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Energy and Science: Five-Year Bibliography 1990-1994

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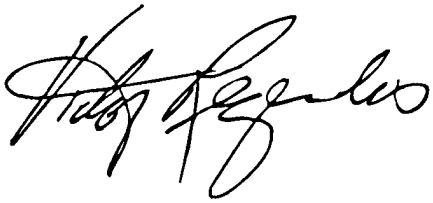
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Preface

The General Accounting Office (GAO), an arm of the Congress, was established to provide independent oversight of federal programs and activities. GAO's Energy and Science Issue Area examines the activities of such entities as the Department of Energy, the Nuclear Regulatory Commission, the Tennessee Valley Authority, the National Science Foundation, the Department of Commerce's National Institute of Standards and Technology, and the Patent and Trademark Office. The Issue Area's work generally focuses on examining the role and continued need for a federal presence in these areas, exposing incidences of waste and mismanagement, and promoting a smaller, more efficient, and cost-effective government.

Organized by our four primary areas of responsibility, this 5-year bibliography lists the energy- and science-related products issued from January 1990 through December 1994. The products are listed chronologically, with the most recent reports first. To help you locate individual reports, a subject index is included in the back of this document.

Questions can be directed to me at the U.S. General Accounting Office, Room 1842, 441 G Street, N.W., Washington, D.C. 20548. I can also be reached on (202) 512-3841 or on the Internet at rezendesv.rced@gao.gov. Readers interested in ordering documents or in requesting bibliographic searches on a specific topic should call the Document Handling and Information Service at (202) 512-6000 or fax a request to (301) 258-4066. An order form and mailing list request form are included in the back of this document; single copies of the products are free of charge.



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Abbreviations

AFMD	Accounting and Financial Management Division
AIMD	Accounting and Information Management Division
ANS	Alaskan North Slope
APA	Alaska Power Administration
AVLIS	atomic vapor laser isotope separation
BCLLWC	Boyd County Low-Level Waste Monitoring Committee
BPA	Bonneville Power Administration
CDC	Centers for Disease Control
CNG	compressed natural gas
CRADA	cooperative research and development agreements
DOD	Department of Defense
DOE	Department of Energy

DOT	Department of Transportation
EIA	Energy Information Administration
EPA	Environmental Protection Agency
ERA	Economic Regulatory Administration
ERMC	environmental restoration management contractor
FERC	Federal Energy Regulatory Commission
ES&H	environment, safety, and health
FOCI	foreign owned, controlled, or influenced
FTC	Federal Trade Commission
FTS	Federal Telecommunications System
GAO	General Accounting Office
GGD	General Government Division
GOCO	government-owned, contractor-operat

Managing DOE: Further Review Needed of Suspensions of Security Clearances for Minority Employees (Letter Report, 12/08/94, GAO/RCED-95-15).

ABSTRACT: From fiscal years 1989 through 1993, the Department of Energy (DOE) suspended 425 security clearances for contractor employees at its Albuquerque, Savannah River, and Oak Ridge Operations Offices.

At each of these locations, GAO found that the clearances of African-Americans, Hispanics, or American Indians were suspended more often than would be statistically expected if the suspensions had been randomly distributed across racial/ethnic groups. DOE does not monitor suspensions of minority groups' security clearances and was unaware of the statistical disparities. GAO believes that DOE needs to further evaluate why these disparities are occurring.

Professional Audit Review Team: Performance Evaluation of the Energy Information Administration (Chapter Report, 12/94, GAO/PART-95-1).

BACKGROUND: GAO reviewed the results of the Professional Audit Review Team's (PART) evaluation of the Energy Information Administration (EIA) for the period October 1992 through June 1994.

FINDINGS: GAO found that: (1) most recipients of EIA reports were confident in using the factual data in the reports and were satisfied with the reports' content; (2) 83 percent of the recipients stated that the reports were useful as sources of basic facts and for maintaining trend information; (3) only 13 to 20 percent of the recipients stated that the reports were useful for conducting investment analysis; (4) 15 to 23 percent of the recipients believed that the reports were timely for investment analysis purposes; (5) a majority of the recipients believed that the reports would be more useful if they were available sooner; (6) EIA improved the quality of the data contained in its Underground Gas Storage Report by extending the data reporting date by 10 days; (7) the National Energy Modeling System has allowed EIA to enhance its ability to represent and analyze alternative energy policies; (8) EIA has provided training and technical information to its technical monitors; and (9) EIA could reduce its operating costs by $5.8 million by performing more of its support services inhouse.

Managing DOE: The Department of Energy Is Making Efforts to Control Litigation Costs (Letter Report, 11/22/94, GAO/RCED-95-36).

ABSTRACT: The Department of Energy (DOE) has not kept centralized data on the costs it reimburses contractors for outside litigation; however, available data indicate that DOE spent about $40 million in fiscal year 1992 on costs linked to the legal defense of current and former contractors. Most costs were for legal fees, travel and administrative expenses, and consultant fees incurred by outside law firms hired by the contractors. These costs, however, were poorly controlled because DOE lacked effective criteria spelling out what costs it would reimburse. As a result, DOE was being billed at higher rates than other federal agencies for professional legal fees, travel, word processing, and photocopying. Furthermore, legal bills were being reimbursed with little or no departmental oversight. DOE has begun to strengthen its control over these costs. In particular, DOE issued specific cost guidelines and instituted procedures for periodically reporting all litigation costs. DOE is also establishing an audit function to enable it to conduct a detailed review of the bills it receives for legal services. Finally, DOE is trying to consolidate cases involving multiple contractors and law firms to improve case management and cut costs.

DOE Contractor's Recreational Costs (Correspondence, 09/30/94, GAO/RCED-94-313R).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the costs for recreational activities for contractor employees at the Department of Energy's (DOE) Oak Ridge facilities for fiscal years 1992 through 1994. GAO noted that (1) the management and operating contractor continued to charge recreational costs to the government as allowed by its contract; (2) the contractor spent over $513,000 for recreational activities in fiscal years 1992 and 1993 and over $181,000 in the first 9 months of fiscal year 1994; (3) the contractor charged recreational costs to three separate accounts; (4) recreation expenses included balls, game officials, facility rentals, and prizes and awards; and (5) to reduce costs in fiscal year 1995, the contractor has eliminated one company-sponsored golf tournament and will require its volleyball and softball teams to pay for the costs of officials.

Energy Management: Department of Energy's Efforts to Manage Overtime Costs Have Been Limited (Letter Report, 09/27/94, GAO/RCED-94-282).

ABSTRACT: The Department of Energy (DOE) direct overtime costs for federal employees almost doubled from $15.5 million to $30.4 million in 1992. DOE has paid overtime for everything from carpet installation to the transport and escort of special nuclear materials. DOE's efforts to manage overtime and minimize costs have been minimal. First, written justifications for overtime are often vague and reviewed only by the employees' immediate supervisors. Thus, some questionable overtime, such as driving DOE officials to the airport from their homes on weekends, continues without scrutiny to ensure that this work is essential or cost-effective. Second, although federal agencies may require that employees take compensatory time rather than receive pay for overtime, DOE does not require them to take compensatory time. Finally, contrary to DOE's policy, employees' annual leave is not always planned to minimize the use of overtime. In some cases, employees took annual leave, worked several regular hours, and then worked overtime after regular working hours.

OMB's High-Risk Program: Comments on the Status Reported in the President's Fiscal Year 1995 Budget (Letter Report, 09/20/94, GAO/AIMD-94-136).

ABSTRACT: GAO examined the Office of Management and Budget's (OMB) update of its high-risk program, as presented in the President's fiscal year 1995 budget submission. For the 1995 budget submission, OMB decided to delete 26 areas from the program. GAO disagrees with OMB's deletion decision in three areas—contract administration controls at the Defense Department, the Energy Department's weapons complex reconfiguration, and staffing at the Bureau of Prisons. Of the 84 active areas on OMB's high-risk list, GAO disagrees with OMB's progress assessment for three areas—the Federal Employees Health Benefits Program, Superfund program controls, and financial management at the Treasury Department.

Managing DOE: Government Property Worth Millions of Dollars Is Missing (Testimony, 09/19/94, GAO/T-RCED-94-309).

ABSTRACT: GAO's work on property management at the Department of Energy (DOE) facilities has led to several conclusions. First, a substantial amount of DOE property is missing, probably more than the $74 million

identified in GAO's April 1994 report on 20 major DOE contractors, including the contractor at Rocky Flats. Second, many weaknesses plague DOE contractors' property management systems, including inadequate property-tracking data bases and a lack of physical protection of DOE's property from theft. Third, DOE has not provided enough oversight of the contractors' property management. For example, many contractors do not have approved property management systems. GAO recognizes that DOE is taking steps to strengthen property management. Although GAO believes that these changes may help, it will take the Department many years of continual management attention to adequately address all of the complex property management problems it faces.

DOE Management: Contract Provisions Do Not Protect DOE From Unnecessary Pension Costs (Chapter Report, 08/26/94, GAO/RCED-94-201).

ABSTRACT: The Department of Energy (DOE) funds the employer retirement contribution for about 18,300 University of California employees who work at DOE's three laboratories. Before revisions were made in October 1992, no limits were placed on the amount of DOE's pension fund contributions and the university was not required to obtain DOE approval of changes to pension benefits. Although the University of California retirement plan reached full funding in 1986, the university regents continued to require employer contributions until November 1990. This report examines (1) whether DOE can recover unneeded pension fund payments and (2) whether the provisions in the revised contracts will allow DOE to control its future pension costs and prevent unneeded payments. GAO recommends the renegotiation of several contract provisions to minimize future payments and better protect the government's interest.

Energy Management: Modest Reforms Made in University of California Contracts, but Fees Are Substantially Higher (Chapter Report, 08/25/94, GAO/RCED-94-202).

ABSTRACT: The Energy Department (DOE) provides the University of California about $2.5 billion a year for research and development at the Los Alamos, Lawrence Livermore, and Lawrence Berkeley Laboratories. In the past, these contracts contained many special, nonstandard clauses that reduced or eliminated DOE's authority to direct the university's actions and contributed to management problems that led to losses of millions of dollars' worth of government property, excessive subcontracting costs, and the loss of classified documents. In 1992, DOE and the University of

California negotiated new 5-year contracts. This report discusses (1) DOE's efforts to add standard clauses typical of DOE's other contracts and eliminate requirements that weakened DOE's authority, (2) the compensation that DOE negotiated for the current contracts, and (3) the proposed changes in contracting policy announced by DOE in February 1994 that may apply to these contracts with the University.

Energy Management: Payments in Lieu of Taxes for DOE Property May Need to Be Reassessed (Letter Report, 07/18/94, GAO/RCED-94-204).

ABSTRACT: The Atomic Energy Commission and its successor agencies—the Energy Research and Development Administration and the Department of Energy (DOE)—acquired a large property inventory nationwide. Most of this property was acquired decades ago for the Manhattan Project and subsequent nuclear weapons development. The Commission was authorized to compensate communities for the loss of tax revenues when such properties were removed from the local tax rolls. Such compensation is termed "payment in lieu of taxes" because federally owned property is not subject to state and local taxation. The Commission was also authorized to make payments in excess of the taxes if a community experienced "special burdens" as a result of these activities. In response to congressional concerns that some communities hosting DOE facilities are receiving compensation while others are not, this report (1) identifies which communities have received payments and how the amounts were determined, (2) assesses whether a 1987 revision of DOE's payment policy was consistent with the Atomic Energy Act of 1946, and (3) examines the potential effect of DOE's 1983 changes to the payment policy.

Managing DOE: Tighter Controls Needed Over the Department of Energy's Outside Litigation Costs (Testimony, 07/13/94, GAO/T-RCED-94-264).

ABSTRACT: The Department of Energy (DOE) has spent millions of dollars to defend its contractors against lawsuits but has not kept track of total costs and has been lax in reviewing bills submitted by law firms, including those for travel, meals, and other expenses. DOE's only attempt to collect data on litigation costs showed that the agency spent about $31 million in fiscal year 1992 on outside legal fees. However, significant other costs, such as the development and operation of litigation data bases—averaging more than $8 million annually—were excluded from DOE's estimate. DOE has yet to establish criteria directing contractors to seek discounted fees

or to set limits on billings by law firms for administrative expenses. Also, DOE has not adequately reviewed legal bills to ensure that they are justified. These shortcomings have caused DOE to pay more than was necessary for contractor litigation. The need for strong DOE controls will become more critical as the details of past radiation experiments on humans continue to be disclosed. These revelations will likely produce more lawsuits against the operators of DOE facilities, thus increasing legal costs for the agency.

DOE's Property Management (Correspondence, 07/11/94, GAO/RCED-94-249R).

BACKGROUND: GAO reviewed the Department of Energy's (DOE) management and operating contractor's control over government-owned property at the agency's Oak Ridge Operations Office. GAO noted that (1) the contractor does not have a system for tracking and accounting for government-owned property or ensuring that subcontractors have procedures to manage and control government-owned property despite contractual and regulatory requirements for such a system; (2) the contractor has not corrected systematic problems since 1988, and Oak Ridge has not ensured that the contractor has acted on recommended corrective actions; (3) Oak Ridge does not know which subcontractors have government-owned property in their possession, the value of the property, or whether there are proper safeguards in place; and (4) these problems persist because DOE does not give them priority attention.

Uranium Enrichment: Activities Leading to Establishment of the U.S. Enrichment Corporation (Fact Sheet, 06/27/94, GAO/RCED-94-227FS).

ABSTRACT: This fact sheet reviews the transition of the Department of Energy's uranium enrichment program to a new government corporation—the United States Enrichment Corporation. GAO discusses (1) the transfer of property and other assets to the Corporation, including uranium inventories and accounts receivable; (2) decisions leading to the preparation of the Corporation's financial statements, pursuant to the requirements of the Atomic Energy Act of 1956; (3) the Corporation's contracting practices, including the extent to which the Corporation complied with federal acquisition regulations; and (4) the Corporation's personnel policies, such as salary and staffing requirements.

Energy Management: Use of Uncosted Balances to Meet Budget Needs (Fact Sheet, 06/06/94, GAO/RCED-94-232FS).

ABSTRACT: This fact sheet provides information on uncosted obligations held by the Department of Energy's (DOE) management and operating contractors. Uncosted obligations are budget authority that DOE has obligated to its contractors for goods and services that have not yet been provided and for which costs have therefore not yet been incurred. At the end of fiscal year 1993, uncosted obligations totaled about $9 billion for DOE-funded programs. DOE's management and operating contractors held about $5.7 billion of these uncosted obligations. This report discusses the uncosted balances reported by contractors at nine DOE facilities. GAO identified uncosted balances related to ongoing programs that could be used to offset fiscal year 1995 budget needs. GAO focused on the funds in two areas—environmental restoration and waste management and defense programs. These program areas had the largest uncosted balances—$1.8 billion and $2 billion, respectively—at the end of fiscal year 1993.

Title 2—UEA Discontinued Operations (Correspondence, 04/28/94, GAO/AIMD-94-108R).

BACKGROUND: GAO reviewed the Department of Energy's Uranium Enrichment Activity's (UEA) reporting of property and equipment losses from discontinued operations. GAO noted that: (1) UEA complied with mandated accounting and financial reporting requirements in its June 1993 financial statements and (2) the net book value of the property and equipment estimated at about $501 million should be recognized as a loss, since these assets no longer benefit UEA, and UEA is unlikely to recover any portion of the cost of the property.

Department of Energy: Status of DOE's Property Management Program (Fact Sheet, 04/07/94, GAO/RCED-94-154FS).

ABSTRACT: This fact sheet provides information on the management of Department of Energy (DOE) property by the 20 major contractors involved in defense-related activities. GAO focuses on (1) the amount of missing property being reported to DOE by these contractors in their most recent property inventory reports, (2) the extent to which DOE has approved contractors' property management systems, and (3) examples of weaknesses reported in the most recent DOE review of the contractors' property management systems.

Department of Energy: Challenges to Implementing Contract Reform (Letter Report, 03/21/94, GAO/RCED-94-150).

ABSTRACT: This report to the Secretary of Energy summarizes GAO's views on her Contract Reform Team's 1994 report entitled Making Contracting Work Better and Cost Less. The Reform Team acknowledges that weaknesses in the Department of Energy's (DOE) "contracting practices are significant and systemic." In GAO's view, the Team's recommendations—more than 45 in all—represent a bold step forward for DOE and address many of GAO's long-standing concerns. These suggestions include using performance-based measures to evaluate contractors, providing more incentives to motivate behavior, and reducing strict reliance on cost contracts. The challenge facing DOE's leadership will be to develop a strategy for making these reforms a reality. Overcoming workforce and management information weaknesses—essential prerequisites for change—is a major hurdle for DOE.

Energy Management: Inadequate DOE Monitoring of Contractors' Acquisitions From Affiliates (Testimony, 03/17/94, GAO/T-RCED-94-128).

ABSTRACT: The Department of Energy's (DOE) monitoring of its main contractors at the Savannah River Site in South Carolina—Westinghouse and Bechtel—do not ensure that DOE pays fair and reasonable prices for acquisitions of goods and services from the contractors' subsidiaries. GAO's review of Westinghouse and Bechtel acquisitions uncovered inadequate cost controls and performance problems, unallowable and questionable costs, and inappropriate contract approvals and contract payments. Poor Westinghouse management and limited DOE internal controls were contributing factors. DOE has not complied with its own regulations requiring competition for acquisitions from affiliates. Furthermore, Westinghouse and Bechtel have been able to acquire items from its subsidiaries without the same level of scrutiny that DOE would apply if the purchases were made from nonaffiliated third parties. Various DOE studies point out that problems with acquisitions from affiliates exist elsewhere in the agency.

Government Contractors: Measuring Costs of Service Contractors Versus Federal Employees (Letter Report, 03/10/94, GAO/GGD-94-95).

ABSTRACT: The federal government spent nearly $12 billion in fiscal year 1992 on advisory and service contracts. An analysis of studies done by GAO, Departments of Energy, and Defense suggests that cost comparisons can

be useful in deciding how to acquire needed services in the most cost-effective way. Federal agencies are not now required to do such cost comparisons in deciding whether to contract for advisory and assistance services. Although the nine studies GAO reviewed indicate that it may be less expensive in some cases if services were done by federal workers rather than by contractors, all of the studies had limitations. The studies also varied in the extent to which they incorporated all possible cost factors. In addition to cost, GAO believes that agencies should consider other factors in deciding whether to contract out for advisory services, including quality, timeliness, the technical skills of federal employees, and the duration of the work to be done. GAO notes that a potential conflict exists between the administration's objectives of (1) giving federal managers the flexibility to obtain needed services from the best possible source and (2) downsizing the federal workforce.

Department of Energy: The Property Management System at the Rocky Flats Plant Is Inadequate (Chapter Report, 03/01/94, GAO/RCED-94-77).

ABSTRACT: A recent audit of government-owned property at the Rocky Flats nuclear weapons plant in Colorado has revealed nearly $30 million in missing items that range from computers to forklifts, a problem attributed to inadequate contractor management and poor Department of Energy (DOE) oversight. Contrary to departmental guidance, DOE has never investigated the circumstances surrounding the missing property. Moreover, the contractor's property management system is inadequate. The plant's property tracking system database is incomplete and contains inaccurate serial numbers for some items. Inappropriate changes have been made to the database, including the deletion of entire records. Finally, the controls over how plant property is retired are inadequate. GAO found that DOE, contrary to its own regulations, has allowed the contractor to operate without written property management procedures and has not approved the contractor's property management system. In addition, DOE has not ensured timely correction of previously flagged property management weaknesses.

Energy Management: DOE Can Improve Distribution of Dollars Awarded Under SBA's 8(a) Program (Letter Report, 02/23/94, GAO/RCED-94-28).

ABSTRACT: Contract dollars awarded by the Department of Energy (DOE) under the Small Business Administration's 8(a) program are concentrated

among a small number of firms. Nearly 60 percent of DOE's $1 billion worth of active contracts in April 1992 went to 13 firms. This concentration is due, in part, to the fact that DOE, like other federal agencies, is authorized to direct noncompetitive 8(a) awards to firms that it specifies. In addition, DOE's Oak Ridge Office has contributed to the concentration of awards by combining several procurements into a single larger procurement, resulting in the award of only one contract rather than several. Although these practices are not prohibited, DOE is missing an opportunity to have a positive impact on a large number of firms. Agencies are required to award 8(a) contracts competitively if the estimated prices of the contracts exceed certain thresholds. DOE, however, has kept price estimates for contracts artificially low and structured contracts so that their estimated prices fall below the thresholds specified for competition. This practice has further contributed to the concentration of 8(a) contract dollars among a small number of firms.

Energy Management: Inadequate DOE Monitoring of Contractors' Acquisitions From Affiliates (Chapter Report, 02/11/94, GAO/RCED-94-83).

ABSTRACT: The Department of Energy's (DOE) monitoring of its main contractors at the Savannah River Site in South Carolina—Westinghouse and Bechtel—do not ensure that DOE pays fair and reasonable prices for acquisitions of goods and services from the contractors' subsidiaries. GAO's review of Westinghouse and Bechtel acquisitions uncovered inadequate cost controls and performance problems, unallowable and questionable costs, and inappropriate contract approvals and contract payments. Poor Westinghouse management and limited DOE internal controls were contributing factors. DOE has not complied with its own regulations requiring competition for acquisitions from affiliates. Furthermore, Westinghouse and Bechtel have been able to acquire items from its subsidiaries without the same level of scrutiny that DOE would apply if the purchases were made from nonaffiliated third parties. Various DOE studies point out that problems with acquisitions from affiliates exist elsewhere in the agency. GAO summarized this report in testimony before the Congress, See: Energy Management: Inadequate DOE Monitoring of Contractors' Acquisitions From Affiliates (GAO/T-RCED-94-128, Mar. 17, 1994) by Victor S. Rezendes, Director of Energy and Science Issues, before the Senate Committee on Governmental Affairs (10 pp.).

DOE's National Laboratories: Adopting New Missions and Managing Effectively Pose Significant Challenges (Testimony, 02/03/94, GAO/T-RCED-94-113).

ABSTRACT: Since the end of the Cold War, the Department of Energy's (DOE) nine national laboratories—Argonne, Brookhaven, Idaho National Engineering Laboratory, Lawrence Berkeley, Lawrence Livermore, Los Alamos, Oak Ridge, Pacific Northwest, and Sandia—have come under increasing pressure to apply their talents to a variety of national issues, ranging from improving U.S. economic competitiveness to cleaning up the environment. Experts and agency officials agree that the laboratories' missions need to be clarified if their resources are to be used most effectively. GAO testified that if DOE is to develop a more effective management strategy, it must better define the laboratory missions and strengthen its working relationship with the laboratories.

Federal Contracting: Weaknesses Exist in NSF's Process for Awarding Contracts (Letter Report, 01/31/94, GAO/RCED-94-31).

ABSTRACT: Weaknesses exist in the National Science Foundation's (NSF) process for awarding competitive contracts. Among the 10 competitive contracts it reviewed, GAO discovered that NSF, when soliciting for proposals, sometimes did not clearly describe the work needed or identify the specific items that it would consider in evaluating the offerors' proposals. In addition, NSF sometimes either changed or improperly scored evaluation factors during the evaluation process. These weaknesses were mainly due to NSF's overall lack of emphasis of contracting activity, including inadequate internal oversight of the contract award process. Insufficient guidance for preparing solicitations and evaluating offerors' proposals were also contributing factors. In addition, GAO discovered shortcomings in NSF's process for awarding noncompetitive contracts. Although agencies are allowed to obtain services from a sole source rather than through competition, the agency must justify the decision to do so in writing. The justification documents what efforts were taken to identify other potential offerors and what steps the agency plans to take to remove barriers to future competition. NSF did not meet either of these requirements for 6 of 11 noncompetitive contracts it awarded during fiscal years 1990 and 1991.

Energy Management: Controls Over the Livermore Laboratory's Indirect Costs Are Inadequate (Chapter Report, 11/16/93, GAO/RCED-94-34).

ABSTRACT: In fiscal year 1991, the Lawrence Livermore Laboratory, a government research and development facility, incurred about $436 million in indirect costs—outlays that are not directly linked to a particular program, such as costs for facility maintenance or accounting services. In response to congressional concerns that indirect costs were not being adequately managed or controlled, GAO examined the adequacy of (1) financial management controls over indirect costs at the Livermore Laboratory and (2) Department of Energy oversight of the laboratory's indirect costs. GAO makes recommendations intended to stop direct costs from being included in the laboratory's overhead pool and to develop adequate internal controls that will ensure the reliability of the laboratory's financial information.

Energy Management: Additional Uncosted Balances Could Be Used to Meet Future Budget Needs (Letter Report, 10/26/93, GAO/RCED-94-26).

ABSTRACT: In congressional testimony last year (GAO/T-RCED-92-41), GAO recommended that the Department of Energy (DOE) develop a system to ensure that uncosted obligations—commitments that DOE has made to contractors for goods and services that have yet to be delivered—are analyzed as part of its budget formation process. Since then, DOE has made significant strides towards effective evaluation of its uncosted balances as part of its budget preparation process. The absence of supporting accounting systems and unfamiliarity with the new definitions, however, have produced inaccuracies in the data included in DOE's first uncosted balances report. These inaccuracies limit the information's usefulness in making budget decisions. Developing the systems to accumulate the information in the format needed for this report would improve the reliability of the information reported. In addition, revising the definition of what should be reported as approved work scope could help spot delayed projects that have accumulated more funding than can be used effectively during the following fiscal year. DOE proposed using about $1 billion of the uncosted balances to meet fiscal years 1993 and 1994 budget needs. GAO believes, however, that the additional amounts of the uncosted balances could be used to reduce the budget amount needed for fiscal year 1994. In addition, procedures requiring the prompt release of encumbered amounts not needed to settle completed and terminated

purchase orders and contracts would help ensure that such amounts are not reported as encumbrances in the future.

DOE Management: Funds for Maintaining Contractors' Operations Could Be Reduced and Better Controlled (Letter Report, 10/25/93, GAO/RCED-94-27).

ABSTRACT: Prefinancing refers to the budget authority that contractors maintain to continue operations at Department of Energy (DOE) facilities in the event of a funding lapse at the start of a fiscal year. At the end of fiscal year 1992, prefinancing funds among DOE contractors totaled $219 million. GAO concludes that the amount of prefinancing funds can be cut and, for some contractors, eliminated. DOE allows its contractors to keep enough money on hand to finance operations for 20 days. GAO questions the need for this funding because (1) other money is available that can be used to continue operations if funding lapses; (2) any lapses in funding are likely to be shorter than 20 days; and (3) some essential activities, such as running the nuclear weapons facilities, can legally be continued for a limited time without appropriated funds. DOE's prefinancing funds are not adequately controlled. For example, prefinancing funds are not specifically requested and justified in DOE's annual budget. Furthermore, DOE does not require the contractors to maintain separate balances for prefinancing funds, allowing them instead to mingle prefinancing funds with operating or construction funds. In addition, DOE has used prefinancing money to offset budget cuts rather than to bridge funding lapses.

Nuclear Waste: Overhead Costs at the Department of Energy's Savannah River Site (Fact Sheet, 10/25/93, GAO/RCED-94-13FS).

ABSTRACT: The Department of Energy's (DOE) contract management, including contractors' overhead costs, continues to be a topic of concern to both the agency and the Congress. GAO has been examining overhead costs billed by Westinghouse, the contractor in charge of DOE's facilities at the Savannah River Site in South Carolina. This fact sheet provides information on overhead costs (1) budgeted under Westinghouse's contract for fiscal year 1993 and the allocation of these costs to Westinghouse's various organizational units at Savannah River and (2) budgeted and incurred by Savannah River's Environmental Restoration Program, including overhead costs distributed to certain environmental restoration projects.

Financial Management: Energy's Material Financial Management Weaknesses Require Corrective Action (Chapter Report, 09/30/93, GAO/AIMD-93-29).

ABSTRACT: In fiscal year 1992, the Department of Energy (DOE) paid $16 billion to universities and private companies to run government-owned facilities involved in research and development and other activities. Serious problems with contractor operations at these facilities have led to gross mismanagement of government property and funds, prompting the Office of Management and Budget and GAO to flag this area as one at highest risk for waste, fraud, and abuse. As part of a series of GAO management reviews of major federal departments and agencies, this report examines DOE's efforts to (1) oversee its contractors' financial operations and (2) correct the financial management material weaknesses cited in its Federal Managers' Financial Integrity Act report.

Department of Energy: Management Problems Require a Long-Term Commitment to Change (Letter Report, 08/31/93, GAO/RCED-93-72).

ABSTRACT: The Congress and others have criticized the Department of Energy (DOE) for inadequately managing its vast nuclear weapons production complex and for allowing contractors, which now dominate agency activities, to elude management and financial oversight. DOE admits these weaknesses and, to its credit, has launched a broad range of initiatives to overcome them. Yet the management challenges facing DOE are so significant that fundamental change will come slowly. Strong leadership is needed to sustain the momentum and to build an effective management structure. Two of the most important management changes have been (1) DOE's reorganization to instill accountability and (2) procurement reforms to bolster contractor oversight. But fundamental DOE weaknesses, including poor communication with field offices and inadequate technical and administrative skills among DOE workers, are undermining the success of these initiatives. Aggressive action to overcome these shortcomings is especially important as the incoming DOE leadership begins grappling with problems plaguing DOE organizational structure and contract management.

Energy Management: Systems Contracting Weaknesses Continue (Letter Report, 06/23/93, GAO/RCED-93-143).

ABSTRACT: GAO reported in 1989 that the Department of Energy (DOE) was encouraging the use of "systems contracts" without any proof that these contracts were cost-effective. Systems contracts are used to procure commonly used items, such as office, industrial, and laboratory supplies, as needed rather than purchasing the items in bulk and storing them in inventory. GAO revisited this issue and discovered that DOE's San Francisco Operations Office has yet to implement GAO's earlier recommendations to help ensure that the use of systems contracting is in the government's best interest. As a result, since January 1990, contractors at DOE's Stanford Linear Accelerator Center and the Lawrence Berkeley Laboratory have spent more than $2 million on office supplies without any assurance that the contracts are cost-effective. The San Francisco Operations Office also has not determined whether controls over systems contracts are adequate at the Stanford and Berkeley facilities. During a 9-month period in 1992, Stanford and Berkeley spent more than $540,000 on office supplies with no guarantee that the prices paid were competitive with prices from other suppliers.

Performance Evaluation of the Energy Information Administration (Chapter Report, 06/93, GAO/PART-93-1).

ABSTRACT: The Congress created the Professional Audit Review Team (PART)—composed of representatives from leading statistical and analytical agencies, including GAO—to evaluate periodically whether the Energy Information Administration has been doing its work in an independent, objective, and professional manner. This report, which covers the period June 1990 through September 1992, examines the usefulness of energy information reports and the adequacy of contract management, including various aspects of the technical monitor program. The report also looks at action the Energy Information Administration has taken on earlier PART recommendations.

Inspectors General: Appointments and Related Issues (Fact Sheet, 05/28/93, GAO/AFMD-93-74FS).

ABSTRACT: This fact sheet provides information on federal inspectors general at various government agencies. Specifically, GAO discusses (1) inspector general appointments and related issues, (2) Department of Energy inspector general resources devoted to the audit of Federal Energy Regulatory Commission activities, and (3) agency and inspector general

resources and staff in the 34 entities with inspectors general appointed by the head of the agency.

Energy Management: DOE Has Improved Oversight of Its Work for Others Program (Letter Report, 04/07/93, GAO/RCED-93-111).

ABSTRACT: In a February 1989 report (GAO/RCED-89-21), GAO pointed out significant weaknesses in the Department of Energy's (DOE) controls over the work it carries out for others, primarily other federal agencies. DOE does this work, called Work for Others, either directly or through its contractors. The program cost about $2 billion in fiscal year 1992. This report discusses (1) the problems identified in the 1989 report, (2) DOE's actions in response to these problems, and (3) other problems needing corrective actions. GAO focuses on the activities of DOE's San Francisco Field Office and its two largest facilities—the Lawrence Livermore National Laboratory and the Lawrence Berkeley Laboratory—which are run for DOE by the University of California.

Title 7—Prepayments (Correspondence, 04/02/93, GAO/AFMD-93-57R).

BACKGROUND: Pursuant to an agency request, GAO clarified a Title 7 requirement that agencies record intragovernmental billings as deferred items if payment is made prior to the receipt of goods and services. GAO noted that: (1) intragovernmental payments often occur before an agency receives goods or services when the agency processes a bill through the Treasury On-Line Payment and Collection System; (2) recording a deferred item helps ensure that immediate recognition of the payment occurs, there are necessary controls to facilitate adequate monitoring and adjustment of all transactions where payment is made prior to receipt of items ordered, and year-end reported expenses and deferred items are accurate; and (3) although recognition of a deferred item is not necessary to comply with the Title 7 requirement, the Nuclear Regulatory Commission should provide a periodic listing to management on the status of open items and implement year-end cutoff procedures to reduce its expense account.

TQM Implementation at Energy (Correspondence, 03/30/93, GAO/GGD-93-21R).

BACKGROUND: GAO reviewed the Department of Energy's (DOE) implementation of total quality management (TQM). GAO noted that (1) 58 percent of the 19 Energy facilities surveyed are implementing various phases of TQM; (2) as DOE invested more effort in TQM activities, TQM

implementation matured; (3) over two-thirds of the DOE facilities reported positive benefits from TQM, but almost one-third believed it was too soon to judge TQM benefits; (4) reported benefits increased as maturity increased; and (5) 9 of 21 potential barriers to TQM were moderate to very major problems for 39 percent or more of the total federal respondents.

Energy Management: Improving Cost-Effectiveness in DOE's Support Services Will Be Difficult (Letter Report, 03/05/93, GAO/RCED-93-88).

ABSTRACT: The Department of Energy (DOE) contracts extensively for a wide variety of support services, including management, administrative, and technical activities. GAO reported in August 1991 (GAO/RCED-91-186) that contracting for this work can cost substantially more than using federal employees. GAO also indicated that many of these contracts had been awarded, not on the basis of comparisons between federal and contract costs, but solely because DOE did not have enough staff to do the work. This report discusses (1) what actions have been taken in response to GAO's earlier recommendations, (2) obstacles DOE has encountered in trying to improve the cost-effectiveness of support services, and (3) whether steps have been taken to overcome these barriers.

Energy Management: High Risk Area Requires Fundamental Change (Testimony, 02/17/93, GAO/T-RCED-93-7).

ABSTRACT: The Department of Energy's (DOE) contract management philosophy has put billions of dollars in yearly contractors' services at risk. These problems date back to the Manhattan Project of the 1940s, when the government, desirous of enlisting the private sector in developing the atomic bomb, gave contractors wide latitude in running the government's weapons research and production facilities. Today, DOE is trying to overcome this legacy of inadequate oversight by giving contractors more incentive to act responsibly while simultaneously increasing oversight of contractors' activities. GAO applauds these efforts but recognizes that they will take years to implement. With the new administration, DOE has a chance to build on the momentum from recent changes in contract management. The new administration needs to continue demanding greater contractor accountability. Improved information and financial management systems, along with better-trained technical staff, will also be needed to ensure accountability. Finally, changes of this magnitude will take long-term commitment and sustained leadership to implement.

Energy Management: Types of Allowable and Unallowable Costs Incurred Under Two DOE Contracts (Fact Sheet, 01/29/93, GAO/RCED-93-76FS).

ABSTRACT: This fact sheet provides information on costs that the Department of Energy's (DOE) management and operating contractor, Martin Marietta Energy Systems, incurred while running DOE's facilities at Oak Ridge, Tennessee; Paducah, Kentucky; and Portsmouth, Ohio. Martin Marietta has two contracts with DOE, one involving Oak Ridge and the other involving the Kentucky and Ohio facilities. GAO identified some limited instances in which costs incurred were determined to be unallowable, including Martin Marietta employee memberships in trade, business, and professional organizations. Compared with the more than $1.8 billion spent on the two contracts in fiscal year 1991, however, the amounts of the unallowable costs were relatively small, and either DOE or Martin Marietta plans to take appropriate corrective action. GAO also found that the most recent allowability-of-costs report, an examination of fiscal year 1991 costs prepared by Martin Marietta's internal audit staff, included a broad discussion of unallowable cost issues and identified some unallowable costs. The two previous reports did not identify any unallowable costs. Furthermore, Martin Marietta gave GAO data showing that it had incurred more than $2.2 million in costs to run DOE facilities in 1992 that had not been charged to the government because Martin Marietta considered them unallowable. These costs included relocation expenses, community relations expenses, incentive compensation for executives, country club dues, and entertainment costs. Also, in fiscal year 1991, Martin Marietta charged more than $320,000 in allowable recreational costs, including $7,300 for golf balls and $20,000 for a Christmas party.

Federal Contracting: Cost-effective Contract Management Requires Sustained Commitment (Testimony, 12/03/92, GAO/T-RCED-93-2).

ABSTRACT: Loose administration of government contracts has resulted in contractors getting bonuses for mediocre performance and billing agencies for millions of dollars in unallowable or questionable costs, such as employee parties, tickets to sporting events, and liquor. Civilian agencies now spend about $55 billion per year on contracts. Although contractors can play a key role in delivering needed services, once contracts are awarded federal agencies often give short shrift to overseeing the quality and cost of completed work. More thorough and timely contract auditing could help minimize the government's

vulnerability to waste, fraud, and abuse. Currently, a significant backlog exists of audits of costs incurred by contractors. Civilian agencies could also beef up their audit effectiveness by clarifying which agency has responsibility for contractor audits, clearly spelling out unallowable and questionable costs, and making clear the government's position on the use of contractor discounts. At the core of the contracting problems, GAO has discovered a lack of senior management attention to agency contracting. In some cases, senior officials have remained blissfully ignorant of waste and abuse because agencies have no way of flagging contracting problems. In other instances, senior officials have neither made managers accountable for effective contract administration nor committed themselves to correcting contracting problems that have surfaced.

