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DOING BUSINESS WITH DOE

A GUIDE FOR THE GAS AND OIL INDUSTRY

Office of Fossil Energy
Gas and Oil Programs

U.S. Department of Energy
Assistant Secretary for Fossil Energy
Office of Gas and Petroleum Technology
Washington, DC 20585

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1.0 INTRODUCTION

This guide has been prepared to assist those in the natural gas and oil industry who may not be familiar with how the Federal government, particularly the U.S. Department of Energy (DOE or Department), does business with private sector companies. Basic information is provided on what DOE is trying to do, why it wants to work with the natural gas and oil industry, how it can work with companies, who to contact, and where to inquire for further information. This last item is noteworthy because it is important for users of this guide to be able to access information about subjects that may interest them. Selected other Federal agencies and their activities related to those of DOE's Office of Fossil Energy (FE or Fossil Energy) also are included in this document as **Appendix A**.

This guide provides an address and/or phone number for every topic covered to prevent any information impasse. If a question is not adequately answered by the guide, please do not hesitate to contact the appropriate person or office.

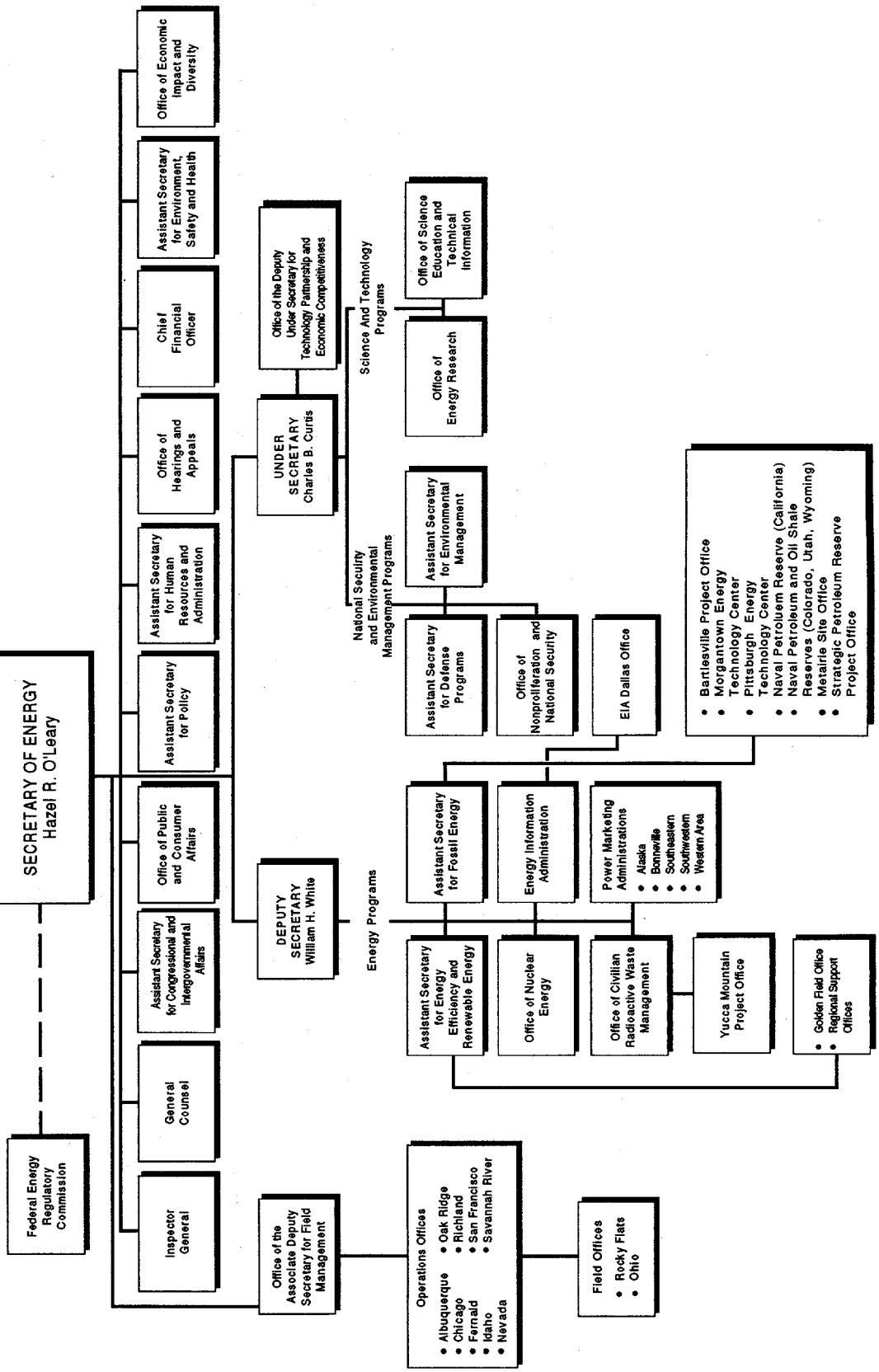
It is hoped that the information provided in this guide will lead to a better understanding of the mission, roles, and procedures of DOE and result in more and better cooperative working relationships between the natural gas and oil industry and DOE. Such relationships will provide a significant benefit to our Nation's economic, technological, and energy security.

1.1 DOE Mission and Relationship to the Public Sector

DOE provides the framework for a comprehensive and balanced national energy plan through the coordination and administration of the energy functions of the Federal government. DOE's mission is to provide scientific foundation, technology, policy, and institutional leadership necessary to achieve efficiency in energy use, diversity in energy sources, a more productive and competitive economy, improved environmental quality, and a secure national defense.

DOE looks to the private sector to assist in the accomplishment of its mission and program objectives. Therefore, it is DOE's policy to encourage outside organizations and individuals to participate in all areas of energy and energy-related research and development, and to initiate imaginative and innovative exploratory research ideas and proposals that are relevant to DOE's mission and will assist in the development and efficient use of reliable energy sources. DOE's ongoing Oil Research Program is an example of DOE/private industry joint technology development efforts. **Exhibit 1** shows the Department of Energy organizational structure.

Exhibit 1 - Department of Energy Organizational Structure



2.0 OFFICE OF FOSSIL ENERGY MISSION AND PROGRAMS

DOE has been developing advanced technologies that make it possible to use all domestic energy resources, including fossil fuel resources, in ways that can promote economic growth while maintaining the Nation's commitment to environmental quality. DOE's Office of Fossil Energy has an integral role in this effort by fostering advanced, more efficient, and cleaner fossil energy technologies through research, development, and demonstration (RD&D) programs. The programs are coordinated through two energy technology centers located in the field (Morgantown, West Virginia; and Pittsburgh, Pennsylvania), a project office in Bartlesville, Oklahoma, and a site office in Metairie, Louisiana. Fossil Energy also manages the Clean Coal Technology Demonstration Program; maintains the Nation's emergency crude oil stockpile, the Strategic Petroleum Reserve; and operates the Naval Petroleum and Oil Shale Reserves, and the Liquefied Gaseous Fuels Spill Test Facility. In addition, Fossil Energy is responsible for administering programs that monitor and regulate international trade in electricity and natural gas.

Fossil Energy oversees a national partnership program with industry, academic institutions, and State agencies to develop and demonstrate advanced fossil fuel technologies for coal, natural gas, and oil. Fossil Energy's RD&D programs are focused on the following: (1) advanced clean coal technologies to reduce pollutants associated with acid rain and global climate change, making this abundant domestic fuel more environmentally acceptable; (2) improved natural gas extraction techniques to unlock new supplies and to expand markets for this clean-burning fossil fuel through new storage, delivery, and end-use technologies; and (3) innovations in exploration and production technologies to prolong the life of known oil fields, and to reveal new oil bearing formations.

2.1 Natural Gas RD&D Programs

Natural gas supplies one-fifth of the primary energy used in the United States. It is an important fuel for the residential sector, where it supplies nearly half of all the energy consumed in U.S. homes. In the future, however, natural gas can increase its contribution in other energy sectors, most notably in the electric power generation and transportation markets.

Fossil Energy has made the development of advanced natural gas technologies one of its highest priorities. Fossil Energy's RD&D program includes the following four areas:

- *Exploration and Production*: Activities to ensure long-term availability of the U.S. natural gas supply.
- *Delivery and Storage*: Development of improved and less costly ways to store and deliver natural gas.
- *Utilization*: Efforts to develop ultra-clean, high-efficiency, natural gas-fueled electric power technologies; and research to improve processes that convert lower-value gas resources to higher-value liquid products.
- *Environmental/Regulatory Impact*: Activities that promote cost-effective regulations based on better knowledge of environmental impacts and risks; and activities that ensure the availability of low-cost waste minimization technologies.

The Fossil Energy natural gas program complements the natural gas-related activities at other DOE offices. For example, the Office of Energy Efficiency and Renewable Energy is developing technologies for more effective use of natural gas in the transportation, industrial, residential, and commercial sectors; and the Office of Energy Research is carrying out more fundamental efforts in geoscience and combustion phenomena.

2.1.1 Exploration and Production

In order to meet the goal of increasing the Nation's gas supply, Fossil Energy is supporting three product lines through its exploration and production research and development program.

- *Drilling, Completion, and Stimulation*: Includes industry-led cooperative research, development, and demonstration activities for commercialization of technologies such as slim-hole drilling, advanced measurement-while-drilling (MWD), hydraulic fracturing, air or air-mist drilling, and horizontal drilling.

- *Low Permeability Formations*: Activities are designed to develop diagnostic technologies for evaluating and characterizing natural fractures; test and analyze multi-strata test wells; and, in partnership with industry, reduce the uncertainty of estimating gas resources and recoverable reserves in western U.S. basins.

- *Resources and Reserves*: Includes activities for development and technology transfer of a natural gas data system comprised of atlases and system models for both conventional and unconventional reservoirs; and secondary gas recovery to increase gas production from mature fields through improved reservoir characterization, reservoir simulation, computer models, infill drilling, and recompletion.

2.1.2 Delivery and Storage

To ensure that consumers of natural gas, particularly in new markets, are confident that gas is a reliable fuel choice, Fossil Energy is studying ways to improve gas delivery and storage. Included are projects to develop an improved deliverability data and reporting system, which involves upgrading State systems for gathering and reporting production information; and the development of better metering equipment to measure natural gas entering the gas gathering pipeline network. Other efforts target improved gas storage, which is becoming an increasingly important requirement for providing reliable gas service. Included are projects to enhance deliverability from the Nation's existing 17,000 storage wells, and to study new storage options such as caverns and aquifers.

2.1.3 Utilization

Fossil Energy undertakes projects in the following areas for development and demonstration of technologies to use natural gas cleanly, more efficiently, and more extensively.

Advanced gas turbine systems are being developed initially for natural gas, with a future option to adapt to coal-derived gas. Advanced turbine systems being developed for the 21st century will be capable of breaking through the temperature barrier that limits the efficiency of today's systems, while significantly reducing nitrogen oxides emissions. Fossil Energy is concentrating on advanced gas turbine systems for

power plants, while DOE's Office of Energy Efficiency and Renewable Energy is focusing on turbine systems for the industrial sector.

Fuel cells will enter the power generation market using natural gas, and later may be adapted to coal-derived gas. Because fuel cells generate electricity electrochemically rather than by combustion, sulfur and nitrogen emissions are virtually nonexistent. Efficiencies can approach 60 percent for power-generating applications, and as high as 85 percent when the waste heat is used for cogeneration. With first generation technologies entering the market, the Fossil Energy program is focusing on higher efficiency fuel cells that could be commercially ready for natural gas applications by the year 2000 and for coal-based applications by 2010.

Natural gas upgrading technologies also are being developed to convert remote sources of natural gas (including refinery off-gases) into more marketable liquid fuels, and to upgrade low-quality natural gas to pipeline specifications. Gas-to-liquids technologies include catalytic, noncatalytic, and biological processes. Low-quality natural gas upgrading technologies include membrane, absorption/adsorption, biological processes, and/or combinations of these processes.

2.1.4 Environmental/Regulatory Impact

Fossil Energy is working with industry, gas-producing States, and others to develop sound technical and economic data that can help regulators develop reasonable environmental requirements for natural gas and oil exploration and production. Fossil Energy simultaneously is testing in the field those technologies that can improve the environmental performance of natural gas field operations, including the minimization of waste products.

According to the National Petroleum Council, more stringent environmental regulations could have a significant impact on future U.S. gas supplies causing a decrease of up to 10 percent in natural gas production in 2010 compared to a more balanced regulatory approach. Issues that will be addressed include leasing and development in the Gulf of Mexico; regulatory and administrative streamlining related to onshore natural gas and oil exploration and production; regional environmental constraints to natural gas and oil exploration, production, transportation, and processing (e.g., naturally occurring radioactive materials, endangered species, waste management practices, air emissions, abandoned sites); and barriers to resource development and environmental management on Native American lands.

