United States General Accounting Office

GAO

Resources, Community, and Economic Development Division

January 1991

Energy Reports and Testimony: 1990

Highlights

Energy Policy

GAO's report, issued June 1990, examines how the U.S. can secure sufficient and reliable future energy supplies to meet increasing demands. The report covers DOE's national energy strategy, energy supply and demand, dependence on foreign oil, electricity production and consumption, environmental effects of energy consumption, and many other energy policy related issues. *Page 7.*

Gasoline Marketing

The federal government is doing little to prevent gas stations from selling low-octane fuel at high-octane prices, a mislabeling practice affecting about nine percent of all gas sales nationwide and cheating more than $150 million annually from motorists. *Page 9.*

PUREX Restart

GAO believes that the Secretary of Energy should decide whether reopening the Plutonium-Uranium Extraction plant (PUREX) at the Hanford Site in Washington state is worth the costs and whether the facility is needed for its intended purposes. *Page 24.*

RCED-91-84

Foreword

Growing dependence on imported oil, the need to develop new technologies to use energy cleanly and efficiently, and the tremendous problems at the Nation's nuclear weapons complex have all served to thrust the Department of Energy, and its programs, once again into the public spotlight. Because of these challenges, energy issues will continue to play a major role in economic and environmental public policy decisions during the 1990s. The question of how we, as a country, develop energy policy will depend largely upon the availability of accurate, timely information and an analysis of key energy concerns upon which we can make our decisions.

This annual index includes information on U.S. General Accounting Office (GAO) documents directly related to energy that were issued between January and December 1990. This index should be useful for general information and research purposes and for understanding energy issues that GAO is addressing. For prior GAO energy information, please refer to the Energy Bibliography cited in the Special Publications Section (page 35).

Questions can be directed to me at the U.S. General Accounting Office, Room 4905, 441 G Street., N.W. Washington, D.C. (202) 275-1441. Readers interested in ordering documents or in requesting bibliographic searches on a specific topic should call the Document Handling and Information Service, (202) 275-6241. The form included in the back of the index can also may be used to order documents.

Victor S. Rezendes, Director
Energy Issues
Resources, Community, and Economic
Development Division

Contents

Energy Supply and Demand

Oil Reserve:
Some Concerns Remain About SPR Drawdown and Distribution

GAO/RCED-91-16, 11/28/90

The crisis in the Persian Gulf has renewed interest in the ability of the Department of Energy's Strategic Petroleum Reserve to counter disruptions in the supply of oil to the United States. To provide this protection, DOE must be able to offset the supplies lost by quickly drawing down reserve oil from its storage sites and distributing it to purchasers. This report (1) reviews DOE's current and planned capability for removing oil from reserve sites and getting it to users via oil distribution networks, (2) examines the Strategic Petroleum Reserve's compliance with pipeline safety requirements, and (3) discusses DOE's efforts to correct problems previously reported by GAO.

Energy Security:
Impacts of Lifting Alaskan North Slope Oil Exports Ban

GAO/RCED-91-21, 11/8/90

The export of Alaska North Slope (ANS) oil is restricted by law; the ban can be lifted only by Presidential certification that exports of this commodity are in the best interest of the nation. GAO examined the energy and economic impacts of removing the export restriction compared with leaving it in place. While GAO's analysis was underway and virtually complete by August 1990, the report recognizes the potential impact on the subject of Iraq's invasion of Kuwait. If the export ban were lifted, some ANS oil would likely go to Pacific Rim nations. Shipments to U.S. east coast ports, which are costly compared with oil transportation to the Pacific Rim, would virtually cease, and some shipments to some west coast destinations might be reduced. The probable economic effects would be an increase in the wellhead price of ANS crude oil; improved economic efficiency in the ANS oil trade, due mainly to lower transportation costs, resulting in increased domestic oil production, better use of refinery processing resources and improved allocation of ANS oil to its highest valued uses; and accelerated decline in U.S. tanker demand because exports would likely be transported on foreign vessels. From an energy security standpoint, the effect of lifting the export ban would probably be to increase total U.S. imports but decrease net imports (imports minus exports); and to improve worldwide oil market efficiency to some extent, which could contribute to U.S. energy security.

Natural Gas:
Opportunities for Federal Cost Savings Through Competitive Purchases

GAO/RCED-91-35, 10/23/90

Changes in federal regulations affecting the sale, purchase, and transportation of natural gas since the late 1970s have provided the federal government with greater opportunities to buy natural gas from sources other than a single public utility serving a local area. With federal agencies buying upwards of $500 million worth of natural gas each year, the potential cost savings are significant. GAO reviewed savings reported by three federal facilities in three states and discovered that savings of between 10 percent and 30 percent were realized through competitive procurement of natural gas. However, GAO found that only a small number of federal facilities appear to be purchasing natural gas competitively. GAO believes that several factors may account for the lack of competitive purchasing. For example, agency personnel may be unaware of natural gas purchasing options and may lack the time, staff, and incentives necessary to explore this option. In addition, facilities have to use enough natural gas to make competitive procurement financially worthwhile. DOD's Defense Fuel Supply Center recently began to evaluate and consolidate competitive procurement among all the services. However, similar central coordination does not exist for federal civilian agencies wishing to buy gas competitively. On the basis of GAO's work, the General Services Administration recently began to evaluate the potential for competitive purchases of natural gas by civilian agencies.

Electricity Supply:
Older Plants' Impact on Reliability and Air Quality

GAO/RCED-90-200, 9/10/90

To help meet America's growing demand for electricity, electric utilities plan to extend the service life of many fossil fuel power plants. Accounting for about 70 percent of the country's generating capacity, these plants—particularly older facilities exempted from the Clean Air Act—are major sources of air pollution. This report examines electric utilities' plans for extending the useful life of older fossil fuel power plants and discusses the effects of life extension on the reliability of the nation's power supply and on air quality.

Electricity Supply:
The Effects of Competitive Power Purchases Are Not Yet Certain

GAO/RCED-90-182, 8/23/90

GAO reviewed plans for meeting the nation's future electric power needs through utilities' use of competitive power purchases. Competitive bidding is a relatively recent development in the utility industry; the first competitive bid solicitation for purchases of electricity occurred in 1984. This report examines electric utilities' use of competitive bidding to buy electricity from non-utility generating sources and identifies how these purchases might affect the reliability and cost of electric power. GAO focused on the experiences of three utilities—Boston Edison, Central Maine Power, and Virginia Power—that are among the first in the country to use competitive bidding for electricity purchases.