TVA Bond Sales (Correspondence, 10/23/92, GAO/RCED-93-43R).

BACKGROUND: Pursuant to a congressional request, GAO provided information on the extent to which minority and regional bond underwriters that participated in the Tennessee Valley Authority (TVA) bond sales were actually located in the TVA service delivery area. GAO noted that (1) the number of underwriting firms considered in the TVA region differed depending on the definition used; (2) between October 1989 and July 1992, TVA conducted seven bond sales totaling $12.8 billion; (3) underwriters located in the seven-state region, but not in the TVA service area, were responsible for 7.6 percent of sales, and underwriters located within the TVA service area were responsible for 4.6 percent; (4) four of seven bond sales included the participation of a single minority firm that was responsible for sales ranging from $5 million to $20 million; (5) another regional minority firm was responsible for $5 million in a January 1992 bond sale, $9 million in a November 1989 bond sale, and $10 million in an October 1989 bond sale; and (6) neither of the 2 minority firms were located in the area actually served by TVA.

Department of Energy: Project Management at the Rocky Flats Plant Needs Improvement (Letter Report, 10/16/92, GAO/RCED-93-32).

ABSTRACT: Various studies of the Department of Energy's (DOE) Rocky Flats Plant in Colorado have highlighted numerous management weaknesses that have affected some projects at the plant. GAO identified two ongoing projects—the supercompactor and upgrades to the plant's low-level waste transfer system—that have experienced massive cost growth during the past 4 years. In both cases, project managers did not properly oversee the early stages of the projects' development. Both the

plant contractor and DOE have taken steps to address some of these weaknesses, but GAO is concerned that these actions may not be comprehensive enough to resolve all the problems. Although the plant contractor has developed corrective action plans and has made progress implementing them, the plans were based only on the contractor's business management review study and may not include some urgently needed corrective actions. DOE officials have said that they have addressed the problems cited in previous management studies but have not yet developed a comprehensive corrective action plan with detailed tasks and completion milestone dates. DOE officials believe that such a plan is necessary and have designated someone to draft one. The agency, however, still needs to define the plan's scope and set a date when the plan should be finished.

Department of Energy: Better Information Resources Management Needed to Accomplish Missions (Chapter Report, 09/29/92, GAO/IMTEC-92-53).

ABSTRACT: Although the Department of Energy (DOE) relies heavily on information in dealing with everything from massive environmental damage to unsafe nuclear weapons facilities, staff throughout the agency are not always receiving the information they need. This situation could increase the likelihood that the public will be unnecessarily exposed to dangerous contaminants; the safety and health of workers will not be adequately protected; outdated weapons components will continue to be manufactured and discarded; and facilities, secrets, and employees will not be adequately protected from threats. In addition, DOE is wasting money developing and running information systems that overlap or duplicate existing systems. These problems exist because DOE has not (1) implemented a strategic information resources management (IRM) planning process that focuses information resource investments on achieving strategic mission objectives and (2) exercised adequate management control to ensure that IRM activities are conducted in accordance with the law. Underlying DOE's ineffective IRM planning and management control is a lack of top management attention to managing information.

UEC **Net Present Value** (Correspondence, 09/23/92, GAO/RCED-92-294R).

BACKGROUND: Pursuant to a congressional request, GAO provided information on cash flow projections for the proposed Uranium Enrichment Corporation (UEC), as envisioned by proposed legislation. GAO

noted that UEC adjusted Department of Energy estimates for revenue and expenses associated with uranium enrichment operations from 1993 through 2011 to project the present value of UEC net operating income to be about $5.2 billion; (2) any estimate of earnings from uranium enrichment operations is subject to major uncertainties because of the inherent difficulty of determining the amount and selling price of enrichment services; and (3) UEC computed the net present value of UEC payments to the Treasury for loans, royalties, leases, and dividends to be about $3.2 billion, but that projection is also subject to major uncertainties.

UEC Cash Flow Projection (Correspondence, 09/17/92, GAO/RCED-92-292R).

BACKGROUND: Pursuant to a congressional request, GAO evaluated a consultant's cash flow projections for the uranium enrichment corporation that would be created by proposed legislation. GAO noted that the projections: (1) incorporate several assumptions that would not apply to the corporation, as envisioned by the proposed legislation; and (2) use revenue and cost figures that do not reflect recent program changes. GAO also noted that its revised projection: (1) uses more recent Department of Energy revenue and cost estimates; (2) makes adjustments to reflect recent changes in the proposed legislation; and (3) shows that, from 1993 through 2005, the corporation will return to the government revenues totaling about $3.8 billion.

Department of Energy: Status of Reporting Compliance for DOE's Major System Acquisitions (Fact Sheet, 08/24/92, GAO/RCED-92-204FS).

ABSTRACT: This fact sheet provides information on the Department of Energy's (DOE) compliance with documentation and reporting requirements for its Major System Acquisitions, which are defined as projects critical to fulfilling an agency's mission. GAO looks at whether certain key documents for each Major System Acquisition have been approved by senior DOE management. These documents include a mission needs statement, a project plan, and an independent cost estimate. Approval of these documents is required before or at the start of a project, which begins upon the completion of the conceptual design.

DOE Management: Impediments to Environmental Restoration Management Contracting (Letter Report, 08/14/92, GAO/RCED-92-244).

ABSTRACT: The Department of Energy's (DOE) proposed new contracting approach for cleaning up contaminated nuclear weapons sites would rely on environmental restoration management contractors, who would assume sole responsibility for handling the cleanup effort. Although DOE has set several important goals for this contracting effort, constraints such as the lack of qualified cleanup personnel would make it hard to achieve them. GAO believes that evaluation should be a major component in the implementation of the 5-year pilot tests at DOE sites in Fernald, Ohio, and Hanford, Washington. DOE has not, however, established final criteria for measuring the concept's success, identified the information needed to evaluate the concept, or established a timetable for conducting the evaluation. In addition, DOE has not yet hired all the staff needed to oversee the pilot tests or developed plans to train current staff in their new oversight duties.

Energy Management: Entertainment Costs Under DOE's Uranium Enrichment Production Contract (Fact Sheet, 07/30/92, GAO/RCED-92-230FS).

ABSTRACT: As part of a contract to produce enriched uranium at government-owned facilities in Paducah, Kentucky, and Portsmouth, Ohio, Martin Marietta Energy Systems was allowed to bill the government for more than half a million dollars in entertainment and liquor costs. The final tab included golf outings, musical performances, receptions, tours, and a charter boat ride. These parties were thrown for utility executives who are either current or potential customers for the government's enriched uranium. GAO questions the legality of spending federal dollars on alcohol and the presence of bureaucrats and contractor employees at such social gatherings. GAO is waiting to hear from the Department of Energy's Office of General Counsel as to why these costs were allowed.

Grant Management: Benefits and Burdens of Increasing NSF Financial Reporting Requirements (Briefing Report, 07/13/92, GAO/RCED-92-201BR).

ABSTRACT: The National Science Foundation (NSF), an independent federal agency established more than 40 years ago to bolster scientific progress in the United States, funded more than 25,000 active research grants in 1992, mainly at universities. Because of congressional concerns about NSF's ability to effectively manage its growing volume of grants—NSF

relies heavily on grantee institutions to ensure that funds are spent in accordance with federal guidelines—this fact sheet provides information on NSF's financial reporting requirements. GAO discusses (1) NSF financial reporting requirements, (2) the extent to which NSF grant funds have been shifted between budget categories and whether large individual budget shifts were used appropriately under current NSF guidelines, and (3) the views of NSF and university officials on increased financial reporting requirements.

Nuclear Waste: Questionable Uses of Program Funds at Lawrence Livermore Laboratory (Letter Report, 05/28/92, GAO/RCED-92-157).

ABSTRACT: Lawrence Livermore National Laboratory spent the bulk of its $32.5 million in nuclear waste program funding on scientific and technical work. About $1.5 million of this money, however, went for apparently unrelated research that the Department of Energy (DOE) authorized even though such funds may be used only for purposes spelled out in the Nuclear Waste Act. DOE, in allowing at least two of its other laboratories to use nuclear waste funds for independent research, did not ensure that the laboratories limited the use of these funds to activities covered by the act. While Livermore's yearly spending on scientific and technical work has fallen by about 60 percent since 1989, the expense of managing this declining workload is expected to decrease only by about 17 percent. Livermore officials attribute the relatively small decline in management costs to the need to meet basic regulatory and project control requirements. DOE has not determined if more efficient ways exist to manage the limited work assigned to Livermore, such as transferring this work to another project contractor. Finally, Livermore awarded all of its project subcontractors on a noncompetitive basis without adequate justification, bringing into question whether the contracts were reasonably priced or other qualified contractors were fairly considered. Livermore is now instituting new procurement policies and procedures that may correct this procurement weakness.

DOE Management: Better Planning Needed to Correct Records Management Problems (Letter Report, 05/08/92, GAO/RCED-92-88).

ABSTRACT: This report examines how the Department of Energy (DOE) responded to a 1988 National Archives and Records Administration evaluation of DOE's record management program, which involves some of the most important and extensive scientific information in existence. That evaluation cited major problems affecting every phase of record

management—from creation and maintenance through disposal. GAO looks at (1) the potential impact of these deficiencies on DOE operations, (2) how DOE has responded to the evaluation, and (3) additional actions DOE should take to improve its responsiveness to the recommendations.

Energy Management: Vulnerability of DOE's Contracting to Waste, Fraud, Abuse, and Mismanagement (Chapter Report, 04/10/92, GAO/RCED-92-101).

ABSTRACT: The Department of Energy (DOE) spends about 90 percent of its budget—more than $17 billion in fiscal year 1990—on contractors, primarily those managing nuclear weapons facilities. Persistent weaknesses in DOE's oversight and management of contractors have led GAO to designate DOE contracting as one of 16 government programs at high risk for waste, fraud, abuse, and mismanagement. This vulnerability arises mainly from DOE's long-standing management approach of indemnifying nearly all contractor costs and not exercising adequate oversight over contractor operations and activities. This report discusses in detail (1) problems resulting from DOE's approach to contracting and (2) DOE's recent efforts to address these problems.

NSF Review: Review Process for the National Science Foundation's Science and Engineering Pipeline Study (Testimony, 04/08/92, GAO/T-RCED-92-24).

ABSTRACT: The National Science Foundation's (NSF) 1987 study entitled "The Science and Engineering Pipeline" was approved by several layers of NSF officials, and the internal review the study received appears to have followed NSF procedures. Information reported in a September 1991 NSF letter, however, may have given the impression that the study received more formal external review than was the case. GAO contacted nine individuals mentioned in the letter and discovered that eight of them had not provided formal review in the form of written or oral comments. When GAO brought this matter to the attention of NSF officials, they said that they used the word "review" to mean "professional interaction," which includes discussions within the professional community on concepts and topics related to the study.

Energy Management: Systematic Analysis of DOE's Uncosted Obligations Is Needed (Testimony, 03/24/92, GAO/T-RCED-92-41).

ABSTRACT: GAO testified on how the Department of Energy (DOE) analyzes uncosted obligations when formulating its budget requests. Generally, uncosted obligations are obligations that DOE has made to contractors for goods and services that have not yet been provided and for which no costs have been incurred. Thus, costs relating to the obligations will be incurred in the future. GAO discusses (1) the size of DOE's growing uncosted obligations, (2) their significance in the budget formulation process, (3) why the uncosted balances exist, and (4) DOE's analysis of uncosted obligations for its fiscal year 1993 budget request.

Nuclear Health and Safety: Increased Rating Results in Award Fee to Rocky Flats Contractor (Letter Report, 03/24/92, GAO/RCED-92-162).

ABSTRACT: In 1989 GAO pointed out problems in the Department of Energy's (DOE) award fee process and recommended that DOE restructure it to reduce the level of discretion exercised in making a final determination. Although DOE tried to improve the process, the final outcome of the first award fee determination for EG&G—the contractor now running the Rocky Flats Plant in Colorado—indicates that some of the same problems persist. Despite findings of significant deficiencies and marginal environmental, safety, and health performance, the contractor's overall performance was deemed "good" and slightly more than $1.7 million was awarded. This increase was possible through discretion exercised by the fee determination official with the concurrence of DOE's Defense Program Office, suggesting that the process remains subjective. Furthermore, the fee was awarded without clearly showing that at least 51 percent of the fee was based on environmental, safety, and health performance—a DOE requirement.

Energy Management: Better Federal Oversight of Territories' Oil Overcharge Funds Needed (Chapter Report, 02/21/92, GAO/RCED-92-24).

ABSTRACT: About $68 million from two oil overcharge cases was made available to five U.S. territories—American Samoa, Guam, the Mariana Islands, Puerto Rico, and the Virgin Islands. In response to congressional concerns about whether these funds have been spent appropriately, this report examines (1) the amount of funds the territories have spent and whether this amount has been accurately reported to the Congress and (2) whether the Departments of Energy and Health and Human Services have adequate monitoring procedures and have taken steps to ensure that

the territories' use of oil overcharge funds is in accordance with legal requirements.

Tennessee Valley Authority: Issues Surrounding Decision to Contract Out Construction Activities (Letter Report, 01/31/92, GAO/RCED-92-105).

ABSTRACT: The Tennessee Valley Authority (TVA) has traditionally used its own employees to do most of its engineering, construction, and modification work. In a significant departure from its long-standing reliance on an in-house construction work force, TVA announced a new policy in May 1991 to contract out all construction and major modification work. Concerns were raised that this decision could mean that thousands of TVA employees would lose their jobs. This report examines the (1) basis for TVA's decision to contract out construction and major modification work; (2) rationale for certain procedures TVA has followed in complying with the government in the Sunshine Act; (3) effect of the decision on TVA employees, including the number and type of employees affected; and (4) effect of the decision on TVA operations.

Energy Management: DOE Has An Opportunity to Improve Its University of California Contracts (Letter Report, 12/26/91, GAO/RCED-92-75).

ABSTRACT: The Department of Energy (DOE) is negotiating extensions of its management and operating contracts with the University of California for the Lawrence Livermore National Laboratory, the Lawrence Berkeley Laboratory, and the Los Alamos National Laboratory. GAO believes that these contract renegotiations afford DOE an opportunity to institute changes that will help ensure that the three laboratories are run effectively and efficiently. Under its current contracts with the University, DOE lacks the authority to direct changes to the laboratories' procurement and property management policies and procedures. The nonstandard procurement and property management clauses in the current contracts have precluded timely corrective action in these areas and have permitted costly procurement actions that do not comply with DOE's policies and procedures. In addition, the university's contracts include a number of other nonstandard clauses that can further limit DOE's effective oversight of the contracts, such as the nonstandard allowable costs clause. GAO strongly supports DOE's (1) goal of including as many standard clauses in the contracts as possible and (2) decision to have any deviations fully justified and approved by DOE's top management.

Energy Management: Tightening Fee Process and Contractor Accountability Will Challenge DOE (Chapter Report, 10/30/91, GAO/RCED-92-9).

ABSTRACT: The Department of Energy's (DOE) contracting practices are 1 of 16 areas in the federal government that GAO has identified as highly vulnerable to waste, fraud, abuse, and mismanagement. As part of a broader GAO effort to examine DOE's process for formally reviewing and assessing the performance of management and operating contractors, this report focuses on those contractors operating under cost-plus-award-fee contracts with DOE's Albuquerque Field Office. GAO selected this office because it administers contracts for four large defense materials production plants—Kansas City, Mount, Pantex, and Pinellas—as well as the contract for the Waste Isolation Pilot Plant, in which DOE plans to store radioactive waste. GAO discusses (1) the effectiveness of DOE's use of performance objectives to set expectations and evaluate contractor performance, (2) the effectiveness of DOE's use of data from on-site reviews to evaluate contractor performance for award fee purposes, and (3) the effect of DOE's new award fee regulations on the performance evaluation and award determination process.

Comments on Proposed Legislation to Restructure DOE's Uranium Enrichment Program (Testimony, 10/29/91, GAO/T-RCED-92-14).

ABSTRACT: GAO testified on legislative proposals that address the future of the Department of Energy's (DOE) uranium enrichment program, established to promote national energy security goals while recovering the government's costs. Each of the three bills and a proposal by Representative Sharp would help establish clear objectives for the enrichment program and allow the new corporation to operate more efficiently than does DOE's current program. The proposals would also help resolve several long-term issues that challenge the program's future, including the need to pay billions of dollars for environmental cleanup and decommissioning at the same time that competition is expected to increase. In addition, GAO believes that all the proposals would be strengthened by including a $3 billion cost recovery goal, rather than forgiving all past recovered costs or relying on unspecified dividends, uncertain stock sales, or undefined rent or royalty payments that may not materialize.

Energy Management: Contract Audit Problems Create the Potential for Fraud, Waste, and Abuse (Letter Report, 10/11/91, GAO/RCED-92-41).

ABSTRACT: Is the Department of Energy (DOE) adequately monitoring and overseeing its contracting process by performing contract audits, and what is the impact or potential impact to the government when they are not performed? Even though DOE contracted out about $17.6 billion in fiscal year 1990 for goods and services, no assurance exists that oversight and control of contract expenditures, through contract auditing, will deter and detect potential fraud, waste, and abuse. Beginning in April 1990, DOE's Office of Inspector General (OIG) reported that DOE managers lack adequate OIG assurance that the management and operating contractors are operating economically, efficiently, and in the government's best interest. The assurance is lacking because the OIG's cyclical audit coverage of DOE's largest management and operating contractors has been incomplete due to staffing and resource limitations. In addition, because nonmanagement and operating contracts can go unaudited for many years, DOE does not know whether it paid a fair and reasonable price for such contracts or whether the costs claimed were accurate and allowable. GAO's review revealed many instances involving millions of dollars in which the government was potentially overbilled, or the amounts paid or claimed were questionable. Unallowable costs claimed included such items as alcoholic beverages, unauthorized spouse travel, and registration for golf tournaments.

Energy Management: DOE Actions to Improve Oversight of Contractors' Subcontracting Practices (Letter Report, 10/07/91, GAO/RCED-92-28).

ABSTRACT: The Department of Energy's Contractor Purchasing System Review Program oversees the extensive subcontracting activities of DOE's management and operating contractors. This report describes the subcontracting deficiencies occurring at DOE, identifies shortcomings in the program, and discusses the corrective actions that DOE has committed to take in response to GAO findings. Management and operating subcontracts, totaling more than $5 billion in 1990, are vulnerable to waste, fraud, and abuse—a fact that is reflected in DOE's own reviews. Poor procurement practices of contractors, coupled with inadequate DOE oversight, have led to excessive subcontractor costs for the government. DOE's reviews have shown that management and operating contractors often do not ensure that subcontractor prices are fair and reasonable and

that contractors are also restricting competition by inappropriately using sole-source purchases.

DOE Management: Improvements Needed In Oversight of Procurement and Property Management Practices at the Lawrence Livermore National Laboratory (Testimony, 08/20/91, GAO/T-RCED-91-88).

BACKGROUND: GAO discussed management issues relating to the University of California's operation of the Lawrence Livermore National Laboratory. GAO noted that: (1) the laboratory did not have adequate controls to ensure that property in its custody was safeguarded against theft, unauthorized use, or loss; (2) because control over secret documents in the laboratory's custody was inadequate and decentralized, management could not readily ensure that secret information was being effectively managed or controlled; (3) the laboratory inappropriately used sole-source purchases, did not comply with Department of Energy (DOE) review and approval requirements, and did not give adequate attention to subcontractor costs; (4) the laboratory had leased up to 58 passenger vehicles on a sole-source basis from the university, since capital funds were unavailable to purchase the vehicles and the General Services Administration did not have the types of vehicles required; (5) in several instances, the university overbilled the laboratory for vehicles that had been returned to the university or which remained in service at the laboratory; (6) the laboratory leased vehicles without obtaining DOE authorization; and (7) DOE and the laboratory have disagreed on the appropriate vehicle fleet size for at least 5 years, mainly because of inadequate DOE oversight of laboratory purchases and property and the mutuality concept included in certain clauses in the DOE contract with the university. GAO believes that there is a need for substantial improvements in laboratory management and DOE oversight of the management effort.

Energy Management: Using DOE Employees Can Reduce Costs for Some Support Services (Letter Report, 08/16/91, GAO/RCED-91-186).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the Department of Energy's (DOE) support service contracting practices, focusing on: (1) the overall cost and use of such contracts; (2) the adequacy of controls to ensure that DOE support service contracts are cost-effective; and (3) whether work performed on selected support service contracts could be performed less expensively by federal personnel.

FINDINGS: GAO found that: (1) in fiscal year 1990, DOE obligated $522 million for support service contracts, a 56-percent increase from 1986; (2) the Office of Management and Budget's (OMB) guidance on support service contracting does not uniformly require agencies to compare contract and in-house performance costs to determine which is more cost-effective; (3) DOE awarded few support service contracts on the basis of cost comparisons, since it could not get additional staff to perform the work in-house because of personnel ceilings; (4) although DOE guidelines for managing support service contracts limit the duration of each contract to 5 years, the guidelines do not limit how long an activity can be performed under successive support service contracts; (5) DOE policy does not require cost comparisons or establish other controls over assessing whether DOE support service contracts are cost-effective; (6) for 11 of the 12 contracts reviewed, DOE use of support service contracts cost $5 million more than federal employees would have cost; and (7) recent actions indicate that OMB may be willing to consider requests for additional staff if the requests adequately justify claimed cost savings.

DOE Management: DOE Needs to Improve Oversight of Subcontracting Practices of Management and Operating Contractors (Testimony, 08/01/91, GAO/T-RCED-91-79).

BACKGROUND: GAO discussed the adequacy of the Department of Energy's (DOE) management controls to prevent fraud, waste, and abuse in subcontracting, focusing on: (1) subcontracting deficiencies at the Lawrence Livermore National Laboratory; and (2) DOE's Contractor Purchasing System Review Program's effectiveness in identifying and correcting subcontracting deficiencies. GAO noted that: (1) DOE reviews show that contractors did not adequately perform and document basic analyses needed to ensure that subcontract prices are fair and reasonable; (2) inadequate DOE oversight and contractors' poor procurement practices have led to excessive subcontract costs; (3) the Lawrence Livermore National Laboratory had such serious systemic weaknesses as inappropriate sole-source purchases, noncompliance with DOE review and approval requirements, and inadequate attention to subcontract costs; (4) the Contractor Purchasing System Reviews have identified internal control weaknesses in contractors' purchases of systems and the award of subcontracts after work has begun; and (5) such limitations in the DOE program as insufficient headquarters oversight, inadequate follow-up by field offices, and resistance to limit contractor purchasing authority have restricted DOE's ability to identify all significant procurement weaknesses. GAO believes that millions of dollars may be wasted each year due to the

extent of overpricing associated with the procurement weaknesses identified.

DOE Management: Management Problems at the Three DOE Laboratories Operated by the University of California (Testimony, 07/31/91, GAO/T-RCED-91-86).

BACKGROUND: GAO discussed management issues relating to the University of California's operation of three Department of Energy (DOE) laboratories. GAO noted that: (1) weaknesses in the University of California's operation of two DOE laboratories included inadequate controls for managing properties, protecting classified documents, and ensuring that subcontractors were not subject to foreign influence; (2) laboratories had weak property accountability controls, resulting in serious inventory losses, and management lacks a system of accountability controls; (3) two laboratories did not comply with DOE regulations and procedures for determining whether contractors were owned, controlled, or influenced by foreign entities, increasing the potential for compromising national security; (4) DOE did not ensure that procedures regarding foreign interests or document classification were in place to protect the government's interest, and DOE headquarters and field offices did not adequately review on-site contractor operations; (5) there were concerns as to whether DOE had adequate resources to carry out its oversight responsibilities; (6) DOE could not effectively manage the contracts for the university-operated laboratories, because the contracts included clauses that provided DOE with less authority than the government regulations; (7) the DOE Inspector General noted a number of weaknesses in the agency's oversight and management practices of university-operated laboratories; and (8) DOE recognized the management weaknesses and has taken action to improve overall contract management.

Comments on Proposed Legislation to Restructure DOE's Uranium Enrichment Program (Testimony, 04/10/91, GAO/T-RCED-91-33).

BACKGROUND: GAO discussed proposed legislation that would restructure the Department of Energy's (DOE) uranium enrichment program as a government corporation. GAO noted that: (1) DOE had limited ability to act quickly in a competitive enrichment market and to set flexible prices; (2) DOE did not recover total costs of its uranium enrichment program through revenues; (3) each of the proposed bills sanctioned an earlier DOE writeoff of unrecovered costs and eliminated all

or most of the remaining unrecovered costs; (4) DOE estimated that the corporation could generate over $3 billion in gross income by the year 2000 and over $8 billion by 2008; (5) the cost of related environmental cleanup and decommissioning would discourage privatization of the corporation and could also threaten its survival; (6) DOE estimated in 1988 that decommissioning costs for the three uranium enrichment plants could total $3 billion; (7) DOE did not completely identify or characterize the waste sites at enrichment plants, and past experience indicated that those costs increased as more information became available; (8) DOE did not set aside any revenues for future cleanup costs; and (9) the administration's 1992 budget requested funds for completing the demonstration of the DOE atomic vapor laser isotope separation process but did not contemplate funding program activities, such as site selection. GAO believes that the proposed bills would: (1) establish clear objectives for the enrichment program; (2) allow it to operate in a more businesslike manner in a competitive market; and (3) address longstanding problems.

Energy Management: DOE Needs to Better Implement Conflict-of-Interest Controls (Chapter Report, 12/26/90, GAO/RCED-91-15).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the Department of Energy's (DOE) controls over conflicts of interest in subcontracts awarded by its research centers, focusing on: (1) DOE policies and procedures for identifying and avoiding conflicts of interest and (2) implementation of those policies.

FINDINGS: GAO found that: (1) DOE regulations relied on subcontractors' self-reporting for identifying possible conflicts of interest; (2) DOE research centers did not properly implement conflict-of-interest determination policies and procedures; (3) DOE's Albuquerque Operations Office improperly allowed the Los Alamos and Sandia research centers to review subcontracts for conflicts of interest resulting in three cases of possible conflicts of interest; (4) Albuquerque failed to verify the accuracy of subcontractors' certifications; (5) Sandia's practices did not follow DOE regulations or approved procedures; (6) Los Alamos and Sandia failed to document their conflict-of-interest decisions; (7) DOE headquarters and the Albuquerque Operations Office failed to exercise proper oversight to ensure avoidance of conflict of interest; and (8) as a result of this review, Albuquerque began to bring its practices into compliance with DOE regulations. In addition, GAO noted that it was unable to test whether policies and procedures were effective, since Albuquerque had not properly implemented them.

Comments on H.R. 2480, The Uranium Enrichment Reorganization Act (Testimony, 10/11/90, GAO/T-RCED-91-3).

BACKGROUND: GAO discussed proposed legislation that would restructure the Department of Energy's (DOE) uranium enrichment program as a government corporation. GAO noted that: (1) it supported restructuring the program as a government corporation and establishing a decommissioning fund; (2) such legislation should include a specific goal to recover past government costs associated with the program; (3) the costs of cleaning up any new facilities should rest with the new corporation; (4) the Congress should set a specific repayment amount consistent with DOE projections of the corporation's expected earnings over the next 10 to 15 years, rather than rely on the receipt of unspecified dividends or on uncertain stock sales; (5) unforeseen licensing problems, environmental and decommissioning costs, and increased competition could inhibit the feasibility of privatization; and (6) the government should pay its share of the cleanup costs associated with the production of uranium under government contracts.

Comments on Smith Barney's Uranium Enrichment Analysis (Testimony, 07/31/90, GAO/T-RCED-90-101).

BACKGROUND: GAO discussed an independent assessment of the Department of Energy's (DOE) uranium enrichment program. GAO noted that the assessment concluded that: (1) the enrichment program should be restructured as a government corporation and operate on a competitive basis; (2) DOE could reduce total costs by making various adjustments and policy decisions; and (3) the government should retain responsibility for environmental and decommissioning costs associated with enriched uranium production. GAO also noted that: (1) past unrecovered costs have hindered congressional initiatives to restructure the program as a government corporation; (2) DOE government customers were responsible for about $764 million of the $9.6 billion in unrecovered costs; (3) a $5.7 billion write-off was not necessary to ensure competitiveness, since DOE priced its enrichment services to recover $3 billion over the next 12 years and projected $3 billion in net income by 2000; (4) restructuring the enrichment program would require the establishment of a fund to decommission the three existing nuclear fuel plants; and (5) several factors concerning the establishment of a private sector enterprise involved licensing old facilities, increased competition, and the resolution of liabilities.

Comments on Smith Barney's Uranium Enrichment Analysis (Testimony, 07/31/90, GAO/T-RCED-90-101A).

BACKGROUND: GAO discussed restructuring the Department of Energy's uranium enrichment program as a government corporation. GAO found that before a private company is formed: (1) the new corporation should bear the costs of modernizing old plants and cleaning up and decommissioning existing facilities; (2) the Congress should consider restructuring legislation to ensure repayment of $3 billion in past costs rather than relying on unspecified dividends and stock sales; and (3) restructuring legislation should require the government to match the corporation's fund contributions.

Energy Management: DOE Controls Over Contractors' Use of FTS Are Inadequate (Letter Report, 07/17/90, GAO/RCED-90-184).

BACKGROUND: Pursuant to a congressional request, GAO examined the Department of Energy's (DOE) controls over contractors' use of the Federal Telecommunications System (FTS).

FINDINGS: GAO found that: (1) DOE policies make supervisors responsible for preventing misuse of the FTS lines assigned to their units; (2) DOE has neither developed procedures to guide supervisors in carrying out this function nor provided information about the calls made over their FTS lines; (3) DOE cannot develop more effective controls over FTS use until it establishes a Privacy Act system of records for its detailed information; and (4) DOE could devise a cost-effective method for reviewing FTS telephone calls and for following up on possible unofficial calls.

Consequences and Implications of the Nuclear Age

Nuclear Materials: Plutonium Storage at DOE's Rocky Flats Plant (Letter Report, 12/29/94, GAO/RCED-95-49).

ABSTRACT: The Department of Energy (DOE) faces a variety of important, unresolved safety problems with plutonium storage at the Rocky Flats Plant in Colorado. When the plant was shut down in 1989, DOE intended to restart operations in a few months, and plutonium was left in place or packaged for short-term storage. However, the operations were never restarted, and the plutonium stayed where it was, raising concerns about plutonium liquid leaking from pipes and tanks, fire hazards, and worker exposure to plutonium. Although DOE has efforts under way to address these problems, important decisions, such as what to do with the plutonium residues, have yet to be made. As a result, estimating the time frames and the total cost for resolving the concerns is difficult. In any event, fully implementing DOE's programs will take many years and will likely cost hundreds of millions of dollars.

Nuclear Nonproliferation: U.S. International Nuclear Materials Tracking Capabilities Are Limited (Letter Report, 12/27/94, GAO/RCED/AIMD-95-5).

ABSTRACT: The Department of Energy's (DOE) computerized Nuclear Materials Management and Safeguards System has significant limitations that impair its ability to track the international movement of nuclear materials. GAO is concerned that DOE's new tracking system will not overcome existing limitations that are often caused by nonsystem problems. For example, the system lacks data that are not required to be reported under the U.S. agreements for cooperation. GAO believes that DOE should have explored systems alterations and asked its intended users to try to mitigate some of these limitations. In addition, because DOE has not followed good systems development practices, it cannot be sure that the system will be cost-effective or will even fulfill the needs of its major users.

Nuclear Waste: Change in Test Strategy Sound, but DOE Overstated Savings (Letter Report, 12/27/94, GAO/RCED-95-44).

ABSTRACT: After pursuing for a decade a strategy for underground tests with nuclear wastes in the Waste Isolation Pilot Plant—a proposed repository for the disposal of transuranic wastes located near Carlsbad, New Mexico—the Department of Energy (DOE) announced in October 1993 that it was abandoning these tests in favor of laboratory-based tests. DOE

claimed that this change would save about $139 million by January 2000 and would allow DOE to begin disposing of waste by 1998. The general consensus among scientists, experts, and regulators is that DOE's decision to discontinue its planned underground tests with transuranic wastes is sound. However, GAO questions DOE's projected cost savings. For instance, DOE lacks documentation for many elements of the estimated cost savings. GAO also concludes that DOE will not be able to open the plant by 1998 instead of 2000. Numerous unresolved issues could affect when DOE can eventually begin disposing of wastes in the facility. For example, it is unclear whether DOE's schedule gives the Environmental Protection Agency enough time to review DOE's procedures and decide if DOE has complied with the Agency's regulatory requirements for disposing of transuranic wastes in a repository.

Nuclear Waste: DOE's Management and Organization of the Nevada Repository Project (Letter Report, 12/23/94, GAO/RCED-95-27).

ABSTRACT: The Department of Energy (DOE), in 1991, hired a contractor—at an estimated cost of $1 billion over 10 years—to engineer, develop, and manage a system for permanently disposing of highly radioactive waste. The centerpiece of this disposal system is a geological repository for disposing of waste. One of DOE's original objectives for hiring this contractor was to reduce the number of participants working on the disposal program, including consolidating under the contractor much of the program work and the investigation of the suitability of Yucca Mountain, Nevada, as a repository site. This report examines whether DOE is effectively using the contractor—TRW Environmental Safety Systems, Inc., a subsidiary of TRW, Inc.—to manage the project. Specifically, GAO reviews DOE's efforts to consolidate participants' activities, streamline decision-making, and cut costs at the repository project. GAO also assesses DOE's recent initiative to reorganize project management.

Nuclear Cleanup: Difficulties in Coordinating Activities Under Two Environmental Laws (Letter Report, 12/22/94, GAO/RCED-95-66).

ABSTRACT: In cleaning up waste sites within its nuclear weapons facilities, the Department of Energy (DOE) must comply with two major environmental laws—the Resource Conservation and Recovery Act of 1976 and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980. The first law regulates the management of facilities that treat, store, or dispose of hazardous wastes and the cleanup of hazardous wastes released from such facilities. The second law governs

the cleanup of inactive waste sites—that is, sites where disposal is no longer occurring. This report discusses (1) what DOE has done to coordinate its cleanup activities under the two acts, (2) what problems with coordination continue and how cleanup activities have been affected, and (3) how DOE plans to improve the coordination of cleanup activities in the future.

Health and Safety: Status of Federal Efforts to Disclose Cold War Radiation Experiments Involving Humans (Testimony, 12/01/94, GAO/T-RCED-95-40).

ABSTRACT: The federal agencies and an independent advisory committee have been working diligently to disclose the details of U.S. government experiments that exposed human beings to radiation during the Cold War era. Although the federal effort is still evolving and thousands of experiments have been identified, it now appears that the full extent of these radiation experiments may never be known because of difficulty locating and analyzing all pertinent documents describing experiments that occurred 30 to 50 years ago. Furthermore, agencies have used inconsistent definitions for their searches and, for the most part, have not verified the accuracy of these searches. As a result, federal agencies are having trouble identifying persons involved in the radiation experiments. Thus, it may prove impossible to achieve one of the major objectives of this effort—to contact the subjects of the experiments or their relatives. Moreover, concern is growing that the advisory committee will not be able to complete its work within the current 1-year time frame. The committee is having problems satisfying its original charters and has done little of the ethical and scientific analysis of Cold War experiments called for in its charter. Despite these difficulties, the committee has decided to expand the overall scope of its work.

Nuclear Health and Safety: Further Improvement Needed in the Hanford Tank Farm Maintenance Program (Letter Report, 11/08/94, GAO/RCED-95-29).

ABSTRACT: At the Department of Energy's (DOE) Hanford facility in Washington State, a backlog in routine maintenance increases the risk of a significant leak or accident involving underground storage tanks that hold 61 million gallons of high-level radioactive waste. Some progress has been made in strengthening the tank farm maintenance program. Westinghouse, a contractor at Hanford, believes that a new maintenance approach has helped to reduce the number of uncompleted maintenance projects from

1,969 to 1,517. However, the remaining backlog of projects is still too great to guarantee that needed maintenance will be done in a timely manner. Tank farm maintenance personnel estimate that to respond promptly to maintenance needs, the number of projects awaiting completion should not exceed 3 months' work—about 300 projects, or less than one-fifth of the current backlog. Westinghouse can further improve its maintenance program by reducing the time spent preparing and closing out maintenance projects. Westinghouse has started to experiment with procedures that other DOE sites use to reduce delays, and these experiments show promise. Westinghouse can also improve its program by gathering and analyzing more information about how it processes maintenance projects.

Nuclear Safety: International Assistance Efforts to Make Soviet-Designed Reactors Safer (Letter Report, 09/29/94, GAO/RCED-94-234).

ABSTRACT: The United States and other nations have serious concerns about the safety of 58 Soviet-designed nuclear power reactors in Russia and eastern Europe. These reactors do not meet international nuclear safety standards. Twenty-five of these reactors, because they are of the oldest design, pose the greatest safety risk; 15 of these reactors are the type that exploded at Chernobyl in 1986. In July 1992, the Group of 7—the major industrialized nations—announced a multimillion-dollar plan to improve the safety of these nuclear power reactors. This report describes the (1) goals and scope of the international assistance, (2) United States' planned and ongoing assistance efforts, (3) impact of the assistance provided, and (4) potential for closing the highest-risk reactors.

Human Experimentation: An Overview on Cold War Era Programs (Testimony, 09/28/94, GAO/T-NSIAD-94-266).