2.2 Oil RD&D Programs

The U.S. is a mature oil province in which large, easy-to-produce oil resources are becoming increasingly difficult to find. This factor, coupled with the growing cost of environmental compliance, has led many large, high-technology companies to concentrate their exploration activities away from the United States. Smaller, less sophisticated independent producers, who are producing an increasingly larger share of U.S. domestic oil from marginally economic wells, are in need of technology that will assist them in increasing production and lowering operating costs. In addition, increasingly heavier crude oil inputs to refineries, stronger demand for lighter fuel products, and more stringent environmental regulations have sharply escalated the costs of processing crude oil into high-quality products.

Fossil Energy is conducting an intensive effort to provide the needed technology to the U.S. oil industry. The objective of Fossil Energy's refocused Oil Program is to assist industry in applying existing technology, promote development of promising technology that can contribute significantly to ultimate

discovery and recovery, and encourage a regulatory climate that protects the environment while allowing the economic application of technology and recovery of oil.

The Oil Program activities are grouped under the areas of Supporting Research, Field Demonstrations, Environmental Research, and Processing.

2.2.1 Supporting Research

Supporting Research includes Exploration and Drilling, Extraction, Technology Transfer, and the Natural Gas and Oil Technology Partnership.

Exploration and Drilling: This program was initiated in 1994 in response to the new realities of the industry. Currently over 85 percent of U.S. exploratory wells are drilled by independents. A multidisciplinary geoscience approach to basin analysis should assist in quickly and cost-effectively identifying underexplored, high-potential regions and formations in U.S. basins. Program initiatives include development of methodologies and techniques to explore untested formations within older producing fields in an environmentally safe manner; more cost-effective engineering methodologies and equipment for drilling technology that could significantly contribute to increased discoveries and recovery; better risk analysis and decisionmaking processes for selecting prospects; and exploration and drilling methods to improve efficiencies and discovery rates, and minimize the risk associated with hydrocarbon exploration and drilling.

Extraction: In the U.S., roughly two-thirds (341 billion barrels) of the discovered oil remain in the ground after conventional methods reach their technical and economic limit. The goal of the extraction program is to provide improved technology and reduce operating costs to make more of this remaining target resource recoverable. Reservoir characterization research, providing improved understanding of reservoir architecture, reservoir geometry dimensions, boundaries, fluid/rock properties, and fluid-flow characteristics, will allow the design of improved recovery processes. Recovery process research is developing technologies for broader application of existing and advanced recovery techniques. Field laboratories will be used to accelerate the development of promising recovery technologies and equipment, and computer models will be used to integrate and transfer research results to operators.

Technology Transfer: The goal of the technology transfer program is to deliver the products of the Oil Program to users in the petroleum community. Customer and stakeholder outreach activities include dissemination of technical reports, training workshops, oil program exhibits at conferences, development of international opportunities for U.S. technology, and enhancement of science and technical education. The program also supports the efforts of the Petroleum Technology Transfer Council (PTTC), a national network of regional organizations focusing particularly on the technology needs of independent operators. For more information on PTTC, contact Thomas Wesson at (918) 337-4401.

Natural Gas and Oil Technology Partnership: The National Laboratory/Industry Partnership Program was initiated in 1988 under the Oil Recovery Technology Partnership. This program began as an alliance between DOE, Los Alamos National Laboratory, Sandia National Laboratories, and the petroleum industry (including the major producers, independent oil producers, and service companies). The Oil Recovery Technology Partnership has been expanded in 1994 to include the implementation of the Advanced Computational Technology Initiative, and renamed as the Natural Gas and Oil Technology Partnership. As of fiscal year (FY) 1995, all nine DOE multi-purpose National Laboratories are eligible to participate in the Partnership program activities. The Partnership programs are further described in **Section 2.5**.

2.2.2 Field Demonstration Projects

Field demonstration projects target research toward production problems specific to geologically similar reservoir classes having the most potential for improved recovery and the greatest risk of abandonment before advanced technology can be applied. The program provides matching Federal funds of up to 50 percent to operators ranging from small oil companies to major producers, along with other organizations such as universities and State agencies. Benefits of this program are increased by contractors' technology transfer efforts to evaluate results, refine processes and methods, and target communication toward operators in geologically similar reservoirs. Currently, 24 cost-shared projects in two reservoir classes are underway, and nine additional projects for a third class were selected in September 1994.

2.2.3 Environmental Research

The goal of the environmental research program is to assist operators to reduce the cost of environmental compliance while improving environmental performance. DOE seeks to encourage sound regulation by State, Native American tribal, and Federal government officials. *Area of Review Variance* support activity assists State governments in the acquisition of variances to forthcoming Environmental Protection Agency requirements related to risk posed to groundwater from injection of produced water for disposal and injection of enhanced oil recovery fluids. Other work aims to simplify regulations to reduce the cost of compliance by natural gas and oil operators without compromising environmental protection. For example, collecting and analyzing scientific data on produced water and sand discharges in the Gulf Coast will be used to affect regulatory decisions.

2.2.4 Processing

The Processing program focuses on research to help industry reduce refining costs, comply with environmental regulations, and meet increasingly complex fuel specifications. Program activities include: development of environmental data and technologies in collaboration with refinery groups, industry, environmental groups, and Federal, State, and local regulators; evaluation of new and promising technologies that reduce specific pollutants, such as air toxics, wastewater, refractory hydrocarbon residues, coke, and spent catalysts; and development of fundamental chemical and thermodynamic data on heavy crude oil and residue that will assist industry to increase processing capacity of domestic heavy crude oils.

2.3 Domestic Natural Gas and Oil Initiative

The Domestic Natural Gas and Oil Initiative (Initiative) was launched by the Administration in December 1993. As stated by the Secretary of Energy, the end goal of the Initiative is to develop new and expanded opportunities for jobs in the domestic natural gas and oil industries, while fostering a climate that will increase production from domestic resource bases and reduce the Nation's reliance on foreign oil.

The Initiative recommended 49 specific actions that are designed to: (1) increase domestic natural gas and oil production and environmental protection by advancing and disseminating new exploration, production, and refining technologies; (2) stimulate markets for natural gas and natural gas-derived products, including their use as substitutes for imported oil where feasible; and (3) ensure cost-effective environmental protection by streamlining and improving government communication, decisionmaking, and regulation.

Several actions of the Initiative already have been completed. For a copy of the Initiative and/or for additional information, contact Robert Porter, Director, Office of Communications, (202) 586-6503.

2.4 Strategic Planning for Natural Gas and Oil RD&D Programs

All program offices at DOE are required to develop and maintain current strategic plans for their operations. Strategic planning is performed by each program office as part the integral steps to fulfill both the program mission and the overall Departmental mission. Strategic planning is designed to ensure that the goals and strategies and specific RD&D activities are developed to achieve the long-term vision defined by the Department and each program office. Fossil Energy's natural gas and oil programs follow the roadmaps outlined in program-specific strategic plans which are responsive to industry needs and requirements.

The first DOE-wide five-year *Natural Gas Strategic Plan and Multi-Year Program Crosscut Plan* was published in 1992 for industry review and comment. For the first time, this effort combined the natural gas RD&D activities of Fossil Energy with those of other DOE offices including Energy Efficiency and Renewable Energy, and Energy Research. The new edition of the plan, currently under development, responds to recommendations of the natural gas industry and program stakeholders and customers. The natural gas program reflects the "systems approach" that addresses technology needs, technology commercialization across the natural gas system and in all market sectors, regulatory constraints, environment, and opportunities for increasing gas use. For additional information, contact Peter Cover at (202) 586-7297.

Fossil Energy's *Oil Research Program Implementation Plan*, published in 1990, redirected the oil program activities to focus on maximizing the supply of domestically produced oil through application of advanced technologies and reversing the rate of oil well abandonments. A draft Fossil Energy petroleum strategic plan that was developed last year is under revision. The new plan will be Department-wide and include crosscutting programs at other DOE offices such as Energy Efficiency and Renewable Energy, Energy Research, Policy, and Defense Programs. The plan also will reflect the Domestic Natural Gas and Oil Initiative actions and high-priority industry RD&D needs currently being identified by the National Petroleum Council. For additional information, contact Guido DeHoratiis at (202) 586-7296.

2.5 Natural Gas and Oil Technology Partnership

The mission of the Natural Gas and Oil Technology Partnership (Partnership) is to stimulate, facilitate, and coordinate the development and transfer of technology to the U.S. natural gas and oil industry through technical interactions and collaborations with DOE's National Laboratories. The Partnership working procedures are simple and do not involve formal solicitations, lengthy proposals, and "red tape" in project evaluation and selection. The Partnership develops new and innovative mechanisms to expedite technology transfer and uses guidance from industry to prioritize activities.

The Partnership currently has four technology focus areas that are important to industry: Oil Recovery Technology, Borehole Seismic Technology, Drilling and Completion Technology, and Advanced Computational Technology. Each of these technology areas has a separate review group and rating and ranking mechanism to ensure that the chosen projects represent the greatest needs of the segment of the industry most concerned with that technology.

The Oil Recovery Technology area addresses a broad range of industry needs, interfacing with industry through an Industry Review Panel. The Borehole Seismic Technology area addresses advanced geophysical methods for improved reservoir characterization, interfacing with industry through the Crosswell Seismic Forum. The Drilling and Completion Technology area provides producers with better

access to reservoirs through improved drilling and completion technologies. Industry interface is accomplished through the Drilling Engineering Association and the Completion Engineering Association. The Advanced Computational Technology area will provide access to cutting-edge computing and associated technologies at DOE's National Laboratories to improve the ability of the domestic industry to explore, produce, and process natural gas and oil resources at lower costs and with reduced environmental risks. The industry interface will be through the Advanced Computational Technology Initiative Forum that will serve as the Industry Review Panel.

Day-to-day management of the Partnership is conducted by the Partnership Office (composed of National Laboratory representatives) that functions as industry's point of contact. The Partnership Industry Steering Committee provides strategic guidance and recommendations on industry's technical requirements against which projects can be planned and developed. The Industry Review Panel of each Partnership technology area evaluates and prioritizes project proposals according to industry needs and the established Partnership criteria. The project reviews are coordinated and summarized by the Partnership Office. Final project selection and funding decisions are made by DOE.

For additional information on the Partnership programs, please contact one of the following:

- Robert J. Hanold
  Natural Gas and Oil Technology
  Partnership Office
  Los Alamos National Laboratory
  P.O. Box 1663, MS D446
  Los Alamos, NM 87545
  (505) 667-1698

- David A. Northrop
  Sandia National Laboratories
  Natural Gas and Oil Technology
  Partnership Office
  P.O. Box 5800
  Albuquerque, NM 87145
  (505) 844-2302

2.6 Advanced Computational Technology Initiative

The Advanced Computational Technology Initiative (ACTI) is a major component of the Administration's Domestic Natural Gas and Oil Initiative. Independent and major producers, service companies, and universities are encouraged to participate in the ACTI program. Under ACTI, strong computational capabilities of the National Laboratories are being redirected to support the natural gas and oil industry. Domestic production of natural gas and oil depends heavily on independent producers who generally do not have access to supercomputers.

The ACTI program will use state-of-the-art computing and associated technologies resident at the DOE National Laboratories to improve the acquisition, processing, and interpretation of geologic, geochemical, geophysical, and engineering data required to optimize the exploration for, and production and processing of natural gas and oil.

The program is designed to advance industry's technology capabilities in areas such as two-dimensional and three-dimensional seismic data acquisition, processing, and interpretation; reservoir characterization and production data acquisition, processing, and interpretation; and modeling and simulation programs. These advancements can then be applied to specific areas including: (1) subsurface structural and stratigraphic imaging and modeling; (2) reservoir characterization and compartmentalization modeling; (3) fluid flow and reservoir performance modeling; and (4) other challenging computational issues identified by industry, both upstream and downstream.

The ACTI program will consist of collaborative projects identified as high priorities by industry participants. Calls for ACTI proposals are announced in the *Federal Register*, *Commerce Business Daily*, industry journals, and the DOE/FE electronic bulletin board. The proposal submittal procedures will be kept simple to encourage industry involvement, i.e., the ACTI program will not involve competitive solicitations.

The projects will be funded by DOE and leveraged by matching industry contributions that will average 50 percent for the overall program. ACTI project proposals, which are to be typically 3 to 5 pages, will be reviewed by the Partnership Office to ensure that they meet established Partnership program criteria requirements and do not duplicate other efforts ongoing at the National Laboratories. Proposals that pass this screening will be given to the ACTI Program Industry Review Panel for evaluation and prioritization. The National Laboratory Task Group for the ACTI Forum will analyze industry input and prepare recommendations based on industry evaluations and priorities.