Energy Regulation:
Factors Relating to Oil Overcharge Settlements Need Better Documentation

GAO/RCED-90-181, 8/23/90

GAO examined the Economic Regulatory Administration's (ERA) handling of the proposed settlement of the Cities Service oil overcharge litigation, including (1) the decision to allow extended payments for the settlement; (2) the analysis of the agency's risks in pursuing the Cities litigation, which ERA used in formulating the settlement; and (3) the role of ERA's litigating attorneys in the proposed settlement. GAO also assessed the adequacy of compliance with internal control standards relating to documentation on the proposed settlement. GAO found that ERA—part of the Department of Energy—has little or no documentation for many of the significant events that led to the proposed settlement, including the basis for the decision to allow extended payments and the litigation risk analysis prepared by ERA. In addition, ERA had little documentation on its negotiating sessions with Occidental and no documentation of the review of the proposed settlement by DOE's Office of General Counsel. ERA also failed to maintain settlement-related documents in a central, readily accessible location, as required by OMB's and GAO's standards. Such documentation, is crucial in evaluating whether oil overcharge cases are being settled in the government's and the public's best interest.

Alcohol Fuels:
Impacts From Increased Use of Ethanol Blended Fuels

GAO/RCED-90-156, 7/16/90

Ethanol is an alcohol made from grain that can be blended with gasoline to extend petroleum supplies and to increase gasoline octane levels. Congressional proposals to encourage greater use of alternative fuels could increase the demand for ethanol. GAO evaluated the growth potential of the ethanol industry to meet future demand increases and the impacts increased production would have on American agriculture and the federal budget. GAO found that ethanol production could double or triple in the next eight years, and that American farmers could provide the corn for this production increase. While corn growers would benefit, other agricultural segments would not; soybean producers, for example could suffer from increased corn oil production (an ethanol byproduct) and cattle ranchers would be faced with higher feed costs because of higher corn prices. Poultry farmers might benefit from lower priced feed. Overall, net farm cash income would increase, and consumers would see slightly higher food prices. Federal budget impacts would include a reduction in federal farm program outlays by an annual average of between $930 million (for double current production of ethanol) to $1.421 billion (for triple production) during the 8-year growth period. However, due to a partial tax exemption for ethanol blended fuels, federal fuel tax revenues could decrease by between $442 million and $813 million. GAO notes that the scope of its evaluation of federal budget impacts covered only farm support programs and fuel taxes; other possible impacts were not analyzed.

Energy Policy:
Developing Strategies for Energy Policies in the 1990s

GAO/RCED-90-85, 6/19/90

This report updates GAO's November 1988 transition report on energy issues facing the nation (see GAO/OCG-89-16TR). That report expressed concern about America's increasing vulnerability to oil supply disruptions; the growing uncertainty about future electric generating capacity; and the health, safety, and environmental problems associated with various energy options. This report supplements the information contained in the transition report and discusses GAO's continuing concerns about energy consumption, increased dependence on foreign oil from Persian Gulf sources that are likely to be interrupted, the adequacy of future

electric generating capacity, and potentially adverse environmental effects of energy consumption. The President's July 1989 initiative to develop a national energy strategy is also discussed.

Gasoline Marketing:
Uncertainties Surround Reformulated Gasoline as a Motor Fuel

GAO/RCED-90-153, 6/14/90

Gasoline is considered reformulated when its chemical makeup has been changed for a specific purpose. In general, government and industry officials agree that reformulated gasoline could help improve air quality by reducing vehicle emissions. In addition, reformulated gasoline offers advantages over other clean-burning alternative fuels because it can use the existing petroleum distribution system. Yet while some petroleum companies have recently begun selling limited amounts of reformulated gasoline to meet specific markets, the most effective formulations for reducing emissions have yet to be determined. Producing reformulated gasoline in large amounts and in more effective formulations would require at least several years' lead time and large investments in new refinery equipment. Industry officials also believe that it could harm small refiners, increase the cost of gasoline to consumers, and require additional imports of crude oil. Because of these uncertainties, GAO believes that it is premature to draw conclusions about the potential of reformulated gasoline in comparison to other alternative fuels.

Nuclear Science:
U.S. Electricity Needs and DOE's Civilian Reactor Development Program

GAO/RCED-90-151, 5/29/90

Electricity projections developed by the North American Electric Reliability Council appear to be the best available estimates of future U.S. electricity needs. The council, which represents all segments of the utility industry, projects that before 1998 certain regions of the country—particularly the heavily populated eastern half of the United States—may experience shortfalls during summer peak demand periods. Working closely with the nuclear industry, DOE is supporting the development of several reactor technologies to ensure that nuclear power remains a viable electricity supply option. In fiscal year 1990, DOE spent $253 million to support industry-led efforts to develop light-water reactors, advanced liquid-metal reactors, and modular high-temperature gas-cooled reactors that are safe, environmentally acceptable,

and economically competitive. GAO spoke with utility company officials in the Southeast, all of whom generally supported DOE's efforts. However, most of these officials do not plan to buy nuclear reactors until after 2000 because of the high cost of building nuclear reactors and current public opposition to nuclear power.

Gasoline Marketing:
Consumers Have Limited Assurance That Octane Ratings Are Accurate

GAO/RCED-90-50, 4/16/90

In 1978 Congress passed the Petroleum Marketing Practices Act. This legislation requires uniform posting of accurate octane ratings on gas pumps to let consumers know the octane rating of the gasoline they are buying. However, because the Federal Trade Commission and the Environmental Protection Agency have not carried out their octane testing and enforcement responsibilities under the Act, there are no federal controls to ensure that gasoline octane postings are accurate. Octane mislabeling is a problem in some states, and GAO believes consumers may be paying millions of dollars each year for gasoline with lower octane rating than what is posted on the pump. GAO is also concerned that the Act lacks provisions for posting octane ratings for gasoline-alcohol blends and has other provisions that may interfere with state octane enforcement efforts.

Energy Management:
Extent of Crude Oil Contamination Is Uncertain

GAO/RCED-90-114BR, 3/8/90

GAO examined allegations that crude oil in Oklahoma and elsewhere in the United States may be contaminated with hazardous wastes and/or other noncrude substances. Some substances occur naturally in crude oil, while others could be intentionally or unintentionally added when the oil is produced and transported. These substances include organic chlorides, sulfur, waste oil, and PCBs. This briefing report provides information on the following: (1) instances of crude oil contamination, the substances found in crude oil, the circumstances involved, the safety and environmental effects of refining contaminated crude, and the extent to which refinery fires and explosions can be linked to the processing of contaminated crude oil; (2) what impact the Resources Conservation and Recovery Act and the Hazardous Liquid Pipeline

Safety Act have on the crude oil contamination issues; and (3) what government and industry actions are being taken to address the contamination issue.

Federal Electric Power:
Views on the Sale of Alaska Power Administration Hydropower Assets

GAO/RCED-90-93, 2/22/90

In a March 1987 letter to the Secretary of Energy, GAO expressed concern about the federal government's efforts to sell the assets of the Alaska Power Administration (APA). GAO's main concern was that APA's planned divestiture approach would likely lead to a proposed sale at a price that would not (1) provide for full cost recovery for the government or (2) reflect the full potential value of the assets to a purchaser. Sales agreements have been reached between APA and potential purchasers of APA's assets—the Eklutna and Snettisham hydroelectric power projects. However, GAO found that APA's current sale proposal does not address GAO's earlier concern about benefitting APA ratepayers at the expense of taxpayers. Congress may wish to consider rejecting the administration's proposal and directing DOE to identify sales proposals that better balance the interests of ratepayers and taxpayers.