ABSTRACT: During World War II and the Cold War, the Department of Defense (DOD) and other national security agencies conducted extensive radiological, chemical, and biological research programs. Precise information on the number of tests, experiments, and participants is unavailable, and the exact numbers may never be known. However, GAO has identified hundreds of experiments in which hundreds of thousands of people were used as test subjects. These experiments often involved hazardous substances, such as radiation, blister and nerve agents, biological agents, and LSD. In some cases, basic safeguards to protect people were either not in place or were not followed. Some tests and

experiments were done in secret, and others involved the use of people without their knowledge or consent or their full knowledge of the risks involved. The effects of the experiments are hard to determine. Although some participants suffered immediate injuries, and some died, in other instances health problems did not surface until 20 or 30 years later. It has proven difficult for participants in government experiments between 1940 and 1974 to pursue claims because little centralized information is available to prove participation or determine whether health problems resulted from the testing. Government experiments with human subjects continue today. For example, the Army uses volunteers to test new vaccines for malaria, hepatitis, and other exotic diseases. Since 1974, however, federal regulations have required (1) the formation of institutional review boards and procedures and (2) researchers to obtain informed consent from human subjects and ensure that their participation is voluntary and based on knowledge of the potential risks and benefits.

Nuclear Waste: Comprehensive Review of the Disposal Program Is Needed (Letter Report, 09/27/94, GAO/RCED-94-299).

ABSTRACT: Recognizing that problems exist with its program to permanently dispose of highly radioactive waste, the Department of Energy (DOE) recently undertook several review initiatives, including a review of past criticisms of the program, a financial and management evaluation of the repository project, and a public inquiry into the continued storage of waste by utilities at their nuclear power reactors after January 1988. Taken together, these efforts are too narrow in scope and are not objective enough to provide the thoughtful and thorough program evaluation that is needed. Many members of the Congress have called for a broad-based independent review of nuclear waste management, including the management of highly radioactive waste from civilian nuclear power reactors. This report discusses why GAO continues to believe that a comprehensive independent review of the disposal program and basic policies guiding the program is needed. Without a comprehensive independent review of the disposal program and its policies, millions—if not billions—of dollars could be wasted in implementing the program over the next several decades.

Health and Safety: Protecting Workers and the Public Continues to Challenge DOE (Testimony, 09/22/94, GAO/T-RCED-94-283).

ABSTRACT: This testimony focuses on the efforts of the Department of Energy (DOE) to protect the health and safety of the workers at its facilities

and the people living in neighboring communities. GAO recently issued two reports on two key functions of DOE's Office of Environment, Safety, and Health—health surveillance and nuclear safety oversight. GAO discusses the findings and recommendations of these reports and the steps DOE has taken in response, as well as outstanding issues concerning the transition of DOE's facilities to regulation by the Occupational Safety and Health Administration.

Nuclear Health and Safety: Consensus on Acceptable Radiation Risk to the Public Is Lacking (Letter Report, 09/19/94, GAO/RCED-94-190).

ABSTRACT: Differences exist in the limits on human exposure to radiation set by federal agencies, such as the Nuclear Regulatory Commission and the Environmental Protection Agency, raising questions about the precision, credibility, and overall effectiveness of federal radiation standards and guidelines in protecting public health. Taken together, the radiation standards that have been developed reflect a lack of overall interagency agreement on how much radiation risk to the public is acceptable. GAO found at least 26 different draft or final federal radiation standards or guidelines. Agencies also do not agree on how to calculate radiation protection standards.

Nuclear Cleanup: Completion of Standards and Effectiveness of Land Use Planning Are Uncertain (Letter Report, 08/26/94, GAO/RCED-94-144).

ABSTRACT: During 50 years of nuclear weapons production, the Department of Energy (DOE) and its predecessor agencies have generated huge amounts of radioactive wastes that have contaminated soil and groundwater. As a result, DOE faces a massive, complex, and costly cleanup effort. During the next several years, DOE and the Environmental Protection Agency (EPA) will decide on methods to be used for environmental cleanup at DOE sites. Standards for "how clean is clean enough" and information about future land uses of DOE sites would help in selecting appropriate remedial actions. Past efforts to develop cleanup standards for radioactive substances were unsuccessful. This report determines (1) how cleanup levels are now determined for DOE sites, (2) the status and the likelihood of success of EPA's efforts to develop cleanup standards for radioactive substances, (3) the status of DOE's land use planning efforts, and (4) what hurdles would need to be overcome if land use planning were to be effectively implemented in determining levels of cleanup.

Department of Energy: Management Changes Needed to Expand Use of Innovative Cleanup Technologies (Letter Report, 08/10/94, GAO/RCED-94-205).

ABSTRACT: Although the Energy Department (DOE) has spent a substantial amount of money to develop waste cleanup technology for the nation's nuclear weapons complex, little new technology has found its way into use. Even where new technology has been successfully demonstrated, agency officials have been reluctant to try new approaches, tending instead to choose conventional techniques to clean up their facilities. As a result, opportunities for more effective cleanup solutions may be missed.

Nuclear Waste: Foreign Countries' Approaches to High-Level Waste Storage and Disposal (Letter Report, 08/04/94, GAO/RCED-94-172).

ABSTRACT: Some features of other countries' approaches to nuclear waste disposal may offer insight for the United States, but a variety of economic, political, geographic, and other factors must be considered in deciding whether these features warrant further exploration and possible adaptation to the U.S. program. Governments around the world support the use of geologic repositories as the best method for disposing of highly radioactive waste, but no country has yet built an operational facility. All the countries GAO visited had experienced problems with their waste management programs, and most do not plan to have a repository until 2020 or later. Differences exist between the U.S. and foreign approaches to repository development. For example, all the countries GAO visited have addressed the issue of temporary waste storage, thereby relieving pressure to quickly build a repository. Also, other countries often involve nuclear facilities in their repository development programs and allow waste managers much flexibility in developing their technical and engineering repository concepts. Finally, several countries are exploring the use of long-lived engineered barriers—fabricated components, such as waste containers—for containing radiation in the repositories they are designing.

Independent Evaluation (Correspondence, 07/27/94, GAO/RCED-94-258R).

BACKGROUND: GAO commented on its evaluation of the Department of Energy's (DOE) Yucca Mountain Site Characterization Project. GAO noted that the: (1) scope of its evaluation is limited to selected funding and scheduling issues (2) evaluation should include a determination of the site's suitability as a radioactive waste repository and the amount of funding and time needed to complete a full investigation (3) draft

statement of work places too much emphasis on evaluating issues other entities have previously reviewed (4) earlier work should be used as a basis for analyzing potential problems in the program and (5) narrow scope of the draft statement of work could result in an assessment that may not address many of the project's major issues.

Nuclear Health and Safety: Sites Used for Disposal of Radioactive Waste in Alaska (Fact Sheet, 07/06/94, GAO/RCED-94-130FS).

ABSTRACT: GAO's review of available information on Project Chariot—an experiment conducted in the 1960s by the former Atomic Energy Commission in which radioactive waste was buried in Alaska—suggests that the amount of radioactive material at the site is not harmful to humans. GAO also identified six Army and Air Force installations in Alaska where radioactive materials had either been disposed of or stored on-site. These radioactive materials involved such items as nuclear power reactor cooling water and smoke detectors. In addition, the Naval Arctic Research Laboratory was used by various institutions for research that included the use of radioactive tracers. Amchitka Island, where underground nuclear tests were done from 1965 to 1971, is being monitored by the Energy Department and the Environmental Protection Agency. The Army Corps of Engineers must still determine whether 138 defense facilities no longer owned by the federal government are contaminated by hazardous or radioactive materials and whether remedial action is required. Sites at five other nonfederal facilities that disposed of or stored radioactive materials were also brought to GAO's attention. These involved (1) storage of pipe contaminated with radioactive material resulting from oil drilling and (2) land and ocean disposal of radioactive waste resulting from university research and aircraft manufacturing.

Nuclear Regulation: Action Needed to Control Radioactive Contamination at Sewage Treatment Plants (Testimony, 06/21/94, GAO/T-RCED-94-247).

ABSTRACT: Radioactive materials are sometimes discharged into municipal sewer systems by hospitals, decontamination laundries, research facilities, and manufacturers licensed by the Nuclear Regulatory Commission (NRC). NRC regulations fall short, however, in controlling low-level radioactive wastes being discharged into municipal sewer systems, possibly putting treatment plant workers, plant property, and the general public at risk. During the past decade, at least nine cases of radioactive contamination of sewage sludge have occurred at treatment

plants. One of the most recent was the inadvertent discovery by NRC in 1991 of radioactive contamination at the Southerly Sewage Treatment Plant in Cleveland, Ohio. NRC has concluded that the elevated radiation levels at the site do not pose health or safety risks to plant workers or to the public. The facility has already spent more than $1.5 million for on-site cleanup and a secured fence, and estimates for off-site disposal range as high as $3 billion. The full extent of contamination at other treatment plants nationwide is unknown because (1) NRC has inspected only 15 of the 1,100 licensees that may discharge radioactive material to determine if a concentration problem exists, (2) NRC does not know how many of the estimated 3,000 "agreement state" licensees may have been inspected, and (3) neither NRC nor the Environmental Protection Agency (EPA) requires treatment plants to test for the presence of radioactive materials in sewage sludge. Exposure to treatment plant sludge, ash, and related by-products can occur in a variety of ways. For example, some of the substances are used for agricultural and residential purposes, such as lawn fertilizer. NRC and EPA studies on the health effects of radioactive materials in sewage sludge and ash have been inconclusive.

International Nuclear Analysis (Correspondence, 06/09/94, GAO/AIMD-94-142R).

BACKGROUND: GAO reviewed a subcontract that supports the Department of Energy's (DOE) International Nuclear Analysis Program. GAO noted that: (1) the subcontract is due to expire on June 30, 1994, and DOE plans to make it definite in the near future; (2) the subcontract is for systems development and replacement of the current DOE nuclear material management tracking system; (3) DOE needs to clarify certain contractual items, such as the scope of work, systems acceptance criteria, and remedies for system deficiencies; and (4) DOE needs to ensure that the subcontract adequately protects the government's interest.

Nuclear Safety: Unresolved Issues Could Impair DOE's Oversight Effectiveness (Letter Report, 06/07/94, GAO/RCED-94-129).

ABSTRACT: In April 1993, the Department of Energy (DOE) announced the transfer of the oversight functions of its Office of Nuclear Safety to the Office of Environment, Safety, and Health as part of a broader streamlining of the entire agency. This report reviews DOE's restructuring of nuclear safety oversight and evaluates whether the proposed changes would improve or detract from DOE's ability to ensure nuclear safety. GAO (1) determines the process DOE used in deciding to consolidate the two

offices and (2) identifies issues that could influence the effectiveness of the nuclear safety oversight carried out by the Office of Environment, Safety, and Health.

Nuclear Regulation: Action Needed to Control Radioactive Contamination at Sewage Treatment Plants (Letter Report, 05/18/94, GAO/RCED-94-133).

ABSTRACT: Radioactive materials are sometimes discharged into municipal sewer systems by hospitals, decontamination laundries, research facilities, and manufacturers licensed by the Nuclear Regulatory Commission (NRC). NRC regulations fall short, however, in controlling low-level radioactive wastes being discharged into municipal sewer systems, possibly putting treatment plant workers, plant property, and the general public at risk. During the past decade, at least nine cases of radioactive contamination of sewage sludge have occurred at treatment plants. One of the most recent was the inadvertent discovery by NRC in 1991 of radioactive contamination at the Southerly Sewage Treatment Plant in Cleveland, Ohio. NRC has concluded that the elevated radiation levels at the site do not pose health or safety risks to plant workers or to the public. The facility has already spent more than $1.5 million for on-site cleanup and a secured fence, and estimates for off-site disposal range as high as $3 billion. The full extent of contamination at other treatment plants nationwide is unknown because (1) NRC has inspected only 15 of the 1,100 licensees that may discharge radioactive material to determine if a concentration problem exists, (2) NRC does not know how many of the estimated 3,000 "agreement state" licensees may have been inspected, and (3) neither NRC nor the Environmental Protection Agency (EPA) requires treatment plants to test for the presence of radioactive materials in sewage sludge. Exposure to treatment plant sludge, ash, and related by-products can occur in a variety of ways. For example, some of the substances are used for agricultural and residential purposes, such as lawn fertilizer. NRC and EPA studies on the health effects of radioactive materials in sewage sludge and ash have been inconclusive. GAO summarized this report in testimony before the Congress; see: Nuclear Regulation: Action Needed to Control Radioactive Contamination at Sewage Treatment Plants (GAO/T-RCED-94-247, June 21, 1994) by Jim Wells, Associate Director for Energy and Science Issues, before the Senate Committee on Governmental Affairs and the Subcommittee on the Environment, Energy, and Natural Resources, House Committee on Government Operations (15 pp.).

Nuclear Nonproliferation: Licensing Procedures for Dual-Use Exports Need Strengthening (Testimony, 05/17/94, GAO/T-NSIAD-94-163).

ABSTRACT: Iraq's use of so-called dual-use equipment—items with civilian uses that can also be used to build nuclear explosives or produce weapons grade uranium and plutonium—has raised concerns about the effectiveness of export controls over this material. The United States approved more than 1,500 licenses for dual-use items, mainly high-speed computers, to eight countries with suspected nuclear weapons programs, significantly increasing the risk that U.S. exports are fueling nuclear proliferation. Weaknesses in the interagency licensing review process have resulted in the approval of a number of sensitive license applications without review by the Energy Department or other members of the Subgroup on Nuclear Export Coordination, an interagency group. United States government approval of sensitive exports dictates the need for effective ways to prevent or detect export diversions, but GAO discovered several weaknesses in current procedures. These include (1) inadequate criteria for selecting prelicense checks and postshipment verifications, (2) ineffective methods used to do these inspections, and (3) a lack of verification of government-to-government assurances against unclear end uses.

Nuclear Waste: Much Effort Needed to Meet Federal Facility Compliance Act's Requirements (Letter Report, 05/17/94, GAO/RCED-94-179).

ABSTRACT: The Federal Facility Compliance Act requires the Department of Energy (DOE) to (1) submit plans for treating mixed wastes, which contain radioactive and hazardous material, to host states or to the Environmental Protection Agency (EPA); (2) get approval of the treatment plans from the states or EPA; and (3) enter into legal orders requiring DOE to comply with the approved plans. If DOE fails to meet an October 1995 deadline, it will be subject to fines of up to $25,000 per day for each violation of restrictions against storing untreated mixed wastes. Because DOE is months away from developing draft and proposed site treatment plans, it is too early to tell if DOE, the states, and EPA will be able to resolve technical and policy issues, negotiate final site treatment plans, and sign compliance orders in time to meet the deadline. However, considering the amount of work that remains and the time available to finish it, if DOE either misses its milestones for preparing the draft and final site treatment plans or if the draft and plans do not adequately resolve mixed waste

treatment, characterization, and disposal issues, the likelihood of missing the deadline increases.

Nuclear Nonproliferation: Export Licensing Procedures for Dual-Use Items Need to Be Strengthened (Chapter Report, 04/26/94, GAO/NSIAD-94-119).

ABSTRACT: Iraq's use of so-called dual-use equipment—items with civilian uses that can also be used to build nuclear explosives or produce weapons grade uranium and plutonium—has raised concerns about the effectiveness of export controls over this material. The United States approved more than 1,500 licenses for dual-use items, mainly high-speed computers, to eight countries with suspected nuclear weapons programs, significantly increasing the risk that U.S. exports are fueling nuclear proliferation. Weaknesses in the interagency licensing review process have resulted in the approval of a number of sensitive license applications without review by the Department of Energy (DOE) or other members of the Subgroup on Nuclear Export Coordination, an interagency group. United States government approval of sensitive exports dictates the need for effective ways to prevent or detect export diversions, but GAO discovered several weaknesses in current procedures. These include (1) inadequate criteria for selecting prelicense checks and postshipment verifications, (2) ineffective methods used to do these inspections, and (3) a lack of verification of government-to-government assurances against nuclear end uses. GAO summarized this report in testimony before the Congress; see: Nuclear Nonproliferation: Licensing Procedures for Dual-Use Export Need Strengthening (GAO/T-NSIAD-94-163, May 17, 1994) by Joseph E. Kelley, Director of International Affairs Issues, before the Senate Committee on Governmental Affairs (20 pp.).

Federal Facilities: Agencies Slow to Define the Scope and Cost of Hazardous Waste Site Cleanups (Letter Report, 04/15/94, GAO/RCED-94-73).

ABSTRACT: Environmental laws require federal agencies to clean up hazardous and radioactive waste contamination at facilities they own or use or once owned or used. Agencies' early cleanup experiences indicate that the overall federal cleanup effort will be enormously expensive and will require decades to complete. Published estimates of the government's cleanup liability now range in the hundreds of billions of dollars and are still growing. This report (1) determines the status of federal efforts to identify facilities potentially requiring cleanup, (2) estimates future

cleanup costs and (3) discusses obstacles to agencies' progress in these areas.

Nuclear Nonproliferation: Concerns With U.S. Delays in Accepting Foreign Research Reactors' Spent Fuel (Letter Report, 03/25/94, GAO/RCED-94-119).

ABSTRACT: A key nonproliferation goal of the United States is to discourage the use of highly enriched uranium, a material that can be used to make nuclear bombs, in civilian nuclear programs worldwide. Research reactors are of particular concern because the major civilian use of highly enriched uranium is as fuel in these reactors. U.S. officials question the safety of spent, highly enriched uranium fuel left in interim storage at reactor sites worldwide and, for security reasons, would prefer that this spent fuel be consolidated and stored permanently in the United States. Under its Off-Site Fuel Policy, the Department of Energy (DOE) has since 1968 been taking back the spent fuel, reprocessing it, and storing the resulting waste at the Savannah River Site in South Carolina. But DOE stopped this practice in the late 1980s, arguing that the fuels policy could not be renewed until environmental studies were done. No spent fuel of U.S. origin has been taken back since the fuels policy expired, despite warnings from operators of foreign research reactors that they were facing fuel storage problems. This report provides information on (1) the effects of delays in renewing the Off-Site Fuels Policy on U.S. nonproliferation goals and programs—specifically, the reduced enrichment program; (2) DOE's efforts to renew the fuels policy; and (3) the price to be charged to the operators of foreign reactors for DOE's activities in taking back the spent fuel.

Health and Safety: Protecting Department of Energy Workers' Health and Safety (Testimony, 03/09/94, GAO/T-RCED-94-143).

ABSTRACT: During the past 50 years, the Department of Energy's (DOE) nuclear weapons complex produced tens of thousands of nuclear weapons. A by-product of this effort was vast quantities of radioactive and other toxic substances, ranging from plutonium and cesium to mercury and lead, all of which pose potential health and safety threats to plant workers—more than 600,000 over the years—and to persons who have lived in neighboring communities. Protecting workers from exposure to radiation and hazardous materials continues to be a problem at DOE sites, and the cleanup program will expose workers to additional dangers. DOE needs a vigorous health and safety program that can accurately determine

and minimize the need for improvement. Although DOE has tried to strengthen the Office of Environment, Safety, and Health, GAO's examination of a key program—the Health Surveillance Program—uncovered many problems. Moreover, concerns have been raised about the quality and reliability of DOE's data on worker exposure to hazardous substances.

Nuclear Health and Safety: Safety and Health Oversight at DOE Defense Nuclear Facilities (Testimony, 03/01/94, GAO/T-RCED-94-138).

ABSTRACT: The Department of Energy's (DOE) history contains many examples in which safety, health, and environmental concerns have taken a backseat to weapons production. DOE officials acknowledge that this has occurred in the past. Since the late 1980s, DOE has tried to strengthen its internal oversight, and in 1988, the Congress created the Defense Nuclear Facilities Safety Board to provide outside independent oversight. These changes have improved safety and health operations at DOE. Even so, GAO believes it is appropriate to assess the effectiveness of these controls and work to provide greater assurances that health and safety are not compromised.

Health and Safety: DOE's Implementation of a Comprehensive Health Surveillance Program Is Slow (Letter Report, 12/16/93, GAO/RCED-94-47).

ABSTRACT: Workers in the Department of Energy's (DOE) industrial complex are at risk of exposure to ionizing radiation, potentially toxic chemicals, and other health hazards. A 1989 DOE panel recommended that the agency implement a health surveillance program to systematically collect and analyze data on workers' health and workplace conditions to detect illnesses or health trends linked to workplace exposure. In the 4 years since, DOE has not fully implemented such a program. DOE attributes the delays to technical difficulties and staffing shortages, although GAO believes that a lack of program planning has also been a contributing factor. DOE now projects full program implementation by 1998. Until a comprehensive program is developed, DOE will continue a program that began at the University of Washington in 1983—one that is limited to analyzing patterns of illnesses and injuries on the basis of information provided by DOE sites. A lack of complete reporting of illnesses and injuries, however, limits the current program's ability to flag the occupational diseases, injuries, and premature deaths that threaten workers. Expanding the program to additional sites without correcting

these problems will simply make a program with limited effectiveness larger and will do little to improve the health of DOE workers.

Nuclear Science: Developing Technology to Reduce Radioactive Waste May Take Decades and Be Costly (Chapter Report, 12/10/93, GAO/RCED-94-16).

ABSTRACT: U.S. efforts to develop a technology, known as waste transmutation, that might be able to reduce the volume and the radioactivity of nuclear waste have lagged because the Department of Energy (DOE) believes that the technology is too costly and unnecessary. Such radioactive waste, the legacy of commercial nuclear power and nuclear weapons production, will have to be buried in a deep geological repository. In essence, any practical application of transmutation is at least decades away, and several roadblocks would likely slow or prevent application should it be pursued. These include current funding constraints; the high cost and the long time needed to develop and implement transmutation; and the technical, institutional, and public challenges that would need to be overcome. Moreover, DOE's waste managers, industry representatives, and others now believe that transmutation is neither necessary nor cost-beneficial.

DOE Management: Implementing the Environmental Restoration Management Contractor Concept (Testimony, 12/01/93, GAO/T-RCED-94-86).

ABSTRACT: As part of its effort to reform contract management, the Department of Energy (DOE) is now pilot testing at its Fernald, Ohio, and Hanford, Washington, sites a new environmental restoration management contractor approach. DOE hopes that this approach will lower cleanup costs, accelerate cleanups, and strengthen agency management control over contractors. GAO testified that the environmental restoration management contractor concept, with its ambitious goals and use of an invoice approach, offers the promise of better DOE oversight of cleanup contractors. Several constraints, however, may make it difficult to realize the concept's goals. GAO continues to believe that a thorough and careful evaluation should be a major component of the pilot tests. More importantly, the success of the pilot tests could be seriously jeopardized unless DOE meets its own estimates of the number of qualified staff and adequately trains them to oversee the contractors.

Nuclear Health and Safety: Examples of Post World War II Radiation Releases at U.S. Nuclear Sites (Fact Sheet, 11/24/93, GAO/RCED-94-51FS).

ABSTRACT: In reaction to the Soviet Union's first atomic bomb detonation in the late 1940s, the U.S. government began a series of nuclear tests that released into the atmosphere what are today considered potentially dangerous quantities of radioactive material. During the 1949 Green Run Test at Hanford, Washington, the military and the Atomic Energy Commission released a radioactive cloud that spread out over southeast Washington and Oregon. The details of these tests have been shrouded in secrecy over the years. This fact sheet provides information on the Green Run Test as well as 12 other radioactive releases at three other nuclear sites—Oak Ridge, Tennessee; Dugway, Utah; and Los Alamos, New Mexico—between 1948 and 1952. During two of the tests at the Los Alamos site, for example, atmospheric radiation reached small towns 70 miles away. The potential health consequences of these experiments are still under study.

ERMC **Follow-up** (Correspondence, 10/27/93, GAO/RCED-94-49R).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the Department of Energy's (DOE) progress in implementing pilot tests for new environmental restoration management contractors (ERMC) at its Fernald and Hanford sites. GAO found that: (1) DOE has selected a contractor for the ERMC pilot test at the Fernald site; (2) DOE has not fully implemented the recommendations for improving ERMC pilot tests and is in the process of designing a plan for evaluating the ERMC approach; (3) DOE evaluation, scheduled to be completed by May 1994, will determine ERMC program effectiveness and whether pilot tests can be used at other DOE cleanup sites; and (4) although DOE has identified staffing needs at the Fernald and Hanford sites, it has not developed a plan for acquiring staff for either site.

Safety and Health: Worker Safety and Health Oversight Issues Facing DOE (Testimony, 10/21/93, GAO/T-RCED-94-54).

ABSTRACT: The Department of Energy (DOE) is involved in various activities that could expose workers to radiation and toxic chemicals. In 1992 alone, 15 DOE workers died during on-the-job mishaps. During the past decade, GAO has repeatedly called for improvements in DOE's safety and health oversight. Although recent DOE initiatives aimed at improving safety and health programs are an important step, the agency needs to

develop a clear safety policy—one that clearly spells out what is expected of contractors and their workers—if its efforts are to succeed. Such a policy, along with specific goals and performance measures, could help DOE improve its safety culture and performance. In addition, GAO continues to believe that DOE's Office of Environment, Safety, and Health needs adequate authority, independence, and resources to perform vigorous independent internal oversight. Finally, a detailed plan could help to ensure a smooth, successful transition to oversight by the Occupational Safety and Health Administration.

Nuclear Weapons: Safety, Technical, and Manpower Issues Slow DOE's Disassembly Efforts (Chapter Report, 10/20/93, GAO/RCED-94-9).

ABSTRACT: The Department of Energy's (DOE) very ambitious schedule for dismantling retired nuclear weapons at its Pantex facility in Texas, coupled with unresolved safety and uranium storage concerns, could lead to conflict between safety and production goals. About 63 percent of the weapons scheduled were disassembled during fiscal year 1992. Disassembly was curtailed, however, by a transportation problem that prevented the delivery of retired weapons to Pantex for about 2 months. As a result, Pantex substantially slowed its disassembly to avoid depleting its inventory of weapons to be disassembled. Concerns about possible exposure of Pantex technicians to radioactive material also curtailed disassembly efforts. In GAO's view, the prospects for meeting DOE's disassembly schedule in the next several years are poor. DOE needs to address several issues that could affect its ability to disassemble nuclear weapons, including a shortage of disassembly technicians and the adequacy of facilities for and the environmental impact of storing large amounts of plutonium at Pantex. More than half of the required safety analysis reports, which enable decisions to be made about whether a facility can operate safely, have not been completed at Pantex. Many of the uncompleted safety analysis reports are for disassembly activities or facilities.

Nuclear Nonproliferation and Safety: Challenges Facing the International Atomic Energy Agency (Chapter Report, 09/22/93, GAO/NSIAD/RCED-93-284).

ABSTRACT: The discovery of Iraq's nuclear weapons program, North Korea's refusal to allow the International Atomic Energy Agency (IAEA) to conduct nuclear inspections, and the Chernobyl nuclear power plant accident have focused attention on nuclear proliferation and the safety of

nuclear power plants. These issues are of particular concern to IAEA, whose main duties are verifying the peaceful use of nuclear material and promoting nuclear energy. This report examines the (1) effectiveness of IAEA's safeguards program and the adequacy of program funding, (2) management of U.S. technical assistance to IAEA's safeguards program, (3) effectiveness of IAEA's program for advising member states about the safety of nuclear power plants, and (4) adequacy of program funding.

Nuclear Waste: Funds Spent to Identify a Monitored Retrievable Storage Facility Site (Letter Report, 09/07/93, GAO/RCED-93-199).

ABSTRACT: The expenditures of the Nuclear Waste Negotiator's Office were consistent with the administrative provisions of the legislation that created the office. The Negotiator was empowered to find a state or an Indian tribe willing to host a repository or a monitored retrievable storage facility for storing hazardous waste. The Nuclear Waste Policy Amendments Act of 1987 gives the Negotiator considerable discretion in managing office procedures, such as hiring and paying staff and entering into leases and contracts. The Department of Energy's (DOE) awards of grants to counties and Indian tribes were consistent with the objectives of the monitored retrievable storage program. DOE has adequately reviewed grant applications and has monitored grantees' expenditures.

Nuclear Materials: Nuclear Arsenal Reductions Allow Consideration of Tritium Production Options (Letter Report, 08/17/93, GAO/RCED-93-189).

ABSTRACT: Plans underway to cut the nation's nuclear weapons stockpile by about 75 percent from 1988 levels will strongly affect future demand for tritium, a gaseous radioactive isotope of hydrogen used to boost the power of nuclear warheads. Because tritium decays yearly, it must be periodically replenished to maintain the potency of the warheads. This report provides information on (1) the impact of nuclear stockpile reductions on the Department of Energy's tritium supply and (2) the agency's alternatives for meeting tritium requirements and for providing a contingency in the event that requirements increase.

Nuclear Security: DOE's Progress on Reducing Its Security Clearance Work Load (Letter Report, 08/12/93, GAO/RCED-93-183).

ABSTRACT: The Atomic Energy Act of 1954 requires the Department of Energy (DOE), which runs the nation's nuclear weapons program and other

sensitive undertakings, to run security checks on persons with access to classified information. DOE has cut its backlog of personnel security clearances from about 135,000 cases in 1988 to about 1,000 cases in June 1993—a 99-percent reduction. Although during the late 1980s DOE was not timely in processing clearances for its contractors' employees, the 20 contractor representatives who GAO interviewed could not recall or document significant problems caused by clearance delays. Most of the delays were characterized as inconveniences that the contractors "worked around." Virtually all the representatives said that they were pleased with DOE's current clearance processing times. DOE has not, however, effectively managed its workload of cases involving questionable information. DOE, although committed to reduce the processing time of these cases, has yet to establish adequate controls over contractors' preemployment checks to screen out unsuitable applicants. According to DOE security officials, some contractors are not verifying information on prospective employees, such as education, personal references, past employers, and credit and criminal records.

Nuclear Regulation: NRC's Nuclear Materials Program Needs Improvement to Protect Public Health and Safety (Testimony, 07/30/93, GAO/T-RCED-93-51).

ABSTRACT: The Nuclear Regulatory Commission (NRC) licenses millions of individuals and organizations throughout the United States to use radioactive material for research and development; medical diagnosis and treatment; and industrial, academic, and consumer activities. This testimony, which draws on an April 1993 GAO report (GAO/RCED-93-90), questions whether the public is being adequately protected from nuclear materials outside power plants, noting that NRC lacks information on whether all states receive the same minimum level of protection. NRC does not collect comparable data for its licensing and inspection programs, and the agency lacks a common set of performance indicators to effectively evaluate both the agreement-states program and the NRC-regulated states program. Moreover, NRC does not have specific criteria or procedures for suspending or revoking an agreement state's program. As a result, NRC has failed to suspend or revoke state programs even though the states are not complying with NRC requirements.

DOE Management: Consistent Cleanup Indemnification Policy Is Needed (Letter Report, 07/12/93, GAO/RCED-93-167).

ABSTRACT: In indemnifying its cleanup contractors, the Department of Energy (DOE) has adopted an inconsistent approach in which the government often accepts liabilities and contractors assume little financial responsibility. Individual contractors are indemnified not on the basis of a well-analyzed policy but as the result of negotiations, during which DOE does not first test to see whether indemnification is needed or set limits to its potential cost. As a result, some contractors have received more-favorable indemnification provisions than have others. More importantly, this approach has exposed the government to unknown but potentially significant financial risk since more than $5 billion in environmental damage lawsuits and claims have been filed under existing contracts. A consistent policy for indemnification that takes into account use of section 119 of the Superfund Amendments and Reauthorization Act, as well as other specific statutes, such as the Price-Anderson Act, can ensure that cleanup contractors are indemnified in a way that protects both the contractors' and the government's interests.

Nuclear Waste: Yucca Mountain Project Management and Funding Issues (Testimony, 07/01/93, GAO/T-RCED-93-58).

ABSTRACT: The Department of Energy (DOE) has given low priority to scientifically assessing Yucca Mountain, Nevada, as a possible disposal site for highly radioactive waste, requesting only about half of the funds needed to complete its investigation on schedule. If DOE continues to request and allot limited funds for the investigation, this effort could take at least 5 to 13 years longer than planned and could boost the disposal program's total cost. To streamline the project, DOE has compressed the time permitted for various scientific studies and is considering similar measures to reduce costs. These actions increase the risk that the site investigations will be inadequate. Moreover, they come at a time when unanticipated technical issues have emerged that could lengthen the investigation. DOE wants to establish a revolving fund to ensure that adequate funds are made available to the disposal program—a move that has implications for the federal deficit, congressional oversight, and the program's long-term financial health.

Nuclear Regulation: Cleanup Delays Continue at Two Radioactive Waste Sites in Ohio (Letter Report, 06/28/93, GAO/RCED-93-156).

ABSTRACT: Two sites in Newburgh Heights, Ohio, are contaminated with low-level radioactive material used during the Chemetron Corporation's chemical manufacturing. Although the company ceased operations more than 20 years ago, it has yet to clean up the sites and still holds a license to possess nuclear materials. The Nuclear Regulatory Commission will not cancel Chemetron's license until the company properly disposes of radioactive material and has spearheaded recent efforts to clean up the sites. This report reviews Chemetron's efforts to clean up the two sites, discusses factors that led to the failure of past cleanups, and addresses problems that Chemetron faces with its current cleanup proposal.

Department of Energy: Cleaning Up Inactive Facilities Will Be Difficult (Letter Report, 06/25/93, GAO/RCED-93-149).

ABSTRACT: Changing defense requirements and tightening domestic budgets are forcing the Department of Energy (DOE) to redefine its missions and to reexamine the need for many of its inactive facilities. Cleaning up these inactive facilities can be a lengthy process, involving everything from preliminary assessments of the type and the amount of contamination in floors, walls, and ceilings to the actual removal of nuclear and hazardous materials. GAO found that DOE is in only the preliminary stages of cleaning up inactive facilities. DOE does not know the number of its facilities that are inactive but not yet transferred to its Office of Environmental Restoration and Waste Management, the full extent of the dangers they pose, or the cost of improving their safety until they can be decontaminated and decommissioned. DOE also lacks an accurate idea of the number of facilities it will close during the next 30 years because of changes in its missions, nor does it know how cleaning up these additional facilities could affect the program's total cost. GAO believes that given that DOE might close up to 7,000 facilities, as well as the program's potential cost, having a single office manage all work at inactive facilities may be a more effective approach to coordinating cleanups.

Nuclear Nonproliferation: Japan's Shipment of Plutonium Raises Concerns About Reprocessing (Letter Report, 06/14/93, GAO/RCED-93-154).

ABSTRACT: In January 1993, the Japanese ship Akatsuki Maru, along with an armed escort vessel, completed a 2-month voyage during which it transported 1.7 tons of plutonium oxide from France to Japan. Although the plutonium had been reprocessed at a French facility, it was originally

obtained from the United States in the form of spent nuclear fuel. The Japanese sought the plutonium to generate commercial nuclear power. Under a 1988 agreement between Japan and the United States, Japan is required to ensure the physical security and safety of such shipments. This report discusses the physical security and safety of the Akatsuki Maru shipment, as well as any costs to the United States arising from it. In addition, the report discusses broader issues raised by the shipment, including concerns about reprocessing and the resulting growth in world plutonium stocks. Finally, the report discusses the implications of the 1988 agreement for future U.S. nuclear agreements.

Radioactive Waste: EPA Standards Delayed by Low Priority and Coordination Problems (Letter Report, 06/03/93, GAO/RCED-93-126).

ABSTRACT: The management and the disposal of radioactive waste have long been of national concern, but without congressional or judicial mandates, the Environmental Protection Agency (EPA) is unlikely to issue radiation protection standards in a timely fashion, which could harm the cleanup of contaminated facilities and radioactive waste disposal. Efforts to promulgate radiation protection standards have been delayed, in part, because EPA perceives radiation protection as less important than other agency activities and has, therefore, allocated limited resources to this effort. EPA has also experienced delays in developing proposed standards because of disputes with the Department of Energy (DOE), the Nuclear Regulatory Commission (NRC), and the Office of Management and Budget (OMB). Although EPA has tried to strengthen coordination with DOE and NRC, OMB has raised additional concerns about standards submitted for its review. OMB's concerns are largely responsible for delaying the issuance of groundwater protection standards for inactive uranium-processing sites. For more than 3 years, EPA has been unable to resolve these concerns, and the two parties still fundamentally disagree about whether contaminated groundwater not now being used should be cleaned up.

Nuclear Waste: Yucca Mountain Project Behind Schedule and Facing Major Scientific Uncertainties (Chapter Report, 05/21/93, GAO/RCED-93-124).

ABSTRACT: In response to the buildup of highly radioactive waste at more than 70 nuclear facility sites across the country, the Department of Energy (DOE) has been developing an underground repository that was expected to be up and running in 1988. By 1991, DOE was estimating that its scientific investigation of a site at Yucca Mountain, Nevada, could be completed in

2001 at a cost of $6.3 billion and that, if the site proved suitable, a repository could be in operation in 2010. GAO found that at its present pace, DOE's investigation of Yucca Mountain will take at least 5 to 13 years longer than planned and could cost up to $600 million more than the agency has projected. GAO recommends that DOE review the program's goals and objectives in light of the program's funding priorities. Such a review should address whether the program's emphasis on the scientific investigation of Yucca Mountain is sufficient and how that investigation can be done more efficiently without sacrificing technical quality.

Safety and Health: Key Independent Oversight Program at DOE Needs Strengthening (Chapter Report, 05/17/93, GAO/RCED-93-85).

ABSTRACT: Since its inception in 1988, the Environment, Safety, and Health Office's Site Representative Program has not provided the vigorous independent oversight originally envisioned. Staffing constraints have limited the program's coverage of Department of Energy (DOE) sites, and the office has lacked a systemic approach for using the site residents' observations to evaluate safety and health performance. In addition, DOE has not required line management to respond to the site residents' findings. As a result, line management has failed to adequately address some major safety and health issues cited by site residents, posing unnecessary risks to workers. In restructuring the program in 1992, the Environment, Safety, and Health Office made a number of improvements, but basic problems persist, such as staffing constraints. In addition, new problems further limit this oversight capability—the program's coverage of occupational health has ceased; the program has not set minimum training requirements for site representatives; and the site representatives are not spending enough time touring work areas to identify safety problems. Finally, the office's ability to resolve problems once they are identified is limited because of the absence of requirements spelling out how line managers should respond to findings.

Nuclear Safety: Progress Toward International Agreement to Improve Reactor Safety (Letter Report, 05/14/93, GAO/RCED-93-153).