Final project selection and funding decisions will be made by the DOE Management Group comprised of members from the Offices of Fossil Energy, Defense Programs, and Energy Research. The first call for proposals was announced in September 1994, and the projects selected will be initiated in January 1995.

For additional information on the ACTI program, contact Thomas Wesson at (918) 337-4401, or Robert Hanold at (505) 667-1698.

2.7 Rocky Mountain Oilfield Testing Center

An action of the Domestic Natural Gas and Oil Initiative calls for establishment of a center at the Naval Petroleum Reserves No. 3, located in Casper, Wyoming, to conduct advanced technology testing, evaluation, and training. This facility, called the Rocky Mountain Oilfield Testing Center, is currently available for testing new applications that lead to increased production, lower operating costs, and improved environmental compliance costs in small gas and oil fields.

The uses and benefits of the Center for various interested parties include the following:

- Independent oil producers can take advantage of the defined reservoirs, documented reserve data, equipment and technical expertise available at the Center to test their ideas;
- Inventors can partner with the Center to test, evaluate, demonstrate, and transfer new technologies to the natural gas and oil industry;
- The Center can provide facilities for the National Laboratories and other government organizations to conduct actual field testing on the theories and techniques that have been tested only in a laboratory environment;
- Environmental agencies can explore ways to prevent and handle threats to ecological systems;
- Universities and trainers can utilize the Center to provide hands-on experience to their students; and
- The Center can provide manufacturers and service companies a place to test new applications of existing technologies to increase productivity and lower operating costs.

For additional information on the Center, contact:

- Capt. Ernest Hunter, USN
  U.S. Department of Energy
  Office of Naval Petroleum and
  Oil Shale Reserves
  1000 Independence Ave., S.W.
  Washington, DC 20585
  (202) 586-4685

- Alan Khatib
  U.S. Department of Energy
  Naval Petroleum and Oil Shale Reserves
  907 N. Poplar, Suite 150
  Casper, WY 82601
  (307) 261-5000, Extension 5075

2.8 Natural Gas and Oil Program Contacts

Natural gas and oil related RD&D programs are administered by Fossil Energy's Office of Gas and Petroleum Technology, which comprises the Office of Oil and Gas Exploration and Production, and the Office of Oil and Gas Processing. The programs are implemented through the following Fossil Energy field offices: Bartlesville Project Office (BPO), Morgantown Energy Technology Center (METC), Pittsburgh Energy Technology Center (PETC), and the Metairie Site Office (MSO). Points of contact for natural gas and oil programs at Headquarters (HQ) and field offices are listed below:

- Patricia F. Godley
  Assistant Secretary for
  Fossil Energy
  U.S. Department of Energy
  1000 Independence Avenue, S.W.
  Washington, DC 20585
  (202) 586-6660

- John W. B. Northington
  Chief of Staff for the
  Assistant Secretary
  for Fossil Energy
  (202) 586-6660

- Reginal W. Spiller
  Deputy Assistant Secretary
  Office of Gas and Petroleum
  Technology
  (202) 586-6660

- Sandra L. Waisley
  Acting Director, Office of Oil and
  Gas Exploration and Production;
  Acting Director, Office of Oil and
  Gas Processing
  (202) 586-5600

  - H. William Hochheiser
    Deputy Director
    Office of Oil and Gas Exploration
    and Production
    (202) 586-5614

  - Arthur Hartstein
    Deputy Director
    Office of Oil and Gas Processing
    (301) 903-2760

The following are the HQ and field contacts for various natural gas and oil related programs.

- Field Demonstration/ Enhanced Oil Recovery
  - Guido DeHoratiis (FE/HQ) (202) 586-7296
  - Edith Allison (BPO) (918) 337-4390
- Oil Supporting Research
  - George Stosur (FE/HQ) (301) 903-2749
  - Rhonda Lindsey (BPO) (918) 337-4407
  - Robert Lemmon (BPO) (918) 337-4405
  - Betty Felber (BPO) (918) 337-4401
- Natural Gas Exploration and Production
  - Elena Subia Melchert (FE/HQ) (202) 586-5095
  - Leonard Graham (METC) (304) 285-4714
  - Harold Shoemaker (METC) (304) 285-4715
  - Albert Yost (METC) (304) 285-4479
  - K-H. Frohne (METC) (304) 285-4412
  - Royal Watts (METC) (304) 285-4218
  - Charles Byrer (METC) (304) 285-4547
  - William Gwilliam (METC) (304) 285-4401
  - John Duda (METC) (304) 285-4217
  - Anthony Zammerilli (METC) (304) 285-4641
- Gas Processing and Upgrading/ Gas-to-Liquids
  - Ralph Avellanet (FE/HQ) (202) 586-8499
  - Hugh Guthrie (METC) (304) 285-4632
  - Rodney Malone (METC) (304) 599-1968
  - Harold Shoemaker (METC) (304) 285-4715
  - Gary Stiegel (PETC) (412) 892-4499
- Natural Gas Delivery and Storage
  - Christopher Freitas (FE/HQ) (202) 586-1657
  - Leonard Graham (METC) (304) 285-4714
  - Albert Yost (METC) (304) 285-4479
  - James Ammer (METC) (304) 285-4383
- Oil Processing/Utilization
  - Arthur Hartstein (FE/HQ) (301) 903-2760
  - Ernie Zuech (FE/BPO) (918) 337-4414
- Environment -- Processing
  - Arthur Hartstein (FE/HQ) (301) 903-2760
  - Nancy Johnson (FE/HQ) (202) 586-6458

- Environment/Regulatory Impact/Exploration and Production

  - H. William Hochheiser (FE/HQ)
    (202) 586-5614
  - Nancy Johnson (FE/HQ)
    (202) 586-6458
  - Jerry Ham (MSO)
    (504) 734-4906
  - Gene Pauling (MSO)
    (504) 734-4131
  - Brent Smith (MSO)
    (504) 734-4970

- Planning and Analysis, Economic Modeling

  - John Pyrdol (FE/HQ)
    (301) 903-2773

- Technology Transfer

  - Herb Tiedemann (BPO)
    (918) 337-4293

2.9 Fossil Energy Field Offices

- Bartlesville Project Office (BPO)

  - Thomas C. Wesson, Director
    220 N. Virginia Avenue
    Bartlesville, OK 74003
    (918) 337-4401

  - R. Michael Ray
    Program Coordinator
    Tertiary Oil Recovery
    Information System
    (918) 337-4403

  - Alex B. Crawley
    Natural Gas and Oil Technology
    Partnership
    (918) 337-4406

Areas of Major Responsibility

- Implementation of the Oil Research Program Plan; advanced exploratory research; operation and maintenance of the Tertiary Oil Recovery System (TORIS) database; Advanced Computational Technology Initiative program field implementation.

	Areas of Major Responsibility
• Morgantown Energy Technology Center (METC) – Thomas F. Bechtel, Director P.O. Box 880 Morgantown, WV 26507-0880 (304) 285-4511 – Louis A. Salvador, Associate Director Office of Product Technology Management (304) 285-4147 – Leonard E. Graham, Director Natural Gas Technologies Branch (304) 285-4714	• Research and development for natural gas production, storage, and utilization, including projects to improve drilling and stimulation technologies for natural gas recovery, development of natural gas atlases, natural gas upgrading, gas turbines, and fuel cells.
• Pittsburgh Energy Technology Center (PETC) – Sun W. Chun, Director P.O. Box 10940 Pittsburgh, PA 15236 (412) 892-6122 – Ralph A. Carabetta Associate Director Office of Project Management (412) 892-5729 – Gregory J. Kawalkin Procurement Officer (412) 892-6135	• Procurement support to oil program, and implementation of the gas-to-liquids RD&D program.

- Metairie Site Office (MSO)

  – Jerry D. Ham, Director
  900 Commerce Road East
  Metairie, LA 70123
  (504) 734-4906

  – Brent Smith
  Environmental Research and
  University Programs
  (504) 734-4970

Areas of Major Responsibility

- Implementation of the Oil and Gas Research Program Plan including environmental research; environmental technology transfer; and coordination and support of programs for Historically Black Colleges and Universities.

2.10 Further Information Sources for Office of Fossil Energy

For more information on Fossil Energy programs, contact the following information services:

- *Telenews*: An electronic bulletin board that can be accessed with a computer/modem by calling (202) 586-6496.

- *Techline*: An automated fax information service, accessed by calling (202) 586-4300 on any touchtone telephone.

- *Fuels Programs BBS*: An electronic bulletin board service (BBS) specializing in natural gas and electricity regulatory information, accessed through a computer/modem by calling (202) 586-7853; or call Fossil Energy, Office of Communications at (202) 586-6503.

- *Internet*: Fossil Energy Home Page address: http://www.doe.gov/html/fe/fehome.html
  DOE Home Page address: htpp://www.doe.gov

3.0 OTHER RELATED DOE OFFICES

In addition to Fossil Energy's Office of Gas and Petroleum Technology, there are several other offices -- some under Fossil Energy -- supporting the natural gas and oil programs on a Department-wide basis, including the Offices of Energy Efficiency and Renewable Energy; Energy Research; Policy; Science, Education, and Technical Information; Environment, Safety and Health; Congressional, Intergovernmental, and Public Affairs; and the Energy Information Administration.

Areas of major responsibility of these offices as related to fossil energy and contacts for further information are provided below in **Sections 3.1 and 3.2.** Fossil energy related capabilities of DOE Laboratories and their contacts are provided in **Section 3.3.**

3.1 Other Fossil Energy Offices

	Areas of Major Responsibility
• Deputy Assistant Secretary for Advanced Research and Special Technologies – Marvin I. Singer U.S. Department of Energy 1000 Independence Ave., S.W. Washington, DC 20585 (202) 586-1577	• Performs and coordinates fossil energy advanced research, materials research, and magnetohydrodynamics (MHD) and fuel cells research.
• Office of Special Technologies – Victor K. Der Director U.S. Department of Energy 1000 Independence Ave., S.W. Washington, DC 20585 (301) 903-2700	• Responsible for development of fuel cells.
• Office of Coal Technology – George Rudins Associate Deputy Assistant Secretary U.S. Department of Energy 1000 Independence Ave., S.W. Washington, DC 20585 (301) 903-3991	• Responsible for advanced power systems, including development of high-efficiency gas turbines.

	Areas of Major Responsibility
• Deputy Assistant Secretary for Fuels Programs – Anthony Como (Acting) U.S. Department of Energy 1000 Independence Ave., S.W. Washington, DC 20585 (202) 586-9482	• Responsible for administering DOE regulatory programs related to imports and exports of natural gas, exports of electrical energy, construction of international electric transmission lines, and the provisions of the Power Plant and Industrial Fuel Use Act of 1978.
– Office of Coal and Electricity Anthony Como, Director (202) 586-5935	– Responsible for regulating exports of electricity, construction, and operation of trans-border electric transmission lines and the Fuel Use Act.
– Office of Natural Gas Clifford Tomaszewski, Director (202) 586-9482	– Responsible for regulating exports and imports of natural gas under Section 3 of the Natural Gas Act.
• Strategic Petroleum Reserve – Richard D. Furiga Deputy Assistant Secretary U.S. Department of Energy 1000 Independence Ave., S.W. Washington, DC 20585 (202) 586-4410	• Responsible for overall management of the Strategic Petroleum Reserve including policy development and planning responsibilities.
– Office of Strategic Petroleum Reserve John W. Bartholomew, Associate Deputy Assistant Secretary (202) 586-4410	– Plans, develops and operates a crude oil storage and distribution system to reduce U.S. vulnerability to supply interruptions.
– Office of Management and Operations John W. Bartholomew Acting Director (202) 586-4421	– Provides planning and financial support to ensure that overall goals and objectives of the Strategic Petroleum Reserve are met.
• Office of Naval Petroleum and Oil Shale Reserves – Capt. Ernest Hunter, USN Director (202) 586-4685	• Plans, develops, and operates a crude oil storage and distribution system for the armed forces during national emergencies.

Areas of Major Responsibility

- Office of Planning and Environment
  - Raymond J. Braitsch
    Acting Director
    U.S. Department of Energy
    1000 Independence Avenue, S.W.
    Washington, DC 20585
    (202) 586-9680

  - Serves as policy, strategy, planing and environment, safety and health interface between Fossil Energy and other groups within and outside of DOE.

- Office of Communications
  - Robert C. Porter, Director
    U.S. Department of Energy
    1000 Independence Avenue, S.W.
    Washington, DC 20585
    (202) 586-6503

  - Responsible for media, Congressional, and industrial relations. Manages the technical information dissemination/technology transfer activities performed by Fossil Energy.

