office of Agricultural and Chemical Development |
| | | | USDI | — | OSM — Office of Surface Mining |

ABBOTT, JAMES H. (31)
Chief
Particulate Technology Branch
EPA/IERL
Research Triangle Park, NC 27711
919-541-2925
FTS-629-2925

ALDRICH, S.R. (2)
Assistant Director
Agricultural Experiment Station
University of Illinois
Urbana, IL 61801
217-333-1604

ALTMAN, DR. LANDY B. (33)
Program Manager-Energy
USDA/SEA/AR Rm 219
B-005
Beltsville, MD 20705
301-344-2740

ALTSCHULER, MORRIS (16)
EPA/ORD/OEET
401 M St, SW
Washington, DC 20460
202-755-0205

ALTSHULLER, DR. A. PAUL (7)
Director
EPA/ESRL
Research Triangle Park, NC 27711
919-541-2191
FTS-629-2191

ANDERSON, DR. CARL E. (13)
Department of Agricultural
Engineering
Iowa State University
Ames, IA 50011
515-294-1434

ANDERSON, DR. CLAUD (41)
Federal Co-Chairman
USDC/Coastal Plains Regional
Commission
1725 K Street, NW Suite 413
Washington, DC 20006
202-634-3910

ASLESON, DR. J.A. (2)
Director
Montana Agricultural Experiment
Station
Montana State University
Bozeman, MT 59717
406-994-3681

AUSTIN, DR. THOMAS S. (35)
Director
Environmental Data and Information
Service
NOAA
3300 Whitehaven Street, NW
Washington, DC 20235
202-634-7318

BALLINGER, DWIGHT G. (4,5)
Director
EPA/EMSL
26 W. St. Clair Street
Cincinnati, OH 45268
513-684-7301

BARCLAY, CHARLES M. (45)
Staff Counsel
Senate Committee on Commerce,
Science, and Transportation
Subcommittee on Aviation
5202 Dirksen Senate Office
Building
Washington, DC 20510
202-224-0423

BARFIELD, DR. B.J. (13)
Department of Agricultural
Engineering
University of Kentucky
Lexington, KY 40506
606-258-5658

BARNHISEL, RICHARD I. (18)
Professor
Department of Agronomy
University of Kentucky
Lexington, KY 40506
606-258-8627

BARRIENTOS, DR. CELSO S. (6)
NOAA/NWS/TDL
W427
Silver Spring, MD 20910
301-427-7613

BARSE, JOSEPH (24)
USDA/ESCS
Natural Resource Econ. Div
500 12th Street, SW
Washington, DC 20250
202-447-4859

BARTON, DR. WELDON (34,35)
Director Office of Energy
Administration Bldg, Rm 226E
USDA
Washington, DC 20250
202-447-2455

BASILEO, MICHAEL A. (6)
NOAA/TEL
6001 Executive Blvd
Rockville, MD 20852
301-426-9080

BATES, DR. CHARLES C. (38)
US Coast Guard (G-MP/82)
400 7th Street, SW
Washington, DC 20590
202-426-1037

BAUMGARTNER, DR. DONALD J. (7,11)
Division Director
EPA/ERL
200 SW 35th Street
Corvallis, OR 97330
503-757-4721
FTS-420-4721

BEATTIE, DR. DONALD A. (34)
Director
Energy Systems Division, Office
of Aeronautics and Space
Technology
(Alternative Energy Sources)
NASA
600 Independence Avenue
Washington, DC 20546
202-755-3127

BECHTEL, WILLIAM R. (40)
Federal Co-Chairman
Upper Great Lakes Regional
Commission
Commerce Bldg, Rm 2093
14th and E Streets, NW
Washington, DC 20230
202-377-2845

BELVIN, E.A., JR (5,7)
TVA
River Oaks Bldg
Muscle Shoals, AL 35660
205-383-4631
FTS-872-4631

BENDER, DR. LLOYD (24)
Project Leader
USDA/ESCS/EDD
Montana State University
Bozeman, MT 59717
406-994-3701
FTS-585-4344

BERG, DAVID (16)
EPA/ORD/OEET
401 M Street, SW
Washington, DC 20460
202-755-2737

BETSON, ROGER P. (8)
Water Systems Development Branch
Division of Water Management
P.O. Drawer E
TVA
Engineering Laboratory
Norris, TN 37828
615-632-4460
FTS-852-4460

BIESINGER, KENNETH E. (11,12)
EPA/ERL
6201 Congdon Boulevard
Duluth, MN 55804
218-727-6692 Ext 512
FTS-783-9512

BILLICK, IRWIN (38)
HUD
Environmental Research,
Office of Policy Development Research
451 7th Street, SW Rm 8214
Washington, DC 20410
202-755-7340

BLANCHARD, BRUCE (2)
Director
Office of Environmental Projects
Review
USDI, Rm 4256
18th and C Streets, NW
Washington, DC 20240
202-343-3891

BLOCH, WAYNE (16)
EPA/ORD/OEET
401 M Street, SW
Washington, DC 20460
202-755-0646

BOND, DR. BILLY JOE (25)
TVA/OACD
Muscle Shoals, AL 35660
205-383-4631 Ext 2419
FTS-872-8419

BOND, THOMAS J. (33)
Staff Specialist
Division of Ecological Services
USFWS
Washington, DC 20240
202-653-5952

BONHAM, DR. CHARLES D. (13)
Range Science Department
Colorado State University
Fort Collins, CO 80523
303-491-6620

BOONE, LTC GEORGE F. (44)

Assistant Director
Civil Works for Environmental
Programs
US Army Corps of Engineers
DAEN-CWZ-P
4G065 Forrestal Bldg
Washington, DC 20314
202-693-7092

BOORAS, SAM (42)

Director
Environment and Safety
Research
Gas Research Institute
10 West 35th Street
Chicago, IL 60616
312-567-6634

BOSTIAN, H.E. (26)

EPA/IERL
Cincinnati, OH 45268
513-684-4318

BOWEN, DR. JOSHUA S. (19,29)

EPA/IERL (MD-65)
Research Triangle Park, NC 27711
919-541-2470
FTS-629-2470

BOYER, JAMES (39)

Bituminous Coal Research, Inc.
350 Hochberg Road
Monroeville, PA 15146
412-327-1600

BRAITHWAITE, DR. KARL (46)

Professional Staff Member
Subcommittee on Environmental
Pollution
4204 Dirksen Senate Office Bldg
Washington, DC 20510
202-224-7861

BRETTHAUER, ERICH (4)

Division Director
EPA/EMSL
P.O. Box 15027
Las Vegas, NV 89114
702-736-2969 Ext 342
FTS-595-2969

BRIDBORD, DR. KENNETH (2)

Director
OECSP, NIOSH
5600 Fishers Lane Rm 8-47
Rockville, MD 20857
301-443-6437

BRNA, DR. TED (25)

EPA/IERL (MD-61)
Research Triangle Park, NC 27711
919-541-2683
FTS-629-2683

BROCKSEN, DR. ROBERT W. (42)

Manager
Ecological Effects Program
Electric Power Research
Institute
3412 Hillview Avenue
P.O. Box 10412
Palo Alto, CA 94303
415-855-2749

BRODERICK, ANTHONY J. (34)

Technical Advisor
Aviation Standards, AVS-4
DOT/FAA
800 Independence Avenue, SW
Washington, DC 20591
202-755-8933
FTS-755-1851

BROMBERG, STEVEN M. (4)

EPA/QAD/EMSL
Research Triangle Park, NC 27711
919-541-2573
FTS-629-2573

BROOKS, DR. JOHN L. (34)

Deputy Division Director
Environmental Biology
National Science Foundation
1800 G Street, NW
Washington, DC 20550
202-632-7318

BROWN, GREG A. (13)

Research Assistant
Plant & Soil Science Department
Montana State University
Bozeman, MT 59717
406-994-4601

BROWN, HARRY E. (2,34)

Policy Analyst
5175 South Agriculture Bldg
USDA/Office of Energy
Energy Research and Development
Coordinator
Washington, DC 20250
202-447-4172

BROWN, LES (41)

Senior Deputy Assistant Secretary
Office of Oceans and International
Environmental & Scientific Affairs
US Department of State
Washington, DC 20520
202-632-5904

BROWN, DR. NOEL J. (41)

United Nations
UN Environment Program
New York, NY 10017
212-754-8139

BROWN, ROBENA J. (36)

Information Analysis Branch
NTIS
Springfield, VA 22161
703-557-4640

BRUBAKER, GERALD L. (44)

Council on Environmental Quality
722 Jackson Place, NW
Rm 5013
Washington, DC 20006
202-395-4946

BULL, DR. RICHARD (9)

EPA/HERL
26 W. St. Clair Street
Cincinnati, OH 45268
513-684-7213

BURCHARD, DR. JOHN K. (32)

Director
Industrial Environmental
Research Laboratory
EPA (MD-60)
Research Triangle Park, NC 27711
919-541-2821
FTS-629-2821

BURNETT, T.A. (29)
TVA
Office Service Warehouse Annex
Muscle Shoals, AL 35660
205-383-2516
FTS-872-2516

BURR, DR. W.W., JR. (33)
Acting Director
Office of Health & Environmental
Research
DOE, Office of Environment
Washington, DC 20545
202-353-3153
FTS-233-3153

BURTON, ELLISON (33)
Special Assistant
for Environment to Assistant
Secretary Resource Application
3504 Federal Bldg
12th and Pennsylvania Avenue
Washington, DC 20461
202-633-8344

BYERLY, RAD (48)
Science Consultant
Natural Resources and
Environment Subcommittee
House Science and Technology
Committee
2319 Rayburn House Office Bldg
Washington, DC 20515
202-225-1064

BYRNES, WILLIAM R. (18)
Department of Forestry and
Natural Resources
Purdue University, Agricultural
Experiment Station
West Lafayette, IN 47907
317-494-8874

CAIN, W.C. (26)
EPA/IERL
Cincinnati, OH 45268
513-684-4335

CALLAWAY, R.J. (7)
EPA/ERL
200 SW 35th Street
Corvallis, OR 97330
503-757-4703
FTS-420-4703

CAMERON, DR. T.P. (39)
National Cancer Institute
Division of Cancer Causes and
Prevention
Landow Bldg
7910 Woodmont Avenue
Bethesda, MD 20014
301-496-1625