ABSTRACT: Representatives of nearly half of the 114 members states of the International Atomic Energy Agency, including the United States, have participated in the development of an international nuclear safety convention—a proposed multilateral treaty to improve civil nuclear power reactor safety. A preliminary draft of the convention has been developed, but discussions are continuing, and when the final convention text will be

completed and presented to member states for signature is uncertain. This report provides information on the development of the nuclear safety convention. GAO discusses (1) the draft convention's scope and objectives, (2) how the convention will be implemented and monitored, (3) the views of selected country representatives on what provisions should be included in the draft convention, and (4) the convention's potential benefits and limitations.

Personnel Security: Efforts by DOD and DOE to Eliminate Duplicative Background Investigations (Letter Report, 05/10/93, GAO/RCED-93-23).

ABSTRACT: The Department of Defense (DOD), the Department of Energy (DOE), and other agencies have developed their own requirements for conducting background investigations and granting security clearances. As a result, clearances are not routinely accepted among agencies, and duplicative investigations may occur. The 1991 National Defense Authorization Act requires DOD and DOE to avoid duplicative background investigations on employees seeking security clearances. Both agencies are major users of background investigations, together budgeting nearly $200 million in fiscal year 1991 for background investigations of their employees. This report examines (1) DOD and DOE efforts to eliminate duplication by automating the exchange of investigative data and (2) DOD's and DOE's participation in interagency efforts to eliminate duplication by standardizing the security clearance process.

Nuclear Regulation: Better Criteria and Data Would Help Ensure Safety of Nuclear Materials (Chapter Report, 04/26/93, GAO/RCED-93-90).

ABSTRACT: Nuclear materials—some intensely radioactive—are widely used in instruments that identify flaws in construction materials for bridges and other structures, as well as in medicine to treat diseases like cancer. The Nuclear Regulatory Commission (NRC) regulates the safe use and control of these materials. NRC enforces its regulations either on its own or by entering into agreements with states. These states assume regulatory responsibility and must have programs that are compatible with NRC's and are adequate to protect public health and safety. In response to congressional concerns about whether NRC is adequately protecting the public from these nuclear materials, this report reviews (1) the comparability of NRC's programs for agreement states and NRC-regulated states, including assessments of the effectiveness of both programs, and (2) NRC's actions on GAO's past recommendations.

Nuclear Waste: Connecticut's First Site Selection Process for a Disposal Facility (Chapter Report, 04/05/93, GAO/RCED-93-81).

ABSTRACT: Connecticut, like all other states, is required to dispose of commercial low-level radioactive waste generated within its borders. Because Connecticut is highly developed and densely populated, however, the search for an appropriate disposal site has been lengthy. The process has been further delayed by opposition from citizens groups, as well as a directive from the state legislature requiring the state siting authority to restart the site screening process. This report reviews Connecticut's first effort to develop a low-level radioactive waste disposal facility, including opportunities for public involvement, and compares the incentives that Connecticut will offer to potential host communities with the incentives offered by other states.

Nuclear Health and Safety: Corrective Actions on Tiger Teams' Findings Progressing Slower Than Planned (Letter Report, 03/25/93, GAO/RCED-93-66).

ABSTRACT: Since 1989, the Department of Energy (DOE) has used Tiger Teams—groups composed of DOE and contractor experts—to assess DOE facilities' compliance with environment, safety, and health (ES&H) regulations. Although the Tiger Teams have helped establish a baseline of compliance at major facilities and have raised awareness throughout DOE about the need to improve performance in this vital area, considerable efforts will be needed to fully comply with ES&H requirements and to establish vigorous and formal ES&H programs at DOE. It could take as long as 7 years to complete all corrective actions on Tiger Team findings. As a result, DOE needs to continue to work with its field offices on verifying the adequacy of corrective actions. DOE needs to ensure that specific measures of contractor responsiveness to Tiger Team findings are included in all performance evaluation plans.

Nuclear Waste: Hanford Tank Waste Program Needs Cost, Schedule, and Management Changes (Chapter Report, 03/08/93, GAO/RCED-93-99).

ABSTRACT: The Department of Energy (DOE) has been trying to clean up the radioactive waste at its Hanford Site in Washington State by encasing it in glass—a process known as vitrification—and shipping it to a geologic repository for permanent disposal. Major technical problems have beset all key steps of the program. Specifically, DOE has not determined how many samples it will ultimately need to determine the contents of the

waste and lacks adequate facilities for analyzing the material. DOE has not fully tested its approach for retrieving different wastes to be treated and is basing its pretreatment plans on unproven technology. Even if DOE surmounts these obstacles, the vitrification plant may not be large enough to treat all of the high-level waste in a reasonable time frame and the technical feasibility of DOE's approach to disposing of low-level waste has yet to be demonstrated. In addition to these technical uncertainties, questions have also been raised about the program's cost, schedule, and management. For example, estimates for completing the project have soared from $14 billion to nearly $50 billion.

Nuclear Waste: Hanford's Well-Drilling Costs Can Be Reduced (Letter Report, 03/04/93, GAO/RCED-93-71).

ABSTRACT: To clean up radioactive and hazardous wastes at its Hanford Site in Washington state, the Department of Energy (DOE) will sink nearly 900 monitoring wells over the next several years at a cost of more than $270 million. The wells are designed to provide information on the nature and the extent of soil and groundwater contamination. Recent studies have suggested that DOE could substantially reduce its costs for sinking the wells by using more efficient drilling methods. Although the Hanford Site contractors have implemented many of the recommended cost-saving measures, other actions could further reduce well-drilling costs. These actions include (1) adopting faster and less expensive well-drilling technologies, (2) using the well-drilling program's work force more efficiently, and (3) centralizing the management of the well-drilling program to improve its effectiveness. DOE and the Hanford contractors, however, have made little effort to take advantage of these opportunities.

Operation Desert Storm: Army Not Adequately Prepared to Deal With Depleted Uranium Contamination (Letter Report, 01/29/93, GAO/NSIAD-93-90).

ABSTRACT: During the Persian Gulf War, a number of U.S. combat vehicles were contaminated by depleted uranium after being struck by munitions or when ammunition stored on board was ignited by accidental fires. Although the Army does not know the full extent to which personnel were exposed to depleted uranium—a radioactive, chemically toxic metal—GAO discovered that at least several dozen U.S. soldiers, some unknowingly, either breathed it in, ingested it, or were hit by contaminated shrapnel. Army and Nuclear Regulatory Commission (NRC) officials believe, however, that the exposure levels did not exceed allowable limits

set by NRC. Although the Army's policy is to minimize individuals' exposure to radiation, it has not effectively educated its personnel about the hazards of depleted uranium contamination or about proper safety measures. What little information is available is not widely disseminated. The military has begun to test crew members who were injured in Abrams tanks and Bradley Fighting vehicles contaminated by munitions hits, along with an Army National Guard unit that claimed exposure while working with contaminated vehicles in the Persian Gulf, but the Army has no plans to medically evaluate other personnel who might have been exposed. The Army still lacks a formal plan to ensure that contaminated vehicles are decontaminated, disposed of, and repaired in an efficient way. These issues may also be relevant to the other services.

Nuclear Weapons Complex: Weaknesses in DOE's Nonnuclear Consolidation Plan (Letter Report, 11/19/92, GAO/RCED-93-56).

ABSTRACT: The end of the cold war and expected reductions in the nation's nuclear weapons arsenal has prompted the Department of Energy (DOE) to study ways to consolidate the agency's nuclear weapons complex. The agency's first choice is to centralize most of its nonnuclear operations, which produce nonnuclear components for weapons, in Kansas City, Missouri. A number of other nonnuclear activities would move to other DOE facilities or be privatized. GAO is concerned because the costs associated with this plan are uncertain, and the technical risks of consolidation have not been thoroughly explored. DOE recognizes some of these weaknesses and is looking into other options, such as moving specific operations to the national laboratories. DOE is also doing more detailed cost estimates on other options. Some weaknesses, however, continue to receive little attention. Further analysis of additional policy options and technical risks is needed to assure the Congress and the public that all reasonable options have been explored and that DOE's approach will minimize risks. Moreover, a specific size for the complex has yet to be decided. GAO believes that the selection of the complex's size and capabilities sets a critical baseline for consolidation planning. Once parameters are placed on the future production capability of the complex, consolidation planning to establish that capability can go forward.

Nuclear Security: Improving Correction of Security Deficiencies at DOE's Weapons Facilities (Letter Report, 11/16/92, GAO/RCED-93-10).

ABSTRACT: Although it is critical that the nation's stock of nuclear materials be properly secured and safeguarded, routine Department of

Energy (DOE) security inspections in 1989 and 1990 uncovered more than 2,100 security deficiencies at 39 of its contractor-run weapons facilities. This report reviews attempts by DOE operating contractors to correct security deficiencies and examines how DOE supervises such contractor efforts. GAO evaluated 20 security deficiency cases at four nuclear weapons facilities and found that contractors are not adequately conducting four of the eight procedures considered necessary to ensure proper correction of deficiencies. The contractors cannot always prove that they have done three critical analyses—root cause, risk assessment, and cost-benefit—and do not always adequately verify that corrective actions are appropriate, effective, and complete. At the same time, DOE oversight has been hampered by computer system incompatibility. DOE reviews of contractors' corrective action plans are sometimes untimely, and DOE cannot always show that it has validated contractors' corrective actions.

Nuclear Security: Safeguards and Security Planning at DOE Facilities Incomplete (Letter Report, 10/30/92, GAO/RCED-93-14).

ABSTRACT: High-risk vulnerabilities may be going undetected at Department of Energy (DOE) field facilities because of ineffective safeguards and security planning. Protection plans, many of which have been in the works for years, remain incomplete for a large number of DOE's sensitive facilities and most of its sites. Although DOE has cited various reasons—such as lack of staff or changes in mission—to explain the situation, GAO believes that the underlying problem is DOE's lack of commitment to the planning process. According to DOE officials, the agency's proposal to improve the process by requiring a new overall plan may actually further complicate the process. The officials believe that the modified planning process could further delay the safeguards and security plans because many plans now being prepared will have to be rewritten and because work required to develop vulnerability assessments will be increased. GAO agrees that implementation of the revised process could increase the amount of vulnerability assessment work, further delaying the completion of plans. In GAO's view, it is important for DOE to complete the remaining sensitive facility plans.

Nebraska Low-Level Waste (Correspondence, 10/14/92, GAO/RCED-93-47R).

BACKGROUND: Pursuant to a congressional request, GAO provided information on the site selection for a low-level radioactive waste facility in Nebraska, focusing on the Boyd County Low-Level Waste Monitoring Committee's (BCLLWC): (1) reservations about the proposed site in the

county; (2) concern about the facility licensing proceeding and any plans to store mixed and decommissioned wastes at the site; and (3) concern that the site might receive wastes from other states. GAO found that: (1) although they did not find the site unsuitable, two BCLLWC geology consultants reported that groundwater could become contaminated and be discharged into a nearby creek and, therefore, the site would not meet regulatory requirements; (2) the site developer did not include mixed wastes and decommissioned wastes in its application for state licensing but would request such permission later; (3) BCLLWC believed the plans for mixed and decommissioned wastes should have been raised at the licensing proceeding; and (4) the Nuclear Regulatory Commission (NRC) alone could grant emergency access to the Nebraska facility if the denial of access would pose a public health threat, but NRC said that applicants first had to exhaust all other alternatives, and it did not anticipate any such situation arising.

Nuclear Weapons Complex: Issues Surrounding Consolidating Los Alamos and Lawrence Livermore National Laboratories (Testimony, 09/24/92, GAO/T-RCED-92-98).

ABSTRACT: This testimony focuses on the Department of Energy's (DOE) nuclear weapons laboratories. GAO discusses three main issues: (1) the research, development, and testing capabilities of the Los Alamos and Lawrence Livermore National Laboratories; (2) recent trends in staffing and funding at DOE's weapons laboratories; and (3) the options identified by the laboratories and DOE for consolidating the Los Alamos and Livermore research, development, and testing programs.

Nuclear Safety: Concerns About the Nuclear Power Reactors in Cuba (Letter Report, 09/24/92, GAO/RCED-92-262).

ABSTRACT: If Cuba obtains the help needed to complete construction of its two Soviet-designed nuclear power reactors, the United States will need assurances that they are built and will be operated in a way that does not pose a risk to the United States in the event of an accidental release of radioactive material. Although work has halted on the two reactors, the first unit is believed to be virtually finished while the second is between 20 and 30 percent complete. The main reactor components have not yet been installed, and the nuclear fuel has not been delivered. Concerns about the reactors center on the questionable quality of the construction, limited regulatory oversight, inadequate training for operators, lax safety standards, and the absence of a Cuban industrial infrastructure to support

the reactors' operation and maintenance. Concerns also exist that the upper portion of the containment dome was designed to withstand pressures of only 7 pounds per square inch. Because Russia demands hard currency as payment for—and Cuba now lacks the money to buy—equipment needed for the reactors, when the reactors will start up is unclear. Continued monitoring of Cuba's progress toward completing the reactors is warranted.

Nuclear Materials: Removing Plutonium Residues From Rocky Flats Will Be Difficult and Costly (Chapter Report, 09/04/92, GAO/RCED-92-219).

ABSTRACT: The Department of Energy's (DOE) Rocky Flats Plant, near Denver, Colorado, processed plutonium for nuclear weapons for nearly 40 years. Plutonium residues, a by-product of this activity, have been accumulating at the plant and DOE now faces removing this material. The plant's latest inventory records for lean residues (materials with relatively low amounts of plutonium) show that 97,000 kilograms of solid residues and 14,000 liters of liquid residues—together containing about 2,900 kilograms of plutonium—are stored at the plant. To clean up Rocky Flats, DOE will have to remove these residues, a difficult task because the residues contain combustible materials and other characteristics that preclude shipping. DOE has not yet decided how it will eliminate the residue backlog at Rocky Flats. The agency is considering three basic alternatives—processing the residues to separate out the plutonium, shipping them to other facilities for processing, or disposing of them as wastes.

Nuclear Materials: Plutonium Processing in the Nuclear Weapons Complex (Fact Sheet, 08/20/92, GAO/RCED-92-109FS).

ABSTRACT: This fact sheet describes the methods and facilities that the Department of Energy (DOE) uses to process plutonium for use in nuclear weapons. Plutonium is not found in nature and has to be artificially produced. DOE no longer manufactures new plutonium, however. Instead, DOE processes and recycles the plutonium from retired nuclear weapons and the plutonium that remains as scrap or residue from plutonium processing. In summary, DOE recovers plutonium in two main ways—aqueous and pyrochemical—at four processing sites. Due to environmental and safety concerns and cuts in the numbers of nuclear weapons, only the Los Alamos processing facility is now up and running.

Nuclear Science: Status of DOE's Self-Supporting Isotope Program (Testimony, 08/12/92, GAO/T-RCED-92-88).

ABSTRACT: Isotopes have important applications in medicine, industry, and scientific research. Although the Department of Energy's (DOE) program to produce and distribute isotopes is relatively small, it is an important domestic source of this material. GAO testified that DOE faces significant obstacles in trying to run the program on a self-supporting basis. Because DOE has been unable to recoup program costs through isotope sales, its original $16 million operating fund has been depleted, and the agency is borrowing money to keep the program solvent. High, uncontrollable operating costs; lack of capital funding; and foreign competition—much of it subsidized—have been the main barriers to the program's self-sufficiency. DOE has hired a consulting firm to help redesign the program. DOE and the firm will then seek ways to finance DOE's newly defined role in the isotope field. But continued government funding is likely to be needed to keep the program afloat. GAO testified that had DOE completed such a study before reorganizing its isotope program in 1989, many of these problems could have been avoided.

Nuclear Waste: New York's Adherence to Site Selection Procedures Is Unclear (Letter Report, 08/11/92, GAO/RCED-92-172).

ABSTRACT: A New York commission charged with choosing a site for a low-level radioactive waste facility announced in September 1989 that it planned limited investigations at five potential sites. Four of the sites were chosen as a result of a statewide screening process, while the fifth site had been offered to the commission by an owner. The counties where the sites are located have raised objections to the site-selection process. GAO concludes that the commission's consideration of the offered site was inconsistent with some of its procedures and may not have followed others.

Nuclear Health and Safety: Mortality Study of Atmospheric Nuclear Test Participants Is Flawed (Letter Report, 08/10/92, GAO/RCED-92-182).

ABSTRACT: A 1979 report from the Centers for Disease Control (CDC) suggested that the incidence of leukemia among servicemen who had participated in atmospheric nuclear tests in the 1950s may have been seriously underestimated. In response, the Defense Nuclear Agency commissioned the National Academy of Sciences to study how low-level radiation affected participants in other atmospheric tests. The Academy's

1985 report concluded that the death rate from cancer in the five tests reviewed was generally less than that which would be expected in the general population. New information developed by the Defense Nuclear Agency in 1989, however, raised doubts about the validity of the Academy study. GAO provides information on the actions or omissions by the federal government in connection with the 1985 National Academy of Sciences report. GAO discusses (1) the accuracy of the data supplied to the Academy, (2) when and how inaccuracies in the data were discovered, (3) when and how the inaccuracies occurred, and (4) what actions have been taken to correct the data and update the 1985 mortality study.

Environmental Technology: Comments on S. 2632, the National Environmental Technologies Agency Act (Testimony, 07/21/92, GAO/T-RCED-92-81).

ABSTRACT: Innovative technologies are needed to clean up the environment and protect it in the future. The combined public and private cleanup effort in the United States alone may cost more than half a trillion dollars during the next 30 years, while the recent summit in Rio de Janeiro underscores the growing global dimensions of the environmental problem. Proposed legislation before the Congress—S. 2632—would create an agency to promote the development and commercial application of environmentally safe technologies and to improve the nation's competitiveness in meeting world demand for such technologies. Although the bill highlights the need for innovative environmental technologies, it also raises fundamental questions that the Congress may want to consider before committing considerable federal investment in a new agency. For example, what are the research and development needs? What are the needs for transfer of technology? What are the regulatory barriers to more widespread use? In any case, GAO believes that some of the bill's provisions could be clarified to avoid potential problems and help ensure success. Finally, the Congress may want to examine the roles of existing government organizations and how they should be integrated to promote the development and deployment of innovative environmental technologies.

Nuclear Science: Monitoring Improved, but More Planning Needed for DOE Test and Research Reactors (Letter Report, 07/15/92, GAO/RCED-92-123).

ABSTRACT: As its stock of nondefense nuclear reactors dwindles due to lower demand and higher operating costs, the Department of Energy (DOE)

must decide which reactors to shut down and which to maintain or replace. In DOE's view, the small number of remaining reactors and their specialized functions makes unnecessary formal long-range planning that would compare the capabilities, ages, and conditions of the reactors. Yet GAO believes that, given the ages of the test and research reactors and the deterioration taking place, it is not premature to plan for the timely retirement or replacement of these reactors. The absence of such planning could lead to safety problems, diminished reactor performance, increased costs to maintain existing safety levels, and gaps in service to experimenters using the equipment. Safety, or at least the identification of safety problems, has improved at DOE's nondefense test and research facilities. DOE now has an inventory of identified problems at these facilities that will take years to correct. Ensuring safer operations, however, demands continued identification and correction of problems.

Nuclear Waste: Improvements Needed in Monitoring Contaminants in Hanford Soils (Letter Report, 07/06/92, GAO/RCED-92-149).

ABSTRACT: Since so much of the radioactive and hazardous waste stored at the Department of Energy's (DOE) Hanford site either has been buried or has leaked from underground storage tanks, monitoring is vital to detect whether contaminants are seeping toward groundwater. GAO has discovered, however, that programs to spot contamination in the vadose zone—the unsaturated soil layer above the groundwater level—have received scant funding, are operating with out-of-date and uncalibrated equipment, and are not comprehensive enough to assess the migration of contaminants. The several different programs and organizations now spending vadose zone funds are often unaware of each other's activities and tend not to share data, personnel, or knowledge. Furthermore, DOE has no plan for improving its vadose zone activities. Vadose zone technology could help DOE save money by reducing the need for doing laboratory analyses and drilling wells.

Nuclear Security: Weak Internal Controls Hamper Oversight of DOE's Security Program (Letter Report, 06/29/92, GAO/RCED-92-146).

ABSTRACT: The Department of Energy (DOE), overseer of the nation's nuclear weapons program, runs a broad range of plants and laboratories to carry out research, development, and production. Given the potentially devastating consequence of radiological sabotage or terrorism, tight security is a must at these facilities. Accordingly, DOE spends nearly $1 billion annually to protect them. GAO reviewed DOE's practice of granting

exceptions to the agency's safeguards and security orders. Approved exceptions have ranged from exceptions to administration requirements, involving, for example, the labeling or marking of classified documents, to more substantive exceptions involving the inventory or storage of special nuclear materials. This report (1) cites the number of exceptions that have been approved, (2) determines whether DOE's written policies and procedures for reviewing and approving exceptions have been followed, and (3) describes the kind of internal control system used for monitoring and following up on individual exceptions.

Nuclear Weapons Complex: Status of Restart Issues at the Rocky Flats Plant (Fact Sheet, 06/22/92, GAO/RCED-92-176FS).

ABSTRACT: GAO reviewed the Department of Energy's (DOE) efforts to resume plutonium operations at the Rocky Flats Plant in Colorado. This fact sheet provides information on (1) the process that is being used at Rocky Flats to identify and manage environment, safety, and health issues; (2) the overall status of these issues at Rocky Flats; and (3) the status of these issues at the buildings where DOE plans to resume plutonium operations.

Uranium Enrichment: Unresolved Trade Issues Leave Uncertain Future for U.S. Uranium Industry (Letter Report, 06/19/92, GAO/RCED-92-194).

ABSTRACT: Total U.S. imports of Soviet-produced natural and enriched uranium were 17 times greater in 1991 than they were 5 years earlier. Department of Energy (DOE) uranium enrichment officials and U.S. miners view these imports as a threat to the domestic uranium market, and in November 1991, the miners filed an antidumping petition against Soviet importers. This report discusses (1) the increasing volume of natural and enriched uranium imported into the United States from the Soviet Union; (2) the ongoing antidumping case initiated by U.S. uranium miners; (3) other factors that will play a large role in determining the future of the domestic uranium market—namely, the breakup of the Soviet Union and the commercial use of highly enriched uranium originally produced for nuclear weapons; and (4) DOE's uranium inventories.

Nuclear Waste: Defense Waste Processing Facility—Cost, Schedule, and Technical Issues (Chapter Report, 06/17/92, GAO/RCED-92-183).

ABSTRACT: Since the early 1980s, the Department of Energy (DOE) has been planning or building facilities to treat and dispose of 34 million gallons of high-level radioactive waste stored in underground tanks at the Savannah River Site in South Carolina. The program has experienced cost increases and is now expected to cost nearly $4 billion and run about 5 years behind schedule. Further cost increases and schedule delays are possible because of technical issues and other uncertainties. Much of the cost increases and schedule slippages resulted from ineffective program management. In addition, because of the way in which DOE reported funding and budget information about the program in the past, the Congress did not have a clear picture of the cost increases and schedule slippages. DOE has taken steps to correct these problems. Two key pretreatment processes continue to be plagued by technical problems. At the same time, an alternative pretreatment method with lower operating costs has become available, raising questions about which pretreatment technology can come online quickest and offer environmental, safety, performance, and cost advantages. GAO recommends that DOE assess and compare the existing and alternative pretreatment technologies to see whether DOE should accelerate its planned efforts to replace the existing technology.

Nuclear Science: Consideration of Accelerator Production of Tritium Requires R&D (Letter Report, 06/15/92, GAO/RCED-92-154).

ABSTRACT: Tritium, a crucial material used in nuclear weapons, gradually decays and must be continually replaced. The Department of Energy (DOE) is responsible for producing tritium and has traditionally generated it at its nuclear reactors. The reactors are getting old, however, and it is unclear how much longer they will last. An alternative—producing tritium with a particle accelerator—was first proposed in 1989 by scientists at Los Alamos and Brookhaven National Laboratories. DOE has devoted scant funds to test the concept, however, and the full extent of the accelerator's abilities remains unknown. DOE declined to pursue this idea because it doubted that enough time existed to develop the concept, given the immaturity of the technology and the urgency with which DOE believed new tritium production capacity would be needed. Reductions in the nuclear weapons stockpile have eliminated the need for an urgent schedule and have given DOE more time to study the accelerator. To sufficiently develop the technology for an accelerator so that it can be

compared with reactors for tritium production would require a research and development program.

Nuclear Waste: Status of Actions to Improve DOE User-Fee Assessments (Letter Report, 06/10/92, GAO/RCED-92-165).

ABSTRACT: The Department of Energy (DOE) is required to build a deep underground repository for the safe, permanent disposal of nuclear waste from the government and the private sector. According to DOE estimates, the program could cost as much as $34 billion if two repositories are built. In a June 1990 report (GAO/RCED-90-65), GAO noted that DOE's methods for estimating program costs and revenues and for assessing fees did not adequately take into account uncertainties like inflation that are inherent in such a long-term program. GAO discusses DOE's periodic assessment of whether the fees charged to utilities running nuclear power plants are adequate to cover the costs of the civilian nuclear waste disposal program. GAO also discusses the need to disclose in the fund's financial statements the possibility that a portion of the one-time user fees due from utilities may be uncollectible because of the uncertain condition of some utilities.

Nuclear Science: DOE's Self-Supporting Isotope Program Is Experiencing Problems (Fact Sheet, 06/03/92, GAO/RCED-92-122FS).

ABSTRACT: Production and distribution of isotopes, which have medical, industrial, and scientific applications, has been a long-standing mission of the Department of Energy (DOE). DOE now generates less than 5 percent of all worldwide isotope sales. DOE is having problems running its isotope sales program on a self-supporting basis, and since 1990, program operating costs have exceeded revenues. Foreign competition and high operating costs have been the main factors discouraging the program's self-sufficiency. U.S. isotope users are concerned that DOE's commitment to operating the program on a self-sufficient basis may limit the domestic availability of some isotopes if DOE cannot produce them cost-effectively.

Nuclear Waste: DOE's Repository Site Investigations, a Long and Difficult Task (Chapter Report, 05/27/92, GAO/RCED-92-73).

ABSTRACT: More than 20,000 metric tons of highly radioactive wastes are stored at more than 70 sites across the country. Because these wastes will remain dangerous for thousands of years, the Department of Energy (DOE) is seeking to develop an underground repository for safe, permanent disposal of this material. Under 1987 legislation, DOE must consider Yucca

Mountain, Nevada, as the sole potential repository site. This report focuses on (1) DOE's efforts to investigate Yucca Mountain since 1988; (2) DOE's efforts to ensure the early identification, primarily through surface-based tests, of any conditions that could disqualify the site; and (3) the effects of delays in DOE's obtaining environmental permits from the state of Nevada.

Nuclear Health and Safety: More Can Be Done to Better Control Environmental Restoration Costs (Chapter Report, 04/20/92, GAO/RCED-92-71).

ABSTRACT: For more than 40 years, the nuclear weapons complex run by the Department of Energy (DOE) has been disposing of hazardous and radioactive waste at sites across the country. DOE estimated in 1988 that its environmental restoration effort, a process to clean up these sites and meet federal and state standards, could cost as much as $64 billion. Although data are unavailable to determine aggregate cost growth associated with DOE's environmental restoration program, indications are that costs are soaring. In response to these increases, DOE began reviewing the causes of cost growth in 1990 to determine whether the cost escalation could be minimized. DOE, concluding that some cost growth has been unnecessary and should be better controlled, has begun (1) conducting program cost reviews, (2) developing procedures that require preparing documentation to support cost estimates, and (3) instituting cost-estimating review procedures. GAO questions the direction and pace of DOE's actions. Specifically, DOE still lacks some basic management tools, such as baselines for individual projects and an information system for monitoring cost growth, to properly understand and analyze environmental restoration cost growth. While these tools would not in themselves stem the program's cost growth, they would help DOE better identify and understand the reasons behind the cost increases, allowing DOE management to deal with the problem.

Cleanup Technology: Better Management for DOE's Technology Development Program (Letter Report, 04/10/92, GAO/RCED-92-145).

ABSTRACT: The Department of Energy (DOE) has implemented its technology development program for environmental cleanup and has funded major research and development projects. The program's funding for fiscal year 1992 is about $303 million, and DOE is requesting about $315 million for fiscal year 1993. The agency has not, however, developed measurable performance goals, overall cost estimates and schedules, and key decision points for evaluating program projects. Without these basic

management tools, DOE will have a hard time determining what its objectives are, how best to achieve them, and when it has achieved them. Moreover, the Congress will have difficulty determining what investments the program is making and what funding is needed.

Nuclear Science: Fast Flux Test Facility on Standby, Awaiting DOE Decision on Future Missions (Fact Sheet, 04/09/92, GAO/RCED-92-121FS).

ABSTRACT: The Fast Flux Test Facility, located at the Hanford Reservation in Washington state, is the Department of Energy's (DOE) newest and largest test and research reactor facility. In operation since 1982, the facility is designed primarily to test how well materials and components proposed for use in advanced reactors work in an operating test reactor. This fact sheet explores the rationale for DOE's 1990 decision to shut down the facility as well as DOE's response to proposals to keep the facility operating.

Nuclear Weapons Complex: GAO's Views on Reconfiguring the Complex (Testimony, 04/01/92, GAO/T-RCED-92-49).

ABSTRACT: In addition to long-standing safety and environmental problems plaguing the nuclear weapons complex, the Department of Energy (DOE) faces a major new challenge—how to reconfigure the weapons complex to meet the nation's defense needs in the 21st century. Key decisions still need to be made about the size of the complex; where, if necessary, to relocate various operations; what technologies to use for new tritium production; and what to do with excess weapons-grade material. The choices confronting DOE and the Congress are difficult given the conflicting demands for limited resources.

Nuclear Weapons Complex: Improving DOE's Management of the Environmental Cleanup (Testimony, 03/30/92, GAO/T-RCED-92-43).

ABSTRACT: Sound, credible management systems are essential to the Department of Energy's (DOE) cleanup of the nation's nuclear weapons complex. Addressing the environmental problems created by nearly half a century of nuclear weapons production is a herculean task. DOE and the Congress will need to make hard choices between the weapons complex cleanup and other national needs. Management systems to set priorities, estimate project costs, and track programs will be critical to this decision-making. While DOE is making progress on these systems, further steps are necessary to improve the prioritization system and determine

how it will be used, refine how DOE estimates costs, and complete and expand the Progress Tracking System.

Connecticut Low-Level Waste (Correspondence, 03/17/92, GAO/RCED-92-137R).

BACKGROUND: Pursuant to a congressional request, GAO provided information on states' efforts to implement the Low-Level Radioactive Waste Policy Amendments Act of 1985, focusing on Connecticut's program for developing a disposal facility for commercial low-level radioactive waste. GAO noted that: (1) 13 states, including 8 states that are members of state compacts, plan to develop new disposal facilities; (2) only California, a member of a 4-state compact, may have a facility operational by the January 1, 1993, deadline, and the other planned facilities could be completed between 1993 and 1999; and (3) Connecticut's facility development schedule is unknown, since it suspended site-specific testing after determining that its site-screening contractor made some errors in its technical investigation of three candidate sites.

Nuclear Waste: Development of Casks for Transporting Spent Fuel Needs Modification (Letter Report, 03/13/92, GAO/RCED-92-56).

ABSTRACT: So that it can start removing radioactive wastes from the nation's nuclear plants in 1998, the Department of Energy (DOE) is developing two kinds of high-capacity casks for shipping spent fuel by truck or by rail and barge. The pace and direction of DOE's cask development program are based on the agency's conviction that a storage facility can be developed in time to receive and store the spent fuel by 1998. GAO doubts that DOE will have a facility up and running by then. Despite grant applications from possible host jurisdictions, the likelihood that a volunteer site will be found remains uncertain. This situation affords DOE an opportunity over the next several years to reevaluate the course and direction of the cask development program while conserving funds until there is a clear need to produce casks. With more time available, DOE can address whether possible technical and operational concerns might affect cask designs.

The SP-100 Nuclear Reactor Program: Should It Be Continued? (Testimony, 03/12/92, GAO/T-NSIAD-92-15).

ABSTRACT: The SP-100 Space Nuclear Reactor Program was created to develop technology for space reactor power systems used in future

National Aeronautics and Space Administration and Defense Department space missions. The program has been struggling, and the government is at a point at which it must decide whether to continue it. GAO's testimony discusses (1) the program's past and projected costs, (2) missions identified by potential users of the technology, (3) recent events that raise questions about the program's continued viability, and (4) possible options for the program's future.

Cleanup Technology: DOE's Management of Environmental Cleanup Technology (Testimony, 02/26/92, GAO/T-RCED-92-29).

ABSTRACT: To clean up its nuclear weapons complex in a cost-effective way, the Department of Energy (DOE) believes that it needs improved cleanup technologies. As a result, DOE has begun a technology development program and has started funding eight integrated cleanup research and development projects. The number of these demonstration projects is expected to change as DOE reassesses its program strategy. Nonetheless, DOE's focus to date has been on setting up the program, not on its future management. GAO testified that DOE needs to develop key management tools fundamental to the program's effectiveness. These tools include measurable performance goals, overall project cost estimates and schedules, and major decision points. Without them, DOE will have problems in measuring the technology development program's progress, informing the Congress about the investments being made and funding required, and weeding out poorly performing projects that are no longer beneficial.

Nuclear Weapons Complex: Major Safety, Environmental, and Reconfiguration Issues Facing DOE (Testimony, 02/25/92, GAO/T-RCED-92-31).

ABSTRACT: The Department of Energy (DOE) faces a monumental task in addressing the legacy of safety and environmental problems created by almost a half century of nuclear weapons production and, at the same time, addressing important issues about the size and structure of the complex in light of a substantially reduced nuclear weapons arsenal. The cost will be large and the difficulties immense. This testimony discusses the (1) progress DOE has made in developing and implementing a safety policy and culture, (2) major challenges DOE faces in cleaning up the weapons complex, and (3) key issues DOE faces in reconfiguring the complex in light of weapons reductions.

Nuclear Waste: DOE Assistance in Funding Route Improvements to Waste Isolation Plant (Fact Sheet, 01/14/92, GAO/RCED-92-65FS).

ABSTRACT: Located near Carlsbad, New Mexico, the Waste Isolation Pilot Plant is intended to be an underground repository for the permanent disposal of transuranic waste—material contaminated with radioactive elements that have atomic numbers greater than uranium. The Department of Energy (DOE) produces this waste at various facilities in its nuclear weapons complex. This fact sheet provides information on DOE's fulfillment agreements with New Mexico to assist the state in obtaining federal funds to improve roads in connection with the plant.

Nuclear Waste: Weak DOE Contract Management Invited TRUPACT-II Setbacks (Chapter Report, 01/14/92, GAO/RCED-92-26).

ABSTRACT: The Department of Energy (DOE) spent about $3 million to buy 24 defective shipping containers intended to transport transuranic waste to storage sites in New Mexico. The containers were built under a subcontract with Westinghouse, DOE's managing contractor for the Waste Isolation Pilot Plant. While smoothing welded surfaces on the containers, the contractors ground the walls too thin to meet the Nuclear Regulatory Commission's (NRC) approved design. NRC later rejected the thin-walled containers. Concerned that the contractor might declare bankruptcy and jeopardize the opening of the plant, DOE allowed Westinghouse to enter into an agreement with the contractor to build 15 NRC-approved containers and purchase the defective ones. This report details several ineffective contracting practices that led to DOE's purchase of the defective containers. Ineffective oversight by Westinghouse and DOE exacerbated the situation. Historically, DOE has given its contractors wide latitude but has done little oversight. Although DOE is trying to improve its contract-management approach, instituting effective, lasting changes will be difficult.

Nuclear Health and Safety: Radiation Events at DOE's Idaho National Engineering Laboratory (Fact Sheet, 01/13/92, GAO/RCED-92-64FS).

ABSTRACT: The Idaho National Engineering Laboratory, established in 1949, is an engineering facility whose primary function is to build, test, and operate nuclear reactors and support facilities. During the 1950s and 1960s, the laboratory released radioactive materials into the atmosphere on several occasions. This fact sheet provides information on nuclear

events at the laboratory through the 1980s and on the extent to which the Department of Energy considered such events in determining the award fee paid to the laboratory contractor. GAO focused on (1) airborne radiation releases that may have exposed the public to radiation levels greater than the current public exposure standards and (2) events that resulted in one or more workers receiving an exposure exceeding the current annual standards for protecting workers from radiation.

Nuclear Waste: Slow Progress Developing Low-Level Radioactive Waste Disposal Facilities (Chapter Report, 01/10/92, GAO/RCED-92-61).

ABSTRACT: Each year, nuclear power plants, businesses, hospitals, and universities generate more than 1 million cubic feet of hardware, rags, paper, liquid waste, and protective clothing that have been contaminated with radioactivity. While most of this waste has been disposed of in facilities in Nevada, South Carolina, and Washington State, recent legislation made the states responsible—either individually, or through groups of states called compacts—for developing new disposal facilities. This report discusses (1) the states' progress and problems in meeting facility development milestones in the law, (2) federal and state efforts to resolve issues related to mixed waste (low-level waste that also contains hazardous chemicals) and waste with very low levels of radioactivity, and (3) the Department of Energy's progress in discharging the federal government's responsibility under the law to manage the most hazardous low-level waste.

Nuclear Security: Safeguards and Security Weaknesses at DOE's Weapons Facilities (Letter Report, 12/13/91, GAO/RCED-92-39).

ABSTRACT: Despite their crucial importance to national security, safeguards at the Department of Energy's (DOE) weapons facilities may be falling short. DOE security inspections have identified many weaknesses, including poor performance by members of DOE's security force, poor accountability for quantities of nuclear materials, and the inability of personnel to locate documents containing classified information. About 13 percent of the 2,100 identified weaknesses resulted in DOE inspectors' giving out unsatisfactory security ratings; another 38 percent led to marginal ratings. In addition, DOE's centralized safeguards and security information tracking system lacks current data on whether DOE field offices have corrected the identified weaknesses. Without reliable information, DOE has no way of knowing whether timely action was taken to correct problems, nor can it determine whether weaknesses are

systemic. DOE has tried to minimize the impact of these security weaknesses at its facilities by establishing multiple layers of protection measures and instituting interim and compensatory measures for identified weaknesses. DOE is also planning enhancements to the centralized tracking system that should improve its reliability and increase its effectiveness.