- Deputy Assistant Secretary for Management
  - Howard Borgstrom
    Acting Deputy Assistant Secretary
    U.S. Department of Energy
    Office of Fossil Energy
    20300 Century Boulevard
    Germantown, MD 20874
    (301) 903-2617

  - Responsible for interfacing with Energy Technology Centers and other DOE field organizations. Conducts technical coordination functions, business operations, and intergovernmental and international affairs policy and management.

    - Office of Business Operations
      Keith N. Frye, Director
      (301) 903-2098

      – Develops business operations policy and guidance for Fossil Energy.

    - Office of Resource Management
      Gene H. Kight, Director
      (301) 903-6841

      – Provides support in the areas of budget and program initiation, management and administration, and communication.

    - Office of Advanced Research
      David J. Beecy, Director
      (301) 903-2787

      – Serves as principal technical advisor and coordinator for materials research and advanced process technologies for liquid and gaseous fuels.

3.2 Other DOE Offices

	Areas of Major Responsibility
• Office of Energy Efficiency and Renewable Energy Christine Ervin, Assistant Secretary U.S. Department of Energy 1000 Independence Ave., S.W. Washington, DC 20585 (202) 586-9220	• Develops and promotes the adoption of cost-effective renewable energy and energy efficiency technologies, and practices in conjunction with the States and with partners in the building, industrial, transportation, and utility sectors for the benefit of the economic competitiveness, energy security, and environmental quality of the Nation.
– Peter Fox Penner Principal Deputy Assistant Secretary (202) 586-9220	
– Office of Utility Technologies Robert San Martin Deputy Assistant Secretary (202) 586-9275	– Works with industry to improve the costs and performance of renewable energy technologies.
– Office of Industrial Technologies Alan Streb Deputy Assistant Secretary (202) 586-9232	– Collaborates with industry to improve the energy efficiency and productivity of industrial processes.
– Office of Transportation Technologies Thomas Gross Deputy Assistant Secretary (202) 586-9315	– Supports research in electric and hybrid vehicles, fuel cells and other advanced power sources, alternative fuels made from biomass and other renewable energy sources, and advanced materials.
– Office of Building Technologies John Millhone Deputy Assistant Secretary (202) 586-1510	– Supports private sector efforts in the building industry to improve energy efficiency and increase the use of renewable energy.
– Office of Technical and Financial Assistance Mary Fowler Acting Deputy Assistant Secretary (202) 586-2300	– Encourages the flow of public information, develops partnerships with private sector and State and local governments, encourages exports of renewable energy technologies, and helps State and local governments make better use of their energy resources through energy planning and management programs, and programs that help finance energy conservation projects.

Areas of Major Responsibility

- Office of Energy Research
  - Martha Krebs, Director
    U.S. Department of Energy
    1000 Independence Ave., S.W.
    Washington, DC 20585
    (202) 586-5430

  - James Decker
    Deputy Director
    (202) 586-5434

  - John Clark
    Executive Director
    (202) 586-5440

  - William Luth
    Engineering and
    Geosciences Division
    (Advanced Computational Technology Initiative program contact)
    (301) 903-5829

  - Office of Program Analysis
    Walter Warnick
    (301) 903-3122
    Nick Woodward
    (301) 903-4061

- Advises the Secretary of Energy on energy research and development programs of DOE and the use of multipurpose basic and applied research; administers DOE programs supporting university researchers; and monitors DOE RD&D programs for deficiencies or duplication of effort.

  - Supports basic research at DOE Laboratories and universities on the basis of competitive, peer-reviewed research proposals.

  - Performs strategic planning and topical studies related to current energy and environmental issues.

- Energy Information Administration
  - Jay E. Hakes, Administrator
    U.S. Department of Energy
    1000 Independence Ave., S.W.
    Washington, DC 20585
    (202) 586-4361

  - Office of Oil and Gas
    Diane Lique, Director
    (202) 586-6401

  - Reserves and Natural Gas Division
    Acting Director
    (202) 586-6090

- Collects, processes, and publishes data in the areas of energy reserves, production, demand, consumption, distribution and technology; provides data publication and distribution services within DOE, throughout the government, and to the public; serves as a clearinghouse for information on energy; and coordinates the activities with DOE's Office of Scientific and Technical Information (see **Section 4.7**).

	Areas of Major Responsibility
• Assistant Secretary for Policy – Susan F. Tierney U.S. Department of Energy 1000 Independence Ave., S.W. Washington, DC 20585 (202) 586-5800 – Donna Bobbish, Director Office of Natural Gas Policy (202) 586-6690 – Leonard Coburn Director, Office of Oil Policy (202) 586-5667	• Acts as a principal advisor to the Secretary of Energy and formulates, recommends, and manages national and international policy development, strategic long-range plans, and integration of Departmental policy and program and budget goals; conducts integrated policy analyses; and conducts systematic evaluations of DOE programs to ensure that each one maximizes its contributions to national energy goals and the Department's goals and objectives.
• Assistant Secretary for Defense Programs, Office of Economic Competitiveness – James L. Van Fleet, Director U.S. Department of Energy 1000 Independence Avenue, S.W. Washington, DC 20585 (202) 586-5782 – Alex Larzelere (202) 586-1101	• Manages dual-benefit R&D program between the private sector and Defense Programs Laboratories and facilities that enhance the technology infrastructure and core competencies necessary for DOE national security mission, while also contributing to U.S. industrial competitiveness. In the course of supporting the Defense Programs mission, conducts collaborative R&D with the gas and oil industry in the areas of mutual interest (e.g., Gas and Oil National Information Infrastructure Testbed project). – Advanced Computational Technology Initiative program contact.
• Assistant Secretary for Environment, Safety and Health – Tara J. O'Toole U.S. Department of Energy 1000 Independence Ave., S.W. Washington, DC 20585 (202) 586-6151	• Ensures that DOE programs are in compliance with environmental, safety and health regulations. Ensures that the environmental, and safety and health impacts of DOE programs receive management review.

	Areas of Major Responsibility
• Office of Science Education and Technical Information – Terry Cornwell Rumsey, Director U.S. Department of Energy 1000 Independence Ave., S.W. Washington, DC 20585 (202) 586-6771 – Elizabeth Buffum Director, Office of Scientific and Technical Information (202) 586-6771 – Richard E. Stephens Director, Office of University and Science Education (202) 586-8949	• Manages coordination and oversight of the collection and dissemination of information resulting from the Department's research and development activities; disseminates scientific and technical information received from international agreements; and advises the Secretary of Energy with respect to science, math, and engineering precollege and university education programs.
• Office of Technology Partnership and Economic Competitiveness – Roger A. Lewis Director, Technology Utilization U.S. Department of Energy 1000 Independence Ave., S.W. Washington, DC 20585 (202) 586-5388 – Sandy Glatt Small Business Coordinator (202) 586-3897	• Responsible for addressing issues related to technology transfer policies and implementation across the DOE complex. Assists small businesses in identifying programs and contacts throughout the DOE system.
• Deputy Assistant Secretary for Procurement and Assistance Management – Richard H. Hopf U.S. Department of Energy 1000 Independence Ave., S.W. Washington, DC 20585 (202) 586-8613	• Responsible for all procurement, grants, cooperative agreements, and financial assistance contracting activities; personal property management; industrial mobilization; and related business activities.

	Areas of Major Responsibility
• Office of Public and Consumer Affairs – Michael Gauldin, Director U.S. Department of Energy 1000 Independence Ave., S.W. Washington, DC 20585 (202) 586-4940	• Manages press services, public affairs, and public information activities. Serves as the chief spokesperson for the Secretary and the Department.

3.3 DOE Laboratories

	Fossil Energy Related Capabilities
• David Schmalzer Manager, Fossil Energy Program (and the ACTI program contact) Argonne National Laboratory 955 L'Enfant Plaza North, S.W. Suite 6000 Washington, DC 20024 (202) 488-2415 or (708) 252-7723	• Environmental sciences, advanced combustion systems, materials technology, instrumentation development, assessment of environmental and economic issues. (Advanced Computational Technology Initiative (ACTI) is a technology area of the Natural Gas and Oil Technology Partnership; see **Section 2.6.**)
• Leon Petrakis Brookhaven National Laboratory Upton, NY 11973 (516) 282-3037 – Margaret Bogosian Office of Technology Transfer Building 902-C (516) 282-7338	• Environmental sciences advanced research and technology development, plume dispersion, atmospheric chemistry, and gas and oil bioprocessing technology. – Advanced Computational Technology Initiative program contact.
• William Carpenter Idaho National Engineering Laboratory P.O. Box 1625 Idaho Falls, ID 83415 (208) 526-4430 – Richard Rice, Manager Advanced Fossil Fuel Products (208) 526-1992	• Environmental remediation, biotechnology, advanced research, and technology development. – Advanced Computational Technology Initiative program contact.
• Sally Benson Lawrence Berkeley Laboratory One Cyclotron Road, Mail Stop 50E Berkeley, CA 94720 (510) 486-5875	• Interwell reservoir imaging, seismic mapping, reservoir performance modeling, use of foams in enhanced oil recovery, high temperature downhole tools, and environmental assessments and controls.

Fossil Energy Related Capabilities

- Norman Goldstein
  Earth Science Division
  (510) 486-5961

  – Advanced Computational Technology Initiative program contact.

- Charles H. Biderman
  Lawrence Livermore National Laboratory
  P.O. Box 808
  Livermore, CA 94550
  (510) 422-4599

  – Alan Burnham
  Fossil Energy Program Leader
  (510) 422-7304

- Complex fracture propagation computer modeling, complex rock mechanics and *in-situ* stress research, environmental research, geostatistical evaluation of geologic and production data.

  – Advanced Computational Technology Initiative program contact.

- Scott Duncan
  Los Alamos National Laboratory
  P.O. Box 1663
  Los Alamos, NM 87545
  (505) 667-5679

  – Robert J. Hanold
  Natural Gas and Oil Technology Partnership Office
  (505) 667-1698

  – Linda K. Trocki
  Program Director
  Energy Technology Programs Office
  (505) 667-3880

- High temperature/pressure downhole tools, hydraulic fracture mapping, interwell seismic reservoir imaging, enhanced oil recovery tracer materials.

  – Co-Chairman for the Natural Gas and Oil Technology Partnership (includes the ACTI program).

  – Advanced Computational Technology Initiative program contact.

- Roddie Judkins
  Oak Ridge National Laboratory
  P.O. Box 2008
  Oak Ridge, TN 37831
  (615) 574-4572

  – Bill Wing
  (615) 574-8839

- Enhanced oil recovery, solid waste management, advanced environmental control technology, application of biotechnology, materials research.

  – Advanced Computational Technology Initiative program contact.

Fossil Energy Related Capabilities

- Walter W. Laity
  Pacific Northwest Laboratory
  Battelle Blvd.
  P.O. Box 999
  Richland, WA 99352
  (509) 375-2780

  – Bryan Shaw
    (509) 376-3592

  - Atmospheric contaminant transport and fate, environmental and health effects, acid rain deposition, material and process research, waste remediation.

  – Advanced Computational Technology Initiative program contact.

- Dick W. Lynch
  Sandia National Laboratories
  P.O. Box 5800
  Albuquerque, NM 87185-0701
  (505) 845-9738

  – David A. Northrop
    Natural Gas and Oil Technology
    Partnership Office
    (505) 844-2302

  – Paul Hommert
    (505) 844-3449

  - *In-situ* rock mechanics, hydraulic fracture mapping, basic hydraulic and explosive fracturing research, high temperature downhole tool electronics, drilling applications.

  – Co-Chairman for the Natural Gas and Oil Technology Partnership (includes the ACTI program).

  – Advanced Computational Technology Initiative program contact.

4.0 DOE TECHNOLOGY TRANSFER PROGRAM

Technology transfer provides multiple benefits to industry, the taxpayers, and the Nation as a whole by commercializing the results of Federally-funded research and development. Technology transfer creates new products and services, improves the quality of life, increases jobs, and helps U.S. industry compete more effectively in world markets.

Technology transfer can mean many things, for example: technical assistance to solve a specific problem; training in advanced equipment, techniques, and processes; use of expensive or unique facilities; access to patents and software; exchange of personnel; and cooperative research. DOE has efforts underway to inform the public of the capabilities of DOE's National Laboratories, to identify the best locations to find assistance or collaboration, and to indicate the best mechanism to use for accomplishing the desired objective.

DOE has significant resources that can be leveraged by the private sector:

- Nine multiprogram National Laboratories plus many other laboratories and specialized facilities with a replacement value approaching $100 billion;
- About 60,000 highly skilled and experienced scientists, engineers, and technicians;
- Thousands of licensable patents and software packages; and
- Annual RD&D investments of more than $6.5 billion.