Federal Electric Power:
Bonneville's Residential Exchange Program

GAO/RCED-90-34, 2/6/90

The disparity in electric power rates paid by residential and small farm customers in the Northwest has decreased over the past decade. The $1.37 billion in exchange program benefits that Bonneville provided to Northwest utilities through fiscal year 1988 has contributed to this decrease. However, a more significant factor in reducing the rate disparity was the fact that Bonneville's costs—and, consequently, its power rates—increased significantly more than did those of the regional utilities. Bonneville has not been conducting the reviews needed to ensure that utilities are passing program benefits through to their residential and small farm customers, although the Northwest Power Act specifically directs Bonneville to do so. Given the dollar value of the benefits that have been provided to regional utilities, GAO believes Bonneville should do such reviews.

Testimony

Long-Term Policies Needed to Address Energy Use and Price Volatility, by Victor S. Rezendes, Director of Energy Issues, before the House Committee on Government Operations. GAO/T-RCED-90-105, 9/5/90

Along with the gasoline price spike after the Exxon Valdez oil spill and the home heating fuel price increases last winter, the rise in oil prices following the Iraqi invasion of Kuwait represents the third sharp increase in energy prices during the last 18 months. The nation's ability to shield itself from the impact of rapid increases in oil prices remains a major issue. GAO testified that although the country is better prepared to deal with this situation than it was in the 1970s—due to increases in energy efficiency and the existence of strategic reserves to replace lost supplies—concerns remain about recent trends showing increasing oil consumption, increased reliance on imports from the Persian Gulf, and the Strategic Petroleum Reserve's role in reducing the impact of these incidents. In GAO's view, a national energy strategy that specifically addresses these matters is sorely needed.

Consumers Have Limited Assurance That Octane Ratings Are Accurate, by Victor S. Rezendes, Director of Energy Issues, before the Subcommittee on Energy and Power, House Committee on Energy and Commerce. GAO/T-RCED-90-90 and GAO/T-RCED-90-90A, 6/20/90

When choosing gasoline, consumers rely on the octane ratings posted at the pumps. However, consumers have little assurance that they are getting the octane that they are paying for. GAO found that octane mislabeling does exist, although the extent of the problem nationwide is unknown. While Congress passed the Petroleum Marketing Practices Act in 1978 to ensure the accuracy of gasoline octane ratings posted nationwide, no federal controls are now in place to monitor the accuracy of octane postings. Further, there is (1) doubt that newer gasoline-alcohol blended fuels are subject to octane posting requirements and (2) concerns in the states that provisions of existing federal law may limit state enforcement efforts.

Alaskan Crude Oil Exports, by Judy England-Joseph, Associate Director for Energy Issues, before the Subcommittee on International Economic Policy and Trade, House Committee on Foreign Affairs. GAO/T-RCED-90-59, 4/5/90

What will the consequences be of lifting the existing ban on the export of Alaskan North Slope crude oil? GAO testified that if the ban is removed, some of this oil will almost certainly be exported to Pacific Rim countries. This is because it is inexpensive to transport oil to the Pacific Rim and because the characteristics of Alaskan North Slope crude may make it more suitable to Pacific Rim rather than West Coast refiners. This would probably lead to gains in economic efficiency, but would also probably harm the maritime industry and independent refiners on the West Coast. It would, of course, benefit crude oil producers in Alaska and California. From an energy security standpoint, lifting the ban would increase total U.S. oil imports but, probably, decrease net imports as a result of increased oil production and improvement in refinery efficiency.

Perspectives on Potential Agricultural and Budgetary Impacts From an Increased Use of Ethanol Fuels, by Judy England-Joseph, Associate Director for Energy Issues, before the House Committee on Ways and Means. GAO/T-RCED-90-23, 2/1/90

GAO testified on its use of an econometric model to assess the affects of expanded ethanol production in this country. Its conclusion: that expanded use of fuels would financially benefit some sectors of agriculture, increase consumer foods costs, decrease federal farm program outlays, and reduce federal motor fuel tax revenues. GAO's study was not designed to reach a conclusion on whether to extend the ethanol fuel tax exemption or the blenders income tax credit, and GAO does not take a position on these matters. GAO does believe, however, that other factors not addressed in its study, including important environmental, energy security, and economic growth consequences attributable to the use of ethanol as a fuel or a fuel blend, need to be factored into the debate on ethanol tax issues.

Managing the Department of Energy

Energy Management:
DOE Controls Over Contractors' Use of FTS Are Inadequate

GAO/RCED-90-184, 7/17/90

In fiscal year 1989, DOE operations offices spent about $16 million on long-distance calls involving the Federal Telecommunications System; almost all of the FTS lines at these offices are assigned to contractor employees. DOE relies on supervisors to control FTS use by contractors. Yet GAO found that DOE's procedures for supervisors are too vague to ensure that contractors' use of FTS is limited to official business. In addition, DOE generally does not give supervisors information on FTS calls made by employees, and DOE evaluations have not focused on controls over FTS use. As a result, DOE cannot be sure that FTS is being properly used by contractors. GAO believes that a program based on an analysis of a sample of FTS telephone calls for follow-up could improve DOE controls over FTS use. By approving for comment in the Federal Register a system of records to comply with Privacy Act requirements, DOE has taken an initial step toward establishing such a program. However, DOE has no plans to establish procedures on how the information that will be available under the system of records should be used to review and control FTS use. It is also unclear how DOE will monitor the procedures established by field locations.

Nuclear Security:
DOE Oversight of Livermore's Property Management System Is Inadequate

GAO/RCED-90-122, 4/18/90

In June 1988, congressional hearings were held on allegations that government-owned equipment at DOE's Lawrence Livermore National Laboratory, including word processors, typewriters, video equipment, cordless hand tools, and highly explosive materials, was being stolen to finance the purchase of illegal drugs. While the laboratory is government-owned, it is run by the University of California. GAO found that the laboratory cannot account for over $45 million worth of government-owned property in its custody. Neither the laboratory's accounting controls nor its physical controls have protected the property in its custody against theft, unauthorized use, or loss. Despite the substantial number of missing items, the contract between DOE and the university generally protects the university against liability for such losses. GAO concludes

that DOE has not provided adequate oversight of the laboratory's property management system and, in essence, has allowed the university to prescribe the terms of the contract.