Uranium Enrichment: Analysis of Decontamination and Decommissioning Scenarios (Briefing Report, 11/15/91, GAO/RCED-92-77BR).

ABSTRACT: This briefing report analyzes—using four different scenarios—the adequacy of a $500 million annual deposit into a fund to pay for the cost of cleaning up the Department of Energy's (DOE) three aging uranium enrichment plants located in Oak Ridge, Tennessee; Paducah, Kentucky; and Portsmouth, Ohio. GAO found that a fixed annual $500 million deposit made into a cleanup fund would not be adequate to cover total expected cleanup costs, nor would it be adequate to cover expected decontamination and decommissioning costs. A $500 million annual deposit indexed to an inflation rate would likely be adequate to pay for all expected cleanup costs, including decontamination and decommissioning costs, and depleted uranium costs.

Nuclear Power Safety: Chernobyl Accident Prompted Worldwide Actions but Further Efforts Needed (Chapter Report, 11/04/91, GAO/NSIAD-92-28).

ABSTRACT: Since the Chernobyl nuclear plant accident in 1986, over 70 of the International Atomic Energy Agency's 112 member states have adopted two conventions to enhance international cooperation by providing (1) timely notification of an accident and (2) emergency assistance. The Agency and other international organizations also developed programs to improve nuclear power plant safety and minimize dangers from radioactive contamination. Despite meaningful improvements, some of the measures have limitations, and serious nuclear safety problems remain in the design and operation of the older, Soviet-designed nuclear power plants. The Agency's ability to select reactors under its operational safety review program is limited. Also, information on the extent and seriousness of safety-related incidents at reactors in foreign countries is not publicly available. No agreements exist among nuclear power countries to make compliance with any nuclear safety standards or principles mandatory. Currently, adherence to

international safety standards or principles is voluntary and nonbinding. Some states support the concept of mandatory compliance, but others, including the United States, believe that mandatory compliance infringes on national sovereignty and that the responsibility for nuclear reactor safety remains with each nation.

Nuclear Science: Accelerator Technology for Tritium Production Needs Further Study (Letter Report, 10/31/91, GAO/RCED-92-1).

ABSTRACT: Has the Department of Energy (DOE) given full and fair consideration to using a particle accelerator for tritium production? In a 1987 report, DOE's Energy Research Advisory Board assessed the feasibility of using an accelerator to produce tritium. GAO concludes that the criteria used to assess the accelerator technology did not provide the flexibility necessary to assess and report on the advantages of relatively small-size accelerators. Cost estimates for accelerators to produce tritium are very uncertain because a detailed design has not been done. Further study is needed to develop meaningful cost estimates. Recent decreases in projected tritium needs for servicing existing and planned nuclear weapons, and a new target concept for the accelerator technology may provide significant benefits. The projected decrease in the need for tritium could make the small accelerators more attractive because they may be capable of meeting future tritium needs, thus reducing the amount of electric power needed for the process. In addition, the successful development of the helium-3 target could almost eliminate radioactive waste from the tritium production cycle. While GAO takes no position on constructing an accelerator for the production of tritium, it does believe that it is valid technology that deserves more balanced consideration.

Nuclear Health and Safety: Problems Continue for Rocky Flats Solar Pond Cleanup Program (Letter Report, 10/17/91, GAO/RCED-92-18).

ABSTRACT: In an earlier report (GAO/RCED-91-31, Jan. 3, 1991), GAO discussed the Department of Energy's (DOE) efforts to clean up the solar evaporation ponds at its Rocky Flats Plant in Colorado. DOE is trying to excavate the ponds used for storing and evaporating low-level radioactive and hazardous waste and stabilize the material by mixing it with concrete. DOE issued a press release in March 1991 stating that it has imposed strict cost control measures in managing the project. Yet DOE's most recent cost data show that total cleanup costs have soared to an estimated $169 million through completion in 2009—$50 million more than the amount GAO reported 9 months ago. Delays have plagued the completion

and approval of the managing plans for conducting and monitoring the program. Cleanup activities that DOE expected to resume by December 1990 have not yet begun. DOE will not meet the first major milestone of the solar ponds program—cleaning up the ponds and moving all the "pondcrete" off site by October 1991. Furthermore, unless DOE provides enough project funding or resolves concerns over pondcrete disposal in Nevada, it will not finish pondcrete processing before Rocky Flats' interim status permit for pondcrete operations expires in November 1992.

Nuclear R&D: Research Efforts Under Way to Support Nuclear Power Plant License Renewal (Letter Report, 09/25/91, GAO/RCED-91-207).

ABSTRACT: Within the next 20 years, licenses will expire for 42 of the 113 nuclear power plants licensed by the Nuclear Regulatory Commission (NRC). At NRC's request, the National Research Council of the National Academy of Sciences examined the future role of NRC's regulatory research, including research on the aging of nuclear power reactors and the possibility of extending their operating licenses for 20 years beyond the normal 40-year term. The Council issued a report in 1986 containing many recommendations on revitalizing nuclear safety research; only four of these recommendations were directed at research related to license renewal. GAO discusses the (1) actions NRC has taken to implement the Council's recommendations on the need for NRC research on reactor aging to support its license renewal efforts; (2) the research on reactor aging completed by the Department of Energy and the industry in response to the Council's recommendation that research be done to prove that license conditions set by NRC can be met, and whether the results have been provided to NRC; and (3) NRC's plan to refine the estimates of risks (or the probability of accidents) created by extending the life of the present generation of reactors.

Nuclear Waste: Operation of Monitored Retrievable Storage Facility Is Unlikely by 1998 (Chapter Report, 09/24/91, GAO/RCED-91-194).

ABSTRACT: Radioactive waste at U.S. nuclear power plants is mounting at a rate of more than 2,000 metric tons a year. Yet the Department of Energy (DOE) does not expect a geologic repository to be available before 2010. In response to concerns about how best to store the waste until a repository is available, GAO reviewed the alternatives of continued storage at utilities' reactor sites or transferring waste to a monitored retrievable storage facility. This report assesses the (1) likelihood of a monitored retrievable storage facility operating by 1998, (2) legal implications if DOE is unable to

take delivery of wastes in 1998, (3) propriety of using the Nuclear Waste Fund—from which DOE's waste program costs are paid—to pay utilities for on-site storage capacity added after 1998, (4) the ability of utilities to store their waste on-site until a repository is operating, and (5) relative costs and safety of the two storage alternatives.

Nuclear Health and Safety: Workers' Compensation Rights Protected at Hanford (Letter Report, 09/10/91, GAO/RCED-91-203).

ABSTRACT: Since 1943 the Washington State Department of Labor and Industries has had a contract with the Department of Energy (DOE) or its predecessor to administer a self-insured workers' compensation/pension program for contractor employees at DOE's Hanford Site near Richland, Washington. This review stemmed from concerns that the contract's implementation could have prevented Hanford employees from filing workers' compensation claims for radiation-related injuries or occupational diseases resulting from their employment at the Hanford Site. GAO found that the procedures since the late 1950s for filing claims contain sufficient checks and balances to ensure that they cannot be blocked by DOE. However, this assurance is lacking for claims initiated between 1943, when Hanford was founded, and the late 1950s. Claim-filing procedures in effect at that time required claims to be submitted to the state through the employer. However, no evidence was found that DOE did not forward employee claims to the state before the procedural change, nor were DOE, state officials, or employee union representatives aware of any Hanford employee being denied the right to file a workers' compensation claim.

Uranium Enrichment: DOE Needs to Pursue Alternative AVLIS Deployment Options (Chapter Report, 08/08/91, GAO/RCED-91-88).

BACKGROUND: GAO reviewed the Department of Energy's (DOE) demonstration and deployment of the atomic vapor laser isotope separation (AVLIS) program and the building of an AVLIS plant, focusing on technical, program, and economic issues.

FINDINGS: GAO found that: (1) independent experts believe that the AVLIS demonstration program will be successful, but the program will not provide the specific cost information needed for a complete evaluation of deployment by the end of 1992 due to unresolved technical issues; (2) by November 1992, DOE will not have fully demonstrated the processes needed to effectively integrate AVLIS into the existing nuclear fuel cycle;

(3) such program activities as plant licensing and site selection and preparation will delay AVLIS plant construction beyond 1993; (4) DOE stopped most AVLIS program activities for fiscal year 1992 in anticipation of the formation of a government corporation to complete such activities, but DOE has not developed any contingency plan for deploying the AVLIS technology should a government corporation not be formed; (5) an updated and expanded uranium enrichment market analysis is needed before any decision is made about building an AVLIS plant; and (6) DOE stopped a planned program that was to obtain private companies' expertise in deploying a commercial plant.

Nuclear Waste: Hanford Single-Shell Tank Leaks Greater Than Estimated (Letter Report, 08/05/91, GAO/RCED-91-177).

BACKGROUND: Pursuant to a congressional request, GAO determined whether the Department of Energy (DOE) or its Hanford, Washington, site contractor fully disclosed the volume of waste that leaked from the site's underground single-shell storage tanks.

FINDINGS: GAO found that: (1) DOE estimated that 750,000 gallons of liquid waste leaked from 66 shell tanks, but did not include the volume of cooling water that had been added to the tanks, some of which could have leaked; (2) DOE historically did not include cooling water that could leak from the tanks in its tank leak studies; (3) DOE noted that it added cooling water to a single tank and that some did leak, but did not provide any volume figures; (4) the contractor's estimate indicated that only 5,000 gallons of waste leaked from that tank, but records indicated that more than 500,000 gallons of contaminated cooling water leaked from the tank; (5) as of February 1991, the contractor estimated that between 50,000 gallons and 800,000 gallons of the cooling water added to the tank between February 1971 and December 1978 could have leaked; and (6) in October 1990, DOE directed the contractor to examine past records to determine the amount of liquid waste that could have leaked from the 66 tanks classified as assumed leakers, including the aforementioned tank.

Nuclear Health and Safety: Environmental, Health, and Safety Practices at Naval Reactors Facilities (Chapter Report, 08/01/91, GAO/RCED-91-157).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the environmental, health, and safety practices at the Department of Energy's Naval Reactors Program facilities, focusing on the programs and

procedures the Naval Reactors implemented to: (1) protect the environment and (2) ensure the health and safety of workers and the public.

FINDINGS: GAO found that: (1) Naval Reactors and its contractors developed and implemented adequate procedures to protect workers and the environment from radiation exposure and other hazardous materials, including asbestos; (2) Naval Reactors requires its workers to take an extensive initial radioactive training course and periodically retrains them on safety procedures; (3) each laboratory and site conducts routine radiological surveys of facilities either daily, weekly, monthly, or annually; (4) records concluded that, since 1967, no Naval Reactors Program personnel has exceeded the federal radiation exposure limit, or the Naval Reactors administrative limit since 1984; (5) the prototype reactor design provides safety measures consistent with commercial nuclear power requirements, but minor environmental and safety accidents have occurred, and past activities resulted in environmental problems that require continuous monitoring; (6) Naval Reactors' asbestos control procedures and requirements either met or exceeded federal standards; (7) although Naval Reactors was previously exempt from oversight, some federal and state environmental oversight agencies have recently been permitted access to Naval Reactors facilities; (8) Naval Reactors and its contractors established an extensive internal oversight program aimed at reporting requirement or procedure deviations; and (9) although Naval Reactors did not routinely overclassify information to prevent public disclosure, it did occasionally misclassify documents.

Nuclear Waste: Extensive Process to Site Low-Level Waste Disposal Facility in Nebraska (Letter Report, 07/05/91, GAO/RCED-91-149).

BACKGROUND: Pursuant to a congressional request, GAO examined the selection of a site for a low-level radioactive waste disposal facility within a 5-state area, focusing on: (1) the contractor's site-selection process, (2) the scientific merit of the geological and hydrologic assessments of the candidate sites, (3) Nebraska's statutory policy requiring community support for the proposed facility at the chosen Boyd County site, and (4) the provision of financial protection to the public against injury or property damages that might result from operation of the proposed facility.

FINDINGS: GAO found that: (1) the detailed geologic and hydrologic assessments at the three candidate sites appeared to be technically

correct; (2) the site-screening process included technical records reviews, on-site assessments, and consideration of such nontechnical factors as public values and concerns, community support, and identification of available land; (3) although initially supported by the Boyd County community, the county board of supervisors withdrew its support for the project after it determined that the contractor was unwilling or unable to meet board conditions; (4) the contractor maintains that it complied with state policy to obtain community support for the proposed facility, but the issue remains open and the state legislature is considering the need for a county vote to address this issue; (5) the contractor will obtain nuclear facility liability insurance and other commercially available insurance as required by the state; and (6) due to concerns about major liability claims, Nebraska enacted legislation requiring all states in the compact to share in the risk of third-party liability.

Nuclear Security: DOE Original Classification Authority Has Been Improperly Delegated (Letter Report, 07/05/91, GAO/RCED-91-183).

BACKGROUND: Pursuant to a congressional request, GAO examined the Department of Energy's (DOE) use and authorization of contractors to make original classification determinations about national security information.

FINDINGS: GAO found that: (1) DOE granted original classification authority on a selective basis but had granted such authority to persons in senior-level positions at facilities dealing with large volumes of classified information, including government-owned, contractor-operated (GOCO) laboratories; (2) as of May 1991, 142 persons, including over 50 contractor employees, had original classification authority; (3) 14 percent of those authorized contractor employees had top-secret level classification authority; (4) contractor employees made 3 top-secret determinations and 189 secret or confidential determinations between fiscal years 1985 and 1990, while DOE personnel made a total of 3,091 original classification determinations during that period; (5) although an executive order limited classification authority to agency heads and their subordinates, DOE believed that its long-standing unique relationship with GOCO facilities and adequate controls to review determinations justified granting such authority to contractors; (6) the National Security Council recommended that DOE reconsider its authorization policy after identifying such delegations during a 1986 site visit, but did not follow up on the recommendation during its 1988 visit; and (7) DOE did not know the extent to which it reviewed or approved contractor classification determinations.

GAO believes that misclassification of information could potentially seriously impact and threaten U.S. national security interests.

Nuclear Waste: Delays in Addressing Environmental Requirements and New Safety Concerns Affect DOE's Waste Isolation Pilot Plant (Testimony, 06/13/91, GAO/T-RCED-91-67).

BACKGROUND: GAO discussed the status of the Department of Energy's (DOE) program for conducting transuranic (TRU) waste disposal tests at its Waste Isolation Pilot Plant (WIPP). GAO noted that: (1) DOE cannot use the WIPP repository until the facility meets environmental requirements and DOE resolves safety concerns; (2) from 1981 through 1988, DOE focused on building WIPP and failed to consider environmental compliance issues; (3) in 1989, DOE proposed to test TRU waste in WIPP to determine compliance with environmental requirements but delayed the tests until it could determine that WIPP would comply with environmental standards; (4) technical problems delaying the tests included gases generated by TRU wastes, the interaction of brine with TRU wastes, and obtaining waste samples characteristics of the waste to be stored at WIPP; (5) the natural movement of rock surrounding underground storage areas raised questions regarding the safety of waste storage operations and the retrieval of wastes after the tests; (6) DOE has not identified where it will store TRU waste in the event that WIPP fails to meet environmental requirements; and (7) temporary storage of TRU wastes has become a contentious issue betweeen DOE and states hosting temporary storage facilities.

Nuclear Waste: Pretreatment Modifications at DOE Hanford's B Plant Should Be Stopped (Letter Report, 06/12/91, GAO/RCED-91-165).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the Department of Energy's (DOE) plans to modify its Hanford Site B Plant in Washington State to pretreat mixed high-level radioactive waste before the vitrification process to turn it into glass.

FINDINGS: GAO found that: (1) although DOE was aware that the plant had not met specific federal or DOE regulations since 1987, it failed to timely discuss the compliance problems with Washington; (2) although the plant did not comply with regulatory requirements, DOE considered modification less costly than construction of a new facility; (3) despite a March 1991 recommendation by Washington that DOE abandon plans to establish the plant as a pretreatment facility, DOE continued to modify B Plant for that

purpose; (4) the process DOE was developing for pretreating approximately 75 percent of its high-level waste could cause extensive corrosion to the plant's embedded waste pipes; (5) DOE was reevaluating B Plant's viability as a pretreatment facility, alternative pretreatment processing options, and alternative pretreatment facilities; (6) a DOE assessment of vitrification process risks suggested that B Plant would not meet federal environmental requirements; (7) DOE believed that its noncompliance was due to the absence of double containment for pipes, tanks, and other processing facilities; and (8) even though DOE halted modification projects totaling more than $400 million, it continued pretreatment projects totaling about $43 million.

Nuclear Regulation: NRC's Relationship With the Institute of Nuclear Power Operations (Letter Report, 05/16/91, GAO/RCED-91-122).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the Nuclear Regulatory Commission's (NRC) relationship with the Institute of Nuclear Power Operations (INPO), focusing on whether NRC: (1) used INPO evaluation reports instead of its own oversight of the nuclear power industry and (2) relied on INPO communications to alert industry of potential nuclear plant safety problems instead of issuing its own information notices.

FINDINGS: GAO found that: (1) the nuclear power industry established INPO not to supplant the NRC regulatory role but to provide the means whereby the industry itself could make its nuclear operations safer; (2) INPO had no legal authority over nuclear utilities but worked with NRC to coordinate regulatory activities; (3) NRC did not routinely use INPO evaluation reports instead of its own inspections to carry out its oversight of the nuclear power industry; (4) approximately 12 times over the past 2 years, NRC decided not to issue its own information notice since INPO had already alerted the industry to the potential problem; and (5) NRC decisions not to issue notices on the same matters reported on by INPO reduced the amount of nuclear power plant safety information available to the public, since INPO reports were not available to the public.

Nuclear Security: Property Control Problems at DOE's Livermore Laboratory Continue (Letter Report, 05/16/91, GAO/RCED-91-141).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the Department of Energy's (DOE) Lawrence Livermore National Laboratory's claim that it found approximately 99 percent of the inventory it previously

reported as missing, focusing on: (1) the accuracy of laboratory claims; (2) whether controls over government-owned property at the laboratory were strengthened; and (3) the adequacy of DOE property control oversight.

FINDINGS: GAO found that: (1) the laboratory's claim was inaccurate, since it excluded missing noncapital equipment purchased prior to 1985 from its analysis and it used a different basis than GAO did for calculating and reporting missing item percentages; (2) taking the differences into consideration, the laboratory actually located only 3 percent of the inventoried equipment, acquired at a cost of $26.8 million, and 13 percent of the inventoried equipment, acquired at a cost of $18.6 million, remained missing; (3) the laboratory's property management policy manual lacked property accountability controls over all noncapital equipment; (4) DOE oversight of changes in laboratory property controls was inadequate; and (5) the DOE San Francisco Operations Office approved the property management policy manual without ensuring that it complied with federal and departmental regulations.

Nuclear Waste: Changes Needed in DOE User-Fee Assessments
(Testimony, 05/08/91, GAO/T-RCED-91-52).

BACKGROUND: GAO discussed the Department of Energy's (DOE) procedures for annually assessing the adequacy of the fee that utilities pay for disposal of spent nuclear fuel. GAO noted that: (1) the nuclear waste program was susceptible to future budget shortfalls; (2) without a fee increase, the civilian waste nuclear program might be underfunded by at least $2.4 billion; (3) inflation was the major contributing factor to program cost increases; (4) indexing the disposal fee to the inflation rate would protect the Nuclear Waste Fund from the effects of inflation; (5) inflation indexing would permit DOE to concentrate its fee assessments on estimated program costs that were unrelated to inflation and revenue uncertainties; (6) a fee increase was not necessary to recover program costs with one repository, but for two repositories the current fee would result in a Fund program deficit of $23 billion; and (7) DOE did not pay its share of program costs. GAO also noted that: (1) DOE had not yet begun investigating the Yucca Mountain, Nevada, repository site; (2) technical and management problems resulted in DOE spending $12 million in 1989 and 1990 to develop a new drilling technology and a facility for managing core samples obtained during the site investigation; (3) DOE spent over $36 million to design the exploratory shaft facility in 1988 and 1989, but poor design and construction methods resulted in DOE selecting a new

design and construction method; and (4) DOE spent about $122 million on general project management.

Nuclear Health and Safety: Environmental, Health, and Safety Practices at Naval Reactors Facilities (Testimony, 04/25/91, GAO/T-RCED-91-24).

BACKGROUND: GAO discussed environmental, health, and safety practices at two Naval Reactors Program research and development facilities. GAO noted that: (1) the laboratories and sites were in full compliance with federal and state standards regarding radioactive releases to the environment and there was no evidence of unsafe radiological operations or conditions; (2) there was no evidence in personnel exposure records, incident reports, and other exposure information that any personnel had exceeded the annual radiation exposure limit; (3) the laboratories and sites provided safety measures that were consistent with the requirements for commercial nuclear reactors; (4) prototype reactors did employ enhanced safety systems and met the intent of safety criteria for normal operations and accident conditions; and (5) the Naval Reactors Program approved a $68 million program to remove or stabilize asbestos at all of its facilities over the next 10 years. GAO believes that all laboratories and sites were: (1) in the process of complying with legislative requirements that potentially hazardous areas be characterized and remedial action taken if necessary and (2) addressing problems associated with radioactively contaminated buildings and chemical wastes in landfills and disposal sites to protect public and worker health and safety.

Nuclear Waste: Problems and Delays With Characterizing Hanford's Single-Shell Tank Waste (Letter Report, 04/23/91, GAO/RCED-91-118).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the status of Department of Energy (DOE) efforts to characterize single-shell tank wastes at its Hanford, Washington, site, focusing on impediments such as: (1) technological limitations and (2) safety considerations.

FINDINGS: GAO found that: (1) due to the number of unresolved issues, DOE was unlikely to complete the first-phase characterization of the single-shell tank wastes by the 1998 deadline; (2) due to several unanticipated events during the initial characterization phase, the contractor lacked sufficient information to develop a revised waste characterization plan by the November 1990 deadline; (3) although 16 core samples were retrieved by April 1990, the contractor only reviewed and

approved 8 data packages in time to support revising the characterization plan; (4) the diversion of single-shell tank resources, such as personnel and the only tank sampling truck, to address higher-priority double-shell tank safety issues in February 1991 would delay the scheduled May 1991 sampling of two single-shell tanks until September 1991 and could affect other future samplings; (5) if the revised plan increased the amount of required sampling, the tri-party agreement between Washington State, DOE, and the Environmental Protection Agency could be affected in terms of milestone dates and program costs; (6) DOE's analysis of the variance in samples analyzed to date and the statements of agency and contractor officials supported the view that two samples would not provide an adequate basis for making informed decisions; (7) due to the number of uncertainties, the Washington State Department of Ecology and DOE believed it would take 2 to 3 years to develop a revised waste characterization plan for sampling the balance of the single-shell tanks; and (8) DOE was conducting studies to resolve safety problems associated with potentially explosive wastes.

Nuclear Waste: DOE Expenditures on The Yucca Mountain Project
(Testimony, 04/18/91, GAO/T-RCED-91-37).

BACKGROUND: GAO discussed the Department of Energy's (DOE) use of appropriated funds for completing a scientific investigation needed to obtain a Nuclear Regulatory Commission (NRC) license to construct and operate a nuclear waste repository site at Yucca Mountain, Nevada. GAO noted that: (1) DOE was not ready to begin on-site investigations, originally scheduled for 1987, until 1991 because it took longer than it expected to complete its site investigation plan and NRC compliance program; (2) Nevada did not issue essential environmental permits that DOE needed before it could start the investigation; (3) prior to 1987, DOE spent about $48 million on drilling holes and obtaining core samples, but due to technical and management problems, the samples' usefulness was unclear; (4) from 1989 to 1990, DOE spent $12 million on developing a new drilling technology and core management facility to use in on-site investigation; (5) DOE spent over $36 million in 1988 and 1989 on the design of an exploratory shaft facility before selecting a new facility design and construction plan due to external criticism of its original plan; (6) it was unclear as to how much of the original design work DOE will have to redo or the additional costs that it will incur due to the new plan; and (7) DOE and its contractors spent about $122 million, or 25 percent of total project costs, on general management of the Yucca Mountain project over a 3-year period.

Nuclear Weapons Complex: Reconfiguring DOE's Weapons Complex (Testimony, 04/18/91, GAO/T-RCED-91-40).

BACKGROUND: GAO discussed the Department of Energy's (DOE) efforts to develop long-term modernization plans to address environmental and safety problems of its aging nuclear weapons complex. GAO noted that: (1) DOE still needs to make key decisions about the size of the complex, where to relocate plutonium operations, which technologies to use for new tritium production, and what to do with excess production; (2) the nation's future provision of tritium for nuclear weapons and management of its plutonium inventory were uncertain and undefined; (3) reconfiguration and modernization costs will be much greater than the $6.7 billion to $15.2 billion that DOE estimated, since its study did not include all upgrades and modernization projects; and (4) DOE failure to resolve such long-standing management issues as reliance on contractors and lack of technical expertise could be detrimental to any reconfiguration of the complex.

Nuclear Waste: Issues Affecting Land Withdrawal of DOE's Waste Isolation Pilot Project (Testimony, 04/16/91, GAO/T-RCED-91-38).

BACKGROUND: GAO discussed the Department of Energy's (DOE) Waste Isolation Pilot Plant (WIPP). GAO noted that: (1) by fiscal year 1997, DOE plans to determine whether WIPP meets the Environmental Protection Agency's (EPA) standards for disposal of transuranic waste in repositories and plans to obtain a variance or exception from the Resource Conservation and Recovery Act (RCRA); (2) DOE postponed plans to demonstrate large-scale waste handling and storage operations until after it determines that WIPP will comply with EPA standards; (3) DOE issued a test plan that reduced the proposed amount of waste to about 1 percent of facility capacity, but it could not determine the exact quantity of waste to be stored until after the compliance determination; and (4) DOE issued a plan describing the decisionmaking process it would follow in deciding where to store the wastes if retrieval became necessary. GAO believes that: (1) DOE needed to demonstrate to EPA that the hazardous wastes would not migrate beyond the WIPP boundary for as long as they remain hazardous to obtain an RCRA exception; (2) the nature and significance of WIPP storage issues warranted congressional input and direction, rather than administrative action; and (3) DOE should address storage issues now before it needs to retrieve and store it elsewhere.

Nuclear Health and Safety: More Attention to Health and Safety Needed at Pantex (Letter Report, 04/15/91, GAO/RCED-91-103).

BACKGROUND: Pursuant to a congressional request, GAO examined key safety and health problems at the Department of Energy's (DOE) contractor-operated Pantex Plant to determine its need for external safety oversight.

FINDINGS: GAO found that: (1) Pantex cited a lack of personnel for its failure to complete more than half of the safety analysis reports needed to ensure plant safety; (2) a DOE team of specialists identified several deficiencies in the plant's radiation protection program, including inadequate staffing, training, and procedures designed to protect workers and the environment from radiation; (3) the Occupational Safety and Health Administration found 168 violations of worker protection regulations at Pantex that had the potential to result in death or serious physical harm; (4) radiation accidents and incomplete safety analysis reports raised questions about the adequacy of Pantex's attention to safety and health; (5) Pantex had one of the highest injury/illness and lost workday rates in the DOE weapons complex; and (6) since Pantex experienced the same types of safety and health problems as those at other DOE facilities, external oversight was needed to ensure the safety of its defense nuclear operations.

Managing the Environmental Cleanup of DOE's Nuclear Weapons Complex (Testimony, 04/11/91, GAO/T-RCED-91-27).

BACKGROUND: GAO discussed the Department of Energy's (DOE) cleanup of the nation's nuclear weapons complex. GAO found that: (1) DOE reorganized its headquarters regional activities to ensure better management focus on the cleanup effort; (2) DOE restructured its award-fee program to better ensure that its contractors appropriately emphasized environment, safety, and health issues; (3) there were problems and delays in cleaning up the almost 57 million gallons of high-level radioactive waste in the single- and double-shell tanks at the DOE Hanford facility; (4) DOE failed to provide effective management and oversight of relatively simple cleanup actions; (5) despite some progress in improving budget estimates, DOE did not adequately review contractor cost estimates and relied on inadequate contractor analyses to substantiate cleanup cost estimates; (6) DOE unilaterally delayed a series of milestones in its agreement with the Environmental Protection Agency and Washington State to govern the Hanford cleanup; (7) DOE failed to set

priorities that could stabilize its environmental problems and avoid further environmental damage; (8) there were fundamental problems in DOE's control and oversight of all of its contractors, including improper procurement procedures, ineffective contract cost control, and failure to carry out its responsibilities; and (9) DOE acknowledged the need for better contract management by taking steps to improve its management of contractors, but solving the problems will be difficult.

Uranium Enrichment: GAO's Views on DOE's New Laser Enrichment Technology—AVLIS (Testimony, 04/10/91, GAO/T-RCED-91-23).

BACKGROUND: GAO discussed the Department of Energy's (DOE) program to develop the atomic vapor laser isotope separation process (AVLIS), a new uranium enrichment technology, focusing on issues that DOE needed to address before building an AVLIS plant. GAO noted that, before building an AVLIS plant, DOE should: (1) adequately demonstrate the AVLIS process with full-scale equipment and develop convincing cost projections; (2) demonstrate an efficient process for integrating an AVLIS plant with existing nuclear fuel companies; (3) submit to the government or a private company a definitive cost analysis; (4) establish a government corporation to complete such program activities as selecting a site and completing the plant licensing process; and (5) update and expand its existing market analysis that considers the impact of possible new nuclear plants and competitors' sales strategies. GAO also noted that: (1) DOE needed to complete the demonstration project to keep future AVLIS deployment options open, such as using a new government corporation for construction or making a technology transfer agreement with a private company; (2) the technical and related cost and market information DOE would develop by completing the demonstration could enhance a new government corporation's ability to timely and efficiently deploy AVLIS and assist private investors in making sound construction decisions; and (3) the Congress should recognize that DOE will not be able to completely address all remaining deployment issues by the end of 1992.

Nuclear Nonproliferation: Controls Over the Commercial Sale and Export of Tritium Can Be Improved (Letter Report, 03/25/91, GAO/RCED-91-90).

BACKGROUND: Pursuant to a congressional request, GAO examined the adequacy of the Department of Energy's (DOE) and the Nuclear Regulatory Commission's (NRC) existing controls on the commercial sales and exports of tritium.

FINDINGS: GAO found that: (1) DOE and its contractor-operated Oak Ridge National Laboratory (ORNL) were slow to investigate the major shipper-receiver and internal tritium discrepancies that allegedly occurred at ORNL in July and August of 1988; (2) DOE, ORNL, and other investigators identified a lack of appropriate ORNL management and DOE oversight as underlying causes of tritium discrepancies; and (3) NRC performed limited monitoring of tritium end use because it considered tritium less strategic than special nuclear materials.

Nuclear Nonproliferation: DOE Needs Better Controls to Identify Contractors Having Foreign Interests (Letter Report, 03/25/91, GAO/RCED-91-83).

BACKGROUND: Pursuant to a congressional request, GAO reviewed whether the Department of Energy (DOE) and three of its weapons laboratories complied with DOE regulations and procedures designed to protect the United States against uncontrolled transfers of nuclear weapons-related technology or material to entities that are foreign owned, controlled, or influenced (FOCI) U.S. companies performing classified work for DOE.

FINDINGS: GAO found that: (1) DOE and its government-owned, contractor-operated weapons laboratories did not fully comply with DOE regulations and procedures aimed at determining contractors' vulnerability to foreign interests and preventing associated risks; (2) DOE did not follow FOCI procedures for 98 percent of the classified contracts it awarded from October 1987 through March 1990 that were subject to such procedures; (3) none of the eight DOE field operations offices completely complied with FOCI procedures when awarding management and operating contracts; (4) DOE regulations for determining whether contractors were subject to FOCI were inadequate; (5) the regulations required DOE contracting officers to make national security determinations, even though DOE safeguards and security officials were more qualified to make such determinations; (6) numerous DOE FOCI requirements were burdensome, and some were inconsistent with Department of Defense (DOD) regulations for determining whether DOD contractors were subject to FOCI, causing confusion among contractors working on both DOE and DOD classified contracts; (7) DOE internal control weaknesses caused numerous problems in safeguarding classified information; and (8) all three DOE weapons laboratories lacked adequate data systems to accurately identify all classified contracts.

Nuclear Materials: GAO's Views on Decreasing Tritium Requirements and Their Effect on DOE Programs (Testimony, 03/13/91, GAO/T-RCED-91-21).

BACKGROUND: GAO discussed the Department of Energy's (DOE) tritium supplies, focusing on: (1) DOE projections of tritium requirements and supplies and (2) the impact of future tritium supplies on DOE programs. GAO noted that: (1) the projected U.S. defense tritium requirements and planned nuclear weapons decreased dramatically from 1988 through 1990 and could decrease further; (2) sufficient tritium supplies will exist to meet the anticipated needs of the nuclear weapons stockpile for the next several years; (3) further retirements of weapons, in addition to those already planned, and negotiations of arms reduction treaties could reduce tritium requirements further; (4) maintaining an overly large tritium reserve would present such disadvantages as tritium's rapid decay rate and the need to constantly replenish it; (5) the decreased tritium requirement provided additional time for DOE to evaluate and resolve outstanding safety and environmental issues and reconsider whether plans for future tritium production capacity were appropriate; (6) three production reactors, which closed in 1988 for safety upgrades, are currently the nation's only production source of tritium; (7) the decrease in current and projected DOE tritium demand suggests that the urgency associated with restarting the reactors has diminished; (8) DOE did not plan to further delay the scheduled restart of the first reactor, in spite of decreases in tritium requirements; and (9) DOE reported that, due to high costs, it would build only one of two reactors it had planned to construct.

Nuclear Safety: Status of Reactor Restart Efforts and Safety Culture Changes (Letter Report, 03/13/91, GAO/RCED-91-95).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the Department of Energy's (DOE) activities to restart three nuclear reactors at its Savannah River, South Carolina, site, focusing on: (1) delays in the restart schedule; (2) factors causing the delays; and (3) safety oversight changes and safety culture concerns.

FINDINGS: GAO found that: (1) DOE announced on February 4, 1991, that it planned to restart the K-reactor in the summer of 1991 and the L-reactor in early 1992; (2) DOE also announced that it planned to terminate the P-reactor as an operational reactor and maintain it in a cold standby status; (3) various factors causing delays in meeting the K-reactor's originally proposed September 1990 restart date included the late

development of the startup test program, delays in completing originally scheduled work, new maintenance and restart requirements, and environmental and fire protection issues; (4) DOE and other interested organizations took such actions to increase attention to safety as reorganizations addressing safety management and oversight issues and extensive independent external oversight of DOE nuclear safety activities; (5) although DOE made safety oversight changes, both DOE and its contractor officials recognized that improving the underlying safety attitude was a long-term effort that may not be fully completed before restart; and (6) DOE estimated that it would spend $3.2 billion on reactor restart and operations between fiscal years 1989 and 1993.

Nuclear Safety and Health: Nonconforming Products Are A Governmentwide Problem (Testimony, 03/06/91, GAO/T-RCED-91-9).

BACKGROUND: GAO discussed contractors' supply of nonconforming products to the federal government. GAO noted that: (1) nuclear utilities installed or received such nonconforming products as fasteners, steel, fuses, pumps, valves, and circuit breakers in about 64 percent of the 113 domestic nuclear power plants; (2) nonconforming products were a governmentwide problem, since the Department's of Defense, Energy, and Transportation and the Federal Aviation Administration and National Aeronautics and Space Administration found them in weapons systems, submarines, aircraft, and the space shuttle; (3) the Nuclear Regulatory Commission reduced its regulatory influence over the nuclear industry by delaying procurement inspections for at least 1 year and withdrawing civil penalties against utilities; (4) there was no governmentwide effort to address nonconforming products, since the Office of Management and Budget failed to fulfill its 1988 committment to act as an information clearinghouse; and (5) federal agencies could benefit from sharing information on their receipt of nonconforming products.

Nuclear Weapons Complex: GAO's Views on DOE's Reconfiguration Study (Testimony, 02/25/91, GAO/T-RCED-91-8).

BACKGROUND: GAO discussed the Department of Energy's (DOE) efforts to develop a comprehensive plan to address its nuclear weapons complex's environmental and safety problems. GAO noted that DOE's nuclear weapons complex reconfiguration study: (1) represented the first phase of a long-term effort to develop a more detailed plan and a programmatic environmental impact statement that DOE expected to complete in 1993 on various alternatives for reconfiguring the complex; (2) recommended a

smaller complex in the future, but did not specify the dimensions; (3) provided information on four possible complex size scenarios ranging from 15 to 70 percent of the fiscal year 1990 nuclear weapons stockpile; (4) recognized the need to stabilize nuclear weapons requirements and concluded that the Nuclear Weapons Council should specify sizing levels upon which to base the future complex; (5) provided only a limited discussion on how the nation would meet its future tritium requirements and manage its plutonium inventory; and (6) estimated reconfiguration and modernization costs ranging from $6.7 billion to $15.2 billion, but did not include the costs of critical components for the future complex. GAO also noted that such long-standing management issues as reliance on contractors and lack of technical expertise could have a detrimental impact on any reconfiguration of the complex.

Nuclear Waste: Quarterly Report as of March 31, 1990 (Letter Report, 02/15/91, GAO/RCED-91-55).

BACKGROUND: Pursuant to a congressional request, GAO evaluated the Department of Energy's (DOE) implementation of the Nuclear Waste Policy Act of 1982, focusing on: (1) public comments regarding the Secretary of Energy's November 1989 report to the Congress assessing the civilian nuclear waste program; (2) uncertainties regarding DOE's criteria for identifying unsuitable site conditions at Yucca Mountain; and (3) how Nevada's refusal to allow DOE access to the Yucca Mountain site could affect its near-term site investigation plans.