4.1 Technology Transfer Menu

Some of the technology transfer mechanisms available to industry are described below.

- *Cooperative Agreements:* Instruments entered into by the government with industry, universities, and others to support or stimulate research. Agreements are generally cost-shared with the non-Federal participant.
- *Cost-Shared Contracts/Subcontracts*: Collaboration of mutual benefit to industry and the government through a procurement. Often the government can agree not to disseminate commercially valuable data that is generated under a cost-shared contract for a limited period of time. Cost-shared contracts include cash and/or in-kind arrangements.
- *Cooperative Research and Development Agreements* (CRADAs): Agreements between Federal government Laboratories and non-Federal parties in which both participants provide personnel, services, facilities, or equipment for the conduct of specified research and development. The non-Federal parties also may provide funds (no direct funding is provided by the Laboratory). Rights to inventions and other intellectual property are negotiated between the Laboratory and participant, and certain data that are generated may be protected for up to five years.
- *R&D Consortia*: Arrangements involving multiple Federal and non-Federal parties working together for a common R&D objective. Funding for R&D consortia may be shared, but usually no funds are exchanged between participants.

- *Exchange Programs*: Arrangements allowing government or Laboratory staff to work in industry facilities, and industry personnel to work in government Laboratories to enhance technical capabilities and support research in specific areas. Costs are borne by the organization sending the personnel. Intellectual property arrangements can be addressed in exchange agreements.

- *Licensing*: Transfer of less than ownership rights in intellectual property, such as a patent or a software copyright, to permit its use by the licensee. Licenses can be exclusive or nonexclusive, for a specific field of use or for a specific geographical area. The potential licensee must present plans for commercialization.

- *User Facility Agreements*: Arrangements permitting private parties to conduct research and development at a Laboratory. For proprietary R&D, the Laboratory is paid for the full cost of the activity. If the work will be published, cost can be adjusted. Intellectual property rights generally belong to the user.

- *Work-for-Others*: Agreements whereby proprietary work for an outside party may be done by technically qualified government Laboratory staff using Laboratory facilities with full costs charged to the party. Title to intellectual property generally belongs to the party sponsoring the work. The government retains a non-exclusive, royalty-free license to such intellectual property.

4.2 Technical Consultation with DOE

For technical information related to various DOE programs and RD&D activities, office directors and program managers can be contacted directly. The names, addresses and telephone numbers of respective offices were given under **Sections 2 and 3.**

4.3 Observation Visits to DOE Research Facilities

DOE's RD&D facilities are located throughout the United States. Together, they form a nationwide network that includes large multi-program National Laboratories, energy technology centers, and project offices. Each can be contacted directly to arrange for observation visits.

4.4 Fossil Energy Technology Transfer Activities and Contacts

Fossil Energy oversees a national partnership program with industry, academic institutions, and State governments to develop advanced technologies so that fossil fuels can be used cleanly and economically.

In order to develop and deploy these new technologies, Fossil Energy supports nearly 1,000 individual research and development projects involving scientists and engineers in the private sector, academic institutions, and the National Laboratories across the country. These projects range from crosscutting research in areas like advanced materials and fundamental geoscience, to the development of complete power generating systems such as high efficiency gas turbines and fuel cells, to the development of new approaches to finding and producing natural gas and oil.

For example, the Clean Coal Technology Demonstration Program (CCTDP) is one of DOE's principal initiatives to move innovative, environmentally sensitive technology over the commercial threshold. CCTDP is a cost-shared industry/government technology development effort to demonstrate a new generation of advanced coal-based technologies, with the most promising technologies being moved into

the domestic and international marketplace. Under this program, a total of 45 first-of-a-kind demonstration ventures were initiated with Federal and matching industry and State funds.

A similar program to transfer new or improved petroleum production technologies to industry is the Oil Recovery Technology Demonstration Program. Cosponsored by government and industry, this program is demonstrating more effective oil exploration and production technologies in domestic reservoirs that are threatened with abandonment. The program is targeted toward geologically similar reservoirs grouped within certain high priority classes, and its thrust is to provide matching Federal funds to oil operators and other organizations that agree to demonstrate existing or novel advanced technologies and actively transfer the results to other operators of similar reservoirs.

Fossil Energy also began planning for a national technology transfer network made up of oil and gas industry members. Coordinated by an industry-led group, the network would provide a means for linking regional organizations into a nationally connected information exchange system involving all segments of the gas and oil industry. Plans for the network were included in a five-year oil technology transfer plan submitted to Congress in FY 1994.

For additional information on Fossil Energy technology transfer programs, contact:

Robert C. Porter
U.S. Department of Energy
Office of Fossil Energy (FE-5)
Office of Communications
1000 Independence Ave., S.W.
Washington, DC 20585
(202) 586-6503
Fax: (202) 586-5246

The following are also Fossil Energy technology transfer contacts. For additional information, contact or write to the following individuals:

U.S. Department of Energy
Office of Fossil Energy
20300 Century Boulevard
Germantown, MD 20874
Fax: (301) 903-4106

- Keith N. Frye
  Director, Office of
  Business Operations
  (301) 903-2098

- Jorgen W. Birkeland
  Technology Transfer Process
  and Evaluation Coordinator
  (301) 903-2811

- Casters Foster
  Small Business and Historically
  Disadvantaged Business Coordinator
  (301) 903-2810

- George E. Hedstrom
  Commercial Financing Operations and
  Manufacturing Coordinator
  (301) 903-5082

- Pat Dickinson
  State Activities Coordinator
  (301) 903-4108

- Miles A. Greenbaum
  International Activities Coordinator
  (301) 903-2796

- Albert Dietz, Jr.
  Work for Others and User
  Facilities Coordinator
  (301) 903-2618

- George W. Thompson
  Budget and Report Policy Coordinator
  (301) 903-2681

The following are the Fossil Energy technology transfer contacts at DOE field offices.

- William F. Lawson
  Morgantown Energy Technology Center
  P.O. Box 880
  Morgantown, WV 26507
  (304) 285-4173
  Fax: (304) 285-4403

- Kay R. Downey
  Pittsburgh Energy Technology Center
  P.O. Box 10940
  Pittsburgh, PA 15236
  (412) 892-6029
  Fax: (412) 892-4152

- Herb Tiedemann
  Bartlesville Project Office
  220 N. Virginia Avenue
  Bartlesville, OK 74003
  (918) 337-4293
  Fax: (918) 337-4418

- Brent Smith
  Metairie Site Office
  900 Commerce Road East
  Metairie, LA 70123
  (504) 734-4970
  Fax: (504) 734-4909

4.5 Technology Transfer Contacts at DOE Laboratories

- Ames Laboratory
  - Daniel Williams
    (515) 294-2635

- Argonne National Laboratory
  - Donald Mingesz
    (708) 252-2030

- Brookhaven National Laboratory
  - Margaret Bogosian
    (516) 282-7338

- Continuous Electron Beam Accelerator Facility
  - Frederick Dylla
    (804) 249-7450

- Fermi National Accelerator Laboratory
  - John T. Venard
    (708) 840-3333

- Idaho National Engineering Laboratory
  - William Carpenter
    (208) 526-4430

- Inhalation Toxicology Research Institute
  - Charles H. Hobbs
    (505) 845-1045

- Lawrence Berkeley Laboratory
  - Cheryl Fragiadakias
    (510) 486-6467

- Lawrence Livermore National Laboratory
  - Pam Burke
    (510) 423-5660
- Los Alamos National Laboratory
  - Peter Lyons
    (505) 665-9090
- National Renewable Energy Laboratory
  - Dallas Martin
    (303) 275-3005
- Oak Ridge Associated Universities
  - Mary Loges
    (615) 576-3756
- Oak Ridge National Laboratory
  - William R. Martin
    (615) 576-8369
- Pacific Northwest Laboratory
  - Marv Clement
    (509) 375-2789
- Princeton Plasma Physics Laboratory
  - Lewis D. Meixler
    (609) 243-3009
- Sandia National Laboratories
  - Warren D. Siemens
    (505) 271-7813
- Savannah River
  - John Corey
    (803) 725-1134
- Stanford Linear Accelerator Center
  - James E. Simpson
    (415) 926-2213
- Superconducting Super Collider
  - Lee Graw
    (214) 935-9000
- Westinghouse Hanford Company
  - Alva L. Ward
    (509) 376-8656

4.6 The Federal Laboratory Consortium for Technology Transfer

The Federal Laboratory Consortium for Technology Transfer (FLC) was organized in 1974 and formally chartered by the Technology Transfer Act of 1986 to promote and strengthen technology transfer nationwide. All major Federal Laboratories and centers and their parent agencies are members of FLC. This Consortium creates an environment that adds value to and supports the efforts of its members and their potential technology transfer partners. FLC operates a network of representatives, develops and tests technology transfer methods, addresses barriers to the process, and emphasizes national initiatives where technology transfer has a role.

FLC is a service organization providing a basic link between the individual laboratory members and the potential users of government-developed technologies. FLC specializes in technology inquiries, technical contacts, and expertise that are not easily satisfied with existing printed material and databases. Through its network, FLC puts the potential user in contact with a Federal Laboratory person with expertise in a specific area of interest. Once the contact is found, the arrangements for technology transfer are developed between the user and the laboratory.

For further information on FLC, contact:

The FLC Administrator
(or Andrew Cowan, Manager, FLC Locater)
224 W. Washington, Suite 3
P.O. Box 545
Sequim, WA 98382-0545
(206) 683-1005
Fax: (206) 683-6654

4.7 Availability of DOE Technical Reports

Results of DOE-funded research are managed under the Office of Scientific and Technical Information (OSTI) in Oak Ridge, Tennessee. OSTI collects and disseminates energy information resulting from DOE-funded research and development, as well as relevant technical literature produced worldwide for use by the DOE community. DOE's scientific and technical information is available in the form of technical reports, on-line retrieval systems, and announcement publications. This information is shared with other government agencies and is made available to the private sector. Further details on OSTI services can be obtained from:

Office of Scientific and Technical Information
U.S. Department of Energy
P.O. Box 62
Oak Ridge, TN 37831
(615) 576-8401
Fax: (615) 576-2865

4.8 DOE Natural Gas and Oil Related Software

The *Energy Science and Technology Software Center* (ESTSC), located in Oak Ridge, Tennessee, is DOE's centralized software management facility. ESTSC is authorized to license and distribute Federally-funded software developed by National Laboratories and other facilities and contractors of DOE and the Nuclear Regulatory Commission. The software contributed to ESTSC represents the latest in Federal technology which has solved many problems in energy, science, environment, administration, mathematics, and computing, and which has become available for transfer to new applications. The collection also contains selected software obtained from the Nuclear Energy Agency of the Organization for Economic Cooperation and Development. Packages contained in the collection range from software designed to run on personal computers and workstations, to software designed for mainframes and supercomputers.

For further information on ESTSC, write to or call:

Energy Science and Technology Software Center
P.O. Box 1020
Oak Ridge, TN 37831-1020
Telephone: (615) 576-2606; Fax: (615) 576-2865
E-Mail: ESTSC@ADONIS.OSTI.GOV

DOE's *Bartlesville Project Office*, located in Bartlesville, Oklahoma, maintains a collection of computer software and supporting documentation on oil related activities. The software includes predictive models of enhanced oil recovery (EOR), BOAST II, BOAST-VHS, and a crude oil analysis data bank.

The predictive models allow calculation of incremental oil recovery and economics of various EOR processes, and can be used for rapid, inexpensive screening of large numbers of reservoirs for the most efficient EOR process. BOAST II, which simulates three-dimensional, isothermal, darcy flow of reservoir fluids, is used to address typical field production problems such as primary depletion studies, and evaluation of secondary recovery waterflooding and displacement operations. BOAST-VHS, a version of the original BOAST program, provides estimates of production from a reservoir using horizontal and/or slanted wells compared to standard vertical wells. These programs are available for IBM-compatible personal computers.

The Bartlesville Project Office also maintains the Tertiary Oil Recovery Information System (TORIS). TORIS contains databases from which statistical analyses, modeling parameters, and comparative analyses can be performed; and models to estimate the technical and economic recoveries of oil under a wide range of technical and economic conditions. Three databases are included in the system: The Reservoir Database (RES) contains much of the important engineering and geological data on the largest reservoirs in the Nation, and currently represents those 2,500 reservoirs that contained about 72 percent of the domestic oil discovered. The Project Database (PROJ) contains historical information on some 1,500 domestic EOR projects, including injection volumes, fluid production volumes, and basic reservoir characteristics for each of the projects begun since 1979. The Crude Oil Analysis Database (COADB) contains more than 9,000 comprehensive analyses of the chemical and physical properties of primarily domestic crude oils -- selected international crudes are also included.