CAMPBELL, DR. WILLIAM F. (18)
Plant Science Department
Utah State University
Logan, UT 84322
801-752-4100

CARLSON, CARL W. (2)
USDA/SEA/AR
Agricultural Research Service
Washington, DC 20251
202-447-7157

CARTER, CONSTANCE (35)
Head
Reference Section
Science and Technology
Library of Congress
Washington, DC 20540
202-426-5582

CASSO, HENRY (45)
Staff Director
Senate Agriculture Committee
Russell Senate Office Bldg
Rm 322
Washington, DC 20510
202-224-2035

CATLIN, ROBERT J. (33)
Acting Director
Office of Environmental Compliance
and Overview
DOE (E201)
Washington, DC 20545
202-353-3033
FTS-233-3033

CATON, DR. GLORIA M. (35)
Oak Ridge National Laboratory
Bldg 2001
Oak Ridge, TN 37830
615-574-7782
FTS-624-7782

CAVAGNARO, DIANE M. (36)
Information Analysis Branch
NTIS
Springfield, VA 22161
703-557-4640

CHIGNELL, DR. COLIN F. (10)
Chief
Laboratory of Environmental
Biophysics
NIEHS
P.O. Box 12233
Research Triangle Park, NC 27709
919-541-3196
FTS-629-3196

CHRISTENSEN, WALTER C. (43)
Assistant for Technical Application
of Energy
OASD (MRA & L) EES
1D760, Pentagon
Washington, DC 20301
202-697-9419

CHRISTIANSON, ALDEN (26,27)
EPA/IERL
Cincinnati, OH 45268
513-684-4207

CLIFFORD, CPT JERRY (44)
DASD (EES)
3D823, Pentagon
Washington, DC 20301
202-695-0221

CLOSE, W. HARRY (37)
Director
Office of Heavy-Duty Vehicle
Research
DOT/NHTSA
NRD-20
2100 2nd Street, SW
Washington, DC 20590
202-426-4553

CLUSEN, RUTH C. (2)
Assistant Secretary
for Environment
DOE
20 Massachusetts Avenue, NW
Rm 6128
Washington, DC 20545
202-376-4185

COFFIN, DR. DAVID L. (9)
EPA/HERL
Research Triangle Park, NC 27711
919-541-2586
FTS-629-2586

COLE, RANDY M. (21)
TVA
470 Commerce Union Bank Bldg
Chattanooga, TN 37401
615-755-3571

COLEMAN, DR. DAVID C. (18)
Natural Resources Ecology
Laboratory
Colorado State University
Ft. Collins, CO 80523
303-491-5571

CONKLIN, CHARLES (48)
Staff Director
Committee on Interior and
Insular Affairs
1324 Longworth House Office Bldg
Washington, DC 20515
202-225-2761

CONVISSER, MARTIN (37)
Director
Office of Environment and Safety
Policy and International Affairs
Office of the Secretary, DOT
P-20
400 7th Street, SW
Washington, DC 20590
202-426-4357

COOPER, DR. BENJAMIN (46)
Professional Staff Member
Subcommittee on Energy
Regulation
3106 Dirksen Senate Office Bldg
Washington, DC 20510
202-224-9894

CRAIG, A.B., SR. (5)
EPA/IERL
Research Triangle Park, NC 27711
919-541-2509
FTS-629-2509

CRAIG, DR. DOUGLAS (9)
DOE/OHER
Washington, DC 20545
301-353-3683
FTS-233-3683

CROWE, JAMES L. (28)
TVA
Office of Power
1320 Commerce Union Bank Bldg
Chattanooga, TN 37401
615-755-3381

CROWE, ROBERT E. (34)
EPA/ CERL
26 W. St. Clair Street
Cincinnati, OH 45268
513-684-7391

CUSON, CAPT CHARLES E., SC, USN (44)
Director
Office of Planning and Management
US Navy
Defense Fuel Supply Center
8A216 Cameron Station
Alexandria, VA 22314
202-274-7423

DALY, GERALD H. (25)
Chief
Operations Branch
Division of Waste Products
(ETW)
US DOE (B-107)
Washington, DC 20545
301-353-4214
FTS-233-4214

DANIELS, JOHN (35)
Office of Energy Information
Services
DOE
1726 M Street, NW
Washington, DC 20461
202-634-5610

DASHIELL, THOMAS R. (44)
Environment and Life Sciences
DOD/OUSDRE
3D 129, Pentagon
Washington, DC 20301
202-697-8714

DAVIDSON, JOHN (44)
Staff Member
Council on Environmental Quality
722 Jackson Place
Washington, DC 20006
202-633-7097

DAVIES, DR. TUDOR (32)
Director
Environmental Research
Laboratory
South Ferry Road
Narragansett, RI 02882
401-789-1071
FTS-838-4843

DAVIS, GEORGE H. (2)
USGS
407 National Center
Reston, VA 22092
703-860-6846

DAVIS, JARED (26)
Assistant Director
Waste Management and
Environmental Research
Office of Nuclear Regulatory
Research
US NRC (113-055)
Washington, DC 20555
301-427-4362

DAVIS, DR. RUTH M. (43,44)
Deputy Under Secretary of
Defense Research and
Engineering
Research and Advanced Technology
3E114, Pentagon
Washington, DC 20301
202-695-5036

DAVIS, WILLIAM P. (7)
EPA/ERL
Bears Bluff Field Station
Box 368
Johns Island, SC 29455
803-559-0371

DAWSON, BOB (48)
Administrator
Committee on Public Works and
Transportation
2165 Rayburn House Office Bldg
Washington, DC 20515
202-225-4472

DeBUCHANANNE, GEORGE (25)
Chief
Office of Radiohydrology
USGS (MS-410)
National Center
Reston, VA 22092
703-860-6976
FTS-928-6976

DENLINGER, NELSON (45)
Chief Clerk
Senate Agriculture Committee
Russell Senate Office Bldg
Rm 322
Washington, DC 20510
202-224-2035

DERR, DR. VERNON E. (5)
NOAA/ERL/WPL
R45X3
Boulder, CO 80302
303-499-1000

de SERRES, DR. FREDERICK J. (10)
Associate Director for Genetics
NIEHS
P.O. Box 12233
Research Triangle Park, NC 27709
919-541-3492
FTS-629-3492

DEUTCH, JOHN M. (33)
Program Planning & Development
DOE
Forrestal Bldg
Washington, DC 20585
202-252-5430

DEVINE, DR. MICHAEL (23)
University of Oklahoma
Science and Public Policy Program
601 Elm Avenue, Rm 432
Norman, OK 73019
405-325-2555

DIEHL, EARLE (39)
Bituminous Coal Research, Inc
350 Hochberg Road
Monroeville, PA 15146
412-327-1600

DIXON, DR. ROBERT L. (10)
NIEHS
P.O. Box 12233
Research Triangle Park, NC 27709
919-541-3333
FTS-629-3333

DOERKSEN, H. (14)
Office of Biological Services
USFWS
Washington, DC 20240
202-653-5223

DOLLHOPF, DOUGLAS J. (13)
Reclamation Research Unit
Department of Animal and Range
Sciences
Montana State University
Bozeman, MT 59717
406-994-4821

DONALDSON, WILLIAM (6)
EPA/ERL
College Station Road
Athens, GA 30605
404-546-3183

DONNELLY, THOMAS F. (46)
Professional Staff Member
Senate Committee on Environment &
Public Works
Subcommittee on Water Resources
4204 Dirksen Senate Office Bldg
Washington, DC 20510
202-224-3116

DORSEY, JAMES (5)
EPA/IERL
Research Triangle Park, NC 27711
919-541-2557
FTS-629-2557

DREHMEL, DENNIS (31)
EPA/IERL
Research Triangle Park, NC 27711
919-541-2925
FTS-629-2925

DREVNA, CHARLES (43)
National Coal Association
1130 17th Street, NW
Washington, DC 20036
202-628-4322

DREYFUS, DR. DANIEL (46)
Staff Director
Senate Committee on Energy & Natural
Resources
3106 Dirksen Senate Office Bldg
Washington, DC 20510
202-224-4971

DRURY, ORCUTT P. (41)
Office of the Assistant
Secretary for Policy
Rm 5717
USDC
Washington, DC 20230
202-377-4568

DUDA, DR. G.D. (9)
Office of Health and
Environmental Research
DOE, Office of Environment
E-201
Washington, DC 20545
301-353-3651
FTS-233-3651

DUGGAN, J.C. (28)
TVA
440 Commerce Union Bank Bldg
Chattanooga, TN 37401
615-755-3571
FTS-854-3571

DUKE, DR. THOMAS W. (11)
EPA/ERL
Sabine Island
Gulf Breeze, FL 32561
904-932-5311
FTS-686-9011

DUTTWEILER, DR. DAVID W. (32)
Director
Environmental Research
Laboratory
College Station Road
Athens, GA 30605
404-546-3134
FTS-250-3134

DYER, ROBERT S. (25)
EPA/ORP
401 M Street, SW
Washington, DC 20460
703-557-8977

EBERHARD, JOHN (37)
Project Director
National Energy-Efficient
Driving System
DOT/NHTSA
2100 2nd Street, SW
Washington, DC 20590
202-426-4892

ELLERTSON, NORRIS C. (40)
Coordinator for Field
Activities
Four Corners Regional
Commission
Federal Co-Chairman's Office
230 First Avenue, N.
Phoenix, AZ 85025
602-261-3361

ELLISON, DR. ALFRED H. (32)
Director
Environmental Sciences
Research Laboratory
Research Triangle Park, NC 27711
919-541-2191
FTS-629-2191

ENGELMYER, STEVE (49)
Counsel
Subcommittee on Energy,
Environment Safety and
Research
2361 Rayburn House Office Bldg
Washington, DC 20515
202-225-5821

ENOS, DR. HENRY (32)
Director
Environmental Research
Laboratory
Sabine Island
Gulf Breeze, FL 32561
904-932-5311
FTS-686-9011

EVERETT, NED (48)
Counsel
Subcommittee on Fisheries and
Wildlife Conservation and the
Environment
3574 House Office Bldg, Annex #2
Washington, DC 20515
202-225-7307

FARLOW, JOHN S. (17)
Chief
Oil Spills Staff
US EPA/IERL-Ci, OHMS B
Raritan Depot
Woodbridge Avenue
Edison, NJ 08817
201-321-6631
FTS-340-6631