Testimony

Comments on H.R. 2480, the Uranium Enrichment Reorganization Act, by Victor S. Rezendes, Director of Energy Issues, before the House Committee on Science, Space, and Technology. GAO/T-RCED-91-3, 10/11/90

GAO testified on H.R. 2480, the Uranium Enrichment Reorganization Act, which would restructure DOE's uranium enrichment program as a government corporation. Specifically, this legislation would allow the corporation to set prices to maximize long-term returns; establish a fund to meet future decontamination, decommissioning, and remedial action costs associated with past uranium enrichment activities; and require the government to pay its share of the costs to clean up mining waste generated under past government contracts. GAO believes that H.R. 2480 takes needed steps toward establishing clear objectives for the enrichment program and would allow the new corporation to better operate as a business entity. The bill would also resolve several long-term issues that seriously challenge the program's future, including the need to pay billions of dollars in environmental and decommissioning costs at a time when competition is expected to increase. However, GAO believes that the bill could be strengthened by including a specific cost recovery provision. Because DOE projects that the corporation's future earnings could be substantial, GAO suggests that Congress require the repayment of $3 billion, rather than rely solely on unspecified dividends and/or uncertain future stock sales that may not materialize unless problems related to licensing uncertainties, increased competition, and billions of dollars in liabilities are adequately resolved.

Comments on Smith Barney's Uranium Enrichment Analysis, by Victor S. Rezendes, Director of Energy Issues, before the Subcommittee on Energy and the Environment, House Committee on Interior and Insular Affairs, and before the Subcommittee on Energy and Power, House Committee on Energy and Commerce. GAO/T-RCED-90-101 and GAO/T-RCED-90-101A, 7/31/90

In a May 1990 report, Smith Barney, Harris Upham and Co. concluded that (1) DOE's uranium enrichment program should be restructured as a government corporation; (2) all past costs have been recovered, and

DOE's customers have been overpaid about $1.2 billion; (3) the government should retain responsibility for environmental and decommissioning costs associated with enriched uranium production before the corporation's formation; and (4) at some future time the corporation could be sold to the private sector. GAO agrees with Smith Barney's recommendation to restructure the enrichment program as a government corporation, but disagrees that DOE's customers have paid for all past costs. Smith Barney did not identify the total environmental or decommissioning costs between the government and the corporation. Since these costs are largely undefined, but could amount to billions, Congress should immediately require the program to begin setting aside funds for these costs. DOE estimates that government purchasers are responsible for 50 percent of the decommissioning costs; therefore, the government should share these costs by matching the corporation's fund contributions. This requirement should continue until the existing plants have been decommissioned.

Energy and the Environment

Hydroelectric Dams:
Issues Surrounding Columbia River Basin Juvenile Fish Bypasses

GAO/RCED-90-180, 9/6/90

Hydroelectric facilities in the Columbia River Basin have contributed to an estimated 80 percent decline in the numbers of salmon and steelhead trout that migrate to the ocean as young fish and return as adults to spawn. The Army Corps of Engineers decided not to build bypasses at two dams to help young fish migrate because the economic benefits would not outweigh the costs. However, fish and wildlife agencies, Indian tribes, and others contend that the Corps' decision rests on a flawed analysis. This report examines the Corps' (1) use of benefit and cost analysis and a computer model used to estimate benefits, (2) consideration of other factors in its benefits estimates, and (3) consideration of the views of outside groups in deciding against construction of the bypasses. GAO also discusses bypass effects on fish survival.

Nuclear Waste:
DOE Needs to Ensure Nevada's Conformance With Grant Requirements

GAO/RCED-90-173, 7/9/90

The state of Nevada opposes DOE's development of a nuclear waste repository at Yucca Mountain. As a result, disputes have arisen over how Nevada has spent financial assistance provided by DOE to pay the state's repository program costs. GAO reviewed Nevada's use of about $32 million in grant funds provided by DOE through June 1989 and found that Nevada improperly spent about $1 million. Nevada used as much as $683,000 for lobbying and litigation expenses that were unauthorized or were expressly prohibited by law, court decision, or grant terms; exceeded a legislative spending limit on socioeconomic studies by about $96,000; and used, contrary to grant terms, about $275,000 from one grant period to pay expenses incurred in the prior year. Also, Nevada did not always exercise adequate internal controls over grant funds, such as timely liquidation of funds advanced to contractors. A permissive approach to grant administration by DOE contributed to Nevada's inappropriate use of grant funds.

Nuclear Waste:
Information on DOE's Interim Transuranic Waste Storage Facilities

GAO/RCED-90-166, 6/8/90

Concerns have been raised that the Waste Isolation Pilot Plant—the Department of Energy's planned permanent disposal facility for transuranic nuclear waste—may require extensive modifications before it can accept waste. This report focuses on the transuranic waste storage capacity at DOE's six interim storage sites. GAO notes that while storage capacity at the six sites will be reached anywhere from early 1991 at the Hanford Site to 100 years at the Nevada Test Site, continued temporary storage of transuranic waste at these interim sites has become a politically contentious issue between DOE and the states where these facilities are located. GAO believes that it is important for DOE to determine as quickly as possible if the Waste Isolation Pilot Plant can be used as a repository.

Nuclear Waste:
Changes Needed in DOE User-Fee Assessments to Avoid Funding Shortfall

GAO/RCED-90-65, 6/7/90

DOE estimates that disposing of radioactive waste from civilian nuclear power plants and its defense-related nuclear facilities could eventually end up costing $32 billion. To pay for this, DOE collects fees from utilities on electricity generated by nuclear power plants and makes payments from its defense appropriation. However, GAO found that unless careful attention is given to its financial condition, the nuclear waste program is susceptible to future budget shortfalls. Without a fee increase, the civilian-waste part of the program may already be underfunded by at least $2.4 billion (in discounted 1988 dollars). Also, DOE has not paid its share of costs—about $480 million—nor has it disclosed this liability in its financial records. Indexing the civilian fee to the inflation rate would address one major cost uncertainty. However, while DOE intends to do this at an appropriate time, it does not use a realistic rate of inflation as its most probable scenario in assessing whether that time has arrived. Congressional legislation will be required to implement an inflation indexing system.

Fossil Fuels:
Outlook for Utilities' Potential Use of Clean Coal Technologies

GAO/RCED-90-165, 5/24/90

Electric utilities burning fossil fuels—mainly coal—account for about two-thirds of the nation's sulfur dioxide emissions and about one-third of the nitrogen oxide emissions. These substances are major contributors to acid rain. This report discusses the extent to which electric utilities plan to use clean coal technologies on their coal-fired power generating units and how such technologies could help reduce acid rain. It also provides utilities' perspectives on how they might react to different emission reduction requirements and compliance dates.