The current modeling system in TORIS contains predictive models for thermal, miscible, chemical, and infill drilling and extraction processes. Each predictive model is designed to use minimum input parameters, while emphasizing computational speed and accuracy. Each model has its own technical recovery algorithms plus full-analysis economic routines. Each model also allows user-selected options, primarily economic, to predict potential recovery using any one of the steam drive, *in-situ* combustion, carbon dioxide, miscible flooding, polymer flood, or surfactant/polymer flooding techniques. RES is available on a reservoir-by-reservoir basis upon request to DOE. PROJ is also available through diskette or tape. COADB is available as a free on-line computer database and also as a mainframe tape.

For further information on gas and oil related software, write to or call:

Herbert A. Tiedemann
U.S. Department of Energy
Bartlesville Project Office
P.O. Box 1398
Bartlesville, OK 74005
(918) 337-4293

The *Morgantown Energy Technology Center* (METC) maintains a comprehensive set of software systems for several nonconventional gas recovery programs, including: eastern gas shales; western gas sands; methane recovery from coal; gas hydrates; and deep source gas. These include both predictive models and data systems. The predictive models simulate gas production for a variety of production scenarios including use of horizontal wells. These models are also capable of predicting the results of stimulating

gas wells. The data systems include well data for 1.6 million oil/gas wells in the United States. METC also maintains process simulators to analyze the retorting of oil shale and processing of natural gas. The predictive models are used for conducting research at METC, and when developed to a level applicable to other users, are made available through the Energy Science and Technology Software Center. Currently, two reservoir models are available through ESTSC: GAS3D2 (a single porosity, three-dimensional, single phase gas model), and SUGAR-MD (a dual-porosity, two-dimensional, single-phase gas model).

A recent METC-developed model is the Gas System Analysis Model (GSAM). GSAM is a comprehensive, nonproprietary, workstation-based computer model capable of assessing the impact of changes in various natural gas system components on gas supply and demand in the United States. GSAM is capable of examining the technical and economic impacts of current and advanced extraction technologies, such as drilling, completion, stimulation, and gas processing, on supply and demand in the United States. The model also has the capability to link with available computer models capable of analyzing distribution, storage, and utilization system components. In addition, GSAM allows the analysis of changes in regulatory, environmental, and tax policies on natural gas supply and demand; includes a risk analysis capability for all system component areas; and provides a graphics capability for the analysis of all results.

For further information, write to or call:

James Mercer
U.S. Department of Energy
Morgantown Energy Technology Center
P.O. Box 880
Morgantown, WV 26507-0880
(304) 285-4509

4.9 DOE Speakers

For public sector meetings on various issues related to natural gas and oil, DOE speakers are available to make technical presentations. For further information related to natural gas and oil speaker availability information, call Robert Porter, Director, Office of Communications, telephone (202) 586-6503.

4.10 Information Services Available through the Energy Information Administration

The Energy Information Administration (EIA), the independent statistical and analytical agency within DOE, offers numerous statistical and projected information services for the petroleum and gas industry, including: crude oil, refined product, and natural gas prices; petroleum and natural gas resources and production; and other relevant information on distribution and transportation of natural gas and oil.

For example, the Comprehensive Oil and Gas Information Source (COGIS) database contains virtually all of the gas and oil data published for the last decade by EIA in its *Petroleum Supply Monthly, Petroleum Marketing Monthly, Natural Gas Monthly, Weekly Petroleum Status Report*, and other reports and articles. COGIS, developed by EIA in cooperation with the U.S. Department of Commerce, also provides timely analyses of major gas and oil trends, weekly and monthly highlights of gas and oil activity, and useful information about other EIA products and services.

COGIS is available through the Commerce Department's Electronic Bulletin Board, which offers both Internet and dial-up access. For information on COGIS, call the U.S. Department of Commerce, Office of Business Analysis, (202) 482-1986.

For further details on EIA's petroleum and gas industry related information services, contact Diane Lique at (202) 586-6401, or Joan Heinkel at (202) 586-4680. For information on energy statistics, contact:

National Energy Information Center, EI-231
Energy Information Administration
U.S. Department of Energy
1000 Independence Ave., S.W.
Washington, DC 20585
(202) 586-8800
Internet E-Mail: INFOCTR@EIA.DOE.GOV

In addition, EIA publications may be purchased from:

Superintendent of Documents
U.S. Government Printing Office
Washington, DC 20402-9325
(202) 512-1800

5.0 TYPES OF BUSINESS RELATIONSHIPS

The Federal government does business with private sector organizations through a number of different instruments and procedures. The most important of these are described below.

5.1 Non-Competitive Solicitations

5.1.1 Notice of Program Interest

The Notice of Program Interest (NPI) is not a solicitation; rather it is a notice in the *Commerce Business Daily* and the *Federal Register* concerning areas of research and other areas where DOE and other Federal departments and agencies hope to receive unsolicited proposals from individuals and organizations. For a subscription to the *Federal Register*, contact the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-9325; (202) 512-1800.

5.1.2 Unsolicited Proposals

When an individual or organization submits a specific proposal to perform work, it is referred to as an unsolicited proposal, whether it was self-initiated or as a result of an NPI.

There are a number of applicable regulations relating to criteria governing acceptance and funding of an unsolicited proposal, including:

- Title 48 *Code of Federal Regulations* (CFR), Chapter 1, The Federal Acquisition Regulation (FAR), Subpart 15.5 -- Unsolicited Proposals;
- Title 48 CFR, Chapter 9, *Department of Energy Acquisition Regulation* (DEAR), Subpart 915.5 - - Unsolicited Proposals; and
- Title 10 CFR, Part 600 -- Financial Assistance Rules.

In an unsolicited proposal, the offeror must present objectives and pertinence of the proposed work to Fossil Energy, the rationale of the approach, the methods to be pursued, the qualifications of the investigators, and the institution, if applicable, and the level of funding required to attain the objectives. The general Fossil Energy policy is to assure that there is a central uniform system that identifies, reviews, and evaluates unsolicited proposals. These proposals may be submitted at any time.

An unsolicited proposal may be accepted by Fossil Energy if it:

- Demonstrates a unique and innovative concept, or demonstrates a unique capability of the submitter;
- Offers a concept or service(s) not otherwise available to the government; and
- Does not resemble the substance of a pending competitive action.

All Fossil Energy unsolicited proposals should be submitted to:

Supervisor, FE UPC, AD-20
FE Unsolicited Proposal Operations
U.S. Department of Energy
Pittsburgh Energy Technology Center
P.O. Box 10940, MS 921-118
Pittsburgh, PA 15236
(412) 892-6181

Detailed requirements concerning format and content of unsolicited proposals are available in the DOE booklet entitled *Guide for the Submission of Unsolicited Proposals* (document number: DOE/PR-0014).

5.1.3 Sole Source Contracts

Any solicitation resulting in award of a contract that does not involve competition is considered a sole source procurement. Both procurement and financial assistance regulations and the laws on which they are based have placed significant emphasis on the need for competition. In Federal procurement, competition is used to the maximum extent possible. Accordingly, competition for DOE award of contracts is viewed as the norm while sole source contracts are considered only on an "exception" basis. In financial assistance, competition is encouraged whenever not restricted by law, and noncompetitive awards occur as a result of the following:

- Unsolicited proposals or responses to a Notice of Program Interest;
- Eligibility which has been restricted by law or by regulation;
- The decision that only one recipient can be adequately responsive to the support and stimulation being provided by DOE; and/or
- Broad solicitations for non-similar innovative responses.

The intention to make such an award must be fully and adequately justified in writing prior to award.

5.2 Competitive Solicitations

5.2.1 Commerce Business Daily Announcements

The *Commerce Business Daily* (CBD), published daily by the U.S. Department of Commerce, lists all proposed and active Federal government Requests for Proposals (RFPs) and other procurement, subcontracting leads, contract awards, and foreign business opportunities. Each RFP appears in the CBD only once. Potential proposers have at least 30 days prior to bid opening to respond.

A subscription to the CBD may be obtained from:

Superintendent of Documents
U.S. Government Printing Office
Washington, DC 20402-9325
(202) 512-1800

5.2.2 Invitation for Bid

An Invitation for Bid (IFB) is used for soliciting bids when detailed specifications concerning the product or service are known and can be described in a precise way. Requirements solicited under this method are usually for hardware or general supplies. Award is based on price competition and a fixed price contract usually results.

5.2.3 Request for Proposal

A Request for Proposal is used for soliciting proposals in response to a broader statement of work than would be found in an Invitation for Bid. An RFP often incorporates performance specifications rather than detailed design specifications. Each RFP gives the place, date, and time for submission of proposals. The evaluation, selection, negotiation, and award are conducted in accordance with the provisions of the solicitation document as well as the Federal Acquisition Regulations (FAR) and the DOE Acquisition Regulations (DEAR). Either a cost reimbursement or a fixed price contract results from this process.

5.2.4 Program Opportunity Notice

A Program Opportunity Notice (PON) is used primarily to solicit competitive proposals relating to non-nuclear energy demonstration projects when there is a stated general objective and an urgent public need, but no definitive statement of work, and where varied approaches are desired. PONs may result in the award of contracts, grants, or cooperative agreements, and multiple awards may be made.

5.2.5 Program Research and Development Announcement

A Program Research and Development Announcement (PRDA) is a solicitation announcement used to solicit a broad mix of research, development, and related non-nuclear energy project proposals. While a PON is geared strictly to accelerating the demonstration of projects utilizing existing technology, a PRDA solicits proposals for projects in areas where research and development is required within broadly defined areas of interest, but where it is difficult to describe in detail the nature of work to be undertaken. A PRDA may be used to solicit proposals for procurement contracts, grants, or cooperative agreements. Multiple awards are generally made which may have dissimilar approaches or concepts.

Both PRDAs and PONs described above are published in the CBD and *Federal Register*. For information concerning these announcements, contact Luther J. Tillman at (202) 586-8182, or write to:

U.S. Department of Energy
1000 Independence Avenue, S.W.
HR-521, Room 8H-023
Washington, DC 20585

5.3 Opportunities for Small Business

A "Small Business" is a concern, including its affiliates, which is independently owned and operated, is not dominant in the field of operation in which it is bidding on government contracts, and can further qualify under the criteria set forth in regulations of the Small Business Administration.

Small businesses are the major source of job creation, economic growth, and technological dynamism in our economy. Current technology policies create both an opportunity and an obligation for all Federal agencies to sharpen their strategic focus on American industrial competitiveness and job creation. For DOE, this sharpened focus creates an enhanced framework for its technology partnership efforts. One of DOE's highest priorities is to work with existing public and private business networks for reaching small and disadvantaged business. DOE is committed to providing opportunities for small businesses through direct funding, procurement opportunities, and technology partnerships (see **Section 6** for selected technology transfer programs).

Public Law 95-507 assists small businesses through special consideration known as set-asides. In a set-aside arrangement, either the individual contract or an entire class of contracts are made available for competition solely between small business firms, with subsequent award to a successful small business bidder. Each CBD announcement indicates whether or not the subject procurement is a small business set-aside.

The set-asides are established independently by the various procurement offices, and are reviewed each year under the guidance of the DOE Office of Small and Disadvantaged Business Utilization. Further information may be obtained by calling (202) 254-5583.

5.4 Opportunities for Small, Disadvantaged (Minority) Business

Small, disadvantaged firms receive the same special consideration as a small business in general. Further, Public Law 95-507 provides that sole-source contracts may be entered into with these firms under section 8(a) of this law. This process involves DOE entering into a contract with a firm using the Small Business Administration as the prime contractor. For certified "8(a)" firms, the contracting process is more rapid. The CBD announcements indicate set-asides for "8(a)" firms. The Section 8(a) process involves identification of potential contracts by either the Small Business Administration or by the procuring agency -- in this case, DOE.

Eligible firms are defined as being owned and operated by African Americans, Hispanic Americans, Native Americans, Asian Pacific Americans, and other minorities or individuals deemed to be socially and economically disadvantaged.

For more information contact:

Leonel V. Miranda
U.S. Department of Energy
Office of Small and Disadvantaged Business Utilization
1707 M Street, N.W.
Washington, DC 20585
(202) 254-5583

5.5 Regional Coordinators for Small Business

The regional coordinators are well informed about DOE programs and opportunities. A list of contacts is provided in **Appendix B.**

5.6 Procurement Automated Source System (PASS)

The Small Business Administration, with DOE financial support, has established the Procurement Automated Source System (PASS). The purpose of the system is to significantly improve government contract and subcontract opportunities for small business concerns by matching future procurement requirements against the capabilities of small businesses or small disadvantaged firms contained in the PASS database. Registration with PASS is free and entirely voluntary. Applications are available from any of the Small Business Administration Offices, or from DOE's Office of Small and Disadvantaged Business Utilization, (202) 254-5583.