FINDINGS: GAO found that: (1) public comments on the Secretary's report called for changes in the nuclear waste program, management restructuring, emphasis on scientific investigation of Yucca Mountain, and a proposal to develop a monitored retrieval storage (MRS) facility; (2) in general, respondents agreed with DOE's restructured program management plan, its efforts to implement a scientifically based investigation, and its revised schedule; (3) DOE received mixed comments on its plans to conduct surface tests of the mountain before constructing an exploratory shaft facility; (4) DOE received mixed views on its plan to separately develop an MRS facility from a repository, and some respondents were concerned that such an action could result in an MRS facility becoming a repository replacement; (5) DOE decided to use its own as well as the Nuclear Regulatory Commission's regulations for identifying unsuitable conditions; (6) DOE and Nevada were engaged in a legal battle over state environmental permits needed for site investigations, and DOE sought legislation enabling it to comply with permit requirements without

Nevada's involvement; and (7) DOE believed that, if the site investigation was delayed, DOE may abandon surface-based testing, which could eliminate the possibility of identifying unsuitable site conditions before performing more costly underground work.

Nuclear Health and Safety: Environmental Problems at DOE's Idaho National Engineering Laboratory (Letter Report, 02/12/91, GAO/RCED-91-56).

BACKGROUND: Pursuant to a congressional request, GAO evaluated environmental problems at the Department of Energy's (DOE) Idaho National Engineering Laboratory (INEL), focusing on: (1) the environmental impact of those problems and their impact on DOE operations and (2) difficulties DOE encountered in managing the site's environmental problems.

FINDINGS: GAO found that: (1) underground pipes and tanks used to transfer and store mixed wastes at the INEL chemical processing plant did not meet secondary containment standards, the primary reason for the plant's remaining closed for over a year; (2) DOE also identified problems related to the treatment and storage of mixed wastes and the lack of Environmental Protection Agency (EPA) approved treatment technologies; (3) past waste disposal practices resulted in releases of radioactive and hazardous contaminants into the ground and the Snake River Plain aquifer; (4) delays occurred in INEL environmental cleanup and compliance activities, partly due to ongoing negotiations among DOE, EPA, and the state of Idaho; and (5) INEL has begun little physical cleanup on more than 200 inactive waste sites.

Nuclear Materials: Decreasing Tritium Requirements and Their Effect on DOE Programs (Letter Report, 02/08/91, GAO/RCED-91-100).

BACKGROUND: Pursuant to a congressional request, GAO provided information on the adequacy of the Department of Energy's (DOE) tritium supplies, focusing on its ability to meet current and future defense tritium requirements for nuclear weapons and the effect of changes in those requirements on DOE programs.

FINDINGS: GAO found that: (1) DOE obtained most of its tritium from reactors currently shut down for safety upgrades and from returned tritium from the nuclear weapons stockpile; (2) since 1988, the actual and projected number of weapons in the stockpile has decreased significantly,

resulting in reduced future tritium requirements; (3) sufficient tritium supplies existed to meet the anticipated requirements for the nuclear weapons stockpile for the next several years; (4) further retirements of weapons, in addition to those already planned, and negotiations of reduction treaties could further reduce future tritium requirements; (5) tritium requirements could decrease even more if the projected number of nuclear warheads is further reduced by additional unilateral retirements or the signing of an arms reduction treaty; (6) the decreased requirements provided additional time for DOE to evaluate outstanding safety and environmental issues before restarting the closed reactors; (7) DOE did not plan to further delay the scheduled 1991 restart of the first reactor, in spite of the decreases in tritium requirements; and (8) the estimated cost of two reactors DOE planned to build was $6.8 billion, and DOE reported that, due to the high cost, it would build only one reactor, while leaving the option of constructing the second reactor open.

Nuclear Security: Accountability for Livermore's Secret Classified Documents Is Inadequate (Letter Report, 02/08/91, GAO/RCED-91-65).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the Department of Energy's (DOE) Lawrence Livermore National Laboratory's controls over weapons research documents, focusing on the: (1) extent of missing classified documents and (2) adequacy of classified document accountability.

FINDINGS: GAO found that: (1) a recent internal inventory identified 12,000 missing secret documents covering a wide range of subjects; (2) since the laboratory did not assess the missing documents' potential for compromising national security, neither the laboratory nor DOE could provide assurance that classified information had not been compromised; (3) an ongoing reconciliation effort located 2,000 missing documents; (4) laboratory accountability for secret documents was inadequate; (5) approximately 108 laboratory groups managed and controlled secret documents using a variety of classified document accountability systems; (6) due to varied accountability practices, the laboratory could not ensure effective document management; (7) laboratory management was implementing a centralized computer data base to ensure effective document control; (8) the laboratory did not keep accurate records showing the location and disposition of all accountable classified documents due to several recordkeeping weaknesses; and (9) DOE failed to provide adequate oversight of the laboratory's secret document control program.

Nuclear Health and Safety: Efforts to Strengthen DOE's Health and Epidemiology Programs (Letter Report, 02/05/91, GAO/RCED-91-57).

BACKGROUND: Pursuant to a congressional request, GAO provided information on the Department of Energy's (DOE) initiatives to address concerns about its ability to effectively oversee health, environmental, and safety activities related to its nuclear weapons production plants.

FINDINGS: GAO found that: (1) DOE did not effectively oversee its health programs, lacked credibility in its health-effects research activities, and did not standardize the collection of pertinent data on the health of its workers; (2) DOE planned to increase its Office of Health staff from 26 to 86 personnel by fiscal year 1992, but the current shortage of qualified staff could hinder its ability to attract the staff required to perform its duties; (3) DOE plans to establish an advisory committee of non-DOE personnel in early 1991 to oversee its environmental, safety, and health activities; (4) DOE was developing a comprehensive database to consolidate previously collected worker health data and provide for collection of future data; (5) DOE reported that the database would be operational by the end of fiscal year 1992 at an estimated developmental cost of about $3 million; and (6) DOE signed an agreement with the Department of Health and Human Services (HHS) to transfer $17 million to HHS in fiscal year 1991 for the management of the ongoing, long-term health-effects and epidemiology studies and research. GAO believes that DOE consolidation of its occupational health programs: (1) and the transfer of its studies to HHS provides a credible framework for overseeing the health of its workers and nearby communities and (2) would strengthen its efforts in overseeing management of its health responsibilities.

Nuclear Safety: The Defense Nuclear Facilities Safety Board's First Year of Operation (Chapter Report, 02/05/91, GAO/RCED-91-54).

BACKGROUND: Pursuant to a congressional request, GAO examined the accomplishments, operations, and problems faced by the Defense Nuclear Facilities Safety Board, focusing on: (1) the Board's mission to improve safety and health conditions at the Department of Energy's (DOE) defense nuclear facilities; (2) problems encountered in hiring technical staff; and (3) changes needed to enhance the Board's independence and credibility.

FINDINGS: GAO found that the: (1) Board, in its first year of operation, established its financial operations, acquired office space, hired staff, and issued recommendations to improve safety at four major DOE facilities;

(2) Board's recommendations for improving DOE facilities involved such issues as operation training, safety standards, radioactive waste storage, restarting plutonium operations, and the need for systematic evaluations of safety issues; (3) Board's inability to offer salaries sufficient to hire scientific and technical staff limited its ability to carry out its functions; (4) Board's independence and public knowledge of its recommendations were essential to establishing and maintaining the public's confidence; and (5) Board lacked a strategic plan to identify future work priorities to help ensure that its oversight was comprehensive and to make its agenda visible to the public.

Nuclear Waste: Quality Assurance Auditors Need Access to Employee Records (Letter Report, 01/18/91, GAO/RCED-91-7).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the Department of Energy's (DOE) efforts to identify and resolve problems stemming from the Privacy Act of 1974's restrictions on maintenance and disclosure of personnel information, focusing on the act's effect on the DOE quality assurance program for contractor personnel involved in the Yucca Mountain, Nevada, nuclear waste repository project.

FINDINGS: GAO found that: (1) under the quality assurance program, the Nuclear Regulatory Commission required DOE to document that DOE and contractor employees were properly qualified and trained to perform repository-related work; (2) DOE did not address the act's restrictions until almost 2 years after it anticipated the need to establish a new system of records that covered both DOE and contractor employees and that permitted quality assurance auditors to have access to the records; (3) the delay in resolving the issue was partially due to confusion over the act's applicability to contractor employees; (4) the delay in addressing the restrictions resulted in a temporary lack of access to records so that quality assurance auditors could verify training and qualification requirements for contractor employees; and (5) before new site characterization work can begin, DOE must ensure quality assurance auditors' and observers' unrestricted access to training and qualification records of DOE and contractor employees.

Nuclear Safety and Health: Problems With Cleaning Up the Solar Ponds at Rocky Flats (Letter Report, 01/03/91, GAO/RCED-91-31).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the Department of Energy's (DOE) progress in cleaning up solar evaporation ponds at its Rocky Flats Nuclear Weapons Plant.

FINDINGS: GAO found that: (1) in September 1986, DOE had to reclassify the ponds' low-level radioactive waste to mixed waste after detecting low concentrations of hazardous waste; (2) the reclassification resulted in the requirement that DOE obtain the necessary permits for hazardous waste storage and disposal; (3) the DOE contractor improperly mixed the cement and sludge waste in making pondcrete, a solidified waste form, causing thousands of pondcrete blocks to crumble and crack; (4) pondcrete packaging material deteriorated under adverse weather conditions; (5) lack of program plans and control mechanisms contributed to the cleanup problems; (6) the contractor developed procedures for processing pondcrete, reinspecting all pondcrete boxes, frequent monitoring of storage pads, and repackaging failed pondcrete boxes; (7) in addition to remixing and repackaging more than 8,000 pondcrete blocks, DOE still had to remove sediment from the largest pond and clean out the remaining four; (8) continued cleanup could result in the production of as many as 20,000 additional pondcrete blocks; and (9) DOE believed that the total project cost would be over $100 million.

Nuclear Regulation: NRC's Efforts to Ensure Effective Plant Maintenance Are Incomplete (Chapter Report, 12/17/90, GAO/RCED-91-36).

BACKGROUND: Pursuant to a congressional request, GAO examined the (1) importance of safe nuclear power plant operations and (2) status of the debate between the Nuclear Regulatory Commission (NRC) and the nuclear utility industry on the need for facility maintenance regulations.

FINDINGS: GAO found that: (1) while both NRC and the industry agreed that maintenance was crucial to safe, reliable, and efficient power plant operations and nuclear utilities improved such maintenance, some problems still remained; (2) the debate centered on NRC's need to establish additional comprehensive maintenance regulations, its endorsement of the industry's program, and the specific plant areas and systems included in such regulations or programs; (3) NRC concluded that the lack of comprehensive regulations applicable to maintenance contributed to inconsistency in utility program implementation; and (4) NRC proposed maintenance regulations that would broaden its oversight over all plant

systems. In addition, GAO found that industry opposed NRC maintenance regulations over all systems, since (1) power plants developed a nearly identical program; (2) including all balance-of-plant systems would dilute attention from the plant's safety-related portions; and (3) NRC lacked guidance that the utilities could use to establish acceptable maintenance programs. GAO also found that: (1) industry believed that utilities, not NRC, should determine the plant systems, structures, and components to be emphasized in maintenance programs; (2) NRC lacked specific standards applicable to all aspects of plant operations and extrapolated the results of selected samples of utility operations to make a judgment about the entire plant; and (3) industry questioned NRC's ability to develop a single quantitative indicator to predict equipment or system failures resulting from poor maintenance practices.

Nuclear Safety and Health: Counterfeit and Substandard Products Are a Governmentwide Concern (Chapter Report, 10/16/90, GAO/RCED-91-6).

BACKGROUND: Pursuant to a congressional request, GAO examined the Nuclear Regulatory Commission's (NRC) and five other agencies' practices for identifying and preventing the supply of nonconforming products, including counterfeit and substandard parts.

FINDINGS: GAO found that: (1) the supply of nonconforming products was a governmentwide problem, since all six agencies contacted found them in various components and systems; (2) although NRC took some actions to detect and minimize the incidence of nonconforming parts in commercial nuclear power plants, it deferred its regulatory responsibility by rescinding penalties and postponing inspections; (3) although individual agencies had programs to detect nonconforming parts, there was no governmentwide effort to address the issue; and (4) there was no centralized source of consolidated information on nonconforming products to increase information exchange and joint investigations among agencies.

Nuclear Safety: Potential Security Weaknesses at Los Alamos and Other DOE Facilities (Chapter Report, 10/11/90, GAO/RCED-91-12).

BACKGROUND: Pursuant to a congressional request, GAO examined: (1) the adequacy of security at the Los Alamos National Laboratory and other Department of Energy (DOE) facilities; (2) DOE oversight of contractor security forces; and (3) the feasibility of establishing federal security forces at DOE facilities.

FINDINGS: GAO found that: (1) DOE did not assess the adequacy of the replacement force at Los Alamos until 6 weeks after contractor personnel went on strike; (2) during the strike, DOE waived medical and physical fitness requirements for the replacement force, and many personnel failed to meet 1 or more of the 12 minimum required skills; (3) DOE sites were not prepared for such strikes; (4) security force training and certification documents were incomplete, inaccurate, or missing, indicating that potential security problems existed; (5) 75 percent of the regular security force lacked one or more of nine skills needed to ensure a minimum level of protection; (6) DOE inspections identified recurring and similar weaknesses, yet rated only one security program as unsatisfactory; (7) DOE lacked specific criteria for rating facility security; (8) DOE lacked an effective system to track corrective actions taken as a result of inspection findings; (9) contractors provided security forces at all but one DOE facility; and (10) labor and benefit costs for a federal security force would be at least $15 million less per year than contract costs, and federal employees could not legally strike.

Nuclear Energy: Consequences of Explosion of Hanford's Single-Shell Tanks Are Understated (Letter Report, 10/10/90, GAO/RCED-91-34).

BACKGROUND: Pursuant to a congressional request, GAO evaluated the potential for ferrocyanide explosions in underground tanks containing high-level waste at the Department of Energy's (DOE) Hanford site.

FINDINGS: GAO found that: (1) DOE lacked sufficient information for judging the probability of a ferrocyanide explosion, and not enough was known to rule out the possibility of a spontaneous explosion; (2) the Hanford environmental impact statement understated the potential consequences of a ferrocyanide explosion; (3) a ferrocyanide explosion could contaminate large areas within and possibly beyond site boundaries and result in high-level radiation exposure at levels with significant radiation-induced cancer consequences; (4) a DOE task force agreed with a GAO assessment that the respirable fraction of radioactive particles produced by an explosion would be higher than originally thought and recommended additional studies; and (5) in response to Defense Nuclear Facilities Safety Board recommendations, DOE planned to study possible chemical reactions that could cause heat generation in the storage tanks, improve temperature measurements, and test radiation stability of ferrocyanide precipitates and the energetics of ferrocyanide reactions.

Nuclear Health and Safety: Long-Term Plans to Address Problems of the Weapons Complex Are Evolving (Letter Report, 09/28/90, GAO/RCED-90-219).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the Department of Energy's (DOE) cost estimates for modernizing and cleaning up its nuclear weapons complex.

FINDINGS: GAO found that: (1) over the next 20 to 30 years, it could cost from $125 billion to about $155 billion to modernize and address the complex's environmental problems; (2) DOE developed a 5-year plan for environmental restoration and waste management to modernize and clean up the nuclear weapons complex; (3) the 1990 updated plan showed substantially higher estimates for environmental restoration and waste management activities; and (4) DOE could not project long-term costs of the clean-up because uncertainties existed about the nature and extent of contamination and the effectiveness of research and development in improving cleanup technologies.

Nuclear Research and Development: Shippingport Decommissioning—How Applicable Are the Lessons Learned? (Letter Report, 09/04/90, GAO/RCED-90-208).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the Department of Energy's (DOE) decommissioning of a Pennsylvania nuclear power plant, focusing on: (1) whether DOE had met congressional goals described in a 1986 hearing and (2) additional information that could assist the commercial power plant industry.

FINDINGS: GAO found that: (1) DOE generally met congressional goals established for the power plant by timely completing decommissioning activities at $7 million under the estimated cost of $98.3 million; (2) DOE used eight contractors to optimize involvement and developed extensive data to help future decommissioning projects; (3) although the power plant increased knowledge regarding the decommissioning of nuclear power plants, the benefits of the lessons learned will vary depending upon the timing and the decommissioning approaches various utilities select; (4) utilities operating commercial plants will probably have to disassemble their reactor pressure vessels when decommissioning because of their large size; (5) DOE decommissioning activities disposed of all the low-level radioactive waste at one facility; (6) utilities will have to dispose of commercial sites' waste at costs higher than those incurred by

noncommercial plants, due to their larger size, higher contamination levels, undetermined disposal sites, and inadequate management structures; and (7) DOE was exchanging decommissioning information with two foreign countries and was assessing the need to use robotics.

Nuclear Waste: DOE Needs to Ensure Nevada's Conformance With Grant Requirements (Chapter Report, 07/09/90, GAO/RCED-90-173).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the Department of Energy's (DOE) program to provide financial assistance to Nevada under the Nuclear Waste Policy Act of 1982.

FINDINGS: GAO found that: (1) Nevada opposes the DOE Yucca Mountain project; (2) Nevada spent most of the $32 million in nuclear waste act grants properly but used $1 million of the funds for activities that were not authorized; (3) Nevada employed law firms that performed lobbying activities between July 1986 and June 1989; (4) Nevada used grant funds to pay expenses incurred in suing DOE; (5) Nevada exceeded the congressional limit on the money it could spend on socioeconomic studies for the year ended June 1989; (6) Nevada used over $150,000 in grant funds to pay expenses of the state's nuclear waste legislative committee; (7) Nevada has internal control weaknesses that place funds at risk; (8) DOE and Nevada have not formally agreed to all of the terms of the grant amendments award documents; and (9) DOE did not resolve the disagreements over the lobbying provision before releasing grant funds, and it has not determined the best way to recover grant funds used for unallowable purposes.

Nuclear Health and Safety: DOE Has Not Demonstrated That Restarting PUREX Is a Sound Decision (Letter Report, 06/29/90, GAO/RCED-90-207).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the shutdown and planned restart of the Plutonium-Uranium Extraction plant (PUREX) at the Department of Energy's (DOE) Hanford Site in Washington State.

FINDINGS: GAO found that DOE has not: (1) demonstrated that restarting PUREX would be a sound decision; (2) demonstrated that a need exists for weapons-grade plutonium from PUREX; (3) determined the need for a supplemental environmental impact statement for PUREX; (4) required that all identified deficiencies in the final safety analysis report be corrected

before the planned restart date; and (5) adequately addressed PUREX staff turnover and training problems.

Nuclear Science: Factors Leading to the Termination of the Antares Laser Research Program (Letter Report, 06/13/90, GAO/RCED-90-160).

BACKGROUND: Pursuant to a congressional request, GAO provided information on the termination of the Antares Laser Research Program at the Department of Energy's (DOE) Los Alamos National Laboratory.

FINDINGS: GAO found that: (1) DOE terminated the laser research program at the end of fiscal year 1985 because of a technical problem; (2) Los Alamos discovered that long-wavelength lasers generated electrons that preheated the target containing the fuel for the fusion reaction, thereby preventing fusion; (3) DOE and Los Alamos believed the problem would have required developing an impractical and expensive laser system for effective use; (4) Los Alamos efforts to fix the technical problem were unsuccessful; (5) Los Alamos conducted two technical evaluations and concluded that the Antares technology was not a good candidate for achieving fusion; and (6) two scientific panels' reviews supported the Los Alamos conclusion.

Nuclear Waste: Information on DOE's Interim Transuranic Waste Storage Facilities (Letter Report, 06/08/90, GAO/RCED-90-166).

BACKGROUND: Pursuant to a congressional request, GAO reviewed: (1) remaining transuranic (TRU) waste storage capacity at Department of Energy (DOE) interim storage sites and projected dates when capacity will be exceeded; (2) statutory or administrative provisions limiting the amount of waste DOE could store at interim storage sites; and (3) planned alternatives to the Waste Isolation Pilot Plant (WIPP) for stored wastes.

FINDINGS: GAO found that: (1) 6 DOE storage sites had the capacity to store an additional 8,700 to 9,700 cubic meters of TRU waste, and an additional storage facility could store about 393 plutonium-equivalent curies of TRU waste, but the extent of remaining storage capacity varied greatly from site to site; (2) 3 storage sites' space for contact-handled TRU waste was beginning to run out; (3) DOE was in the process of constructing or could construct additional storage facilities as needed, if no other safety restrictions applied; (4) although storage site officials did not identify any statutory restrictions on the amount of TRU waste that could be stored at

the sites, certain administrative restrictions could affect storage at some sites; (5) due to regulations regarding waste storage mixtures, some storage sites would have to either revise their status permits or obtain state regulatory agency approval in order to expand capacity beyond permitted limits; (6) until WIPP is operational, DOE plans to continue TRU waste storage at its interim storage sites, but is exploring the possibility of storing TRU waste on Department of Defense-controlled property; and (7) DOE required each interim site to develop site-specific waste management plans describing how they would manage TRU waste until DOE constructed a final disposal site.

Nuclear R&D: Usefulness of Information From Shippingport Decommissioning for Rancho Seco (Letter Report, 06/07/90, GAO/RCED-90-171).

BACKGROUND: Pursuant to a congressional request, GAO provided information related to the Department of Energy's (DOE) decommissioning of the Shippingport, Pennsylvania, nuclear power plant and the usefulness of this information to the decommissioning of the Rancho Seco, California, nuclear power plant.

FINDINGS: GAO found that DOE reported that: (1) a nuclear power plant could be decommissioned within the established costs and time frames, (2) equipment and technology exist to decommission a nuclear power plant, and (3) strict management attention to planning can lead to reduced occupational exposures and efficient removal of radioactively contaminated components. GAO believes that DOE needs to: (1) wait for results from international research and other activities before deciding to participate in the decommissioning of Rancho Seco, (2) consider decommissioning Rancho Seco through a contractor that performs work in connection with commercial or government nuclear activities, and (3) weigh the costs of conducting research at Rancho Seco against the long-term benefits.

Nuclear Waste: Changes Needed in DOE User-Fee Assessments to Avoid Funding Shortfall (Chapter Report, 06/07/90, GAO/RCED-90-65).

BACKGROUND: Pursuant to a legislative requirement, GAO provided information on the Department of Energy's (DOE) efforts to implement nuclear waste legislation.

FINDINGS: GAO found that: (1) the nuclear waste program might be susceptible to future budget shortfalls; (2) without a fee increase, the civilian waste part of the program might be underfunded by at least $2.4 billion; (3) DOE has neither paid its share of costs nor disclosed this liability in its financial records; (4) DOE estimates did not adequately recognize program uncertainties; (5) DOE intends to address one major cost uncertainty by indexing the civilian disposal fee to the inflation rate; and (6) DOE did not use a realistic inflation rate as its most probable scenario in assessing whether user fees were adequate.

Correcting Environmental Problems Facing the Nuclear Weapons Complex (Testimony, 05/17/90, GAO/T-RCED-90-85).

BACKGROUND: GAO discussed the Department of Energy's (DOE) efforts to correct the environmental problems facing the nuclear weapons complex. GAO found that: (1) in making nuclear weapons, enormous amounts of hazardous and radioactive wastes are generated, and DOE now faces serious and costly environmental problems; (2) DOE data show that it might cost over $100 billion to address the environmental problems; (3) future costs may be greater as more is learned about the nature and extent of contamination, because the full scope of the problems is unknown; (4) some areas of the weapons complex may be irreversibly contaminated and may require long-term institutional control; (5) DOE has made important changes to its organization that should help change its management focus from materials production to environmental concerns; (6) DOE must properly organize itself to manage the long-term program needed to address the many environmental problems it faces; and (7) DOE must have an effective management system to ensure that the most serious environmental problems are identified and adequately funded and that funds allocated to correcting environmental problems are used effectively.

Nuclear Waste: Quarterly Report as of December 31, 1989 (Letter Report, 04/30/90, GAO/RCED-90-130).

BACKGROUND: Pursuant to a congressional request, GAO provided its quarterly status report on the Department of Energy's (DOE) implementation of the Nuclear Waste Policy Act of 1982, focusing on the: (1) Nuclear Regulatory Commission's (NRC) ability to implement an Environmental Protection Agency (EPA) containment standard for repository licensing; and (2) impact of that requirement on DOE determination of a proposed repository site's suitability.

FINDINGS: GAO found that: (1) the EPA repository containment standard limited the cumulative release of radioactive material into the environment over a 10,000-year period; (2) NRC expressed concern regarding potential DOE difficulty in satisfactorily demonstrating such compliance, since there were limitations and uncertainties in the methods and data for calculating acceptable levels of risk; (3) NRC collaboratively worked with EPA to develop additional guidance on how DOE could demonstrate compliance with the containment standard and avoid lengthy licensing delays; (4) NRC guidance regarding the standard emphasized maintaining the quality of the scientific work that supported the numerical results of compliance analyses; and (5) both NRC and EPA believed that DOE attempts to characterize the site of its proposed repository would provide valuable insight into potential problems of demonstrating compliance with the containment standard.

Nuclear Health and Safety: Status of GAO's Environmental, Safety, and Health Recommendations to DOE (Letter Report, 04/20/90, GAO/RCED-90-125).

BACKGROUND: Pursuant to a congressional request, GAO evaluated the Department of Energy's (DOE) progress in resolving problems at its contractor-operated sites, focusing on the status of GAO recommendations concerning environmental, safety, and health matters relating to the nuclear weapons complex.

FINDINGS: GAO noted that: (1) since 1980, it had made 54 specific recommendations to DOE on various environmental, safety, and health matters and (2) open recommendations to DOE called for program control improvements and clearer standards and policies related to environmental, safety, and health matters. GAO found that: (1) DOE took corrective actions to fulfill 31 of the 54 GAO recommendations; (2) the Congress established a Defense Nuclear Facilities Board to oversee operations within the nuclear weapons complex; and (3) DOE has instituted changes that should result in a higher degree of sensitivity to environmental, safety, and health matters.

Nuclear Security: DOE Oversight of Livermore's Property Management System Is Inadequate (Chapter Report, 04/18/90, GAO/RCED-90-122).

BACKGROUND: Pursuant to a congressional request, GAO determined the extent of property losses at the Department of Energy's (DOE) Lawrence

Livermore National Laboratory and assessed the adequacy of laboratory controls over government-owned property.

FINDINGS: GAO found that: (1) the laboratory could not account for or locate a substantial number of government-owned items in its custody; (2) an internal inventory determined that the missing property had an acquisition value of over $45 million; (3) the laboratory had lost accountability over about 14 percent of certain high-value theft-prone items, worth about $2 million when acquired; and (4) despite the substantial number of missing items, the contract between DOE and the laboratory contractor protected the contractor against liability for such losses. GAO also found that: (1) the laboratory's property controls did not ensure that government-owned property was adequately safeguarded against theft, unauthorized use, or loss; (2) the laboratory had no policies and procedures for controlling items with an acquisition cost below $1,000 and gathered no consistent data on those items, which made it difficult to identify how many items the laboratory bought; (3) the laboratory did not independently verify government-owned inventories of precious metals that were in the custody of subcontractors, making it difficult for it to verify reported consumption of the metals; (4) DOE did not provide adequate oversight of the laboratory's property management system and allowed the contractor to prescribe the terms of the contract; (5) DOE neither required the laboratory to conform with DOE property management regulations nor approved its property management system; and (6) DOE did not develop or provide guidance spelling out the criteria for performance of property management functions.

Nuclear Safety: Concerns About Reactor Restart and Implications for DOE's Safety Culture (Letter Report, 04/12/90, GAO/RCED-90-104).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the Department of Energy's (DOE) efforts to restart three nuclear production reactors at the Savannah River Site in South Carolina.

FINDINGS: GAO found that: (1) the site contractor submitted a restart plan to DOE that detailed actions needed for restart; (2) the plan proposed to restart one reactor in September 1990, and the other two in December 1990 and March 1991, respectively; (3) as of March 1990, the contractor was revising the plan to assess the effects of tasks added to restart requirements; (4) DOE planned to announce a restart schedule in April 1990; (5) the contractor planned to make safety, operational, and management changes by fall 1990, which could cause additional restart

delays; (6) potential delays ranged from 1.5 months to over 2 years; (7) DOE needed to improve employee attitudes toward safety at the site; (8) the contractor intended for the plan and associated activities to address safety issues; and (9) the contractor prepared a management policy statement describing implemented or planned culture changes, but the policy lacked a plan for measuring the success of those changes.

Performance of Participants in DOE's Inertial Confinement Fusion Program (Testimony, 04/05/90, GAO/T-RCED-90-58).

BACKGROUND: GAO discussed six contractors' performance under the Department of Energy's (DOE) Inertial Confinement Fusion Program (ICF). GAO found that although one contractor successfully performed some support tasks: (1) it performed unacceptably on some target fabrication and delivery tasks; (2) its role under the current contract was to support the efforts of other contractors by supplying components for use in ICF experiments; (3) one contractor had to subcontract for some needed support services; and (4) complaints about the quality of some of its cryogenic target work persisted. GAO also found that: (1) the lead laboratory for the ICF glass laser program accomplished many of its objectives but had to defer some important experiments because it did not receive sufficient funding; and (2) other laboratories cited funding problems, lack of access to other laser facilities, and complex experiments as reasons for program schedule delays.

Nuclear Health and Safety: Need for Improved Responsiveness to Problems at DOE Sites (Letter Report, 03/28/90, GAO/RCED-90-101).

BACKGROUND: Pursuant to a congressional request, GAO provided information about the Department of Energy's (DOE) and its contractors' responsiveness to DOE technical safety appraisals and environmental surveys of contractor-operated facilities and sites.

FINDINGS: GAO found that: (1) DOE has conducted 48 technical safety appraisals of facilities and operations at DOE sites between 1986 and the present; (2) DOE has conducted environmental surveys at 37 sites between 1985 and the present; (3) the appraisals and surveys identified over 1,700 safety and health problems and almost 1,300 environmental problems at the sites; (4) DOE and its contractors resolved 591, or 34 percent, of identified health and safety problems, including 46 of the 113 highest-priority problems; (5) DOE has not completely resolved any of the identified environmental problems, many of which it characterized as very

serious and complex; and (6) the DOE computer-assisted tracking system did not include all of the important information necessary to provide a comprehensive picture of identified environmental, safety, and health problems.

Efforts to Improve DOE's Management of the Nuclear Weapons Complex (Testimony, 03/28/90, GAO/T-RCED-90-64).

BACKGROUND: GAO discussed the Department of Energy's (DOE) efforts to resolve environmental, safety, and health problems at its nuclear weapons facilities. GAO found that DOE: (1) took a number of initiatives to deal with major problems involving facility deterioration; noncompliance with environmental, safety, and health standards; improper disposal of radioactive wastes; and contaminated groundwater; (2) issued strategic plans for modernization and environmental cleanup activities at its facilities and made efforts to hold its contractors more accountable; (3) restructured its oversight and management functions to ensure the safe operation of its facilities; and (4) began facility assessments to determine whether they met federal, state, and local environmental, safety, and health standards. GAO concluded that successful management of DOE nuclear facilities depended on: (1) effective coordination among program offices; (2) recruitment of technically qualified staff; and (3) the commitment to resolve environmental, safety, and health problems at all departmental levels.

Nuclear Regulation: The Military Would Benefit From a Comprehensive Waste Disposal Program (Chapter Report, 03/23/90, GAO/RCED-90-96).

BACKGROUND: Pursuant to a congressional request, GAO compared the Army's, Navy's, and Air Force's low-level radioactive waste disposal practices.

FINDINGS: GAO found that: (1) the Department of Defense (DOD) lacked a comprehensive waste disposal program; (2) none of the three services had complete information on the amounts or types of low-level radioactive waste generated or disposed of; (3) the Navy lacked a low-level radioactive waste disposal program, while the Air Force participated in the Army's disposal program; (4) the services' stockpiling of waste, pending long-term disposal at three commercial sites, increased the potential for accidental releases of waste similar to that which occurred at Wright-Patterson Air Force Base in 1986; (5) commercial sites have

periodically banned the Army and the Air Force for failure to comply with federal and state waste packaging and shipping requirements; (6) compliance problems could worsen after 1993, when there could be as many as 16 different interstate compact and state disposal requirements; (7) significant differences existed among and within the services regarding waste disposal management expertise and training, volume-reduction techniques, and use of cost-effective methods; (8) commercial sites' surcharges and penalties resulted in DOD paying almost twice the actual cost of waste disposal; and (9) two of the three commercial sites will close by December 1992, increasing the likelihood that DOD will store waste or seek exemptions to dispose of waste outside each generator's region if no other sites become available.

DOE's Management and Oversight of the Nuclear Weapons Complex
(Testimony, 03/22/90, GAO/T-RCED-90-52).

BACKGROUND: GAO discussed the Department of Energy's (DOE) management and oversight of the nuclear weapons complex, focusing on: (1) unresolved environmental, safety, and operational problems; (2) long-term management problems; (3) the current status of DOE management initiatives; and (4) its views on those initiatives. GAO noted that: (1) the costs of remedying continual safety and environmental problems regarding the aging and deterioration of DOE nuclear facilities, groundwater and soil contamination, and radioactive waste disposal could total $155 billion; (2) DOE has not developed strategies for addressing long-standing management problems concerning the emphasis on production over safety concerns, inadequate environmental and safety oversight, and a lack of technically qualified personnel; (3) DOE initiated actions to address long-standing management problems, including the restructuring of internal oversight responsibilities, issuance of environmental restoration, waste management, and modernization strategies, assessments of facilities' compliance with applicable regulations, and efforts to increase contractors' accountability; and (4) the success of recent management initiatives will depend on the commitment of DOE to environmental, safety, and health issues, effective coordination and cooperation among DOE oversight groups, and the availability of technically qualified personnel.

Nuclear Science: DOE's Acceptance of Academy of Sciences' 1986 Inertial Fusion Technical Priorities (Fact Sheet, 03/15/90, GAO/RCED-90-115FS).

BACKGROUND: Pursuant to a congressional request, GAO reviewed aspects of the Department of Energy's (DOE) Inertial Confinement Fusion (ICF) program, focusing on: (1) the National Academy of Sciences' (NAS) 1986 review panel recommendations concerning ICF program priorities, which recommendations DOE accepted; and (2) DOE use and application of the recommendations in negotiating the ICF contract.

FINDINGS: GAO found that: (1) the NAS report listed priority areas for the ICF program to pursue in the 5 subsequent years; (2) DOE directed its program toward the technical priority recommendations, while ICF laboratories responded in their individual programs; (3) program objectives, major laboratories' capabilities, and smaller programs' roles had either been strengthened or pursued; (4) NAS-recommended funding was inadequate because of inflation, and some laboratories did not meet program objectives; (5) DOE and some of the laboratories gave advanced laser development a higher priority than recommended, which caused the ICF program to be distracted from orderly scientific progress; and (6) based on NAS' recommendation, DOE made contractor fabrication and delivery of components the highest priorities under the ICF contract.

Nuclear Science: Performance of Participants in DOE's Inertial Confinement Fusion Program (Briefing Report, 03/15/90, GAO/RCED-90-113BR).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the Department of Energy's (DOE) Inertial Confinement Fusion Program, focusing on the performance of the six participating laboratories for the period January 1, 1987, through June 30, 1989.

FINDINGS: GAO found that: (1) while the program emphasized decentralization and laboratory autonomy, the six participants worked in close cooperation with each other to achieve program objectives; (2) one contractor was not effectively achieving program objectives, primarily because of difficulties in transitioning from a primary research role to a laboratory support role; (3) DOE believes that the contractor's 3-year contract period is sufficient to correct existing problems and will therefore recompete the contract when it expires in 1990; (4) overall, the other five laboratories met most of their program objectives, but three

laboratories cited limited funding and unanticipated technical difficulties as reasons for deferring or not completing certain goals; (5) despite a 1985 National Academy of Sciences' recommendation that program funding remain constant with that year's performance levels, inflation has cut the program's budget by about $88 million; and (6) the 1990 budget request for the program was $168.9 million, although congressional committees supported a funding increase to $173.9 million.

DOE's Efforts to Correct Environmental Problems of the Nuclear Weapons Complex (Testimony, 03/15/90, GAO/T-RCED-90-47).

BACKGROUND: GAO discussed the Department of Energy's (DOE) efforts to correct environmental problems in its nuclear weapons complex. GAO noted that: (1) the weapons complex faced such serious and costly environmental problems as inactive waste sites requiring cleanup, groundwater and soil contamination, facilities' noncompliance with environmental laws and standards, and delayed opening of a permanent waste repository; (2) although the full extent of environmental problems in the complex was unknown, data indicated that it could cost over $100 billion for environmental restoration; (3) to focus management attention on environmental problems, DOE underwent programmatic restructuring, issued a 5-year plan for environmental restoration and waste management, and took actions to make its contractors more accountable for environmental and safety matters; and (4) DOE requested $2.8 billion for fiscal year 1991 environmental restoration and waste management activities, although that amount would not fully fund all of the activities it outlined in its 5-year plan. GAO believes that, although DOE has taken several actions to better address environmental problems in its nuclear weapons complex, DOE must have more effective management systems in place to ensure that it: (1) identifies and obtains funding for the most serious environmental problems; (2) effectively manages and spends funds allocated for cleanup and waste management; and (3) maintains a strong commitment to resolving environmental problems.

Nuclear Waste: Quarterly Report as of September 30, 1989 (Letter Report, 03/02/90, GAO/RCED-90-103).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the status of the Department of Energy's (DOE) implementation of mandated policies and procedures for nuclear waste storage, disposal, and transportation in an underground repository, focusing on: (1) whether DOE was ready to begin construction of the facility and (2) how recent changes

in scheduling and in its developmental approach have affected DOE activities.