Nuclear Waste:
Quarterly Report as of December 31, 1989

GAO/RCED-90-130, 4/30/90

This is GAO's quarterly status report on the implementation of the Nuclear Waste Policy Act of 1982, which requires DOE to carry out a federal program for the safe and permanent disposal of high-level nuclear waste in geologic repositories. GAO found that the Nuclear Regulatory Commission and others are concerned that EPA's repository containment standards may be written in such a way that it may be difficult, if not impossible, for DOE to satisfactorily demonstrate compliance. The specific concern is that limitations and uncertainties in the methods and data for making the necessary numerical calculations—such as predicting the occurrence of uncertain events like earthquakes over the long period of time—could lead to lengthy licensing delays unless EPA and/or NRC provide enough guidance on acceptable ways for addressing these limitations and uncertainties. NRC's staff has taken initial steps in what it expects to be a collaborative process with EPA to develop more guidance on how DOE is to demonstrate whether or not the Yucca Mountain site complies with the containment standard. Furthermore, both NRC and EPA expect that DOE's experience over the next several years in demonstrating that its new repository for certain defense wastes--DOE's Waste Isolation Pilot Plant—complies with EPA's standards should provide valuable insight into the problems that can be expected in demonstrating compliance with the containment standard for an NRC-licensed repository.

Nuclear Regulation:
The Military Would Benefit From a Comprehensive Waste Disposal Program

GAO/RCED-90-96, 3/23/90

Because of an accidental release in 1986 of low-level waste stored at the Wright-Patterson Air Force Base, Ohio, several individuals inhaled small amounts of a radioactive substance. GAO examined the Nuclear Regulatory Commission's oversight of the Department of Defense's use, handling, and disposal of radioactive material and found that (1) no comprehensive DOD waste disposal program exists and (2) none of the three services knows the full extent of its low-level radioactive waste disposal problems. Throughout the 1980s, the Army and the Air Force had, on occasion, been banned from disposal sites for failing to comply with federal and state requirements. By December 1992, two of the three sites now used by DOD to dispose of waste will close, and only a limited number of new sites may be available for several years. In the interim, DOD will pay substantial surcharges to dispose of waste. After January 1993, DOD will have to comply with disposal requirements for as many as 16 sites or store waste on-site pending the availability of new sites. GAO believes DOD needs to take full advantage of the time between now and January 1993 to establish a low-level radioactive waste disposal program. DOD also needs to work with other federal agencies, compacts, and states to determine the feasibility of dedicating a portion of one or more disposal sites for the government's use.

Fossil Fuels:
Pace and Focus of the Clean Coal Technology Program Need to Be Assessed

GAO/RCED-90-67, 3/19/90

Coal, one of America's most abundant energy sources, is also a major cause of air pollution and acid rain. Since 1984 DOE's Clean Coal Technology program has sought to financially assist private industry in demonstrating the commercial application of emerging clean coal technologies. So far Congress has appropriated $2.75 billion for the program. DOE has requested project proposals from industry through three separate solicitations (or rounds) and has chosen 39 projects. GAO found that DOE's elaborate process for evaluating, ranking, and selecting round-two project proposals provides reasonable assurance that proposals were consistently and thoroughly evaluated and that projects

were chosen using the applicable criteria. However, of the 16 projects DOE selected in round-two, 12 were rated weak in meeting certain of the evaluation criteria. GAO also noted that half of the 48 proposals that were evaluated in round-two fared poorly against three or more of the evaluation criteria. This suggests that DOE may have problems in identifying and funding additional promising clean coal technology projects in future rounds. As of December 31, 1989, only three projects were in the demonstration or operation phase and none had been fully demonstrated. Rather than move into round four and five of the program, GAO believes it may be beneficial to wait until DOE has more information on actual project results.

Greenhouse Effect:
DOE's Programs and Activities Relevant to the Global Warming Phenomenon

GAO/RCED-90-74BR, 3/5/90

Concerns about global warming stem from mounting scientific evidence that increasing concentrations of carbon dioxide and other trace gases produced by man are starting to alter the earth's temperature. This briefing report provides information on (1) the scientific understanding of the global warming phenomenon and DOE's research efforts to fill information gaps on the issue, (2) the nature of program planning and criteria used by DOE for evaluating global warming research and development, (3) DOE leadership on the global warming issue and efforts to integrate its various activities into energy policy and planning considerations, and (4) proposed policy and/or program changes made by responsible agencies or groups for improving energy efficiency and/or reducing energy-related emission with potential climate change effects.

Nuclear Waste:
Quarterly Report as of September 30, 1989

GAO/RCED-90-103, 3/2/90

At the end of the July-September 1989 quarter, GAO found that DOE was not ready to begin site characterization, including construction of the exploratory shaft facility, at Yucca Mountain, Nevada. This was due to (1) continuing delays in developing quality assurance programs, (2) unresolved criticisms of the design of the exploratory shaft facility and DOE's proposed methods for constructing it, and (3) a decision by the

state of Nevada not to issue necessary environmental permits. In addition, the Nuclear Regulatory Commission and a group representing utilities had raised many significant concerns about DOE's approach to characterizing the site. In November 1989, DOE extended the repository's projected operating date by seven years, from 2003 to 2010. In doing so, it delayed by three years beginning construction of and testing in the exploratory shaft facility until November 1992 and September 1995, respectively. DOE said these delays will allow it to overcome current program obstacles. DOE also intends to evaluate early the suitability of the site by conducting tests from the site's surface beginning in January 1991. DOE's new site characterization and approach are intended to result in a technically sound and cost-effective program.

Testimony

Utilities Potential Use of Clean Coal Technologies, by Victor S. Rezendes, Director of Energy Issues, before the Subcommittee on Economic Stabilization, House Committee on Banking, Finance and Urban Affairs. GAO/T-RCED-90-56, 3/28/90

Emerging clean coal technologies could help significantly reduce emissions from coal-fired power plants. However, it is uncertain whether this technology will be commercially available and widely deployed in time to meet the requirements of proposed acid rain legislation. Although utilities said they would give much greater consideration to these technologies once legislation is enacted, they indicated that their investment decisions would also depend on factors like technical feasibility, cost effectiveness, and emission control capability. Because of anticipated time frames needed for demonstration and deployment, GAO concludes that emerging clean coal technologies may play only a limited role in reducing acid rain during the next 15 years.

Producing Nuclear Weapons Safely

Nuclear Safety and Health:
Counterfeit and Substandard Products Are a Governmentwide Concern

GAO/RCED-91-6, 10/16/90

Nonconforming products like fasteners, pipe fittings, electrical equipment, and valves have been installed in U.S. nuclear power plants. Some of these products that failed to conform to design or other specifications were fraudulently produced (counterfeit) and/or substandard. GAO found that utilities have installed nonconforming products in, or are suspected of having received them, for almost two-thirds of the nation's 113 domestic nuclear power plants. Also, during the past five years, inspections by the Nuclear Regulatory Commission have uncovered problems with 12 of 13 utilities' quality assurance programs. While NRC took enforcement action against eight utilities, in April 1990 the Commission withdrew action against two utilities and deferred the quality assurance program inspections for at least one year. Nonconforming products are a governmentwide problem; however, consolidated data that could help stop the purchase of these products by government and utility officials are not to be found. Further, the magnitude of the problem, cost to the taxpayers, and potential dangers resulting from using such products are unknown. While the Office of Management and Budget agreed in 1988 to act as a clearinghouse for information on nonconforming products, OMB has not yet fulfilled its commitment.