5.7 Headquarters Directory of Potential Sources (ACCESS)

The Automated Contractor Capability Experience Source System (ACCESS) database is used by DOE procurement operations as it seeks firms to meet Headquarters requirements. Businesses interested in being included in the ACCESS database should complete the Standard Form (SF) 129, "Solicitation Mailing List Application," and file it with:

U.S. Department of Energy
Deputy Assistant Secretary for
Procurement and Assistance Management
Office of Management Support
Solicitation Mailing List, HR-532
1000 Independence Avenue, S.W.
Washington, DC 20585

It is important to note that, inclusion in the ACCESS does not mean that each applicant will automatically receive copies of DOE solicitations. The database is large and only a portion of the list may be utilized for a particular subject area for any solicitation. Also, businesses interested in contract opportunities beyond DOE Headquarters should submit the SF-129 to each DOE office of interest.

5.8 Administrative Guidance in Preparing Proposals

DOE's Document Control Specialist provides assistance on information concerning Requests for Proposals that are listed in the *Commerce Business Daily*. All requests must be made in writing to U.S. Department of Energy, 1615 M Street, N.W., Room No. 240, Washington, DC 20036. For additional information, call (202) 634-4552.

DOE's Office of Procurement and Assistance Management serves as a central point of contact to discuss business matters related to DOE procurement and policy procedures, and other general business. Further information can be obtained by calling (202) 586-8182.

5.9 Security of Proposal Information

Non-proprietary proposals should be submitted when possible. However, if this is not feasible, the proprietary portions of the proposal should be clearly marked in accordance with FAR 52.215-12, "Restriction on Disclosure and Use of Data" (April 1984). DOE is obligated to protect the confidentiality of properly marked proposal information.

Copies of the FAR may be purchased from:

Superintendent of Documents
Government Printing Office
Washington, DC 20402-9325
(202) 512-1800

5.10 Reporting Requirements

Recipients of financial assistance or procurement contract awards will be expected to satisfy reporting requirements stipulated in the solicitation. The schedule of reports is arranged at the time of negotiations. The selection of appropriate reports, their frequency, and the amount of detail vary based on factors such as the program objectives, amount of funding, and type of instrument awarded. For additional information, refer to the following:

DOE Uniform Contracting Reporting System
Report Number: DOE/CR-0001/4; Stock Number: 061-000-00347-9

For a copy, contact:

Superintendent of Documents
U.S. Government Printing Office
Washington, DC 20402-9325
(202) 512-1800

5.11 Patents, Data and Copyrights

Small businesses and nonprofit organizations generally have the right to elect to retain title to inventions they make in the performance of DOE funding agreements (grants, contracts, and cooperative agreements) for experimental, developmental, or research work unless DOE determines that exceptional circumstances require a different disposition of rights.

Entities that are not small businesses or nonprofit organizations are subject to DOE's statutory patent policy under Section 152 of the Atomic Energy Act of 1954, as amended, and Section 9 of the Federal Nonnuclear Energy Research and Development Act of 1974. Under this policy, title to inventions conceived or first actually reduced to practice in the course of or under a contract, grant, or cooperative agreement with DOE vests in the Government, and the contractor receives a royalty free, nonexclusive, revocable license for use of such inventions. DOE may, however, waive its rights either in advance of contracting or after an invention is made.

Policies governing patents under contracts are contained in 48 CFR 927.3 and in 10 CFR 600.33 for financial assistance actions. Policies concerning technical data and copyrights are detailed in 48 CFR 927.4.

5.12 Cost Sharing or Cost Participation

The decision as to whether contract or assistance agreements will include either a cost sharing or cost participation provision, respectively, is made on a case-by-case basis. Normally, DOE will fully fund the early phases of basic research and development programs. However, subsequent phases of these programs -- which provide the performer with present or future economic benefits through commercialization -- will require some form of cost sharing or cost participation.

5.13 Equal Opportunity Employment

All organizations receiving financial support from DOE are required to comply with the provisions of Executive Order No. 11246 of September 24, 1965, as amended, and with the rules and regulations, and relevant orders of the Secretary of Labor. For information on how to obtain a copy of this or any other Executive Order, contact:

Office of the Federal Register
Presidential and Statutes Division
National Archives and Records Administration
7th Street and Pennsylvania Avenue, N.W.
Washington, DC 20408
(202) 523-5230

6.0 SELECTED DOE PROGRAMS FOR TECHNOLOGY TRANSFER

6.1 Small Business Innovation Research Program

The principal purposes of the *Small Business Innovation Research (SBIR) Program*, mandated by Public Law (P.L.) 97-219 and reauthorized in 1992 until the year 2000 by P.L. 102-564, are to: (1) stimulate technological innovation; (2) increase small business participation in Federal research and development; (3) foster and encourage participation by minority and disadvantaged persons in technological innovation; and (4) increase private sector commercialization of technology developed through Federal research and development. There are three phases to the SBIR program:

- *Phase I* : Awards are made on a fixed-price basis in amounts of up to $75,000 for a period of performance of approximately six months. A new SBIR solicitation for Phase I awards is issued each year.

- *Phase II* : A second award is made to firms with approaches to problems that appear sufficiently promising under Phase I. Phase II awards are in the amount of up to $750,000 for a period of performance of up to 24 months.

- *Phase III* : Phase III is a term used to describe the commercialization outside of the SBIR program of technology that was conceived (Phase I) and developed (Phase II) within the SBIR framework.

DOE's SBIR program is administered through the Office of Energy Research. Questions about the SBIR program or the requests for copies of the solicitations may be addressed to:

Kay Etzler, Program Spokesperson
c/o SBIR Program Manager, Mail Stop: ER-16
U.S. Department of Energy
19901 Germantown Road
Germantown, MD 20874
(301) 903-5867

6.2 Technology Reinvestment Project

The mission of the *Technology Reinvestment Project* (TRP), a fully collaborative, government-wide effort, is to stimulate the transition to a growing, integrated, national industrial capability that provides the most advanced, affordable, military system and the most competitive commercial products. TRP is implemented through the multi-agency Defense Technology Conversion Council (DTCC) chaired by the Advanced Research Projects Agency (ARPA). The Council members include the Departments of Defense, Commerce, Energy, and Transportation; the National Aeronautics and Space Administration; and the National Science Foundation. Projects are selected through competitive solicitations, and the activities are cost shared with non-Federal government entities. TRP programs are structured to expand high quality employment opportunities in dual-use technologies that demonstrably enhance U.S. competitiveness and national security. The TRP mission is accomplished by:

- Focusing defense and commercial resources on the development of dual-use product and process technologies;

- Supporting manufacturing and technology assistance to small firms; and

- Promoting education and training programs that enhance U.S. manufacturing engineering, and target displaced defense industry workers.

TRP is divided into three related activity areas: *Technology Development*, to promote the development of dual-use technologies; *Technology Deployment*, to establish links between existing technology capabilities for small- and medium-sized businesses; and *Manufacturing Education and Training*, to establish programs for retraining of defense industry workers and improvement of the manufacturing curriculum in U.S. colleges and universities.

As required, all TRP projects must be selected competitively, and all efforts selected by TRP must provide an improvement (capability, affordability, etc.) necessary to meet the Department of Defense (DOD) requirements. Under Technology Development, commercial development of a technology without this relevance is not within the scope of TRP. For each TRP Technology Development effort, a partnership must be formed that has the breadth of experience and capabilities to carry out the project. The TRP Technology Deployment efforts provide assistance to the small- and medium-sized businesses that are the backbone of the defense industry. Technology Deployment efforts also have restrictions on who can propose. Since the benefits to DOD from TRP efforts are only realized in the long-term, it is necessary that the proposer show a real commitment to carry the effort through. Sharing the cost also shares the risk, which provides an incentive for the proposers to follow through until completion. Cost sharing of at least 50 percent is required by the private sector.

Additional information and copies of all TRP documents, all TRP solicitations, and information about outreach activities can be obtained by:

- Calling 1-800-DUAL-USE (1-800-382-5873) Monday through Friday from 8:00 a.m. to 7:00 p.m., Eastern Time;

- Faxing (703) 696-3813, addressed to Technology Reinvestment Project, PA#94-27; or

- Electronic mailing: Internet address pa94-27 @ arpa.mil.

6.3 Small Business Technology Transfer Pilot Program

Title II of the Small Business Research and Development Enhancement Act of 1992, P.L. 102-564, established the *Small Business Technology Transfer (STTR) Pilot Program.* Under this program, a portion of a Federal agency's extramural research or R&D budget is reserved for awards to small businesses for cooperative R&D to be conducted jointly with a non-profit research institution. The set-aside of the extramural R&D budget used to fund this three-year pilot program is 0.05 percent in FY 1994, 0.10 percent in FY 1995, and 0.15 percent in FY 1996. The following five Federal agencies, those with extramural research or R&D budgets over $1 billion, are authorized to conduct STTR pilot programs in FY 1994-1996: DOD, DOE, Health and Human Services (HHS), NASA, and the National Science Foundation (NSF).

STTR is similar to the Small Business Innovation Research Program in that the primary goal of both programs is to increase private sector commercialization of technology developed through Federal R&D. Furthermore, each program issues a solicitation for grant applications at least once per year and has the

same structure consisting of Phases I, II, and III. The unique feature of the STTR program is that, for both Phase I and Phase II projects, at least 40 percent of the work must be performed by the small business and at least 30 percent of the work must be performed by the non-profit research institution. Such institutions include Federally-funded research and development centers, universities, and other non-profit organizations.

For additional information, contact Kay Etzler at (301) 903-5867.

6.4 Energy Research Laboratory Technology Transfer Program

The goal of the *Energy Research Laboratory Technology Transfer Program* is to enhance U.S. economic performance and competitiveness and the core competencies of Energy Research laboratories and programs. The program emphasizes evaluation to build on accomplishments and gain recognition and support for basic research science programs of the Office of Energy Research. The major activities of the program are to establish and maintain quick-response centers at the Energy Research laboratories; promote industry-driven, cost shared spin-off CRADAs; and form multi-laboratory partnerships with industry. The quick response centers provide technical assistance to small businesses, and promote technology projects, personnel exchanges, small spin-off CRADAs, and regional development projects with State and local governments.

For additional information, contact Brian O'Donnell at (202) 586-3825.

6.5 Energy Related Inventions Program

The *Energy Related Inventions Program*, a joint program with DOE's Office of Energy Efficiency and Renewable Energy and the National Institute of Standards and Technology (NIST), offers technical and financial assistance primarily to individual inventors and small companies (see **Appendix A, Section A.3**).

For additional information, contact Terry Levinson at (202) 586-1479.

6.6 Small Business Technology Integration Program

The *Small Business Technology Integration Program*, administered by DOE's Office of Environmental Restoration and Waste Management, works with small businesses interested in advancing, applying, or licensing innovative technologies for site cleanup and waste management.

For additional information, contact Joseph Paladino at (301) 903-7449 or 1-800-845-2096.

6.7 Small Business Initiative Program

The *Small Business Initiative Program*, administered by DOE's Office of Defense Programs, focuses on manufacturing and advanced technology development segments of the small business community, and provides technical assistance, cooperative research opportunities, and access to technical facilities.

For additional information, contact Michael Snow at (505) 845-4947.

6.8 Office of Economic Impact and Diversity

The Office of Economic Impact and Diversity works with energy related small and historically underutilized businesses that could benefit from the transfer of new and emerging technologies.

For additional information, contact Gloria Smith at (202) 586-8383.

6.9 Energy Analysis and Diagnostic Centers

Energy Analysis and Diagnostic Centers (EADCs) at 30 participating institutions use the talents of engineering school faculty to direct the work of student engineering professionals to conduct energy audits; or energy, waste, and productivity assessments for small- and medium-sized manufacturing plants.

For additional information, contact:

Eastern Region: Rutgers University - (908) 445-3655; Fax: (908) 445-0730
Western Region: University City Science Center - (215) 387-2255; Fax: (215) 382-0056

APPENDICES

APPENDIX A
OTHER GOVERNMENT AGENCIES

Several other Federal government agencies conduct energy RD&D programs through interagency working agreements in order to mutually benefit from technical and scientific information generated in areas such as energy resources, technology, environment, conservation, health and safety, economics, and forecasting.

Complete descriptions of all Federal government agencies and offices and their programs are included in *The United States Government Manual* which can be obtained from the U.S. Government Printing Office, Superintendent of Documents, (202) 512-1800. Some of these agency programs are described below.