FARRELL, DR. KENNETH R. (2)
USDA/ESCS
GHI Bldg, Rm 448
500 12th Street, SW
Washington, DC 20250
202-447-8104

FARRIER, DAVID (11)
DOE/LETC
P.O. Box 3395, University Station
Laramie, WY 82071
307-721-2274
FTS-328-4274

FAUCETT, H.L. (28)
TVA/OACD
National Fertilizer Development
Center
Emissions Control Development
Project
Muscle Shoals, AL 35660
205-383-4631 Ext 2516
FTS-872-8516

FLORA, DR. HOLLIS B., II (19,25)
TVA
Energy Research
470 Commerce Union Bank Bldg
Chattanooga, TN 37401
615-755-3291
FTS-854-3291

FOLLETT, DR. R.F. (12,18)
USDA/SEA/AR/NPS
Rm 233/Bldg 005, BARC West
Beltsville, MD 20705
301-344-3216

FORD, DR. ANDREW (24)
Staff Member
LASL, MS-606
P.O. Box 1663
Los Alamos, NM 87545
505-667-4569
FTS-843-4569

FOUST, ROBERT (47)
Legislative Aide-Energy
Subcommittee on Arms Control,
Oceans, and International
Environment
325 Russell Senate Office Bldg
Washington DC 20510
202-224-4642

FOX, PHYLLIS (22)
Manager
Oil Shale Program
Lawrence Berkeley Laboratory
University of California
Berkeley, CA 94720
415-843-2740 Ext 6698
FTS-451-6698

FREEMAN, HARRY M. (27)
EPA/IERL
Cincinnati, OH 45268
513-684-4363

FRIDAY, COL E.W., JR. (44)
Director
Environmental and Life Sciences
OUSDRE/DOD
3D129, Pentagon
Washington, DC 20301
202-695-9604

FRIETSCH, WILLIAM, III (3, 32)
EPA/ORD/OEPER
401 M Street, SW Rm 3817E
Washington, DC 20460
202-426-0264

FRITZ, EUGENE S. (14)
USFWS National Power Plant
Team
2929 Plymouth Road
Ann Arbor, MI 48105
313-668-2376
FTS-378-2376

GAGE, DR. STEPHEN J. (32)
Assistant Administrator
Office of Research &
Development
401 M Street, SW
Washington, DC 20460
202-755-2600

GALEGAR, WILLIAM C. (7, 32)
Director
Robert S. Kerr ERL
P.O. Box 1198
Ada, OK 74820
405-332-8800
FTS-743-2224

GALLER, DR. SIDNEY (2)
Deputy Assistant Secretary
for Environmental Affairs
USDC
Rm 4325
Washington, DC 20230
202-377-4335

GALLI, ALFRED A. (3)
EPA/ORD/OEPER
401 M Street, SW Rm 3817J
Washington, DC 20460
202-426-0288

GAMOTA, DR. GEORGE (43)
Director for Research
OUSDRE/DOD
3D1089, Pentagon
Washington, DC 20301
202-697-6506

GARDNER, DR. DONALD E. (9)
EPA/HERL
Research Triangle Park, NC 27711
919-541-2531
FTS-629-2531

GARVEY, JAMES (39)
Bituminous Coal Research, Inc.
350 Hochberg Road
Monroeville, PA 15146
412-327-1600

GAUCHE, JERRY (46)
Legislative Assistant
Senate Committee on Finance
Subcommittee on Energy and
Foundations
3121 Dirksen Senate Office Bldg
Washington, DC 20510
202-224-6665

GEHRIG, JAMES J. (45)
Professional Staff Member
Senate Committee on Commerce,
Science, and Transportation
Subcommittee on Science,
Technology & Space
5202 Dirksen Senate Office Bldg
Washington, DC 20510
202-224-9351

GILMORE, DONALD B. (27)
EPA/EMSL
P.O. Box 15027
Las Vegas, NV 89114
702-736-2969 Ext 241

GILTMIER, JAMES (45)
Professional Staff Member
Subcommittee on Environment,
Soil Conservation, and Forestry
322 Russell Senate Office Bldg
Washington, DC 20510
202-224-2035

GLASS, DR. GARY E. (11,12)
Senior Research Chemist
EPA/ERL
6201 Congdon Blvd
Duluth, MN 55804
218-727-6692 Ext 573
FTS-783-9573

GLOVER, JERRY C. (35)
Executive Officer
National Environmental Satellite
Service
National Oceanic & Atmospheric
Administration
Washington, DC 20233
202-763-7570

GOLDSTEIN, DR. GERALD (5,6)
DOE/OHER
Mail Station E-201
Washington, DC 20545
301-353-5348
FTS-233-5348

GOLOMB, DR. DAN (3)
EPA/ORD/OEPER
401 M Street, SW Rm 3817H
Waterside Mall (RD-682)
Washington, DC 20460
202-426-0265

GOODYEAR, C. PHILLIP (14)
USFWS National Power Plant Team
2929 Plymouth Road, Rm 206
Ann Arbor, MI 48105
313-668-2378

GOTTLEIB, DR. MYRON (22)
DOE/ECT
20 Massachusetts Ave, NW
Washington, DC 20545
301-353-5587
FTS-233-5587

GOULD, HAROLD (48)
Executive Director
House Committee on Science and
Technology
2321 Rayburn House Office Bldg
Washington, DC 20515
202-225-6371

GOULD, WALTER L. (18)
Associate Professor
Department of Agronomy
New Mexico State University
Las Cruces, NM 88003
505-646-3405

GOVAN, EMILIA L. (33)
Environmental Advisor to the
Acting Assistant Secretary
for Energy Technology
DOE
Washington, DC 20545
202-376-4542

GRANT, ROBERT (37)
Senior Policy Specialist &
Program Manager
Office of Science and Technology
Office of Environmental Affairs
US Department of Commerce
Washington, DC 20230
202-377-2652

GRAVATT, DR. CARY (5)
NBS
Office of Environmental
Measurements
Washington, DC 20234
301-921-3775

GREATHOUSE, DAN (9)
EPA/HERL
26 W. St, Clair Street
Cincinnati, OH 45268
513-684-7368

GREENWOOD, DR. LAWRENCE R. (2)
Environmental Observation
Division
NASA Headquarters
Washington, DC 20546
202-755-8620

GREESON, PHILLIP E. (6)
USGS
412 National Center
Reston, VA 22092
703-860-6834

GRIESEMER, DR. RICHARD (39)
Associate Director
Carcinogenesis Testing Program
Landow Bldg, Rm 3A22
7910 Woodmont Avenue
Bethesda, MD 20014
301-496-5591

GRILLO, JOSEPH P. (37)
Chief
State Programs Division
DOT/NHTSA
400 7th Street, SW
Washington, DC 20590
202-426-8298

GRUBE, DR. WALTER E., JR. (9)
EPA/HERL
26 W. St. Clair Street
Cincinnati, OH 45268
513-684-7406

GRUNDY, RICHARD D. (46)
Senior Professional Staff Member
Energy and Natural Resources
3202 Dirksen Senate Office Bldg
Washington, DC 20510
202-224-9894

GUSTAFERRO, JOSEPH F. (37)
US Department of Commerce
Office of Ocean, Resource, and
Scientific Policy Coordination
Rm 5517
14th and Constitution, NW
Washington, DC 20230
202-377-4363

HAASE, BARRY L. (42)
Director
Office of Pipeline and Producer
Regulations
FERC, Rm 7000
825 N. Capital Street
Washington, DC 20426
202-275-4473

HAGHIRI, FAZ (18)
Ohio Agricultural R&D Center
State Department of Agriculture
Wooster, OH 44691
216-264-1021

HALL, ROBERT E. (19,20,29,31)
EPA/IERL (MD-65)
Research Triangle Park, NC 27711
919-541-2477
FTS-629-2477

HALL, DR. WARREN A. (13)
Colorado State University
Fort Collins, CO 80523
303-491-5048

HAMILTON, DR. D. H., JR. (14)
DOE/OHER
Washington, DC 20545
301-353-5324
FTS-233-5324

HANGEBRAUCK, ROBERT (19,20,21)
EPA/IERL
Research Triangle Park, NC 27711
919-541-2825
FTS-629-2825

HANSON, DR. R. G. (13)
Department of Agronomy
University of Missouri
Columbia, MO 65201
314-882-2801

HARDESTY, JACK (38)
Information Officer, NIOSH
Parklawn Bldg
5600 Fishers Lane
Rockville, MD 20857
301-443-2140

HARDY, JOHN D. (45)
Professional Staff Member
Senate Committee on Commerce, Science,
and Transportation
Subcommittee on Merchant Marine and
Tourism
5202 Dirksen Senate Office Bldg
Washington, DC 20510
202-224-6742

HARMON, DALE L. (31)
Particulate Technology Branch
EPA/IERL (MD-61)
Research Triangle Park, NC 27711
919-541-2925
FTS-629-2925

HARRIS, DR. BRUCE (31)
Process Measurement Branch
(MD-62)
US EPA/IERL
Research Triangle Park, NC 27711
919-541-2557
FTS-629-2557

HARRIS, EUGENE F. (17)
EPA/IERL
Cincinnati, OH 45268
513-684-4417

HARRIS, DR. HOWARD S. (15)
NOAA/ERL
7600 Sand Point Way, NE
Seattle, WA 98115
206-442-5590

HARSCH, WILLIAM W. (45)
Deputy Associate Director
Natural Resources/Environment
Division of the President's
Reorganization Project
Executive Office of Management
and Budget
Rm 3235, New EOB
Washington, DC 20503
202-395-5105

HART, DR. LARRY G. (9,10,15)
Assistant to Scientific Director
NIEHS
P.O. Box 12233
Research Triangle Park, NC 27709
919-541-3205
FTS-629-3205

HARTLEY, ROBERT P. (27)
EPA/IERL
Cincinnati, OH 45268
513-684-4335

HARVEY, MICHAEL (46)
Chief Counsel
Senate Committee on Energy &
Natural Resources
3204 Dirksen Senate Office Bldg
Washington, DC 20510
202-224-0611

HAY, DR. RONALD L. (13)
Associate Professor
Agricultural Experiment Station
University of Tennessee
P.O. Box 1071
Knoxville, TN 37901
615-974-7126