Nuclear Safety:
Potential Security Weaknesses at Los Alamos and Other DOE Facilities

GAO/RCED-91-12, 10/11/90

In March 1989, the contract security force at the Department of Energy's Los Alamos National Laboratory began a 10-week strike as a result of longstanding labor-management relations problems, including overtime, disciplinary, and sick leave policies. Because Los Alamos carries out nuclear weapons research and testing activities, around-the-clock security is essential. During the strike, DOE used temporary replacements. However, GAO is concerned about the adequacy of security at Los Alamos before, during, and after the strike. At issue is whether the security force was properly trained. GAO is also concerned about security at other DOE facilities. DOE inspections found recurring and similar weaknesses but DOE rated only one security program as unsatisfactory. GAO believes that this was due to a lack of DOE criteria specifying the severity and frequency of inspection findings that would

result in a satisfactory or unsatisfactory rating. Also, DOE lacks an effective mechanism for ensuring that corrective actions are taken on inspection findings. GAO found that some inspection findings went uncorrected for as much as five years. While DOE believes that federal and contract forces are equally capable of protecting its facilities and that the costs for both are similar, DOE lacks current cost data. GAO estimates that annual labor and benefits costs could be cut $15 million if DOE federalized the security forces at the nine facilities GAO reviewed.

Nuclear Energy:
Consequence of Explosion of Hanford's Single-Shell Tanks Are Understated

GAO/RCED-91-34, 10/10/90

Built in 1943 on the Columbia River in southeastern Washington State, the Hanford Site is a major DOE defense facility that recovers the plutonium from spent reactor fuel. This process produces a large volume of highly radioactive, heat-producing liquid waste. To temporarily store this material until a more permanent disposal method is discovered, DOE has built underground waste storage tanks. GAO concludes that the consequences of an explosion in one of these underground tanks holding ferrocyanide would be more severe than DOE reported in its 1987 Hanford Site environmental impact statement. Although several studies done by DOE and outside experts have indicated that the probability of a ferrocyanide-caused explosion is low, this conclusion is based on limited information on waste conditions in the tanks. GAO believes that such an explosion could be catastrophic: the force of the explosion would blow a large hole in the tank top, radioactive material would be spewed into the air, and large areas within and possibly beyond the boundaries of the Hanford Site would be contaminated. Over the long term, significant numbers of radiation-induced cancers could be expected. A task force of independent DOE experts reviewed GAO's findings and agreed with GAO's assessment that the level of breathable radioactive particles generated by the explosion would be higher than that indicated in the 1987 environmental impact statement; however, the Task Force believes that more studies are needed to determine the potential radiation dose.

Nuclear Health and Safety:
Long-Term Plans to Address Problems of the Weapons Complex Are Evolving

GAO/RCED-90-219, 9/28/90

The Department of Energy's long-range studies, published in 1988, indicate that over the next 20 years it could cost from $125 billion to $155 billion to modernize the nation's nuclear weapons complex and restore the environment at nuclear facilities. However, DOE has neither updated these long-term cost estimates nor developed long-term plans. The development of these plans is a difficult yet important task. Many uncertainties surround the problems of the weapons complex. "What should our nuclear weapons capabilities be?"; "How clean is clean?"; and "How safe is safe?" are some of the fundamental policy issues that will have to be answered. DOE's plans are critical, since Congress relies on them to make informed budget decisions and to weight the enormous cost of correcting problems of the nuclear weapons complex against competing budget priorities in a deficit-conscious era. This report discusses existing cost estimates and DOE's current efforts to revise and update its modernization, environmental, and waste management plans.

Nuclear Health and Safety:
DOE Has Not Demonstrated That Restarting PUREX Is a Sound Decision

GAO/RCED-90-207, 6/29/90

The Plutonium-Uranium Extraction (PUREX) plant at DOE's Hanford Site in Washington state was closed in December 1988 for safety reasons. DOE plans to restart the plant in March 1991 in order to resume extracting weapons-grade plutonium from spent fuel and to dispose of spent fuel that cannot yield weapons-grade plutonium. However, GAO found that DOE's plans for restarting the facility are inadequate. Specifically, DOE has not (1) shown that PUREX is needed for weapons-grade plutonium production or that PUREX is the best alternative for waste disposal purposes, (2) determined that a supplemental environmental impact statement is needed, (3) required that previous safety problems be corrected before the plant is reopened, and (4) provided assurance that staff will be fully trained to operate PUREX safely. GAO believes that the Secretary of Energy should decide whether reopening PUREX is worth the costs and whether the facility is needed for its intended purposes. If so, a supplemental environmental impact statement should be

prepared and all safety- and training-related issues should be resolved before PUREX is restarted.

Nuclear Health and Safety:
Status of GAO's Environmental, Safety, and Health Recommendations to DOE

GAO/RCED-90-125, 4/20/90

In over 60 reports and testimonies in the 1980s, GAO called attention to the growing problems facing DOE's nuclear weapons complex. This report provides information on the status of our recommendations made to DOE during the 1980s on environmental, safety and health issues relating to its nuclear weapons complex. Out of 54 recommendations, GAO considers 23 to be still open. The open recommendations call for such improvements as tighter program controls and clearer standards and policies related to environmental, safety, and health matters.

Nuclear Safety:
Concerns About Reactor Restart and Implications for DOE's Safety Culture

GAO/RCED-90-104, 4/12/90

GAO reviewed DOE's efforts to restart three nuclear reactors at its Savannah River site in South Carolina. Restarting the reactors, which have not been in operation since 1986, is a top priority at DOE because the reactors are the nation's only production source of tritium, a radioactive gas used in nuclear weapons. This report describes (1) factors that might delay restarting the reactors and (2) what the operating contractor is doing to bring about a better attitude toward safety among its personnel at the Savannah River site. This report also contains information on safety attitude problems at other DOE facilities and with DOE employees.

Nuclear Health and Safety:
Need for Improved Responsiveness to Problems at DOE Sites

GAO/RCED-90-101, 3/28/90

This report summarizes the responsiveness of DOE and contractors to findings contained in DOE technical safety appraisals and environmental surveys. These appraisals and surveys have been done at DOE

facilities and sites to find out the extent of the environmental, the safety, and health problems and to prioritize them for corrective action. As of January 1990, DOE computer data showed over 1,700 safety and health problems and almost 1,300 environmental problems. The majority of these problems, however, have not yet been corrected. GAO also looked at the extent to which DOE has developed a computerized tracking system to monitor the status of its environmental, safety, and health problems. GAO found that the computer system lacks important information, such as various field office and independent appraisals. Inclusion of this information would provide a more complete picture of the problems at the sites.