FINDINGS: GAO found that: (1) DOE did not begin construction on an exploratory shaft facility by November 1989, as planned, because it did not comply with Nuclear Regulatory Commission (NRC) quality assurance requirements, resolve facility-design problems, or obtain the required state permits; (2) DOE restructured the repository program, which extended site characterization and repository licensing deadlines to October 2001, exploratory shaft facility completion to November 1992, and underground testing deadlines to September 1995; (3) responding to state and NRC recommendations to identify disqualifying conditions early in site preparation, DOE planned to precede underground testing with surface testing, beginning in January 1991; and (4) the scheduled extensions will allow DOE to reevaluate its plans for the exploratory shaft facility, resolve problems in obtaining state permits, and conduct thorough site investigations.

GAO's Views on DOE's 1991 Budget for Addressing Problems at the Nuclear Weapons Complex (Testimony, 03/02/90, GAO/T-RCED-90-33).

BACKGROUND: GAO discussed the Department of Energy's (DOE) 1991 budget request relating to cleaning up and modernizing its nuclear weapons complex. GAO noted that: (1) to more effectively deal with its problems, DOE restructured its programmatic and safety organizations, issued a 5-year plan for environmental restoration and waste management, and undertook efforts to make contractors more accountable for environmental and safety matters; (2) the Congress mandated the establishment of the Defense Nuclear Facilities Safety Board to help ensure the safe operation of DOE facilities; (3) although the full scope of DOE environmental problems was still unknown, estimates indicated that cleanup could cost up to $155 billion; (4) unresolved problems included the shut-down of several key facilities, delayed opening of a waste repository, reactor and facility operational safety, facility deterioration, and groundwater and soil contamination; (5) DOE requested $8.6 billion for its weapons complex, including $1.9 billion for modernization and safety upgrades; (6) DOE also requested $2.8 billion for environmental restoration and waste management for 1991; (7) DOE projected that funding for environmental restoration would continue to increase over the next 5 fiscal years; (8) DOE planned to perform some modernization efforts during 1991 without the benefit of an overall approved strategic plan; and (9) DOE

identified several material weaknesses that could affect its ability to rebuild and clean up the nuclear weapons complex.

Nuclear Waste: Transuranic Waste Storage Limitations at Rocky Flats Plant (Letter Report, 02/28/90, GAO/RCED-90-109).

BACKGROUND: GAO reviewed the Department of Energy's (DOE) plans for resolving the on-site waste storage problem at its Rocky Flats nuclear weapons plant.

FINDINGS: GAO found that: (1) the shutdown of Rocky Flats weapons production facilities precluded accurate projections of the on-site waste storage capacity; (2) DOE took initiatives to extend the storage limit by reducing the volume of waste generated, removing some waste from the current radioactive-mixed waste inventory, and installing equipment to reduce the waste in the current inventory; (3) monthly generation of waste declined from an average of 361 cubic yards in fiscal year 1984 to 95 cubic yards during fiscal year 1989; and (4) DOE took steps to increase employee awareness and training on using hazardous chemicals so that radioactive waste could be minimized.

Nuclear Science: The Feasibility of Using a Particle Accelerator to Produce Tritium (Briefing Report, 02/02/90, GAO/RCED-90-73BR).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the feasibility of the Department of Energy (DOE) producing tritium, a critical material for nuclear weapons, using a linear accelerator, rather than a nuclear reactor, focusing on: (1) whether DOE adequately considered particle accelerator technologies during its examination of tritium production options and (2) the cost, safety, and environmental advantages of accelerator production over nuclear reactor production of tritium.

FINDINGS: GAO found that: (1) although accelerator production of tritium appeared feasible, DOE needed to design an accelerator with the operating characteristics necessary for tritium production; (2) although DOE concluded that alternative technologies could not provide new tritium production capacity within the needed time frame, it was reviewing the accelerator in more detail; (3) accelerator production of tritium would present fewer safety and environmental concerns, could have more cost and schedule advantages, and could be sized to meet specific tritium needs; and (4) because of the amount of electricity required to produce tritium with an accelerator, DOE could need a new electric generating

plant, which could cause environmental consequences associated with fossil fuel or nuclear power generation.

Environment, Safety, and Health: Status of DOE's Reorganization of Its Safety Oversight Function (Briefing Report, 01/30/90, GAO/RCED-90-82BR).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the impact a proposed Department of Energy (DOE) reorganization plan would have on its safety oversight activities for nuclear facilities.

FINDINGS: GAO noted that: (1) DOE responded to public concern over a 1979 nuclear accident by establishing the Office of Assistant Secretary for Environment, Safety, and Health in September 1985; (2) a 1986 accident in the Soviet Union led to a 1988 congressional mandate for an external, independent oversight board; and (3) despite previous actions to address safety issues, the Secretary of Energy determined in 1989 that the DOE safety oversight program was a failure, primarily because clear lines of responsibility did not exist for DOE oversight activities. GAO found that the proposed restructuring plan would clearly identify lines of responsibility for DOE safety management and oversight by: (1) specifying safety responsibilities for management personnel; (2) reorganizing DOE offices for independent, internal oversight of safety activities; and (3) clarifying the external safety board's role in overseeing the internal safety program. GAO also found that the plan's success depended on: (1) the degree of personnel commitment to safety and reconciliation of safety concerns with production goals; (2) whether each oversight group had a clear role and adequate guidelines regarding its responsibilities and relationships with the other groups; (3) how effectively DOE oversight groups worked together to achieve safety goals; and (4) the availability of experienced and qualified personnel to perform safety oversight activities.

Electric Vehicles: Likely Consequences of U.S. and Other Nations' Programs and Policies (Chapter Report, 12/30/94, GAO/PEMD-95-7).

ABSTRACT: California and several northeastern states have adopted or are considering legislation that would require automobile manufacturers—both foreign and domestic—to supply 70,000 electric vehicles in 1998 and nearly a million by 2003. Uncertainties about the readiness of electric vehicle technology led GAO to compare electric vehicle development and commercialization programs internationally. Reviewing programs in France, Germany, Italy, Japan, Sweden, Switzerland, and the United Kingdom, as well as the United States, GAO sought to answer the following questions: (1) What are the current barriers to the widespread introduction of electric vehicles? (2) What are the nature and extent of other nations' policies and programs for developing, producing, and promoting electric vehicles? (3) What are the likely effects of introducing electric vehicles in terms of costs to the individual, national energy savings, and effects on the environment?

Natural Gas Regulation: Little Opposition to FERC's Recent Policies on Transportation-Related Services (Letter Report, 12/21/94, GAO/RCED-95-39).

ABSTRACT: During the past decade, the Congress and the Federal Energy Regulatory Commission (FERC) have taken several steps to lessen federal regulation of the production and interstate transportation of natural gas. Industry attention has now focused on regulatory changes in transportation services. This report reviews recent regulatory changes affecting three aspects of the industry—the collection of gas from wells for delivery to a processing plant or pipeline; the holding of gas, normally in underground reservoirs, for later use; and the interconnection points among several pipelines where gas and transportation services can be obtained easily. GAO discusses how producers, pipeline companies, and end-users view these changes. GAO also reviews the Energy Department's plans to intervene in energy-related regulatory proceedings in the states and the extent to which Energy plans to work with FERC in such interventions.

Air Pollution: Allowance Trading Offers an Opportunity to Reduce Emissions at Less Cost (Chapter Report, 12/16/94, GAO/RCED-95-30).

ABSTRACT: In 1990, the Congress adopted a new regulatory approach to reduce acid rain, allowing electric utilities to trade allowances to emit

sulfur dioxide, a major cause of acid rain. Utilities that reduce their emissions below their required levels can sell their extra allowances to other utilities to help them meet their requirements. The Environmental Protection Agency estimates that this flexible approach to curbing acid rain could reduce costs significantly because trading allowances can be less costly than other methods of controlling pollution. This report discusses the (1) extent to which trading is expected to cut sulfur dioxide emissions and compliance costs and the status of the allowance trading market; (2) impediments to increased trading of allowances; and (3) implications of designing a similar approach to curb carbon dioxide emissions.

Gasohol: Federal Agencies' Use of Gasohol Limited by High Prices and Other Factors (Letter Report, 12/13/94, GAO/RCED-95-41).

ABSTRACT: The total amount of gasohol used by the federal government remains unknown because agencies do not keep information on purchases by individual drivers, which account for about 54 percent of all motor fuel use. The remaining motor fuel is bought in bulk, and the percentage represented by gasohol has not increased significantly since 1981. GAO found that gasohol consumption by the federal fleet was 269 million gallons in fiscal year 1993. This amount would represent the upper limit of potential gasohol consumption if all vehicles used by federal agencies were refueled with gasohol during that year. If, instead, federal agencies bought gasohol at the same rate as the general public—7.1 percent of gasoline consumption—they would potentially use about 19 million gallons. Although federal agencies have tried to encourage the use of gasohol since 1991, several barriers still exist that limit purchases. The main impediment is that the price of gasohol is not competitive with the price of gasoline. Gasohol is also sometimes unavailable because of the small number of ethanol and gasohol suppliers in some locations. In addition, environmental regulations mandating the use of clean-burning fuels to reduce emissions may limit the use of gasohol in some areas or affect its supply and price in others.

International Trade: Issues Regarding Imposition of an Oil Embargo Against Nigeria (Letter Report, 11/10/94, GAO/GGD-95-24).

ABSTRACT: The U.S. House of Representatives has condemned the effort of Nigeria's military government to thwart that country's return to civilian and democratic rule and in jailing prominent human rights activists and democratic political leaders. This report assesses the potential economic

impact of a multilateral oil embargo on Nigeria, the world oil market, and the U.S. economy. GAO also examines the political viability of undertaking such an action. Finally, GAO assesses the potential economic impact of a U.S. unilateral oil embargo on Nigeria, the world market, and the U.S. economy, as well as its potential political impact on Nigeria.

Energy Supply: Energy Potential of Municipal Solid Waste Is Limited (Letter Report, 09/20/94, GAO/RCED-94-200).

ABSTRACT: More than 195 million tons of municipal solid waste—basically household and commercial garbage—were generated in the United States. Yet only a small portion of solid waste is now used for energy production, mainly through the use of electricity-generating facilities that burn municipal waste as a fuel and engines fueled by waste gases from landfills. GAO concludes that energy recovery from municipal solid waste holds limited potential to contribute to the nation's overall energy production, not only because of the volume and energy content of the waste itself, but also because of factors affecting the use of waste disposal, including public opposition and the availability of financing. This report also discusses (1) the environmental impact of producing energy from waste, (2) the Energy Department's research and development efforts to use waste as a viable energy source, and (3) the potential energy savings from and environmental impact of recycling waste material.

Energy Policy: Ranking Options to Improve the Readiness of and Expand the Strategic Petroleum Reserve (Letter Report, 08/18/94, GAO/RCED-94-259).

ABSTRACT: This report discusses several near- and long-term options for improving the readiness of and expanding the Strategic Petroleum Reserve. Resolving problems affecting the Reserve's readiness, such as the buildup of geothermal heat and gas in stored crude oil, and replacing equipment at the end of its design life would overcome the significantly degraded ability of the Reserve to respond to oil disruptions. As a result, GAO ranked these options as high priorities. Continuing to fill the reserve to its current capacity of 750 million barrels or expanding the reserve to hold one billion barrels would both cost much more. Considering the limited potential benefits and the higher costs of filling or expanding the Reserve, GAO gave this option a relatively low priority. The benefits of increasing the Reserve's daily drawdown capability are less clear; however, implementing this option would increase the nation's ability to

respond more flexibly to oil disruptions and would likely entail more moderate costs. GAO ranked this option as a medium priority.

Alternative-Fueled Vehicles: Progress Made in Accelerating Federal Purchases, but Benefits and Costs Remain Uncertain (Chapter Report, 07/15/94, GAO/RCED-94-161).

ABSTRACT: To reduce U.S. dependence on foreign oil and improve air quality, federal agencies have pioneered the use of vehicles fueled by ethanol, natural gas, methanol, propane, and electricity. Federal agencies now manage a fleet of about 7,800 cars, trucks, and vans that use alternative fuels. Wider public acceptance of these vehicles, however, has been stymied by a shortage of convenient refueling stations; high costs; and uncertainties surrounding the economic, environmental, and other benefits of alternative fuels. This report (1) identifies uncertainties about the benefits and costs of using alternative fuels; (2) assesses federal efforts to encourage the development of refueling facilities for such fuels; (3) reviews federal efforts to accelerate acquisitions of alternative-fueled vehicles; and (4) evaluates efforts to coordinate federal, state, and local alternative fuels programs.

Electromagnetic Fields: Federal Efforts to Determine Health Effects Are Behind Schedule (Chapter Report, 06/21/94, GAO/RCED-94-115).

ABSTRACT: Much needed federal research on the health consequences of exposure to electromagnetic fields emitted from power lines lags behind schedule, and a final report to be delivered to the Congress by March 1997 will likely be based on limited information. Most federal power lines are found in rural areas, where the risk of public exposure to electromagnetic fields is lower. Sources other than power lines, such as home appliances and office equipment, are more common sources of exposure to electromagnetic fields. Lacking conclusive scientific evidence on the health effects of such exposure, states and utilities have responded cautiously to the public's concerns and have taken relatively inexpensive and convenient measures to reduce public exposures, such as restricting public uses of power line rights-of-way. Future actions will be driven largely by the results of scientific research. The Department of Energy (DOE) and other agencies have missed milestones for implementing a national research program on electromagnetic fields. DOE officials blame the delay on competing priorities during the 1992-1993 presidential transition.

Geothermal Energy: Outlook Limited for Some Uses but Promising for Geothermal Heat Pumps (Chapter Report, 06/03/94, GAO/RCED-94-84).

ABSTRACT: Growth in the use of geothermal energy to generate electricity will be modest because most of the known economically viable hydrothermal fields are slowly being depleted from use. Furthermore, the price of electricity being generated from these fields is only marginally competitive with that of electricity derived from other sources. To improve the competitiveness of geothermal power, the Department of Energy (DOE) is supporting industry efforts to extend the life of the hydrothermal fields, explore for new resources, and cut drilling costs. Geothermal power production causes fewer, less serious environmental problems than does conventional power production. Geothermal resources suitable for direct-use heating applications offer an environmentally benign resource alternative; however, their growth potential is poor because of the high risk of drilling and the high cost of installation, low price of fossil fuels, and lack of information on geothermal resources located near large cities. Geothermal heat pumps are the most energy-efficient way to heat and cool buildings in most parts of the country. Their wider use could cut energy costs, conserve fossil fuels, and reduce emission. Their use to date, however, has been limited because consumers, contractors, installers, and utilities are unfamiliar with the technology; installation costs are high; and neither DOE nor industry has actively promoted them.

Energy Policy: Energy Policy and Conservation Act Reauthorization (Testimony, 05/25/94, GAO/T-RCED-94-214).

ABSTRACT: The government-owned and -operated Naval Petroleum Reserve (NPR) in Elk Hills, California—the seventh largest oil field in the lower 48 states—generated oil sales revenues of $327 million in 1992. The Department of Energy (DOE) sells most of this oil to California refiners through competitive bids. The prices received by the government for this oil have been lower than prices for crude oil in other parts of the country. GAO concludes that it will be difficult for DOE to boost revenues from NPR oil sales by selling oil to Gulf Coast or midcontinent oil refineries because this oil is of lower quality than other available crudes, and shipping costs are high. This report explores other ways that DOE may be able to increase revenues. For example, DOE bills its customers more often than private oil producers do, resulting in buyers making lower bids to compensate for the higher administrative costs. DOE also does not market its oil as aggressively as private producers do. GAO also discussed (1) the relative

priority that should be given to several options for improving the readiness and expansion of the Strategic Petroleum Reserve and (2) the evolving mission of the International Energy Agency.

Naval Petroleum Reserve: Limited Opportunities Exist to Increase Revenues From Oil Sales in California (Letter Report, 05/24/94, GAO/RCED-94-126).

ABSTRACT: The government-owned and -operated Naval Petroleum Reserve (NPR) in Elk Hills, California—the seventh largest oil field in the lower 48 states—generated oil sales revenues of $327 million in 1992. The Department of Energy (DOE) sells most of this oil to California refiners through competitive bids. The prices received by the government for this oil have been lower than prices for crude oil in other parts of the country. GAO concludes that it will be difficult for DOE to boost revenues from NPR oil sales by selling oil to Gulf Coast or midcontinent oil refineries because this oil is of lower quality than other available crudes, and shipping costs are high. This report explores other ways that DOE may be able to increase revenues. For example, DOE bills its customers more often than private oil producers do, resulting in buyers making lower bids to compensate for the higher administrative costs. DOE also does not market its oil as aggressively as private producers do. In testimony before Congress, GAO summarized this report and also discussed (1) the relative priority that should be given to several options for improving the readiness and expansion of the Strategic Petroleum Reserve and (2) the evolving mission of the International Energy Agency; see: Energy Policy: Energy Policy and Conservation Act Reauthorization (GAO/T-RCED-94-214, May 25, 1994), by Victor S. Rezendes, Director of Energy and Science Issues, before the Subcommittee on Energy and Power, House Committee on Energy and Commerce (15 pp.).

Electricity Regulation: FERC's Efforts to Monitor and Enforce Hydroelectric Requirements (Letter Report, 05/24/94, GAO/RCED-94-162).

ABSTRACT: The Federal Energy Regulatory Commission (FERC) regulates about 1,670 nonfederal hydroelectric projects across the country. FERC's main concern is that project operators abide by terms and conditions designed to protect people, property, and the environment. GAO concludes that FERC's monitoring procedures and practices are adequate to ensure that these projects are complying with its requirements. FERC's procedures for investigating allegations of noncompliance with license requirements are adequate and generally followed. FERC's monitoring and enforcement

efforts to ensure structural soundness, public safety, and environmental protection are showing positive results. The number of violations committed each year fell from 157 in fiscal year 1989 to 87 in 1993, a 45-percent decline. Over the same period, FERC increased its enforcement efforts against project owners who commit violations. Compliance orders, which are directives to correct deficiencies, jumped from 26 to 37; fines totaling $3.7 million were levied against 31 projects; and eight licenses were revoked.

Energy Conservation: Contractors' Efforts at Federally Owned Sites (Letter Report, 04/29/94, GAO/RCED-94-96).

ABSTRACT: Energy experts estimate that the federal government—the nation's largest energy consumer—could cut annual energy use in its buildings by at least 25 percent. This report focuses on how energy contractors managing sites owned by five agencies—the Departments of the Air Force, Army, Navy, and Energy, and the National Aeronautics and Space Administration—have achieved reductions in energy use. GAO discusses (1) energy consumption at the government-owned sites operated by contractors in the United States, (2) incentives and funding sources available for contractors to use in reducing energy consumption, and (3) contractors' energy conservation efforts and the results these efforts have achieved.

Bonneville Power Administration: Borrowing Practices and Financial Condition (Briefing Report, 04/19/94, GAO/AIMD-94-67BR).

ABSTRACT: The Bonneville Power Administration (BPA), which markets and distributes power generated on the Columbia River and its tributaries, faces significant operating and financial risks because of its heavy reliance on borrowing, recent operating losses, and other uncertainties. For nearly all of its capital investments, BPA uses debt financing—that is, BPA borrows money and repays the debt, with interest, through future revenues. Almost all of BPA's new borrowing is projected to come from the U.S. Treasury. By contrast, public utilities and federal entities, such as the Tennessee Valley Authority, generally use a higher portion of their current revenues to pay for capital expenditures than BPA does. In the short term, BPA's low financial reserves provide little flexibility to respond to further operating losses, increasing the possibility that BPA would be unable to make its annual payment to Treasury. In the longer term, BPA's financial viability could also be jeopardized if the gap between BPA rates and the cost of alternative energy sources continues to narrow. Such a scenario could

cause some BPA customers to meet their energy needs elsewhere, leaving a dwindling pool of ratepayers to pay off the debt burden accumulated during previous years.

Energy Conservation: Federal Agencies' Funding Sources and Reporting Procedures (Letter Report, 03/30/94, GAO/RCED-94-70).

ABSTRACT: The federal government is the largest single energy user in the nation. In fiscal year 1992, the energy bill for 500,000 federal buildings and facilities came to more than $3.6 billion. The National Energy Conservation Policy Act requires that federal agencies, by the year 2000, cut energy use 20 percent from 1995 levels. This report provides the latest information available on the energy activities at the six largest energy-consuming agencies: the Departments of Defense, Energy, Transportation, and Veterans Affairs; the General Services Administration; and the Postal Service. GAO identifies (1) energy expenditures, spending on energy conservation, and energy efficiencies achieved; (2) funding sources available for energy conservation measures; and (3) procedures used for tracking them.

International Trade: Kazakhstan Unlikely to Be Major Source of Oil for the United States (Letter Report, 03/04/94, GAO/GGD-94-74).

ABSTRACT: Covering a territory of more than 1 million square miles, or about one-third of the continental United States, Kazakhstan, part of the former Soviet Union, is rich in oil, gas, and mineral deposits. The risk of disruption to Middle East oil production and the rising U.S. demand for foreign oil have spurred American interest in oil sources outside the Persian Gulf. This report provides information on Kazakhstan's potential as (1) a source of oil for the United States and (2) an investment opportunity for the U.S. petroleum industry and an export market for U.S. oil and gas equipment supplies. GAO also discusses Kazakhstan's oil and gas production, reserves, exports, and consumption; the possible pipeline routes for bringing Kazakhstan's oil to export markets; the factors encouraging and discouraging investment in Kazakhstan's petroleum sector; and the efforts of the U.S. government to support exports to and investment in Kazakhstan's petroleum sector and U.S. oil companies' responses to those efforts.

Natural Gas: Costs, Benefits, and Concerns Related to FERC's Order 636 (Letter Report, 11/08/93, GAO/RCED-94-11).

ABSTRACT: The Federal Energy Regulatory Commission's (FERC) Order 636 is intended to spur development of a more open and accessible pipeline system for buyers and sellers of natural gas. The order requires many interstate pipeline companies to offer their customers transportation, storage, and other services separately or as part of a "bundled" package by the 1993 winter heating season. The pipeline companies will be able to recover from their customers the costs that can be directly attributed to the new regulation as long as FERC determines that these costs were prudently incurred. Order 636 changes how FERC sets the pipeline transportation rates. Under the new rate design, customers requiring uninterrupted service—mainly local distribution companies serving residential or commercial users—will pay more of the pipeline companies' fixed costs. Customers that can tolerate "interruptible" service, such as manufacturers of fertilizer or glass, could end up paying less. In response to congressional concerns about the effect of Order 636 on consumers' gas bills, this report (1) estimates the potential shift in fixed costs among pipeline consumers resulting from the changes in the way that transportation rates are designed, (2) reports the pipeline companies' estimates of the transition costs of implementing the new rule, and (3) summarizes available information on the benefits of the new order and the costs and benefits arising from changes in the law and FERC regulations since 1978.

GAO Products on International Energy Agency (Correspondence, 09/17/93, GAO/RCED-93-217R).

BACKGROUND: Pursuant to a congressional request, GAO summarized its reviews of U.S. participation in the International Energy Agency (IEA). GAO found that: (1) in general, the United States has benefitted from participation in IEA and should continue to participate; (2) although IEA has tested its emergency oil-sharing system and resolved some problems, it is uncertain whether the system will function successfully in an oil shortage; (3) the United States will initially have to provide oil to participants in an emergency, since oil imports represent a small percentage of its oil supplies; (4) the United States has not developed a fair-sharing system to ensure that domestic and international oil producers share the burden of supplying oil in emergencies, since officials do not believe it is needed; (5) antitrust concerns and foreign barriers to information exchange could hamper the emergency system's function; (6) the United States relies

primarily on market forces to restrain demand during oil shortages and drawdowns of the Strategic Petroleum Reserve; (7) several IEA members have not met the 90-day reserve requirement; (8) companies are reluctant to provide complete data to IEA information systems which impairs the emergency system's function; and (9) although IEA has established long-term conservation and research and development programs to reduce dependence on imported oil, the United States and several other IEA members have not met IEA goals.

Electricity Regulation: Factors Affecting the Processing of Electric Power Applications (Testimony, 08/06/93, GAO/T-RCED-93-65).

ABSTRACT: Although the Federal Energy Regulatory Commission (FERC) has tried to cut the time required to process electric power applications, further improvements are possible. FERC is responsible for regulating the rates, the terms, and the conditions of proposed wholesale electricity transactions—a growing portion of the nation's electricity business—as well as mergers and other deals among utilities. These improvements are especially important considering the potential increased workload arising from the Energy Policy Act. FERC's management information system could be upgraded to give agency managers more specific information with which to spot problems and assess performance. By examining the information exchanged by applicants and FERC staff at the initial filing stage, FERC could determine if changing policy statements or filing requirements would reduce the number of incomplete applications. Alternative resolution techniques could reduce the need for time-consuming trial-like hearings. Similar techniques could help applicants settle disputes before submitting applications to FERC.

Rural Electrification: REA Borrowers' Investments in Cable and Satellite Television Services (Chapter Report, 07/29/93, GAO/RCED-93-164).

ABSTRACT: Concerns have been raised about the possibility that borrowers have been using loans from the Rural Electrification Administration (REA) to subsidize their cable or satellite television services. One-fourth of the REA borrowers responding to a GAO survey provide such services; respondents reported investments in these businesses totaling $357 million. REA borrowers may have a competitive advantage in their cable or satellite businesses. They have access, for example, to credit sources created to finance electric and telephone cooperatives. Many share space, equipment, and staff used for their utility services with their cable or satellite business. REA does restrict the

amounts that borrowers may invest in nonutility activities. REA also has accounting and auditing controls, including annual audits of borrowers, designed to ensure that borrowers comply with their loan agreements. Regulation of REA borrowers by other federal agencies is limited. State regulation of borrowers and their affiliates varies, depending on whether the borrower is a cooperative or is investor-owned. GAO did not determine whether federal and state oversight prevents borrowers from cross-subsidizing their cable and satellite businesses.

Fossil Fuels: The Department of Energy's Magnetohydrodynamics Development Program (Letter Report, 07/29/93, GAO/RCED-93-174).

ABSTRACT: The Department of Energy (DOE), along with industry, has been working for years to develop magnetohydrodynamics (MHD) technology for generating electricity. MHD is a potentially high-efficiency technology that generates electrical power from coal by passing extremely hot coal combustion gases through a channel surrounded by a magnetic field. In recent years, DOE's MHD program has focused on demonstrating the proof-of-concept, or feasibility, of coal-fired MHD electric power plants. This report discusses (1) the financial history of developing MHD technology, (2) progress in meeting the proof-of-concept program's schedule, (3) potential problems and concerns, (4) DOE's management of the program, and (5) DOE's plans for MHD.

Electricity Regulation: Factors Affecting the Processing of Electric Power Applications (Letter Report, 07/23/93, GAO/RCED-93-168).

ABSTRACT: Although the Federal Energy Regulatory Commission (FERC) has tried to cut the time required to process electric power applications, further improvements are possible. FERC is responsible for regulating the rates, the terms, and the conditions of proposed wholesale electricity transactions—a growing portion of the nation's electricity business—as well as mergers and other deals among utilities. These improvements are especially important considering the potential increased workload arising from the Energy Policy Act. FERC's management information system could be upgraded to give agency managers more specific information with which to spot problems and assess performance. By examining the information exchanged by applicants and FERC staff at the initial filing stage, FERC could determine if changing policy statements or filing requirements would reduce the number of incomplete applications. Alternative resolution techniques could reduce the need for time-consuming trial-like hearings. Similar techniques could help

applicants settle disputes before submitting applications to FERC. GAO summarized this report in testimony before the Congress; see: Electricity Regulation: Factors Affecting the Processing of Electric Power Applications (GAO/T-RCED-93-65, Aug. 6, 1993), by Victor S. Rezendes, Director of Energy and Science Issues, before the Subcommittee on Environment, Energy, and Natural Resources, House Committee on Government Operations (16 pp.).

Energy Policy: Other Nations' Policies to Reduce Oil and Coal Use in Transport and Industry (Chapter Report, 05/28/93, GAO/RCED-93-139).

ABSTRACT: By 2010, U.S. oil and coal consumption are projected to rise by almost one-fifth over 1990 levels. The nation's continued heavy reliance on fossil fuels, particularly oil and coal, raises questions about its ability to meet energy security, environmental, and economic objectives. This report examines how other industrialized nations have dealt with the dilemma. GAO discusses the (1) factors that influence the type and the amount of energy that other nations use and, specifically, the trends in energy supply and use in Canada, France, Germany, Japan, and South Korea and (2) key policies and programs that these nations have adopted to promote conservation and the efficient use of oil and coal in their transportation and industrial sectors.

Natural Gas: FERC's Compliance and Enforcement Programs Could Be Further Enhanced (Chapter Report, 05/27/93, GAO/RCED-93-122).

ABSTRACT: The natural gas industry, despite increasing competition, retains many characteristics of a monopoly. To protect the public interest, the Federal Energy Regulatory Commission (FERC) regulates the sale and the transportation of natural gas and the construction of pipeline facilities. FERC has tried to stop pipeline companies from engaging in potentially discriminatory practices that favor their own unregulated subsidiaries, but FERC's efforts could be even more effective. For example, FERC needs to aggressively enforce pipeline bulletin board and other reporting requirements used to detect and deter discriminatory practices. FERC also needs to target audits of pipeline companies on the basis of information suggesting that discriminatory practices may exist. FERC recently tried to beef up its enforcement of environmental regulations by hiring more inspection staff and by better informing its inspection staff and the industry of FERC's environmental requirements. GAO suggests that FERC (1) require companies to give FERC advance notice of construction scheduled for environmentally sensitive areas, (2) require companies to

submit periodic environmental compliance reports for all major construction projects requiring environmental mitigation measures, and (3) formally seek civil penalty authority from the Congress to enforce FERC's requirements for projects approved under the Natural Gas Act.

Energy Policy: Changes Needed to Make National Energy Planning More Useful (Chapter Report, 04/27/93, GAO/RCED-93-29).

ABSTRACT: The oil and price shocks of the early 1970s spurred the Congress to create a permanent mechanism for developing and implementing a national energy policy. Under the law, the President must submit a comprehensive national energy plan to the Congress every 2 years. GAO found that the six national energy plans submitted by three administrations since 1979 have varied significantly in responding to the law's provisions. Although most plans set objectives and outlined strategies to achieve them, no plan fully addressed the act's main provisions. For example, no plan established the specified 5- and 10-year objectives. Most plans included only general goals, and only three plans provided analysis supporting these goals. The administrations' differing views on the federal role in energy as well as new energy developments influenced the content of the plans and the degree to which they addressed the law's provisions. GAO believes that although the law provides a useful framework for developing an energy policy, the frequency and timing requirements have not contributed to effective planning. As a result, plans are unlikely to involve the comprehensive planning exercise the Congress envisioned.

Alternative-Fueled Vehicles: Potential Impact of Exemptions From Transportation Control Measures (Letter Report, 04/19/93, GAO/RCED-93-125).

ABSTRACT: To reduce air pollution and U.S. oil dependence, the Congress has passed legislation promoting the use of alternative-fueled vehicles. Several barriers, however, including higher fuel costs and uncertainty about the availability of alternative fuels, may deter businesses and consumers from buying these vehicles. As a result, legislation has been introduced that would offer potential buyers exemptions from some transportation control measures, including high-occupancy vehicle lanes. This report examines (1) how exemptions might affect achieving the transportation control measures' purposes, (2) how effective exemptions might be in increasing purchases of alternative fueled vehicles and the use of alternative fuels, (3) whether government and industry officials believe

that an exemption program should be controlled by the federal government or the states, (4) how the public might react to exemptions, (5) how exemptions are likely to affect the enforcement of transportation control measures, and (6) what specific kinds of alternative-fueled vehicles might receive exemptions.

Electricity Supply: Efforts Under Way to Develop Solar and Wind Energy (Chapter Report, 04/16/93, GAO/RCED-93-118).

ABSTRACT: Wind and sunlight have the potential to help meet the United States' electrical needs without the adverse environmental effects associated with other energy sources, yet they now supply less than 1 percent of the nation's electricity. This report identifies (1) economic and institutional barriers that discourage electric utilities from using wind or solar power; (2) efforts by government, utilities, and industry to foster the use of wind and solar power; and (3) ways in which the Department of Energy's programs could further assist the development of wind and solar technologies.

Trans-Alaska Pipeline: Projections of Long-Term Viability Are Uncertain (Letter Report, 04/08/93, GAO/RCED-93-69).

ABSTRACT: The Department of Energy (DOE) asserts that the Congress will have to authorize the leasing of the coastal plain of Alaska's Arctic National Wildlife Refuge—an area of high oil and gas potential—by 1997 to keep the Trans-Alaska Pipeline operating. DOE concludes that because of the projected rate of decline in oil production from Alaska's North Slope, the pipeline will likely be forced to shut down by the year 2009. The possible shutdown of the pipeline could be a consideration in reaching a policy decision on whether to open the refuge to oil and gas development or whether to designate the coastal plain as wilderness, thereby precluding future development. In assessing DOE's conclusion that 2009 is the most likely year that the pipeline will be forced to shut down, GAO evaluated the reasonableness of (1) the minimum operating level that DOE assumed for the pipeline and (2) the model and the key economic, geologic, engineering, and cost assumptions that DOE used to estimate oil production at the North Slope. GAO also looked at the reasonableness of DOE's belief that it will take 10 to 12 years to develop new oil fields in the refuge.

GAO Products on Bonneville Power Administration (Correspondence, 03/31/93, GAO/RCED-93-133R).

BACKGROUND: Pursuant to a congressional request, GAO provided a summary of its work on the Bonneville Power Administration (BPA) and other related agencies involved in BPA system operations since the enactment of the Pacific Northwest Electric Power Planning and Conservation Act. GAO noted that its work: (1) included recommendations for agency actions and how the agency responded to the recommendations and (2) concerned issues of financial management, endangered species, resource acquisition, irrigation, electricity transmission, administration, nuclear power plant construction, and utility rates.

Energy Conservation: Appliance Standards and Labeling Programs Can Be Improved (Chapter Report, 03/24/93, GAO/RCED-93-102).

ABSTRACT: The Department of Energy (DOE) is behind schedule in upgrading energy efficiency standards for household appliances, such as refrigerators, air conditioners, and heat pumps. This has happened because (1) the appliance program's budget has been cut and staffing has remained flat despite an increasing workload and (2) DOE officials generally review proposed standards sequentially, rather than using a faster concurrent review process. The upshot is that U.S. consumers, by continuing to buy less efficient appliances, will spend an estimated $1.7 billion more on energy costs through 2030 than they would have if DOE had upgraded the standards on time. The Federal Trade Commission's (FTC) labeling program is intended to inform consumers about appliance energy use and costs. Despite concerns voiced by consumers and manufacturers about the accuracy of existing appliance labels, which do not take into account changing energy prices, FTC has not reviewed the format and information content of labels, calling into question the program's effectiveness. To promote compliance with federal efficiency standards and accuracy in labels, DOE and FTC rely largely on voluntary tests done by industry associations. GAO did not determine the extent to which appliances met efficiency standards, but it did discover instances in which pool heaters and refrigerator-freezers fell short of the energy efficiency claims on their labels or were less efficient than the standards required. DOE and FTC do not systematically monitor and investigate compliance with the standards.

Energy Security and Policy: Analysis of the Pricing of Crude Oil and Petroleum Products (Chapter Report, 03/19/93, GAO/RCED-93-17).

ABSTRACT: During the first week following the Iraqi invasion of Kuwait in August 1990, crude oil prices in the United States shot up by more than one-third—from about $22 a barrel to about $30 a barrel. The prices of gasoline, home heating oil, and jet fuel also increased substantially. Yet world inventories of crude oil were at their highest level since the late 1970s. This situation raised questions about how prices for crude oil and petroleum products are set, particularly during market shocks. This report (1) explains the pricing of crude oil and three products refined from it—gasoline, home heating oil, and jet fuel—under normal market conditions and during market shocks and (2) describes the federal government's authority to respond to disruptions in the oil supply and the government's use of this authority during the Persian Gulf war.

Electricity Regulation: Electric Consumers Protection Act's Effects on Licensing Hydroelectric Dams (Chapter Report, 09/18/92, GAO/RCED-92-246).

ABSTRACT: The Federal Energy Regulatory Commission (FERC) faces a major challenge. By the end of 1993, the long-term operating licenses for more than 15 percent of the nation's nonfederal hydroelectric power projects will expire. In relicensing these projects, FERC must balance electricity needs with environmental and other considerations, as spelled out in the 1986 Electric Consumers Protection Act. This report: (1) reviews the effects of that legislation on FERC's licensing process for and decisions about hydroelectric power projects, (2) provides information on FERC's use of temporary licenses for projects seeking relicensing, and (3) identifies FERC's requirements for ensuring public safety at hydroelectric projects.

Energy Policy: Options to Reduce Environmental and Other Costs of Gasoline Consumption (Chapter Report, 09/17/92, GAO/RCED-92-260).

ABSTRACT: GAO evaluated six policy options—a higher gas tax, a tax on tail pipe emissions, subsidies for alternative fuels, higher fuel economy standards for new vehicles, surcharges for cars that are less fuel efficient and pollute more, and financial rewards for people who voluntarily scrap older vehicles—to determine their effect on the economy, the environment, traffic congestion, and other issues. These policy options can be modified or combined to more effectively reduce gasoline consumption and air pollution from cars and light trucks and to meet

other important policy objectives. Options that send consumers clear market signals, such as higher gasoline or tailpipe emission taxes, could help ensure that the costs of gasoline use in these vehicles are visible and fully considered by consumers when they buy, maintain, drive, and trade in vehicles. These options could also increase the demand for more fuel-efficient and alternatively fueled vehicles. Relying on just one option to meet multiple and sometimes conflicting policy objectives, however, could be difficult and costly. This, in turn, could reduce the chance that any policies will be adopted. An eclectic strategy incorporating the best designs of individual policy options seems desirable. GAO summarized this report in testimony before the Congress; see: Energy Policy: Options to Reduce Environmental and Other Costs of Gasoline Consumption (GAO/T-RCED-92-94, Sept. 17, 1992) by Victor S. Rezendes, Director of Energy and Science Issues, before the Subcommittee on Environment, House Committee on Science, Space, and Technology (12 pp.).