HAYES, DR. CARL G. (9)
HERL/RTP
Environmental Research Center
Research Triangle Park, NC 27711
919-541-2242
FTS-629-2242

HAYNE, W. ALSTON (41)
Deputy Assistant Secretary,
Environment
Office of Oceans and
International Environmental and
Scientific Affairs
US Department of State
Washington, DC 20520
202-632-7964

HEILER, BERNIE (16)
EPA/ORD/OEPER
401 M Street, SW
Washington, D. C. 20460
202-755-0646

HENSCHER, D. B. (20)
EPA/IERL (MD-61)
Research Triangle Park, NC 27711
919-541-2825
FTS-629-2825

HEREFORD, GRAHAM (24)
EPA/IERL
Research Triangle Park, NC 27711
919-541-2815
FTS-629-2815

HICKEY, DR. HARRISON R., JR. (24)
TVA
Division of Environmental Planning
401 Chestnut Street, Rm 375
Chattanooga, TN 37401
615-755-3155

HILDEBRAND, BRUCE (44)
Deputy
Environment, Safety, and
Occupational Health
Office of the Asst Secretary
(IL and FM)
Department of the Army,
Pentagon
Washington, DC 20301
202-695-1370

HILL, RONALD D. (17)
EPA/IERL
5555 Ridge Avenue
Cincinnati, OH 45268
513-684-4410

HINOTE, HUBERT (24)
TVA
Div of Navigation Dev. and Region
Studies
270 K Liberty Bldg
415 Walnut Street
Knoxville, TN 37902
615-632-4860

HIRSCH, DR. ALLAN (32)
Deputy Assistant Administrator
EPA/ORD/OEPER
401 M Street, SW
Washington, DC 20460
202-426-0803

HODDER, RICHARD L. (13)
Program Leader
Reclamation Research Unit,
Montana State University
Animal and Range Sciences Department
Agricultural Experiment Station
Bozeman, MT 59717
406-994-4821

HODGE, KENNETH E. (36)
Manager
Transport Aircraft Office
Office of Aeronautics and Space
Technology
NASA, RJ-5
Washington, DC 20546
202-755-3000

HOEL, DAVID G. (10)
NIEHS
Biometry Branch
Research Triangle Park, NC 27709
919-541-3441
FTS-629-3441

HOLLEY, C. WAYNE (6)
TVA
401 Chestnut St, Rm 150
Chattanooga, TN 37401
615-755-3135

HOLLINDEN, DR. G. A. (28)
Program Manager
of Environmental Control
Technology
TVA
Office of Power
470 Commerce Union Bank Bldg
Chattanooga, TN 37401
615-755-3584

HOROWITZ, DR. LAWRENCE (47)
Staff Director
Senate Committee on Human
Resources
Subcommittee on Health and
Scientific Research
308 C Senate Courts
Washington, DC 20510
202-224-7675

HORTON, WILLIAM J. (43)
Assistant
for Petroleum OASD (MRA & L) EES
1D760, Pentagon
Washington, DC 20301
202-697-1988

HOSSNER, DR. LLOYD R. (13)
Professor
Soil Chemistry
Soil & Crop Sciences Department
Texas A&M University
College Station, TX 77843
713-845-3041

HOUSE, DR. PETER W. (33)
Director
Office of Technology Impacts
DOE
20 Massachusetts Ave, NW
Rm 4134
Washington, DC 20545
202-376-1820

HUBAND, DR. FRANK L. (34)
Group Leader
Environment, Energy, and
Resources
National Science Foundation
Rm 1240
1800 G Street, NW
Washington, DC 20550
202-632-4091

HUDSON, HUGH H. (4)
USGS
Water Resources Division
Denver Federal Center
Box 25046 - Stop 406
Lakewood, CO 80225
303-234-4118

HUFFMAN, GEORGE L. (27)
EPA/IERL
Cincinnati, OH 45268
513-684-4478

HUGHES, KENT H. (15)
NOAA/EDIS/NODC
Washington, DC 22305
202-634-7510

HUNDEMANN, AUDREY (36)
Information Analysis Branch
NTIS
Springfield, VA 22161
703-557-4640

HUSAR, DR. RUDOLF B. (24)
Washington University
Department of Mechanical
Engineering
P.O. Box 1185
St. Louis, MO 63130
314-889-6099

HUTNIK, RUSSELL J. (18)
Professor of Forest Ecology
School of Forest Resources
Pennsylvania State University
312 Forest Resources Laboratory
University Park, PA 16802
814-865-4901

INNES, JOSEPH (37)
Chief
Division of Engineering and
Demonstrations
DOT/NHTSA
400 7th Street, SW
Washington, DC 20590
202-426-1597

ISOM, BILLY G. (15)
TVA
E&D Bldg
Muscle Shoals, AL 35660
205-383-4631, Ext 2727
FTS-872-8727

JACOBS, JAMES J. (13)
Associate Professor
Division of Agricultural
Economics
University of Wyoming
Laramie, WY 82071
307-766-2386

JACOBS, DR. THEODORE (43)
OASN for Research Engineering
and Systems
4D745, Pentagon
Washington, DC 20350
202-694-5090

JACOFF, FRANCINE S. (34)
Technical Information Coordinator
EPA/ORD/OEET (RD-681)
Washington, DC 20460
202-426-4567

JAKOBSON, KURT (16)
EPA/ORD/OEET
401 M Street, SW
Washington, DC 20460
202-755-0205

JANES, T. KELLY (21)
EPA/IERL
ERC Bldg
Research Triangle Park, NC 27711
919-541-2851
FTS-629-2851

JANSEN, IVAN J. (18)
IL Agricultural Experiment Station
N 411 Turner Hall
University of Illinois
Urbana, IL 61801
217-333-3650

JARVIS, ARTHUR (4)
EPA/EMSL
P.O. Box 15027
Las Vegas, NV 89114
702-736-2969, Ext. 381
FTS-595-2969

JASINOWSKI, JERRY J. (2)
Assistant Secretary for Policy
USDC, Rm 5858
Washington, DC 20230
202-377-2624

JELEN, VICTOR F. (23)
EPA/IERL
Ridge Avenue Bldg, Rm 227
Cincinnati, OH 45268
513-684-4338

JOHANNSEN, DR. C. J. (13)
Ecological Effects
Environmental Effects of Energy
Development - Remote Sensing
University of Missouri
Department of Agronomy
214 Waters Hall
Columbia, MO 65211
314-882-2001

JOHNSON, ARTHUR D. (40)
Regional Program Coordinator
Pacific Northwest Regional
Commission
444 North Capitol St, NW
Suite 122
Washington, DC 20001
202-633-7458

JONES, DR. HERBERT C., III (5, 7, 15)
TVA
E & D Bldg
Muscle Shoals, AL 35660
205-383-4631, Ext 342
FTS-872-4631

JONES, JULIAN W. (25)
Emissions/Effluents Technology
Branch
EPA/IERL
Research Triangle Park, NC 27711
919-541-2489
FTS-629-2489

JONES, WILLIAM (47)
General Counsel
House Government Operations
Committee
2157 Rayburn House Office Bldg
Washington, DC 20515
202-225-5051

KAIL, LTC RICHARD L. (43)
Army - Special Assistant for
Energy
OASA (Installations, Logistics,
and Financial Management)
3E619, Pentagon
Washington, DC 20301
202-697-5986

KAMMER, R. (2)
NBS
Administration Bldg A1123
Washington, DC 20234
301-921-3361

KARAS, GEORGE (38)
Director
Environmental Review Division
HUD, Rm 7276
Washington, DC 20410
202-755-6300

KEANEY, DAVID (47)
Professional Staff Member
Senate Committee on Foreign
Relations
4229 Dirksen Senate Office Bldg
Washington, DC 20510
202-224-5381

KEATING, W. ROBERT (40)
Energy Programs Director
New England Regional Commission
53 State Street, Suite 400
Boston, MA 02109
617-223-6330

KEEFER, DR. ROBERT F. (18)
Associate Professor
Division of Plant Sciences
University of West Virginia
Morgantown, WV 26506
304-293-4817

KEENAN, DR. BOYD (23)
ORBES
271 Boyd Avenue
Elmhurst, IL 60126
312-833-7610

KENNEDY, R. H. (17)
DOE/ECT
Washington, DC 20545
301-353-5643
FTS-233-5643

KILGROE, JAMES D. (21)
EPA/IERL
ERC Bldg
Research Triangle Park, NC 27711
919-541-2851
FTS-629-2851

KILPATRICK, FREDERICK A. (6)
USGS
407 National Center
Reston, VA 22092
703-860-6848

KING, DR. DONALD R. (41)
Director
Office of Environmental Affairs
Department of State
22nd and C Streets, NW
Washington, DC 20520
202-632-9278

KIRCHGESSNER, DR. DAVID (21)
EPA/IERL (MD61)
Research Triangle Park, NC 27711
919-541-2851
FTS-629-2851

KIRKHAM, DON (13)
Professor of Agronomy
Iowa State University
Ames, IA 50011
515-294-4264

KIRKLAND, CAPT JOHN R. (38)
Chief
Marine Environmental Protection
Division
US Coast Guard
G-WEP/73
Washington, DC 20590
202-426-2010

KISH, CARLA (48)
Staff Consultant
Subcommittee on Energy and
the Environment
1327 Longworth House Office Bldg
Washington, DC 20515
202-225-8331

KLEIN, DR. MILTON (41)
Director
Research, Development
and Technology Applications
International Energy Agency
Organization for Economic
Cooperation and Development
Chateau de la Muette
2 Rue Andre - Pascal 75775
Paris Cedex 16, France

KLEINEBERG, DR. G. (38)
Chief
Chemistry Branch
US Coast Guard R&D Center
Avery Point
Groton, CT 06340
203-445-8501
FTS-642-7274

KLIMA, DR. EDWARD F. (15)
NOAA
National Marine Fisheries
Service
Southeast Fisheries Center
Galveston Laboratory
4700 Avenue U
Galveston, TX 77550
713-763-1211, Ext 501

KORPON, KATHI (46)
Professional Staff Member
Senate Committee on Environ-
ment and Public Works
Subcommittee on Resource Pro-
tection
4204 Dirksen Senate Office Bldg
Washington, DC 20510
202-224-7851