Nuclear Science:
DOE's Acceptance of Academy of Sciences' 1986 Inertial Fusion Technical Priorities

GAO/RCED-90-115FS, 3/15/90

DOE's Inertial Confinement program uses lasers or particle beam accelerators to bombard tiny fusion fuel capsules to cause a momentary fusion reaction. Six participants are involved in the program: the Lawrence Livermore, Los Alamos, and Sandia National Laboratories; the Naval Research Laboratory; the University of Rochester; and KMS Fusion, Inc. The National Academy of Sciences reviewed the program in 1986 and has another review underway. This fact sheet addresses the following questions: What program priorities did the Academy's 1986 review panel recommend for the program? Which program priorities recommended by the Academy in its 1986 review were accepted by DOE? Which tasks in DOE's contract with KMS were designed by DOE to satisfy the program priorities recommended by the Academy and accepted by DOE?

Nuclear Science:
Performance of Participants in DOE's Inertial Confinement Fusion Program

GAO/RCED-90-113BR, 3/15/90

GAO examined the performance of the six participants in DOE's Inertial Confinement Fusion Program. GAO specifically looked into DOE's allegation that the performance of one of the six participants—KMS Fusion, Inc.—did not meet program expectations. KMS, a private contractor,

supports the inertial fusion research experiments of the other participants, mainly by providing fusion target components. Other program participants include DOE's Lawrence Livermore, Los Alamos, and Sandia National Laboratories; the Naval Research Laboratory; and the University of Rochester. GAO found that KMS' performance was mixed. In addition, most of the six participants did not accomplish all of their planned objectives or assigned tasks for various reasons. However, GAO believes that comparisons of performance among the six would not be valid because of the different functional role each performs in the program, different degree of difficulty of objectives, and different stages of development of participant programs.

Nuclear Waste:
Transuranic Waste Storage Limitations at Rocky Flats Plant

GAO/RCED-90-109, 2/28/90

The current shutdown of Rocky Flats' weapons component production facilities and the uncertain duration of the shutdown prevents GAO from predicting when the plant's 1,601-cubic-yard-limit on transuranic waste storage is likely to be reached. Once restarted, however, production could continue for as long as six to eight months, depending on how successful Rocky Flats is in identifying and removing some nonregulated wastes from the current inventory. Production beyond this point is questionable until Rocky Flats installs a supercompactor to reduce the volume of waste stored on-site or arrangements are made to store the transuranic waste off-site.

Nuclear Science:
The Feasibility of Using a Particle Accelerator to Produce Tritium

GAO/RCED-90-73BR, 2/2/90

Nuclear reactors are now the only proven way to produce the amount of tritium needed for nuclear weapons. GAO looked at whether DOE could produce this critical material by using a linear accelerator rather than a reactor. This briefing report examines (1) whether using an accelerator as a tritium production facility seems feasible; (2) whether DOE adequately considered particle accelerator technologies during its examination of future tritium production options; and (3) what cost, safety, and environmental advantages accelerator production of tritium might have over production by a nuclear reactor.

Environment, Safety, and Health:
Status of DOE's Reorganization of Its Safety Oversight Function

GAO/RCED-90-82BR, 1/30/90

In May 1989, the Secretary of Energy announced an organizational and management restructuring plan. Concerns arose that this plan would diminish the independent safety oversight role of DOE's Office of Environment, Safety, and Health by replacing it with internal oversight by line managers and with external review by safety boards. This briefing report provides (1) information on the major events that led to the proposed restructuring and (2) a brief description of the proposed restructuring plan, including its status as of November 30, 1989. GAO also provides general observations on the plan.

Nuclear Health and Safety:
Better Earthquake Protection Needed at DOE's Savannah River Site

GAO/RCED-90-24, 12/26/89

In 1886 an earthquake measuring about seven on the Richter scale devastated Charleston, South Carolina. GAO examined whether today DOE, in the event of a major earthquake at its Savannah River site, can ensure the safety of its employees and the public. The Savannah River site is about 80 miles east of Charleston. GAO found that only in 1988 and 1989 did DOE begin to systematically correct seismic problems that have existed at Savannah River for years. Many structures now at the reactor site might not withstand a major earthquake, thereby threatening employees and the public with releases of radiation. While DOE has begun a comprehensive seismic program for the reactors and other facilities at Savannah River, it will take years to adequately protect the site from earthquakes. GAO recommends that DOE establish a comprehensive, systematic seismic program for the reactors and high-risk nuclear facilities at Savannah River. Because of the potential for earthquakes elsewhere, GAO also recommends that DOE look at upgrading seismic programs at DOE locations with high-risk nuclear facilities.

Nuclear Health and Safety:
Savannah River's Unusual Occurrence Reporting Program Has Been Ineffective

GAO/RCED-90-53, 12/20/89

Since its beginning in 1981, DOE's Unusual Occurrence Reporting program has provided an incomplete picture of unusual reactor-related events at the Savannah River Site. Between 1982 and 1987, only 39 percent of the events identified by the contractor as having "significant consequence or hazard potential" were reported to DOE as unusual occurrences. GAO believes most of these events should have been reported. The problem of underreporting is mainly due to inadequate oversight of contractor operations by the Savannah River Operations Office. While DOE's Savannah River Office is trying to improve oversight of contractor operations, GAO believes that the Operations Office can do more to ensure that the contractor reports all significant unusual occurrences. GAO also believes DOE headquarters could clarify its criteria for identifying reactor-related events that should be reported.

Testimony

Performance of Participants in DOE's Inertial Confinement Fusion Program, by Victor S. Rezendes, Director of Energy Issues, before the Department of Energy, Defense Nuclear Facilities Panel, House Committee on Armed Services. GAO/T-RCED-90-58, 4/5/90

GAO testified on the performance of KMS Fusion, Inc. and the other five participants in DOE's Inertial Confinement Fusion Program. The goal of the program is to create a small thermonuclear explosion in the laboratory for weapons physics studies. DOE had alleged that KMS' performance had not met program expectations. This testimony summarizes the results of two previous GAO reports; see GAO/RCED-90-113BR, 3/15/90 and GAO/RCED-90-115FS, 3/15/90.

Correcting Environmental Problems Facing the Nuclear Weapons Complex, by Victor S. Rezendes, Director of Energy Issues, before the Senate Committee on Environment and Public Works. GAO/T-RCED-90-85, 5/17/90

GAO discussed DOE's efforts to correct the environmental problems facing the nuclear weapons complex. GAO's testimony focuses on three main points: First, the weapons complex faces a variety of serious and costly environmental problems. Second, during the past year, DOE has made some important changes to its organization that should help

change its management focus from one that emphasizes materials production to one that more clearly focuses on environmental concerns. Third, because resolution of DOE's environmental problems will require considerable resources during a period of budgetary constraints, it is imperative that DOE have internal controls in place to ensure that resources are spent efficiently in its environmental and waste management programs.

Efforts to Improve DOE's Management of the Nuclear Weapons Complex, statement for the record by Victor S. Rezendes, Director of Energy Issues, before the Subcommittee on Natural Resources, Agriculture Research and Environment, House Committee on Science, Space and Technology. GAO/T-RCED-90-64, 3/28/90

GAO's statement for the record discusses DOE's efforts to improve management of environmental, safety, and health matters at the nuclear weapons complex. Specifically, GAO addresses the following issues: (1) DOE's environmental, safety, and operational problems; (2) longstanding management problems of the complex; (3) recent DOE initiatives to improve its management of the complex; and (4) key management issues that could affect DOE's recent initiatives.