1. Environmental Protection Agency

The *U.S. Environmental Protection Agency* (EPA) was created to provide coordinated and effective governmental action on behalf of the environment. Its objective is to abate and control pollution systematically, through the integration of research, monitoring, standard setting, and enforcement activities. The agency activities are grouped under the following areas (further information can be obtained by calling the telephone numbers provided):

- Water
  - Robert Perciasepe
    Assistant Administrator
    401 M Street, S.W.
    Washington, DC 20460
    (202) 260-5700

- Air and Radiation
  - Mary D. Nichols
    Assistant Administrator
    401 M Street, S.W.
    Washington, DC 20460
    (202) 260-7400

  - Global Change Division
    Sam Napolitano
    (202) 233-9751

- Wetlands
  - John W. Meagher
    Director
    401 M Street, S.W.
    Washington, DC 20460
    (202) 260-7791

- Prevention, Pesticides and Toxic Substances
  - Lynn R. Goldman
    Assistant Administrator
    401 M Street, S.W.
    Washington, DC 20460
    (202) 260-2902

- Solid Waste and Emergency Response
  - Elliott Laws
    Assistant Administrator
    401 M Street, S.W.
    Washington, DC 20460
    (202) 260-4610

- Watershed Protection
  - Geoffrey M. Grubbs
    Director
    401 M Street, S.W.
    Washington, DC 20460
    (202) 260-7040

- Office of Policy, Planning and Evaluation
  - Climate Change Division
    Dennis Tirpak, Director
    (202) 260-8825

- Research & Development
  - Gary J. Foley
    Acting Assistant Administrator
    401 M Street, S.W.
    Washington, DC 20460
    (202) 260-7676

  - Peter W. Preuss
    Director, Office of Technology
    Transfer and Regulatory Support
    (202) 260-7669

  - Alfred W. Lindsey
    Director, Office of Environmental
    Engineering and Technology
    Demonstration
    (202) 260-2600

(Research & Development continued):

- Courtney Riordan,
  Director, Office of Environmental
  Process and Effects Research
  (202) 260-5950

- William H. Farland
  Director, Office of Health and
  Environmental Assessment
  (202) 260-7317

  - Terry Harvey, Director
    Environmental Criteria and
    Assessment Office
    26 W. Martin Luther King Dr.
    Cincinnati, OH 45268
    (513) 569-7531

  - Lester D. Grant, Director
    Environmental Criteria and
    Assessment Office
    MD-52, 3200 Highway 54
    Research Triangle Park, NC 27711
    (919) 541-4173

2. Department of the Interior

The jurisdiction of the *Department of the Interior* (DOI) includes the conservation and development of mineral and water resources. The following two offices are of possible interest:

- *Water and Science*: This office manages programs that support the development and implementation of water and mineral policies and assists in the development of economically and environmentally sound resource activities. For additional information, contact:

  - U.S. Geological Survey
    Dr. Gordon P. Eaton
    Director
    119 National Center
    Reston, VA 22092
    (703) 648-7411

    - David Houseknecht
      Energy Program Coordinator
      (703) 648-6470

Major Areas of Responsibility

- Investigates and assesses the Nation's land, water, energy (coal, oil, gas), and mineral resources. Conducts research and investigations on resource assessment and characterization, including preparation of maps and digital and cartographic data, collection and interpretation of data on energy and mineral resources, and conduct of fundamental and applied research in the sciences and techniques involved.

Major Areas of Responsibility

- Bureau of Reclamation
  Daniel P. Beard
  Commissioner
  18th & C Streets, N.W.
  Washington, DC 20240
  (202) 208-4157

  - Works in partnership with other agencies to develop water conservation plans, provide for the efficient and effective use of water and related resources, and improve management of existing water resources. Ensures that the lands it manages are free from hazardous and toxic waste, and assists other Federal and State agencies in protecting and restoring surface and ground water resources from hazardous waste contamination.

- *Land and Minerals Management*: The activities of this office include onshore and offshore minerals management; mineral data collection and analysis; surface mining reclamation and enforcement functions; operations management of minerals on the Outer Continental Shelf; and assessment of these frontier area mineral resources. For additional information, contact:

Major Areas of Responsibility

- Minerals Management Service
  Cynthia Quarterman
  Acting Director
  1849 C Street, N.W.
  Washington, DC 20240
  (202) 208-3500

  - Hugh Hilliard
    Deputy Associate Director for
    Policy and Management
    Improvement
    (202) 208-3398

  - Assesses the nature, extent, recoverability, and value of leasable minerals and resources on the Outer Continental Shelf, including natural gas and oil. Ensures orderly and timely inventory and development, as well as efficient recovery of mineral resources; and encourages utilization of the best available and safest technology. Responsible for resource evaluation and classification, environmental review, leasing activities, lease management, and inspection and enforcement programs for Outer Continental Shelf lands.

- Bureau of Land Management
  Mike Dombeck
  Acting Director
  1849 C Street, N.W.
  Washington, DC 20240
  (202) 208-3801

  - Del Fortner
    Team Leader, BLM Onshore
    Oil and Gas Performance Review
    (202) 208-5537

  - Responsible for total management of public lands and subsurface resources in lands where mineral rights are owned by the Federal government. Oversees and manages the development of energy and mineral leases, and ensures compliance with applicable regulations governing the extraction of these resources.

- Fish and Wildlife and Parks: This office is responsible for programs associated with the development, conservation, and utilization of fish, wildlife, recreation, historical, and national park system resources. It represents the Department of the Interior in the coordination of marine environmental quality and biological resources programs.

	Major Areas of Responsibility
– Fish and Wildlife Service Molly Beattie, Director 1849 C Street, N.W. Washington, DC 20240 (202) 208-5634	• Conducts activities for the protection and improvement of land and water environments (habitat preservation) that directly benefit natural resources and quality to human life, including biological monitoring through scientific research; surveillance of pesticides, heavy metals, and other contaminants; studies of fish and wildlife populations; ecological studies; environmental impact assessments; and environmental impact statement reviews.

2.1 The National Oil Spill Response Test Facility (OHMSETT)

OHMSETT is a one-of-a kind facility built in 1974 by the Environmental Protection Agency to test marine oil spill response equipment and procedures. The facility is located on Sandy Hook Bay on the U.S. Naval Weapons Station Earle in Leonardo, New Jersey. OHMSETT is now managed by the Minerals Management Service (MMS), with financial support from the U.S. Coast Guard and Environment Canada.

Through the MMS, the OHMSETT facility is available for commercial or experimental testing of equipment and prototypes. The facility features an open-air tow and wave tank where environmentally safe testing can be done in the presence of oil. A daily fee is assessed on users on the basis of estimated annual operation and maintenance costs for the facility.

OHMSETT's main feature is an above-ground concrete tank measuring 203 meters (667 feet) long by 20 meters (65 feet) wide and 2.4 meters (8 feet) deep. The tank is normally filled with salt water from Sandy Hook Bay; however, it can be filled with fresh water. Other major features include the following: a towing carriage system; a wave generator; an electrolytic chlorinator to control biological activity; filtration and oil/water separation systems; a movable wave-dampening beach; and permanent and mobile storage tanks that can store up to 417 cubic meters (109,896 U.S. gallons) of test fluids, such as crude oil.

OHMSETT's tank provides a safe and controlled environment for conducting tests and experiments on oil spill containment and cleanup technologies, such as the performance of booms and skimmers in oil to standard test protocols; performance of chemical treating agents; and remote-sensing technologies and other innovative technologies.

For more information on the OHMSETT facility, contact:

Technology Assessment and Research Branch
Attn: MMS Project Office
U.S. Department of the Interior
Minerals Management Service
381 Elden Street
Herndon, VA 22070-4817
Telephone: (703) 787-1560
Fax: (703) 787-1575

3. Department of Commerce

The Federal Nonnuclear Energy Research and Development Act of 1974 (Public Law 93-577) established a comprehensive national program for research and development of all potentially beneficial energy sources and utilization technologies. The purpose of the program is to provide an opportunity for independent inventors and small businesses with promising energy related inventions to obtain Federal assistance in developing and commercializing their inventions. The program is conducted by DOE with assistance from the Department of Commerce, National Institute of Standards and Technology (NIST). Direct grants are available from DOE for inventions that are judged favorably by NIST's Office of Energy Related Inventions.

If use of an invention will result in energy savings, more efficient use of energy, or increasing energy supplies from nonnuclear sources, the invention would be considered energy related under this program, and would qualify for consideration. DOE determines whether and how the recommended inventions should be supported, and takes the necessary support action. DOE expects to support almost all NIST-recommended inventions. Although individual grant or contract awards have exceeded $100,000, the average award is for $70,000.

For additional information, contact Shirley Waters at (301) 975-5500, or write to:

Office of Energy Related Inventions
National Institute of Standards and Technology
Gaithersburg, MD 20899

4. Department of Transportation

- *United States Coast Guard*: The U.S. Coast Guard of the Department of Transportation is responsible for enforcing the Federal Water Pollution Control Act (33 U.S.C. 1251), as amended by the Oil Pollution Control Act of 1990 (P.L. 101-380), and various other laws relating to the protection of the marine environment. The U.S. Coast Guard program objective is to ensure that public health and welfare and the environment are protected when spills occur. Under these laws, U.S. and foreign vessels are prohibited from using U.S. waters unless they have insurance or other guarantees that potential pollution liability for cleanup and damages will be met.

  Other functions include: providing a National Response Center to receive reports of oil and hazardous substance spills, investigating spills, initiating subsequent civil penalty actions when warranted, encouraging and monitoring responsible party cleanups, and when necessary, coordinating Federally-

funded spill response operations. The program also provides a National Strike Force to assist Federal On-Scene Coordinators in responding to pollution incidents. For further information, contact Commander Kenneth Keane at (202) 267-0440, or write to:

U.S. Coast Guard Headquarters
Room 2100
2100 2nd Street, S.W.
Washington, DC 20593-0001

- *Office of Pipeline Safety*: The Office of Pipeline Safety (OPS) of the Department of Transportation establishes and provides for enforcement of safety standards for transportation of gas and hazardous liquids by pipeline. OPS publishes annual reports on the hazardous materials and pipeline safety programs, which are transmitted to Congress, State agencies, safety organizations, and to industry and the public upon request. It maintains a reporting system that gathers, processes, and analyzes accident and operator data from pipeline companies; carriers transporting hazardous materials by rail, highway, air and water; and manufacturers of containers used in transporting hazardous materials.

  In addition, OPS conducts natural gas research primarily in the areas of pipeline safety and leak detection, and conducts studies related to seismic evaluation, information systems development, and environmental protection.

  For additional information, contact George W. Tenley, Jr. at (202) 366-4595, or write to:

  Office of Pipeline Safety
  Research and Special Programs Administration
  Department of Transportation
  400 Seventh Street, S.W.
  Washington, DC 20590

APPENDIX B
DOE REGIONAL COORDINATORS FOR SMALL BUSINESS

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APPENDIX C
REFERENCE PUBLICATIONS FOR ADDITIONAL INFORMATION

1. *Capsule Review of DOE Research and Development Laboratories and Field Facilities,* U.S. Department of Energy, September 1992 (DOE/ST-002P).

2. *Databases Available at the Energy Library: New Databases Available Since January 1988,* U.S. Department of Energy, April 1991 (Supplemental to DOE/MA-0247).

3. *Department of Energy Technology Transfer Contacts - Who's Who in T^2,* U.S. Department of Energy, April 1994.

4. *Doing Business with the Department of Energy,* U.S. Department of Energy, Office of Small and Disadvantaged Business Utilization, April 1993 (DOE/MA-0271).

5. *Doing Business with the Federal Government,* U.S. General Services Administration, Washington, DC, 1989 (GPO Item No. 559).

6. *The Domestic Natural Gas and Oil Initiative,* U.S. Department of Energy, December 1993.

7. *Energy Information Directory 1991,* U.S. Department of Energy, National Energy Information Center, Washington, DC, February 1992 [DOE/EIA-0205(91)].

8. *Federal Executive Directory Including Congress,* Carrol Publishing Company, Washington, DC, May/June 1993.

9. *Guide for the Submission of Unsolicited Proposals,* U.S. Department of Energy, Office of Procurement, Assistance and Program Management, October 1991 (DOE/PR-0014).

10. *Natural Gas Strategic Plan and Multi-Year Program Crosscut Plan (FY 1994-1999),* U.S. Department of Energy, December 1993 (DOE/FE-0297P).

11. *The NIST/DOE Energy Related Inventions Program, What It Is and How It Works,* U.S. Department of Commerce, National Institute of Standards and Technology, and U.S. Department of Energy, January 1990.

12. *The Secretary's Annual Report to Congress, 1991,* U.S. Department of Energy, Washington, DC (DOE/S-0105).

13. *Technology Transfer - 1994,* U.S. Department of Energy, January 1994 (DOE/LM-002 DE94005148).

14. *The United States Government Manual 1994/1995,* Office of the Federal Register, National Archives and Records Administration, Washington, DC.