KRAYBILL, DR. H. F. (39)
National Cancer Institute
Division of Cancer Causes and
Prevention
Landow Bldg
7910 Woodmont Avenue
Bethesda, MD 20014
301-496-1625

KUBLAWI, SALIM (40)
Director
Energy, Environment and
Natural Resources
Appalachian Regional Com-
mission
1666 Connecticut Ave, NW
Washington, DC 20235
202-673-7861

KUYAPT, DR. CHRIS (36)
Director
Center for Radiation Research
National Bureau of Standards
RAD P C229
Washington, DC 20234
301-921-2551

KYROS, PETER (48)
Counsel
House Committee on Merchant
Marine and Fisheries
1334 Longworth House Office Bldg
Washington, DC 20515
202-225-4047

LACHAPELLE, DAVID G. (20,29,30)
EPA/IERL (MD-65)
Research Triangle Park, NC 27711
919-541-2236
FTS-629-2236

LaFLEUR, DR. PHILIP (36)
Director
Center for Analytical Chemistry
NBS, Chem A309
Washington, DC 20234
301-921-2851

LANDERS, ROBERT (4)
EPA/EMSL
P.O. Box 15027
Las Vegas, NV 89114
702-736-2969, Ext 336

LANES, STEVE (49)
Staff Director
Subcommittee on Energy Research
and Production
House Science and Technology
Committee
B374 Rayburn House Office Bldg
Washington, DC 20515
202-229-9117

LANIER, WILLIAM S. (20,29)
EPA/IERL (MD-65)
Research Triangle Park, NC 27711
919-541-2432
FTS-629-2432

LaROCK, RALPH (39)
NASA Headquarters
RE-14
Washington, DC 20546
202-755-2306

LASKA, RICHARD M. (34)
EPA/ORD/ORPM/TIO (RD-674)
401 M Street, SW
Washington, DC 20460
202-426-9454

LAUGHLIN, THOMAS (46)
Professional Staff Member
Subcommittee on Energy Re-
sources and Materials Production
3106 Dirksen Senate Office Bldg
Washington, DC 20510
202-224-2564

LAVOIE, DR. RONALD L. (33)
Director
Science and Academic Affairs
Office
NOAA
6010 Executive Blvd
Rockville, MD 20852
301-443-8721

LEE, DR. C. C. (27)
EPA/IERL
Cincinnati, OH 45268
513-684-4334

LEFCOURT, DR. PAUL (12)
EPA/ORD/OEPER (RD-682)
401 M Street, SW Rm 3817 I
Washington, DC 20460
202-426-0265

LEFOHN, DR. ALLEN (23)
EPA/ORD
Federal Bldg
Montana Energy Operations Staff
Helena, MT 59601
406-449-5432

LEHMAN, DR. RICHARD (33)
Acting Director
Office of Ecology and
Conservation
Room 5813
NOAA
Washington, DC 20230
202-377-5181

LEHMANN, EDWARD (36)
Chief
Information Analysis Branch
NTIS
Springfield, VA 22161
703-557-4640

LEIGH, CDR TED (37)
Chief
Environmental Technology Branch
US Coast Guard
GDOE-1/TP54
Washington, DC 20590
202-426-1023

LEISS, DR. JAMES (35)
Associate Director
High Energy and Nuclear Physics
Office of Energy Research
MS-J309
Department of Energy
Washington, DC 20545
301-353-3081
FTS-233-3081

LEWIS, DR. ROBERT A. (15)
DOE/OHER
Washington, DC 20545
301-353-5079
FTS-233-5079

LIBERICK, WALTER W. (27)
EPA/IERL
Cincinnati, OH 45268
513-684-4363

LIEBMAN, SAMUEL (35)
Smithsonian Science Information
Exchange
Science Division
1730 M Street, NW
Washington, DC 20036
202-381-4211

LINDEMANN, DR. WILLIAM C. (13)
Agricultural Experiment Station
New Mexico State University
Las Cruces, NM 88003
505-646-0111

LINDSAY, DR. WILLIAM (42)
Director
Office of Electric Power
Regulations
FERC, Rm 5100
825 N. Capital Street
Washington, DC 20426
202-275-4777

LITTLE, C. O. (2)
Associate Director
Agricultural Experiment Station
University of Kentucky
Lexington, KY 40506
606-257-2833

LORIA, JOHN (39)
Solar Terrestrial Systems Office
Energy Systems Division
NASA (RET-14)
600 Independence Ave, SE
Washington, DC 20003
202-755-2306

LOWETH, HUGH (45)
Deputy Associate
Director/Energy and Science
Executive Office of Management and
Budget
726 Jackson Place, NW
Rm 8001
Washington, DC 20503
202-395-3404

LOWMAN, DR. FRANK G. (12)
EPA/ERL
South Ferry Road
Narragansett, RI 02882
401-789-1071

MACBETH, ANGUS (34)
Chief
Pollution Control Section
Land and Natural Resources Division
Department of Justice
Washington, DC 20530
202-739-2707

MACHTA, LESTER (4)
NOAA
Air Resources Lab
8060 13th Street
Silver Spring, MD 20903
301-427-7645

MACKENZIE, DR. JAMES (44)
CEQ
722 Jackson Place, NW
Rm 5013
Washington, DC 20006
202-395-4946

MacLAUCHLAN, R. S. (2,17)
USDA/SCS
P.O. Box 2890
Washington, DC 20013
202-447-5667

MacWOOD, NANCY (46)
Legislative Assistant
Senate Committee on Finance
Subcommittee on Health
3121 Dirksen Senate Office Bldg
Washington, DC 20510
202-224-6665

MAGEE, ROBERT A. (22)
Program Manager
Radian Corporation
8500 Shoal Creek Blvd
P.O. Box 9948
Austin, TX 78766
512-454-4797, Ext 281

MAKEPEACE, G.R. (43)
Director for Engineering
Technology
OUSDRE
Department of Defense
3D1089, Pentagon
Washington, DC 20301
202-697-7922

MALLING, DR. HEINRICH V. (10)
NIEHS
Lab of Biochemical Genetics
P.O. Box 12233
Research Triangle Park, NC 27709
919-541-3378
FTS-629-3378

MANEVAL, DR. DAVID (18)
USDI
Office of Surface Mining
18th and C Streets, NW
Washington, DC 20240
202-343-5238

MANNINA, GEORGE (48)
Professional Staff Member
Subcommittee on Fisheries and
Wildlife Conservation and
the Environment
3578 House Annex #2
Washington, DC 20515
202-225-1320

MARCEAU, IAN (48)
Staff Director
Subcommittee on Natural Resources
and Environment
Committee on Science and Technology
2321 Rayburn House Office Bldg
Washington, DC 20515
301-225-1066

MARIENTHAL, GEORGE (43, 44)
Deputy Assistant
Secretary of Defense
Energy, Environment, and Safety
OASD (MRA&L)
3D823, Pentagon
Washington, DC 20301
202-695-0221

MARTIN, CALVIN J. (44)
Defense Fuel Supply Center (DFSC-AE)
Environmental Control Office/
Cameron Station
Alexandria, VA 22314
202-274-6579

MARTIN, G. BLAIR (20,29)
Combustion Research Branch
EPA/IERL (MD-65)
Research Triangle Park, NC 27711
919-541-2235
FTS-629-2235

MAULBETSCH, JOHN S. (42)
Program Manager
Water Quality Control and Heat
Rejection
Electric Power Research Institute
3412 Hillview Avenue
P.O. Box 10412
Palo Alto, CA 94303
415-855-2438

MAXWELL, J.D. (29)
TVA
Office Service Warehouse Annex
Muscle Shoals, AL 35660
205-383-2516
FTS-872-2516

MAXWELL, MICHAEL A. (25,28)
Chief
Emissions and Effluent
Technology Branch
EPA/IERL (Md-61)
Research Triangle Park, NC 27711
919-541-2578
FTS-629-2578

MAYO, FRANCIS T. (32)
Director
Municipal Environmental
Research Laboratory
Cincinnati, OH 45268
513-684-7951

McCABE, MIKE (49)
Staff Director
Environmental Study Conference
3334 House Office Bldg, Annex #2
Washington, DC 20515
202-225-2988

McCAMMON, DR. HELEN M. (8,14)
DOE/OHER
Washington, DC 20545
301-353-5547
FTS-233-5547

McCARROLL, DR. JAMES (38)
Manager
Health Effects Program
Electric Power Research Institute
3412 Hillview Avenue
P.O. Box 10412
Palo Alto, CA 94303
415-855-2578

McCARTHY, GEORGE D. (40)
Federal Co-Chairman
Old West Regional Commission
1730 K Street, NW
Suite 426
Washington, DC 20006
202-634-3907

McCARTHY, WILLIAM N., JR. (16,22)
EPA/ORD/OEET
401 M Street, SW
Washington, DC 20460
202-755-2737

McCLENDON, DR. L. M. (36)
Water Program Manager
NBS/Office of Environmental
Measurements
Chem A345
Washington, DC 20234
301-921-3775

McCORMACK, DONALD E. (18)
Soil Survey Interpretations
Division
USDA/SCS
P.O. Box 2890
Washington, DC 20013
202-447-9218

McGLAMERY, GERALD G. (28)
Emission Control Development
Projects
OACD-TVA
Office Service Warehouse Annex
Muscle Shoals, AL 35660
205-383-4631
FTS-872-8516

McKELL, DR. CYRUS M. (18)
Professor of Range Ecology
Department of Range Science
Utah State University
Logan, UT 84322
801-752-4100

McMILLION, LESLIE G. (4)
EPA/EMSL
P.O. Box 15027
Las Vegas, NV 89114
702-736-2969, Ext 241

McNELIS, DR. DAVID N. (4,5)
EPA/EMSL
P.O. Box 15027
Las Vegas, NV 89114
702-736-2969, Ext 261

McPHAIL, ROBERT L. (40)
Administrator
Western Area Power Administration
Department of Energy
P.O. Box 3402
Golden, CO 80401
303-231-1511
FTS-327-1511

MELFI, DR. S. HARVEY (4)
NASA/EBT-8
Environmental Observation Division
Washington, DC 20546
202-755-8628

MEYER, LEW (26)
EPA/ORP
Rm 1018 - Crystal Mall #2
401 M Street, SW
Washington, DC 20460
703-557-8977

MILLER, DR. EILIF V. (2,13)
Principal Soil Scientist
USDA/SEA/CR
6421 South Bldg
Washington, DC 20250
202-447-6347