DOE's Management and Oversight of the Nuclear Weapons Complex, by Victor S. Rezendes, Director of Energy Issues, before the Department of Energy Defense Nuclear Facilities Panel, House Committee on Armed Services. GAO/T-RCED-90-52, 3/22/90

DOE's nuclear weapons complex is virtually shut-down today due to a multitude of serious environmental, safety, and operational problems. These include deteriorated facilities, contaminated soil and groundwater, and disposal of radioactive waste that has been in temporary storage for decades. GAO discussed these ongoing problems, as well as (1) longstanding management problems, (2) recent DOE management and oversight initiatives, and (3) GAO's views on DOE's efforts and implications for the future management of the complex.

DOE's Efforts to Correct Environmental Problems of the Nuclear Weapons Complex, by Victor S. Rezendes, Director of Energy Issues, before the Department of Energy Defense Nuclear Facilities Panel, House Committee on Armed Services. GAO/T-RCED-90-47, 3/15/90

GAO's testimony focuses on four main issues: (1) the environmental problems at DOE's nuclear weapons complex, (2) recent changes in

DOE's organizational structure, (3) DOE's 1991 budget request, and (4) the need for effective management systems. GAO concludes that the environmental problems are enormous and will take decades to resolve. Widespread contamination can be found at many DOE sites, and the full extent of the environmental problems is unknown. DOE has taken several steps during the past year to better deal with these problems, including making organizational improvements and requesting additional funds for environmental restoration and waste management activities. However, GAO believes that further improvements are needed to ensure that the most serious environmental problems are identified and funded and that DOE effectively manages and spends funds allocated to correcting environmental problems. GAO also believes that continued oversight is needed to ensure that DOE maintains its commitment to acceptable environmental practices.

GAO's Views on DOE's 1991 Budget for Addressing Problems at the Nuclear Weapons Complex, by Keith O. Fultz, Director of Planning and Reporting, before the House Committee on Budget. GAO/T-RCED-90-33, 3/2/90

This statement for the record discusses DOE's 1991 budget request as it relates to cleaning up and modernizing the nuclear weapons complex. GAO's testimony focuses on (1) the continuing problems of the complex, (2) DOE's progress in addressing these problems, and (3) important budget issues. In 1989 GAO testified on serious problems at the complex and the staggering cost to address them. GAO believes the situation is not any better in 1990. The nation's ability to produce weapons grade nuclear material is virtually nonexistent because a number of key facilities are shut down. Widespread environmental contamination exists at many DOE sites and the full extent of the environmental problems remains unknown. GAO estimates it could cost up to $155 billion to address these problems.

Energy Research and Development

Nuclear Research and Development:
Shippingport Decommissioning—How Applicable Are the Lessons Learned?

GAO/RCED-90-208, 9/4/90

In examining the decommissioning of the Shippingport, Pennsylvania, nuclear power plant by the Department of Energy, GAO found that DOE generally met the goals it set for decommissioning Shippingport - completing its activities four months ahead of schedule and $7 million under budget. DOE used over eight contractors on the project and produced many annual or topical reports that officials believe will be useful to the commercial nuclear industry. However, because Shippingport was a smaller reactor and less radioactive than other reactors, lessons learned from its decommissioning are limited. Further, many years may elapse before utilities dismantle a larger number of plants. In the interim, decommissioning activities on higher radioactivity- contaminated pressure vessels here and abroad will advance the state-of-the-art beyond the lessons learned at Shippingport. Efforts by the United Kingdom, Japan, and the U.S. (Three Mile Island) to identify technology to reduce worker exposures may also be more useful than the information arising from Shippingport.

Energy R&D:
Conservation Planning and Management Should Be Strengthened

GAO/RCED-90-195, 7/30/90

Energy efficient technologies can be a major help in offsetting increased energy use stemming from economic growth. In the 1970s and 1980s, for example, the DOE conservation research and development program produced commercially successful technologies like fluorescent lighting advances and low emissivity window coatings that provide substantial energy savings. In the early 1980s, however, energy conservation R&D funding and staff were cut substantially, reflecting the administration's view that conservation research should primarily be the responsibility of the private sector. This report (1) provides an overview of DOE's conservation R&D program in terms of funding, government R&D policies, and technology successes and (2) identifies planning and management improvements to increase the effectiveness of the conservation R&D program.

Nuclear Science:
Factors Leading to the Termination of the Antares Laser Research Program

GAO/RCED-90-160, 6/13/90

Los Alamos National Laboratory terminated the Antares Laser Research Program at the end of fiscal year 1985 because of a technical problem that would have been prohibitively expensive to resolve. Los Alamos found that long-wavelength lasers generate electrons that preheat the target containing the fuel for the fusion reaction, effectively preventing fusion. Before it terminated the program, Los Alamos did two technical evaluations and concluded that the Antares technology was not a good candidate for achieving fusion. Both evaluations were reviewed—one by an independent scientific panel and the other by the National Academy of Sciences. As a result, GAO believes that the program was given adequate technical review before its termination. GAO also discusses an interim report issued by the National Academy of Sciences in January 1990, which concluded that long-wavelength laser technology is not a viable candidate for fusion and recommended that the Department of Energy not pursue the technology.

Nuclear R & D:
Usefulness of Information From Shippingport Decommissioning for Rancho Seco

GAO/RCED-90-171, 6/7/90

The nuclear power plant in Rancho Seco, California, was shut down in June 1989 in response to a voter referendum. This report discusses the lessons learned from DOE's decommissioning of the Shippingport, Pennsylvania, nuclear power plant and the usefulness of this information to Rancho Seco and the commercial nuclear power industry in general. It also addresses additional questions that could be answered if DOE funded a research project as part of the decommissioning activities for Rancho Seco.

Energy R&D:
DOE's Allocation of Funds for Basic and Applied Research and Development

GAO/RCED-90-148BR, 5/24/90

In fiscal year 1990, DOE's budget for research and development efforts encompassing programs in fossil, nuclear, solar, fusion, and renewable energy sources as well as basic energy sciences and energy conservation was over $4 billion. This briefing report provides information on how DOE allocates energy R&D funds. Specifically, it discusses how priorities have evolved over the last 10 years, how the overall DOE funding for R&D has been distributed between basic research and applied research and development, and how much DOE has invested in major demonstration projects over the last 10 years.

Special Publications

Energy:
Bibliography of GAO Documents—January 1986 - December 1989

GAO/RCED-90-179, 7/90.

Growing dependence on imported oil, the need to develop new technologies to use energy cleanly and efficiently, and the tremendous problems at the nation's nuclear weapons complex have all thrust DOE and its programs into the limelight once again. This timely bibliography includes information on 1986 GAO documents relating to energy issues. Forms for ordering materials are included.

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