MILLER, ELLEN S. (47)
Professional Staff Member
Senate Committee on Governmental
Affairs
3308 Dirksen Senate Office Bldg
Washington, DC 20510
202-224-4751

MILLS, PAUL E. (22)
Quality Assurance Officer
Program Operations Office
EPA/IERL
Cincinnati, OH 45268
513-684-4216

MITCHELL, DR. CLIFFORD L. (10)
Chief
Laboratory of Behavioral and
Neurological Toxicology
NIEHS
P.O. Box 12233
Research Triangle Park, NC 27709
919-541-3220
FTS-629-3220

MOBLEY, J. D. (29,30)
Process Technology Branch (MD-61)
Utilities and Industrial Power Div
EPA/IERL
Research Triangle Park, NC 27711
919-541-2915
FTS-629-2915

MONTGOMERY, HUGH B. (18)
Assistant Director
Abandoned Mineland Reclamation
Program
USDI
Rm 213, Post Office Bldg
1823 Stout Street
Denver, CO 80202
303-837-5918
FTS-327-5918

MOORE, DR. H. G., JR. (2)
TVA Interagency Coordinator
401 Chestnut Street, Rm 268
Chattanooga, TN 37401
615-755-3161

MOORE, JOHN (47)
Staff Director
House Government Operations
Committee
2157 Rayburn House Office Bldg
Washington, DC 20515
202-225-5051

MOORE, THOMAS (46)
Professional Staff Member
Senate Committee on Environment
and Public Works
Subcommittee on Nuclear
Regulation
4204 Dirksen Senate Office Bldg
Washington, DC 20510
202-224-2664

MOURNIGHAN, R. E. (27)
Project Officer
EPA/IERL
Cincinnati, OH 45268
513-684-4334

MUELLER, LEONARD H. (11)
EPA/ERL
6201 Congdon Blvd
Duluth, MN 55804
218-727-6692, Ext 529
FTS-783-9529

MUGLER, JOHN P., JR. (6)
NASA
Env. Quality Program Office
Hampton, VA 23665
804-827-2717

MULLAN, JOSEPH (43)
National Coal Association
1130 17th Street, NW
Washington, DC 20036
202-628-4322

MUNN, DR. J. I. (39)
National Cancer Institute
Division of Cancer Causes and
Prevention
Landow Bldg
7910 Woodmont Avenue
Bethesda, MD 20014
301-496-1625

MURPHY, THOMAS A. (32)
Director
Environmental Research
Laboratory
200 SW 35th Street
Corvallis, OR 97330
503-757-4601
FTS-420-4601

MURRAY, DR. WILLIAM (38)
Acting Deputy Assistant
Administrator for Health and
Ecological Effects
EPA/ORD
Rm 3100
401 M Street SW
Washington, DC 20460
202-426-2382

NAUMAN, CHARLES (3)
EPA/ORD/OEPR
401 M Street, SW
Washington, DC 20460
202-426-3974

NELSON, WILLIAM C. (13)
Coordinator
Agricultural Economics
North Dakota Experiment Station
North Dakota State University
Fargo, ND 58102
701-237-7441

NETTESHEIM, DR. PAUL (10)
Chief
Laboratory of Pulmonary
Function and Toxicology
NIEHS
P.O. Box 12233
Research Triangle Park, NC 27709
919-541-3540
FTS-629-3540

NIELSEN, DR. G.A. (13)
Professor
Soil Genesis, Morphology and
Classification
Plant and Soil Science Department
Montana State University
Bozeman, MT 59717
406-994-4601

NORLING, RICH (48)
Staff Director
Subcommittee on Oceanography
1501 Longworth House Office Bldg
Washington, DC 20515
202-225-3444

NORMAN, DR. LINDSAY, JR. (2)
Acting Director
Bureau of Mines
2401 E Street, NW
Washington, DC 20241
202-634-1300

NOSENZO, LOUIS V. (41)
Deputy Assistant Secretary
Energy Office of Oceans and Inter-
national Environmental
and Scientific Affairs
US Department of State
Washington, DC 20520
202-632-4360

NUTT, BGEN WAYMOND C. (43)
Director
Maintenance and Supply
AF/LEY
Air Force
4E278, Pentagon
Washington, DC 20301
202-695-4900

O'BRIEN, WILLIAM E. (28)
Emission Control Development
Projects
OACD-TVA
Office Service Warehouse Annex
Muscle Shoals, AL 35660
205-383-2516
FTS-872-8516

O'BRYAN, DONALD J., JR. (18)
Office of Surface Mining
Department of the Interior
Washington, DC 20240
202-343-6786

O'CONOR, DR. GREGORY T. (2,39)
Division Director
Division of Cancer Cause
and Prevention
National Cancer Institute
Building 31, Rm 11A03
Bethesda, MD 20014
301-496-6618

O'KEEFFE, ANDREW E. (4)
EPA/ESRL
Research Triangle Park, NC 27711
919-541-2408
FTS-629-2408

OLEXSEY, ROBERT A. (26,27)
EPA/IERL
OR&D
Cincinnati, OH 45268
513-684-4363

ONDICH, GREG (23)
EPA/ORD/OEET (RD-681)
401 M Street, SW
Washington, DC 20460
202-755-4857

ORSINI, ERIC A. (43)
Special Assistant for Energy
OASA (Installations, Logistics
and Financial Management)
3E620, Pentagon
Washington, DC 20301
202-697-9030

OSBORNE, MICHAEL C. (19)
EPA/IERL
Research Triangle Park, NC 27711
919-541-2898
FTS-629-2898

PARADISE, STEVEN (47)
General Counsel and Staff Director
Senate Committee on Human
Resources
4230 Dirksen Senate Office Bldg
Washington, DC 20510
202-224-5375

PARENT, CDR J. H. (38)

Chief
Planning and Special
Project Staff
U.S. Coast Guard (G-MP/82)
400 7th Street, SW
Washington, DC 20590
202-426-1483

PATTON, DR. GEORGE (39)

Director
Environmental Affairs
American Petroleum Institute
2101 L Street
Washington, DC 20037
202-457-7070

PENA, BERT (47)

House Committee on Agriculture
Subcommittee on Department In-
vestigations, Oversight, and
Research
1301 Longworth House Office Bldg
Washington, DC 20515
202-225-1867

PERHAC, DR. RALPH (38,42)

Physical Factors Program Manager/
Acting Department Director,
Environmental Assessments
3412 Hillview Ave
P.O. Box 10412
Palo Alto, CA 94303
415-855-2586

PETERS, WARREN (19)

EPA/IERL (MD-61)
Research Triangle Park, NC 27711
919-541-2547
FTS-629-2547

PINES, ALBERT (34)

EPA/ORD
401 M Street, SW
Washington, DC 20460
202-426-9454

PLYLER, EVERETT L. (19,25,28)

EPA/IERL
Research Triangle Park, NC 27711
919-541-2915
FTS-629-2915

PONDER, WADE (19)

EPA/IERL
Research Triangle Park, NC 27711
919-541-2915
FTS-629-2915

POTTER, DR. FRANK M., JR. (48)

Staff Director and Counsel
Subcommittee on Energy and Power
3204 House Office Bldg Annex #2
Washington, DC 20515
202-225-1030

POVINELLI, FREDERICK P. (36)

Acting Manager
Advanced Propulsion Systems
Office
Office of Aeronautics and Space
Technology
NASA (RJ-5)
Washington, DC 20546
202-755-2497

POWER, SAMUEL F., III (37)

Acting Chief
Automotive Fuel Economy Research
and Analysis
DOT/NHTSA
2100 2nd Street, SW
Washington, DC 20590
202-426-2957

POWERS, THOMAS G. (49)

General Counsel
House Small Business Committee
2361 Rayburn House Office Bldg
Washington, DC 20515
202-225-5821

POWERS, THOMAS J. (22)

EPA/IERL
Environmental Engineering
Cincinnati, OH 45268
513-684-4363

PRESTON, DR. ERIC (11)

Terrestrial Systems Division
EPA/ERL
200 SW 35th Street
Corvallis, OR 97330
503-757-4671
FTS-420-4671

PRESTON, DR. GEORGE (42)

Technical Manager
Integration and Coordination
3412 Hillview Avenue
P.O. Box 10412
Palo Alto, CA 94303
415-855-2461

PRINCIOTTA, FRANK T. (16,32)

Director
Energy Processes Division
EPA/ORD/OEET
401 M Street, SW
Washington, DC 20460
202-755-2737

PUESCHEL, DR. RUDOLF F. (4)

NOAA
Atmospheric Physics & Chemistry Lab
Boulder, CO 80302
303-499-1000, Ext 6360
FTS-323-6360

PYATT, EVERETT (44)

Principal Deputy Assistant Secretary
Defense (Logistics and Environment)
OASN (MRA & L)
266 Crystal Plaza #5
2211 Jefferson Davis Highway
Arlington, VA 22202
202-692-3227

QUINN, HERBERT B. (2)

Acting Director
USFWS
Office of Biological Services
Washington, DC 20240
202-634-4860

RAKES, SAMUEL L. (19,22)

EPA/IERL
Research Triangle Park, NC 27711
919-541-2825
FTS-629-2825

RALL, DR. DAVID P. (2)

Director
NIEHS
Box 12233
Research Triangle Park, NC 27709
919-541-3201
FTS-629-3201

REID, BARRY (7,11)

EPA/ERL
200 SW 35th Street
Corvallis, OR 97330
503-757-4607
FTS-420-4607

REID, C.P.P. (13)

Associate Professor
Colorado State University
Fort Collins, CO 80523
303-491-6637

REIN, CDR. DAVID A. (44)
Air and Water Program
Deputy Assistant Secretary
of Defense (EES)
3D823, Pentagon
Washington, DC 20301
202-695-0221

REITER, DR. LAWRENCE (9)
Research Pharmacologist
EPA (MD-74)
Research Triangle Park, NC 27711
919-541-2671
FTS-629-2671

REMINI, WILLIAM C. (25)
DOE
ET-772 MS B-107
Washington, DC 20585
301-353-2962
FTS-233-2962

REY, GEORGE (16)
EPA/ORD/OEET
401 M Street, SW
Washington, DC 20460
202-426-2683

REZNEK, DR. STEVEN R. (2,32)
Deputy Assistant Administrator
EPA/ORD/OEET
401 M Street, SW
Washington, DC 20460
202-755-4858

RHODES, WILLIAM (22)
EPA/IERL
ERC Bldg
Research Triangle Park, NC 27711
919-541-2851
FTS-629-2851

RIVLIN, DR. ALICE (49)
Director
Congressional Budget Office
2nd and D Streets, SW
House Annex #2
Washington, DC 20515
202-225-2037

ROSE, CARL (45)
General Counsel
Senate Agriculture Committee
Russell Senate Office Bldg
Rm 322
Washington, DC 20510
202-224-2035

ROSE, SUSAN (35)
DOE (E201)
Office of Environment
Washington, DC 20545
202-353-3794
FTS-233-3794

ROTH, DR. CHARLES B. (18)
Department of Agronomy
Purdue University
West Lafayette, IN 47907
317-749-2891

ROUSH, THOMAS (11)
EPA/ERL
6201 Congdon Boulevard
Duluth, MN 55804
218-727-6692 Ext 568
FTS-783-9568

RUANE, RICHARD J. (8)
TVA
401 Chestnut Street, Rm 248
Chattanooga, TN 37401
615-755-3167
FTS-854-3167

SADLER, COL. C. D. (44)
Director
Environmental Policy
OASD (MRA&L) EES
3D823, Pentagon
Washington, DC 20301
202-695-0221

SAGAN, DR. LEONARD (39)
Program Manager
Biomedical Studies
Electric Power Research Institute
3412 Hillview Avenue
P.O. Box 10412
Palo Alto, CA 94303
415-855-2585

SALKIND, DR. MICHAEL (36)
Program Manager
NASA Headquarters (RJT-4)
600 Independence Avenue, SW
Washington, DC 20546
202-755-3000

SAMMIS, DR. THEODORE W. (18)
Department of Agricultural
Engineering
New Mexico State University
Las Cruces, New Mexico 88003
505-646-2902

SANDERS, WALTER M., III (7)
EPA/ERL
College Station Road
Athens, GA 30605
404-546-3171
FTS-250-3171

SARVIS, AUBREY L. (45)
Staff Director and Chief Counsel
Senate Committee on Commerce, Science
and Transportation
5202 Dirksen Senate Office Bldg
Washington, DC 20510
202-224-5115

SAVITZ, DR. MAXINE (40)
Acting Assistant Secretary for
Conservation and Solar
Applications
DOE
20 Massachusetts Avenue, NW
Washington, DC 20245
202-376-4934

SCHAFER, CARL (32)
Director
Industrial Extractive Processes
Division
EPA/ORD/OEET (RD-681)
401 M Street, SW
Washington, DC 20460
202-755-9014

SCHARDT, BRUTON B. (27)
Program Manager
NASA Headquarters (ERS-2)
600 Independence Avenue, SW
Washington, DC 20546
202-755-6038

SCHPEPPACH, RAYMOND C. (49)
Assistant Director
Congressional Budget Office
Natural Resources and Commerce
Division
Rm 3409, House Annex #2
2nd and D Streets, SW
Washington, DC 20515
202-225-1494

SCHNEIDER, DR. ERIC D. (11,12)
EPA/ORD/ERL
South Ferry Road
Narragansett, RI 02882
401-789-1071
FTS-838-4843

SCHUENKE, DAVID (47)
Staff Director
Subcommittee on Environment,
Energy, and Natural Resources
B-371 Rayburn House Office Bldg
Washington, DC 20515
202-225-6427

SCHUPPERT, KEN (28)
Emission Control Development
Projects
OACD-TVA
Office Service Warehouse Annex
Muscle Shoals, AL 35660
205-383-4631
FTS-872-8516

SCHWENGELS, PAUL (16)
EPA/ORD/OEET
401 M Street, SW
Washington, DC 20460
202-755-2737

SCOTT, JOHN (40)
Federal Programs Officer
Ozarks Regional Commission
No. 2099B, Commerce Bldg
14th & E Streets, NW
Washington, DC 20230
202-377-2572

SEGAL, ELLIOTT (48)
Staff Director
Subcommittee on Health and the
Environment
2415 Rayburn House Office Bldg
Washington, DC 20515
202-225-4952

SHALALA, DR. DONNA E. (2)
Assistant Secretary
for Policy Development
and Research
HUD 451 7th Street, SW
Rm 8100
Washington, DC 20410
202-755-5600

SHANHOLTZ, DR. V.O. (13)
Department of Agricultural
Engineering
Virginia Polytechnic Institute
and State University
Blacksburg, VA 24061
703-951-6615

SHARKEY, WILLIAM J. JR. (43)
Director for Energy
OASD (MRA&L) EES
1D760 Pentagon
Washington, DC 20301
202-697-5981

SHAW, LEONARD (41)
Division of Environmental Review
and Compliance
Heritage Conservation and
Recreation Service
USDI
Washington, DC 20240
202-343-7554

SHEA, DR. KEITH R. (33)
Assistant Director
Program Management
Science and Education Administration
USDA
14th and Independence Avenue, NW
Washington, DC 20250
202-447-7223

SHEPHERD, DR. GEORGE (33,35)
Director
Office of Program Coordination
DOE
20 Massachusetts Avenue, NW
Rm 4235
Washington, D.C. 20545
202-376-4445

SHYKIND, DR. EDWIN B. (41)
Director
Office of Business Policy Analysis
USDC
Rm 3112
Washington, DC 20230
202-377-2496

SIEBERT, GEORGE W. (44)
Pesticides & Toxic Substances
OASD (MRA&L) EES
3D833, Pentagon
Washington, DC 20301
202-697-5947

SKINNER, DR. QUENTIN (18)
Assistant Professor
Range Management Division
University of Wyoming
Box 3354 University Station
Laramie, WY 82071
307-766-4139

SMITH, DR. DAVID A. (9)
DOE/OHER
Washington, DC 20545
202-353-4819
FTS-233-4819

SMITH, LINDA K. (35)
EPA/ORPM/TIO (RD-675)
401 M Street, SW
Washington, DC 20460
202-426-9454

SMITH, LOWELL (16,24)
EPA/ORD/OEET
401 M Street, SW
Washington, DC 20460
202-426-2683

SMITH, DR. MICHAEL (18)
Assistant Professor
Range Management Division
P.O. Box 3354, University
Station
University of Wyoming
Laramie, WY 82071
307-766-2337

SMITH, MONA (42)
USDI/OSM
1100 L Street, NW
Washington, DC 20240
202-523-5485

SMITH, DR. RICHARD M. (13,18)
Professor of Agronomy
Division of Plant Sciences
University of West Virginia
Morgantown, WV 26506
304-293-4817

SMITH, DR. WILLIS (46)
Professional Staff Member
Subcommittee on Energy Research
and Development
3106 Dirksen Senate Office Bldg
Washington, DC 20510
202-224-7530

SNELL, DR. JACK E. (33)
Director
Office of Energy Programs
National Bureau of Standards
Washington, DC 20234
301-921-3275

SONTAG, DR. JAMES (39)

Executive Secretary
NCI Clearinghouse
NIH/NCI
Bldg 31, Rm 3A16
Bethesda, MD 20014
301-496-5108

SPARKS, DR. LESLIE E. (31)

Particulate Technology Branch
EPA/IERL (MD-61)
Research Triangle Park, NC 27711
919-541-2925
FTS-629-2925

SPENSLEY, JAMES W. (49)

Counsel and Staff Director
Subcommittee on Energy Develop-
ment and Applications
House Science and Technology
Committee
B374 Rayburn House Office Bldg
Washington, DC 20515
202-225-9117

STACY, DR. RALPH (9)

HERL/RTP (MD-58)
Medical Bldg C
Mason Farm Road
Chapel Hill, NC 27514
919-541-2601
FTS-629-2601

STAPLETON, DR. GEORGE E. (9)

DOE/OHER
Washington, DC 20545
202-353-5039
FTS-233-5039

STATNICK, ROBERT M. (16)

EPA/ORD/OEET
401 M Street, SW
Washington, DC 20460
202-755-2737

STEMMLE, DR. JAMES (3,24)

EPA/ORD/OEPER (RD-682)
401 M Street, SW
Rm 3817C
Washington, DC 20460
202-426-3974

STENBURG, ROBERT L. (26,27)

EPA/MERL
Cincinnati, OH 45268
513-684-7861

STEPHAN, DR. DAVID G. (32)

Director
Industrial Environmental
Research Lab
EPA
Cincinnati, OH 45268
513-684-4402

STERN, DR. CARLOS (44)

Deputy for Environment & Safety
SAF/MIQ
4C885 Pentagon
Washington, DC 20330
202-697-9297

STERN, MICHAEL (46)

Staff Director
Senate Committee on Finance
2222 Dirksen Senate Office Bldg
Washington, DC 20510
202-224-4515

STERN, RICHARD D. (28,29)

EPA/IERL
Research Triangle Park, NC 27711
919-541-2915
FTS-629-2915

STEWART, JOHN G. (45)

Professional Staff Member
Senate Committee on Commerce,
Science and Transportation
Subcommittee on Science, Tech-
nology and Space
5202 Dirksen Senate Office Bldg
Washington, DC 20510
202-224-9351

STEWART, DR. ROBERT E. JR. (14)

Coal Project Leader
Office of Biological Services
USFWS
Washington, DC 20810
202-653-5223

STICKEL, LUCILLE F. (14)

USFWS
Patuxent Wildlife Research Center
Laurel, MD 20810
301-776-4880

STIRLING, DEBORAH J. (45)

Staff Counsel
National Oceans Policy Study
Senate Committee on Commerce,
Science and Transportation
5202 Dirksen Senate Office Bldg
Washington, DC 20510
202-224-9321

STROJAN, DR. CARL L. (8)

Lab of Nuclear Medicine and
Radiation Biology
University of California
900 Veteran Avenue
Los Angeles, CA 90024
213-825-1403

STROMBOTNE, DR. RICHARD L. (37)

Director
Office of Automotive Fuel
Economy Standards (NRM-20)
DOT/NHTSA
400 7th Street, SW
Washington, DC 20590
202-426-0846

STUKEL, DR. JAMES J. (23)

ORBES
133 Advanced Computation Bldg
1011 West Springfield Avenue
Urbana, IL 61801
217-333-8861

SUNDARARAMAN, N. (34)

Office of Environment and Energy
DOT/FAA
800 Independence Avenue, SW
Washington, DC 20591
202-755-8933/1851

SWIFT, DR. JERRY J. (26)

EPA/ORD (ANR-459)
401 M Street, SW
Washington, DC 20460
703-557-7604

TAIT, HOWARD (14)

USFWS
NSTL Station, MS 39529
601-688-2091
FTS-494-2091

TAMNY, LEWIS D. (21)

EPA/IERL (MD-61)
Fuel Process Branch
Research Triangle Park, NC 27711
919-541-2709
FTS-629-2709

TARKINGTON, TERRY (29)

Emission Control Development
Projects
OACD-TVA
Office Service Warehouse Annex
Muscle Shoals, AL 35660
205-383-4631
FTS-872-8516

TEASLEY, JOHN I. (11)
EPA/ERL
6201 Congdon Blvd.
Duluth, MN 55804
281-727-6692, Ext 509
FTS-783-9509

TEIXEIRA, DONALD (42)
Program Manager
Air Quality Control
Electric Power Research
Institute
3412 Hillview Avenue
P.O. Box 10412
Palo Alto, CA 94303
415-855-2425

THIEL, DR. CHARLES C. JR. (34)
National Science Foundation
Problem-Focused Research
Applications
1800 G Street, NW
Washington, DC 20550
202-632-4345

THOEM, TERRY (4)
EPA
Region VIII
1860 Lincoln St, Suite 900
Denver, CO 80295
303-837-5914

THOMAS, AL (10)
Deputy Chief
TERB
OECSP, NIOSH
5600 Fishers Lane, Rm 8-48
Rockville, MD 20857
301-443-3843

THOME, PITT G. (27)
NASA Headquarters (ER-2)
Director
Resource Observation Division
600 Independence Avenue, SW
Washington, DC 20546
202-755-8458

THORNTON, ROBERT D. (48)
Counsel
Subcommittee on Fisheries and
Wildlife Conservation and the
Environment
3574 House Annex #2
Washington, DC 20515
202-225-7307

THORUD, D. (2,12,17)
USDA
Forest Environment Research
P.O. Box 2417
Rm 808
Washington, DC 20013
703-235-1071

THURNAU, ROBERT (22)
EPA/IERL
Cincinnati, OH 45268
513-684-4363

TINKLEMAN, DR. MICHAEL (42)
Washington Representative
Energy Analysis and Environment
EPRI
1800 Massachusetts Avenue, NW
Suite 700
Washington, DC 20036
202-872-9222

TOBERMAN, ROBERT G. (40)
Executive Director
Southwest Border Regional Commission
100 North Stone, Suite 309
Tucson, AZ 85701
602-792-6781
FTS-762-6871

TORSTRICK, R. L. (28)
Emission Control Development
Projects
OACD-TVA
Office Service Warehouse Annex
Muscle Shoals, AL 35660
205-383-4631
FTS-872-8516

TOZZI, JIM J. (45)
Chief
Environmental Branch
Natural Resources Division
Office of Management and Budget
726 Jackson Place,
Rm 8222
Washington, DC 20503
202-395-6827

TYLER, ERROL (48)
Counsel
Subcommittee on Water Resources
2165 Rayburn House Office Bldg
Washington, DC 20515
202-225-4472

URBANEK, JOSEPH W. (44)
Special Assistant
for Environmental Protection
Defense Logistics Agency -
Technical and Logistics Services
DLA-SME
4C499 Cameron Station
Alexandria, VA 22314
202-274-7503

VANCE, WILLIAM F. (43)
Assistant
for Energy Program Management
OASD (MRA&L) EES
1D760, Pentagon
Washington, DC 20301
202-697-2500

VAN HORN, DR. ANDREW J. (23)
Director of Engineering Group
Teknekron, Inc.
2118 Milvia Street
Berkeley, CA 94704
415-548-4100

WAGNER, COL JOHN E. (43)
Assistant
for Energy Conservation
OASD (MRA&L) EES
1D760, Pentagon
Washington, DC 20301
202-697-1988

WAGNER, WILLIAM (5)
NIOSH
944 Chestnut Ridge Road
Morgantown, WV 26505
304-599-7421
FTS-923-7421

WALD, DR. HASKELL P. (42)
Director
Office of Regulatory Analysis
FERC
Rm 9216
825 N Capitol Street, NE
Washington, DC 20426
202-275-4118

WALL, H. (31)
Ultimate Disposal Section
EPA/MERL
Cincinnati, OH 45268
513-684-7659

WALLACE, DR. ARTHUR (8)
Lab of Nuclear Medicine and
Radiation Biology
University of California
900 Veteran Avenue
Los Angeles, CA 90024
213-825-8739

WALSH, JAMES P. (2)
Deputy Administrator
National Oceanic and
Atmospheric Administration
Commerce Bldg
Rm 5802
Washington, DC 20230
301-377-3436

WAMMEL, ARTHUR W. (44)
Solid Waste Management and
Resource Recovery Programs
OASD (MRA&L) EES
3D 823, Pentagon
Washington, DC 20301
202-695-0221

WASEL, ROBERT (39)
Solar Energy Division
NASA (RE-14)
600 Independence Avenue, SE
Washington, DC 20003
202-755-2306

WASSER, JOHN H. (20)
EPA/IERL (MD-65)
Research Triangle Park, NC 27711
919-541-2476
FTS-629-2476

WATERS, DR. MICHAEL D. (9)
Coordinator of Genetic Toxicology
Program
EPA/HERL (MD-68)
Biochemistry Branch
Environmental Toxicology Division
Research Triangle Park, NC 27711
919-541-2518
FTS-629-2518

WATSON, JOHN L. (40)
Executive Director
Western Interstate Energy Board
Western Interstate Nuclear Board
3333 Quebec Street
Suite 2500
Stapleton Plaza
Denver, CO 80207
303-837-5851

WATSON, McIVER (41)
Coastal Plains Regional Commission
215 East Bay Street
Charleston, SC 29401
803-274-4411
FTS-677-4411

WATTERS, DR. ROBERT L. (8,14)
DOE/OHER
Washington, DC 20545
301-353-5329
FTS-233-5329

WEAVER, DR. NEILL (39)
Director of Health and Biological
Sciences
American Petroleum Institute
2101 L Street, NW
Washington, DC 20037
202-457-7190

WEBER, DR. DAVID (3)
EPA/ORD/OEPR (RD-682)
401 M Street, SW
Rm 3817B
Washington, DC 20460
202-426-0288

WEISS, DR. LEONARD (47)
Staff Director
Subcommittee on Energy, Nuclear
Proliferation and Federal
Services
6206 Dirksen Senate Office Bldg
Washington, DC 20510
202-224-2627

WELLS, W. L. (28)
TVA
470 Commerce Union Bank Bldg
Chattanooga, TN 37401
615-755-3581
FTS-854-3581

WESLER, JOHN E. (34)
Office of Environment and Energy
DOT/FAA
800 Independence Avenue, SW
Washington, DC 20591
202-755-8933/1851

WEST, FOWLER C. (47)
Staff Director
House Committee on Agriculture
1301 Longworth House Office Bldg
Washington, DC 20515
202-225-2171

WEWERKA, EUGENE M. (21)
DOE/LASL
Group CMB-8, MS 734
Los Alamos, NM 87545
505-667-5182
FTS-843-5182

WHITE, DR. DAVID (24)
Coordinator
Coal and Geothermal Programs
Texas Energy Advisory Council
7703 North Lamar
Austin, TX 78752
512-475-5588

WHITNAH, JOHN C. (33)
Acting Director
Office of Management Support
DOE
20 Massachusetts Avenue, NW
Rm 6128
Washington, DC 20545
202-376-4191

WIESNER, LOREN E. (13)
Associate Professor
Plant and Soil Science Department
Montana State University
Bozeman, MT 59717
406-994-4601

WILDER, IRA (17)
Chief
OHMSB
EPA/IERL-Ci
Edison, NJ 08817
201-321-6635
FTS-340-6635

WILLIAMSON, W. E. (48)
Staff Director and Chief Clerk
House Committee on Interstate
and Foreign Commerce
2125 Rayburn House Office Bldg
Washington, DC 20515

WINZER, GEORGE E. (38)
Environmental Research
Office of Policy Development
and Research
HUD 451 7th Street, SW
Rm 8216
Washington, DC 20410
202-755-7340

WOLFE, DR. DOUGLAS A. (8)
NOAA/ERL
OCS Environmental Assessment
Program
Boulder, CO 80302
303-499-1000 Ext. 6531
FTS-323-6531

WOODARD, DR. DONALD (12)
USDI/FWS
Office of Biological Services
Washington, DC 20240
202-634-4913

WYZGA, DR. DONALD (42)
Program Manager
Integrated Assessment
Electric Power Research Institute
3412 Hillview Avenue
P.O. Box 10412
Palo Alto, CA 94303
415-855-2577

YAGO, JOHN W. JR. (46)
Staff Director
Environment and Public Works
4204 Dirksen Senate Office Bldg
Washington, DC 20510
202-224-6176

YANCIK, DR. JOSEPH (43)
National Coal Association
1130 17th Street, NW
Washington, DC 20036
202-628-4322

YEAGER, KURT (42)
Director
Coal Combustion
Systems Division
Electric Power Research Institute
3412 Hillview Avenue
Palo Alto, CA 94303
415-855-2456

YOUNT, DR. J. DAVID (32)
Acting Director
Environmental Research
Laboratory
6201 Congdon Boulevard
Duluth, MN 55804
218-727-6692
FTS-783-9549

ZARGER, T. G. (15)
TVA
Division of Forestry
Fisheries and Wildlife
Development
Norris, TN 37828
615-494-7173 Ext. 255
FTS-852-4411

ZARUBICA, MICHELE (41)
Special Assistant/Environment
to the Assistant Secretary for
Energy and Minerals
US Department of the Interior
Rm 6650
18th and C Streets, NW
Washington, DC 20240
202-343-5781
FTS-928-5781

ZIELINSKI, DR. WALTER, JR. (36)
Air Program Manager
NBS/Office of Environmental
Measurements
Chem A347
Washington, DC 20234
301-921-3775

ZINN, D. W. (2)
Director
Agriculture Experiment Station
West Virginia University
Morgantown, WV 26506
304-293-2395