Energy Policy: Options to Reduce Environmental and Other Costs of Gasoline Consumption (Testimony, 09/17/92, GAO/T-RCED-92-94).

BACKGROUND: GAO discussed the external costs of gasoline consumption and fuel policy options, focusing on the: (1) current options' effect on consumers and the economy and (2) effects of option modifications and combinations. GAO noted that: (1) options that could reduce gasoline consumption and pollutants include federal gasoline taxes, tailpipe emission taxes, and alternative fuel usage; (2) federal gasoline taxes could lead to slower economic growth and impose a financial burden on the poor; (3) tailpipe emission taxes could reduce pollution severity, but measurement and enforcement would be difficult; (4) alternative fuels could increase greenhouse emissions, vary emission aspects, and require federal subsidies to compete with low gasoline prices; (5) higher Corporate Average Fuel Economy standards and a fee-rebate program could improve fuel economy and reduce greenhouse emissions but would impose additional costs on the U.S. automobile industry; (6) scrap program options would target old vehicles and reduce emissions but could impose a financial burden on lower income groups; (7) redesigning fuel tax options could redirect negative economic growth effects and burdens on the poor; (8) improvements in gasoline and tailpipe tax options could assist in deficit reduction, reduce other taxes, and promote long-term economic growth; (9) combining alternative fuel and tax options could increase alternative fuel demand and usage, reduce emissions, and reduce the need for subsidies; and (10) combining higher Corporate Average Fuel

Economy standards, fee-rebate programs, and scrap programs would reduce emissions and increase demand for fuel-efficient vehicles.

East European Energy: Romania's Energy Needs Persist (Chapter Report, 08/04/92, GAO/NSIAD-92-257).

ABSTRACT: Modernization of Romania's energy sector and increased production are crucial if that country is to achieve market reforms and reinvigorate its economy. Because the changing energy economies of Romania and other East European countries may open up new markets for Western energy technologies, this report provides information on (1) trends and problems linked to Romania's energy production and imports, (2) Romania's energy needs and the steps being taken or planned to address them, (3) factors that discourage U.S. trade with and investment in Romania's energy sector, and (4) U.S. government and international efforts to develop Romania's energy sector.

Alternative Fuels (Correspondence, 07/24/92, GAO/RCED-92-240R).

BACKGROUND: Pursuant to a congressional request, GAO provided information on: (1) tunnel restrictions for gaseous-fueled vehicles in Baltimore, Boston, and New York; (2) the implications of Department of Transportation (DOT) regulations requiring recertification of compressed natural gas (CNG) cylinders; and (3) the consistency of provisions for alternative-fuel tax benefits in recently proposed legislation. GAO noted that: (1) regulatory agencies in Baltimore, Boston, and New York have recently supported relaxing their regulations that block access for gaseous-fueled vehicles and have been working with the CNG and liquified petroleum gas industries to resolve potential safety issues associated with gaseous fuels; (2) DOT requires CNG cylinder recertification only for those vehicles involved in commerce, but some state and local governments require all CNG vehicle users to maintain DOT certification; and (3) inconsistencies among the proposed legislation's provisions for tax deductions could result in some acceptable fuels' not receiving tax benefits.

Hydroelectric Dams: Proposed Legislation to Restore Elwha River Ecosystem and Fisheries (Testimony, 07/09/92, GAO/T-RCED-92-80).

BACKGROUND: GAO discussed the Elwha River Ecosystem and Fisheries Restoration Act, focusing on: (1) the Federal Energy Regulatory Commission's (FERC) authority to license dams on the Elwha River; (2) the

Department of the Interior's position on removal of the dams to restore fisheries; and (3) who should pay the costs if the dams are removed. GAO noted that: (1) the Glines Canyon Dam is within the boundaries of a national park, where FERC does not have the authority to license dams; (2) Interior, FERC, and the National Marine Fisheries Service believe that removing both dams offers the best prospects for restoring the Elwha River fisheries and their surrounding ecosystem; and (3) the cost of removing the dams should be allocated among parties in proportion to the benefits they have received from the dams or will receive from the restoration of the river.

Gasohol: Federal Agencies' Use of Gasohol (Testimony, 06/24/92, GAO/T-RCED-92-73).

ABSTRACT: This testimony examines federal agencies' use of gasohol—gasoline containing 10 percent ethanol. Bulk purchases of gasohol for use in federal motor vehicles have been limited, and the extent to which gasohol has been used by federal credit card purchasers of motor fuel is unknown. Eliminating or tightening exemptions from requirements for the use of gasohol and promoting its use among credit card users may increase demand. The Defense Department (DOD) has advertised in trade publications its need for more suppliers, generating increased supplier inquiries about future federal contracts. Yet questions remain about the ability of DOD and industry to meet increased demand, particularly given the current limited availability of gasohol, pending environmental regulation that may spur ethanol demand, and the expense of gasohol when handling and other costs are factored in.

Energy Conservation: Efforts Promoting More Efficient Electricity Use (Testimony, 06/23/92, GAO/T-RCED-92-74).

ABSTRACT: Utility-sponsored "demand-side management" programs encourage consumers to use less energy by better insulating their homes and businesses and by replacing appliances with more efficient models. This testimony discusses (1) the likelihood that such programs will result in energy conservation; (2) impediments that must be overcome; and (3) Department of Energy efforts to promote demand-side management and integrated resource planning, including efforts identified in the agency's National Energy Strategy.

South American Oil: Marginal Producers Not a Likely Source for Increased U.S. Imports (Letter Report, 06/16/92, GAO/NSIAD-92-227).

ABSTRACT: GAO reviewed the petroleum industries of the following eight South American countries that produce petroleum but are not major exporters: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Peru, Tobago, and Trinidad. This report discusses (1) the amount of crude oil the United States imports from the eight countries, (2) expected crude oil production for these countries through the year 2010, and (3) investment reforms that these countries have recently made in their petroleum industries. In general, although the United States imports some oil from these countries, as a group, the eight countries are currently net oil importers because combined domestic oil consumption exceeds oil production. Furthermore, the net oil imports are expected to continue to increase through the year 2010, making it unlikely that the United States will obtain increased oil shipments from these countries.

Alternative Fuels: Experiences of Brazil, Canada, and New Zealand in Using Alternative Motor Fuels (Chapter Report, 05/07/92, GAO/RCED-92-119).

ABSTRACT: The oil crisis of the 1970s spurred the governments of Brazil, Canada, and New Zealand to seek domestic alternatives for their motor fuels. Each government was the catalyst for action on alternative fuels, and this leadership proved crucial in removing economic and technological barriers and persuading industry and consumers that alternative fuels were important. Participation by the fuel, automotive, and utility industries was vital in attracting and retaining consumers for alternative fuels and vehicles in each country. Finally, consumer acceptance was essential to the use of alternative fuels in these countries, and incentives such as reduced taxes or subsidies helped boost consumer use of alternative fuels. These countries' experiences, however, show that introducing and sustaining the use of alternative fuels is neither a quick nor an easy undertaking. For example, consistent long-term government commitment was sometimes hard to maintain because of resource limitations and other reasons. In some cases, failure to maintain this commitment undercut sustained use of alternative fuels. Furthermore, alternative fuel initiatives struggled when industry was not actively involved in vehicle development, fueling system construction, and marketing.

Energy R&D: DOE's Prioritization and Budgeting Process for Renewable Energy Research (Testimony, 04/30/92, GAO/T-RCED-92-57).

BACKGROUND: GAO discussed the Department of Energy's (DOE) planning and budgeting processes for renewable energy technology research and development. GAO noted that: (1) the Office of Management and Budget (OMB) provides DOE with overall policy and budgetary direction, including budget planning targets that are based primarily on the preceding year's budget; (2) using the preceding year's budget request as a guide, DOE allocates OMB spending targets among DOE program offices, and the Secretary meets with each of the Assistant Secretaries to review program office priorities and funding levels; (3) the Secretary sends the approved budget proposal to OMB for review before it goes to the Congress; (4) starting with its fiscal year 1993 budget request, the Secretary has directed the Office of Policy, Planning and Analysis to rank civilian energy research and development activities according to their projected contributions to National Energy Strategy objectives; (6) within the Office of Conservation and Renewable Energy, the Assistant Secretary determines budget allocations developed by each of the five Conservation and Renewable Energy offices; (7) the offices base their proposals on a process that incorporates strategic and multiyear program plans and the views of national laboratories, renewable energy industries, and end-users of renewable energy; and (8) although the Office of Conservation and Renewable Energy has no written procedures for ensuring compliance with congressional spending directives, program officials make provisions for following through on the directives.

Energy R&D: DOE's Prioritization and Budgeting Process for Renewable Energy Research (Letter Report, 04/29/92, GAO/RCED-92-155).

ABSTRACT: This report examines how the Department of Energy (DOE) plans and budgets research and development projects for renewable energy technologies. Such technologies include electricity generation from solar, wind, and geothermal energy sources. GAO discusses how DOE (1) determines the annual budget for energy technologies, including renewal, fossil, and nuclear energy, and the role played in this process by the Office of Management and Budget; (2) allocates research and development funds among renewable energy technologies; and (3) ensures that specific congressional directives for research and development projects for renewable energy technology are followed. GAO summarized this report in testimony before the Congress; see: Energy R&D: DOE's Prioritization and Budgeting Process for Renewable Energy Research

(GAO/T-RCED-92-57, Apr. 30, 1992) by Victor S. Rezendes, Director of Energy Issues, before the Subcommittee on Investigations and Oversight, House Committee on Science, Space, and Technology (15 pp.).

Electricity Supply: Efforts Under Way to Improve Federal Electrical Disruption Preparedness (Letter Report, 04/20/92, GAO/RCED-92-125).

ABSTRACT: This report examines the federal government's plans and policies for meeting major disruptions in the supply of energy, such as those caused by severe weather or sabotage. GAO discusses (1) to what extent the Department of Energy (DOE) includes other federal, state, local, and utility organizations in its preparedness planning; (2) how sufficient the statutory authorities available to federal agencies are for responding to major electrical disruptions; and (3) whether emergency plans incorporate restoration priorities and measures to help ensure adequate supplies of electrical equipment.

Energy Conservation: DOE's Efforts to Promote Energy Conservation and Efficiency (Letter Report, 04/16/92, GAO/RCED-92-103).

ABSTRACT: The Department of Energy (DOE) is responsible for spearheading federal efforts to encourage energy conservation. This report focuses on DOE programs promoting electricity and overall energy efficiency. GAO examines (1) the scope of DOE's energy conservation and efficiency programs, including its Integrated Resource Planning Program; (2) the way in which policy options identified in the National Energy Strategy promote conservation and efficiency, as well as increased energy supplies; and (3) the extent to which DOE evaluates program results and considers evaluation results when planning and budgeting for these programs. GAO also discusses the role of the Federal Energy Regulatory Commission, which regulates most wholesale electricity transactions, in promoting energy conservation and efficiency.

Electricity Supply: Regulating Utility Holding Companies in a Changing Electric Industry (Letter Report, 04/09/92, GAO/RCED-92-98).

ABSTRACT: How adequately are consumers and investors protected in the electric utility industry? This report looks at (1) recent changes within the electric utility industry that involve utility holding companies; (2) the effect of these changes on the Securities and Exchange Commission's (SEC) administration of the Public Utility Holding Company Act of 1935;

and (3) the relationship between SEC, the Federal Energy Regulatory Commission, and state regulators in protecting consumer and investor interests in the changing industry.

Mexican Oil: Issues Affecting Potential U.S. Trade and Investment (Chapter Report, 03/18/92, GAO/NSIAD-92-169).

ABSTRACT: This report deals with issues affecting potential future U.S. trade with and investment in Mexico's petroleum industry. GAO discusses (1) recent trends in Mexican oil production and exports and the main factors affecting Mexico's ability to meet current production and export goals, (2) the views of U.S. oil-producing and oil service contracting companies on principal barriers to and possible benefits of U.S. trade with and investment in Mexico's oil industry and the response of Mexican officials, and (3) the U.S. government's efforts to help Mexico's petroleum sector. GAO summarized this report in testimony before the Congress; see: Mexican Oil: Mexican Policies Affect U.S. Trade and Investment Opportunities (GAO/T-GGD-92-24, Mar. 26, 1992) by Allan I. Mendelowitz, Director of International Trade and Finance Issues, before the Subcommittee on International Economic Policy and Trade and on Western Hemisphere Affairs, House Committee on Foreign Affairs (10 pp.).

Natural Gas: Factors Affecting Approval Times for Construction of Natural Gas Pipelines (Letter Report, 02/26/92, GAO/RCED-92-100).

ABSTRACT: During the period of GAO's review, the median processing time for the Federal Energy Regulation Commission (FERC) to approve applications to build natural gas pipelines was about 1 year, but some approvals took much longer. FERC has tried to shorten the time it takes pipeline companies to receive approval to start construction, and the Congress is considering several bills aimed at speeding or eliminating the need for FERC approval. Nevertheless, FERC could further improve its timeliness and performance in processing applications by better informing and training its staff and others on policy changes, negotiating generic agreements with other federal agencies on their environmental reviews of pipeline applications, and strengthening its management information system.

Energy Management: Better Federal Oversight of Territories' Oil Overcharge Funds Needed (Chapter Report, 02/21/92, GAO/RCED-92-24).

ABSTRACT: About $68 million from two oil overcharge cases was made available to five U.S. territories—American Samoa, Guam, the Mariana Islands, Puerto Rico, and the Virgin Islands. In response to congressional concerns about whether these funds have been spent appropriately, this report examines (1) the amount of funds the territories have spent and whether this amount has been accurately reported to the Congress and (2) whether the Departments of Energy and Health and Human Services have adequate monitoring procedures and have taken steps to ensure that the territories' use of oil overcharge funds is in accordance with legal requirements.

International Energy Agency: Response to the Oil Supply Disruption Caused by the Persian Gulf Crisis (Letter Report, 01/21/92, GAO/NSIAD-92-93).

ABSTRACT: The rapid increase in worldwide oil prices after Iraq's invasion of Kuwait in 1990 focused renewed attention on how the use of emergency oil stocks held by members of the International Energy Agency can mitigate the effects of an oil supply disruption. This report reviews (1) the International Energy Agency's decision on whether to draw down emergency oil stocks in response to the disruption in oil supplies following the Iraqi invasion, (2) the U.S. policy on restraining oil demand, (3) the U.S. position on domestic sharing of oil supplies in an emergency and oil companies' views on that position, and (4) the extent of the Department of Energy's efforts to educate the American people about U.S. participation in the International Energy Agency.

Electricity Supply: Potential Effects of Amending the Public Utility Holding Company Act (Chapter Report, 01/07/92, GAO/RCED-92-52).

ABSTRACT: Seeking to reap the potential benefits of greater competition, proposals to exempt some electric generators from the ownership restrictions of the Public Utility Holding Company Act of 1935 could alter the structure of the nation's $170 billion electric utility industry. This report evaluates how the proposals might affect (1) the reliability and cost of the U.S. electricity supply and (2) state and federal regulation of electric utilities.

Venezuelan Energy: Oil Production and Conditions Affecting Potential Future U.S. Investment (Letter Report, 12/12/91, GAO/NSIAD-92-73).

ABSTRACT: Because military and political instability in the Persian Gulf makes the United States vulnerable to oil supply disruptions, a 1991 Department of Energy report encourages diversification of U.S. oil sources and greater reliance on imports from countries outside the Gulf, such as Venezuela. GAO's report, also published in Spanish, (1) discusses recent increases in Venezuelan oil production and the main factors affecting continued increases through 1996, (2) assesses recent investment reforms in the Venezuelan petroleum industry and U.S. petroleum companies' response to these reforms, (3) identifies the major impediments and inducements to U.S. investment in Venezuela's petroleum industry, and (5) reviews the U.S. government's efforts to support Venezuela's energy sector.

Sector de Energia en Venezuela: La Produccion Petrolera y las Condiciones Para Posibles Inversiones de los EE.UU. (Letter Report, 12/12/91, GAO/NSIAD-92-73SV).

ABSTRACT: Because military and political instability in the Persian Gulf makes the United States vulnerable to oil supply disruptions, a 1991 Department of Energy report encourages diversification of U.S. oil sources and greater reliance on imports from countries outside the Gulf, such as Venezuela. This Spanish translation; (1) discusses recent increases in Venezuelan oil production and the main factors affecting continued increases through 1996; (2) assesses recent investment reforms in the Venezuelan petroleum industry and U.S. petroleum companies' response to these reforms; (3) identifies the major impediments and inducements to U.S. investment in Venezuela's petroleum industry; and (4) reviews the U.S. government's efforts to support Venezuela's energy sector.

Electricity Supply: Utility Demand-Side Management Programs Can Reduce Electricity Use (Chapter Report, 10/31/91, GAO/RCED-92-13).

ABSTRACT: According to Department of Energy projections, to meet electricity demand in the year 2000, the nation may need more than 100 new large power plants. Utility-sponsored programs promoting more efficient electricity use—called demand-side management programs—can help avoid the costs and environmental concerns associated with power plants. This report examines (1) the potential for utility-sponsored

demand-side management programs to cut future electricity demand; (2) impediments to the effectiveness of such programs; and (3) efforts by utilities, states, and federal power-marketing agencies to encourage efficient electricity use.

Electricity Supply: Regulation of the Changing Electric Industry Under the Public Utility Holding Company Act (Testimony, 10/03/91, GAO/T-RCED-92-2).

ABSTRACT: This testimony focuses on the Securities and Exchange Commission's (SEC) administration of the Public Utility Holding Company Act of 1935, intended to protect the public, investors, and consumers from abuses associated with the control of electric and gas utility companies through the holding company structure. These abuses include subjecting subsidiary utilities to excessive charges for services, construction work, and materials; frustrating effective state regulation through the holding company structure; and overloading subsidiary utilities with debt to prevent voluntary rate reductions. GAO discusses (1) industry changes during the past decade involving electric utility holding companies; (2) SEC's regulatory response to such changes; and (3) the relationship between SEC, the Federal Energy Regulatory Commission, and states in protecting consumer and investor interests in light of these changes.

Oil Reserve: Impact of NPR-1 Operations on Wildlife and Water Is Uncertain (Letter Report, 08/01/91, GAO/RCED-91-129).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the basis for the disagreements between the Department of Energy (DOE) and its Argonne National Laboratory relating to Argonne's development of a supplemental environmental impact statement (SEIS) for Naval Petroleum Reserve No. 1 (NPR-1), focusing on: (1) the DOE Naval Petroleum Reserves-California (NPRC) and Argonne positions on NPR-1 impacts on endangered species and groundwater quality and how SEIS would discuss those uncertainties; and (2) NPR-1 compliance with environmental laws and regulations governing endangered species, wastewater disposal, and historic preservation activities.

FINDINGS: GAO found that: (1) between 1981 and 1989, the number of foxes living free within the NPR-1 study area decreased from 164 to between 44 and 58; (2) Argonne concluded in an SEIS draft that NPR-1 operations could have contributed to the decline of foxes in that area; (3) NPRC and Argonne staffs disagreed about how SEIS should describe the

effects of NPR-1 operations on endangered foxes and nearby groundwater, primarily due to a lack of definitive data; (4) in September 1990, NPRC notified Argonne that DOE would prepare a final SEIS, but it was unclear to what extent DOE would use Argonne's data and views; (5) DOE and others were conducting research that could provide additional data on factors affecting the fox population and wastewater migration; (6) DOE has not ensured that NPR-1 operations comply with the Endangered Species Act and the National Historic Preservation Act's regulations; (7) Argonne concluded in a June 1990 SEIS draft that NPR-1 operations violated California wastewater disposal requirements for sumping, but DOE believed that NPR-1 had not violated the requirements, and the state had not made a determination on that issue; (8) factors contributing to the noncompliance included NPRC officials' lack of knowledge regarding environmental requirements, noncoordination with federal and state agencies having environmental responsibilities, and mismanagement, which could result in legal action, fines, or a temporary shutdown; and (9) NPRC is taking action to address the problems, but unless DOE improves its management controls, similar problems may continue to exist.

Alternative Fuels: Experiences of Countries Using Alternative Motor Fuels (Testimony, 07/29/91, GAO/T-RCED-91-85).

BACKGROUND: GAO discussed other countries' use of alternative motor fuels, focusing on: (1) Brazil's, Canada's, and New Zealand's programs to encourage such fuel usage; and (2) the Department of Energy's (DOE) progress in implementing the Alternative Motor Fuels Act of 1988. GAO noted that: (1) despite Brazil's difficulties with poor alternative-fueled vehicle performance and an inadequate fuel supply, about 30 percent of its passenger vehicles exclusively operated on ethanol; (2) in 1981, Canada began converting gasoline fuel to propane, encouraging the use of natural gas, providing conversion grants, and installing alternative-fueling stations; (3) currently, there are about 27,000 natural gas powered vehicles in Canada; (4) New Zealand initiated its alternative fuel program in 1979 to reduce its dependence on imported oil, but reduced such incentives in 1985 because of governmentwide austerity efforts; (5) currently, there are about 105,000 converted vehicles operating in New Zealand; (6) factors affecting consumers' acceptance of alternative fuel include price, convenience, and reliability; and (7) in each country, the fuel industry played a role in ensuring vehicle quality, providing fueling infrastructure, and establishing marketing approaches. GAO also noted that: (1) auto manufacturers have not provided DOE with the quantity, type, and size of alternative-fueled vehicles solicited because of technological readiness

problems and market uncertainties; and (2) DOE experienced higher than expected costs for procuring such vehicles.

Full Disclosure of National Energy Strategy Analyses Needed to Enhance Strategy's Credibility (Testimony, 07/08/91, GAO/T-RCED-91-76).

BACKGROUND: GAO discussed the development of the Department of Energy's (DOE) National Energy Strategy (NES), focusing on the: (1) analytical support the policy proposals set forth and (2) factors that will influence its potential success. GAO noted that: (1) in the latter stages of the NES development process, there was less public participation than DOE originally intended; (2) energy and environmental benefits from implementing NES are unclear and may be overstated, since the administration included the estimated impacts of the Clean Air Act Amendments of 1990 in projecting the overall impacts of NES; (3) the supporting analyses did not compare the NES package of proposals with alternative proposals or variations; (4) DOE had not published rigorous cost-benefit analyses supporting two somewhat controversial measures of government intervention not to be included; and (5) the rate of growth in gross national product used in the NES analysis was significantly higher than other GNP projections. GAO believes that the: (1) NES proposals to improve energy efficiency may not be as successful as projected if current low oil prices continue and (2) administration and DOE set very high expectations for the NES process, which might have been too difficult to meet even under ideal circumstances.

Natural Gas: Factors Affecting the Time It Takes to Approve Construction of Natural Gas Pipelines (Testimony, 06/27/91, GAO/T-RCED-91-73).

BACKGROUND: GAO discussed the Federal Energy Regulatory Commission's (FERC) approval process for natural gas pipeline construction, focusing on the: (1) time it takes FERC to process pipeline construction applications, (2) factors affecting its application processing time, (3) potential impact of FERC actions and proposed regulations and legislation to expedite its application procedures, and (4) need for improvements in its management information systems. GAO noted that: (1) the median time for processing the 125 certificates or approved applications reviewed was 331 days, 40 percent took longer than 1 year, and 10 certificates took at least 2 years; (2) factors affecting processing time included outside intervention, projects involving multiple applicants, unresolved policy issues, incomplete applications, and lengthy

environmental reviews; (3) FERC took such actions to reduce its processing and construction times as placing limits on filing competitive applications, adopting a two-phase decision approach, shifting certification process requirements, and requiring less data and proposed rule changes to further streamline the certification process; (4) proposed legislation would facilitate faster pipeline construction by providing the industry with unregulated options to either limit or increase FERC authority; (5) FERC believes that it needs more authority to continue processing construction applications when agencies do not review environmental assessments in a timely manner; and (6) FERC's information system is deficient and does not enable FERC to effectively evaluate its application review process.

Gasoline Marketing: Consumers May Not Be Receiving the Octane They Are Paying for or May Be Unnecessarily Buying Premium Gasoline (Testimony, 06/12/91, GAO/T-RCED-91-65).

BACKGROUND: GAO discussed: (1) gasoline octane mislabelling; and (2) possible consumer overbuying of premium gasoline. GAO noted that: (1) consumers may be unknowingly purchasing gasoline with lower octane than they need due to mislabeled octane ratings on gasoline pumps; (2) the Environmental Protection Agency (EPA) had not tested octane ratings at retail stations since 1981, and the Federal Trade Commission failed to ensure that octane testing requirements were being met or prosecute violators; (3) the extent of mislabeling nationwide is unknown, but industry and state information indicates that mislabeling is occurring and is costly to consumers; (4) the Petroleum Marketing Practices Act excluded the newer gasoline-alcohol blends from octane posting requirements; (5) although states agreed that testing for octane rating accuracy was an effective deterrent to mislabeling, only 32 states had such programs; (6) involving states in testing octane ratings could better ensure that consumers receive the octane they pay for; and (7) the 3- to 26-percent difference between premium gasoline sales and the automotive fleet needing premium gasoline indicated that consumers might have spent from $441 million to approximately $4.3 billion in 1989 for unnecessary premium gasoline. GAO believes that consumers need increased awareness about vehicle octane requirements and posted octane rating accuracy.

Alternative Fuels: Increasing Federal Procurement of Alternative-Fueled Vehicles (Letter Report, 05/24/91, GAO/RCED-91-169).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the Department of Energy's (DOE) progress in implementing the Alternative

Motor Fuels Act of 1988, enacted to encourage the development and use of methanol, ethanol, and natural gas as transportation fuels, and the production of methanol-, ethanol-, and natural gas-powered vehicles.

FINDINGS: GAO found that: (1) due to technological readiness problems and market uncertainties, automobile manufacturers did not provide DOE with the quantity, type, price, and size of alternative-fueled light-duty vehicles it desired; (2) the extent to which future corporate average fuel economy credits would encourage manufacturers to build alternative-fueled light-duty vehicles was uncertain; (3) DOE was unable to establish a commercial heavy-duty truck program or to collect data to study the use of alcohol and natural gas fuel in such trucks but expected to make progress on this program during 1991 as a result of planned initiatives with industry; (4) DOE was able to collect performance and emissions data on only a limited number of alternative-fueled buses through 1990, but it expected to place and test more buses in service during 1991; and (5) the extent to which alternative fuels were competitively priced with gasoline would determine their use.

Electricity Regulation: Issues Concerning the Hydroelectric Project Licensing Process (Letter Report, 05/10/91, GAO/RCED-91-120).

BACKGROUND: Pursuant to a congressional request, GAO examined the: (1) Federal Energy Regulatory Commission's (FERC) review of the financial and economic feasibility of proposed hydroelectric projects during its licensing process, (2) extent of speculation on potential hydropower sites, and (3) possible need to amend the Federal Power Act to allow licensees more time to arrange financing and commence construction of licensed projects.

FINDINGS: GAO found that: (1) FERC's analysis was not intended to guarantee that a licensed project will prove to be economically or financially feasible; (2) the Federal Power Act allows licensees an initial 2 years to commence construction and then allowed FERC to grant one 2-year extension, if requested by the licensee and warranted by circumstances; (3) nonfederal hydroelectric projects affecting the nation's navigable waterways required a license from FERC; (4) FERC must give equal consideration to such nondevelopmental aspects as conserving energy and preserving environmental quality; (5) between fiscal years 1980 and 1985, FERC issued 430 hydroelectric licenses for new projects, and 93 percent began construction within 4 years of receiving a license; and (6) the

Federal Power Act established a 4-year limit for beginning construction of licensed hydropower sites to discourage speculation.

U.S.-Mexico Energy: The U.S. Reaction to Recent Reforms in Mexico's Petrochemical Industry (Letter Report, 05/03/91, GAO/NSIAD-91-212).

BACKGROUND: Pursuant to a congressional request, GAO examined recent reforms in Mexico's petrochemical industry.

FINDINGS: GAO found that: (1) Mexico's petrochemical industry faced shortages in supplies of basic petrochemicals and investment funds; (2) Mexico lacked financial resources for natural gas, the primary raw material for the petrochemical industry, exploration, and development; (3) the Mexican government had the exclusive right to produce and distribute all basic petrochemicals, but foreign investors may now acquire 100-percent ownership of a secondary petrochemical plant if they establish a special trust with a Mexican credit institution; (4) the Mexican government-owned oil company, Petroleos Mexicanos (PEMEX), created a program to obtain private or foreign investment in its basic petrochemical plants, but PEMEX would remain the operator; (5) Mexican petrochemical investment reforms are subject to a risk of reversal, because they were created by administrative decree, not by law; (6) Mexico's accessibility to raw materials makes it the most economical place for U.S. producers of secondary petrochemicals to locate; and (7) the U.S. and Mexican petrochemical industries are complimentary.

Progress Made Implementing the Alternative Motor Fuels Act of 1988 (Testimony, 04/25/91, GAO/T-RCED-91-44).

BACKGROUND: GAO discussed the Department of Energy's (DOE) implementation of the Alternative Motor Fuels Act of 1988. GAO noted that: (1) technological readiness problems, market uncertainties, and other factors resulted in automobile manufacturers not providing DOE with the quantity, type, and size of alternative-fueled light-duty vehicles it desired; (2) DOE experienced much higher than projected additional costs for procuring and placing such vehicles; (3) those additional costs resulted in the agency's experiencing delays in collecting vehicle performance data; (4) the extent to which future corporate average fuel economy credits will encourage manufacturers to build alternative-fueled light-duty vehicles was uncertain and depended on such factors as development costs and gasoline prices; (5) DOE was unable to establish a commercial heavy-duty

truck program or collect data to study the trucks' use of alcohol and natural gas fuel, as required by the act; and (6) DOE only collected performance and emissions data on a limited number of alternative-fueled buses through 1990, but it expected to place and test more buses in service during the remainder of 1991.

Balanced Approach and Improved R&D Management Needed to Achieve Energy Efficiency Objectives (Testimony, 04/17/91, GAO/T-RCED-91-36).

BACKGROUND: GAO discussed the Department of Energy's (DOE) energy conservation research and development (R&D) programs and the administration's National Energy Strategy (NES). GAO noted that: (1) NES was directed at increasing government R&D funding for long-term energy-efficient technologies but did not address the possibility that energy prices may remain relatively low in the future; (2) the current low market prices for energy, particularly fossil fuels, did not fully reflect all of the production and consumption costs; (3) DOE projections of energy-efficiency improvements were uncertain because of the limited information available and the questionable reliability of the information in DOE models; and (4) the conservation R&D budget request of $274 million in fiscal year 1992 was a 28-percent increase over fiscal year 1991 but was still below the $296 million received in fiscal year 1980. GAO believes that: (1) energy prices will directly affect NES proposals because relatively low prices generate less urgency to identify and implement efficient alternatives and higher prices encourage the development and use of more efficient technologies and (2) the effective use of the limited R&D funding will depend on strong planning and management.

Hydroelectric Dams: Costs and Alternatives for Restoring Fisheries in the Elwha River (Letter Report, 03/27/91, GAO/RCED-91-104).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the effects of the Elwha and Glines Canyon dams on fisheries in the Elwha River in Washington State, focusing on the: (1) Federal Energy Regulatory Commission's (FERC) authority to license those dams; (2) potential costs of removing the dams to restore the fisheries; (3) potential costs of restoring the fisheries without removing the dams; and (4) effectiveness of both dam removal and dam retention, coupled with mitigation measures in restoring fish to the Elwha River.

FINDINGS: GAO found that: (1) FERC estimated that the cost of removing both dams would be about $61 million and was subject to an increase of $124.6 million if FERC requires the transfer of dam sediment to a disposal site; (2) FERC estimated that the cost of constructing fish passage facilities with the dams in place ranged from $20 million to $40.4 million, depending on the facilities selected; (3) FERC estimated the annual cost of operating and maintaining such facilities at $160,000 to $260,000; (4) FERC estimated that it would cost $3.1 million to construct hatchery facilities to restore fish upriver from the dams with passage facilities and would cost $240,000 a year to operate; (5) FERC believed that dam removal would provide the best prospects for restoring the fisheries but would also result in the loss of nearly 40 percent of local power supplied by the dams' hydroelectric generators; (6) FERC could purchase replacement power from a local utility; and (7) although dam retention with mitigation measures would allow the continued use of dam-produced power to meet part of its energy requirements, FERC's analysis indicated that such measures would increase dam-generated electricity costs to about the local utility's rate.

Federal Electric Power: Effects of Delaying Colorado River Storage Project Irrigation Units (Letter Report, 03/22/91, GAO/RCED-91-62).

BACKGROUND: Pursuant to a congressional request, GAO provided information on the effects of the Bureau of Reclamation's and the Department of Energy's (DOE) exclusion from the hydropower rate of irrigation construction costs for certain projects within the Colorado River Storage Project.

FINDINGS: GAO found that: (1) the exclusion of participating projects' costs resulted in lower Colorado Project power rates and revenues than would otherwise exist; (2) such exclusion would not materially affect the required repayment of project costs or the ultimate development of water resources within the Upper Colorado River Basin; (3) rescheduling the indefinite projects did not affect the cost recovery of the remaining participating projects, and the U.S. Treasury would recover its investment within the required 50 years; (4) 13 of 19 participating projects, and portions of another project, were or would be constructed; (5) irrigation construction costs for the indefinite participating projects totaled about $1.24 billion, a cost excluded from the power rate calculation; (6) the estimated irrigation construction cost of all authorized Central Utah Project units was $1.1 billion; (7) the Bureau and DOE excluded the cost of indefinite participating projects from power rate calculations because power users were concerned that they were paying for projects that would

never be built; (8) excluding the estimated costs of indefinite Colorado projects from the power rate calculation was not precluded by law; and (9) none of the information provided to the Congress identified which of the Colorado's participating projects were included in the current electric power rate calculation or why some projects were excluded.

Federal Responses to December 1989 Heating Fuel Shortages Were Limited (Testimony, 03/13/91, GAO/T-RCED-91-7).

BACKGROUND: GAO discussed: (1) alleged December 1989 heating fuel shortages, (2) the type of data the Department of Energy's Energy Information Administration (EIA) collected and its analyses of heating fuel supply and demand, (3) the impact of federal agencies' delayed processing of Jones Act waivers on heating fuel supplies, and (4) the impact of interruptible natural gas contracts on heating fuel supplies and availability. GAO noted that: (1) in December 1989, the east coast experienced short-term heating fuel shortages; (2) two principle reasons for the shortages were increased demand due to extremely cold temperatures and the inability of the distribution system to move heating fuel stocks from refineries and storage terminals to areas experiencing shortages; (3) federal agencies took from 6 to 17 days to process Jones Act waivers that would have allowed foreign-flagged vessels to transport heating fuels between U.S. ports; (4) EIA maintained data and prepared forecasts on distillate demand and supply, but data limitations reduced EIA ability to adequately monitor the supply shortages; (5) in December 1989, some customers with interruptible natural gas contracts discontinued their gas services; and (6) those contract customers entered distillate and propane markets, reducing fuel supplies available to residential consumers.

Gasoline Marketing: Premium Gasoline Overbuying May Be Occurring, but Extent Unknown (Letter Report, 02/26/91, GAO/RCED-91-58).

BACKGROUND: Pursuant to a congressional request, GAO determined: (1) whether consumers were needlessly buying premium gasoline, (2) whether the higher retail price of premium gasoline included a greater price mark-up than that included in the retail price of regular gasoline, and (3) possible reasons for the price differences between premium and regular gasoline.

FINDINGS: GAO found that: (1) premium gasoline sales exceeded the percentage of vehicles that required premium gasoline; (2) government

and industry studies, although not conclusive, indicated that consumers might be overbuying premium gasoline; (3) although consumers perceived premium gasoline to be a better product, fewer of them were willing to substitute it for a lower octane fuel when prices rose substantially; (4) the price difference between premium and regular gasoline was the same at the refinery and the retail pump; and (5) additional processing costs, better detergent additives, and increased advertising contributed to the higher price of premium gasoline.

Energy Policy: Evolution of DOE's Process for Developing a National Energy Strategy (Letter Report, 02/21/91, GAO/RCED-91-76).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the Department of Energy's (DOE) process for developing the National Energy Strategy (NES), focusing on the opportunities DOE provided for public comment.

FINDINGS: GAO found that: (1) DOE began developing NES in July 1989 in response to a presidential directive and legislative requirement that the President biennially prepare and submit to the Congress a National Energy Policy Plan; (2) DOE expected NES to serve as a comprehensive blueprint for decisions about energy and be an administration plan rather than a DOE plan; (3) NES received significantly greater public input in the early development stage than in the latter stages; (4) DOE held 18 public hearings during NES development on a variety of energy topics and received 2,067 written submissions; (5) DOE failed to announce public hearings far in advance, providing less than 2 weeks' notice for 10 hearings and less than 1 weeks' notice for 6 hearings; (6) the Secretary of Energy intended the first NES draft to help the Congress understand the direction of the national energy policy and how the administration planned to achieve it and to facilitate continued dialogue; (7) the interim NES report summarized the voluminous public input rather than the intended draft strategy; (8) although the interim report did not satisfy the plan criteria, DOE planned to meet the requirements with its final NES report; (9) public review of NES options under consideration was limited; and (10) the option summaries lacked sufficient information to act as a quality control mechanism and were not presented in a manner that facilitated comparison in terms of the President's NES objectives.

Energy Security: Federal Responses to December 1989 Heating Fuel Shortages Were Limited (Letter Report, 02/20/91, GAO/RCED-91-78).

BACKGROUND: Pursuant to a congressional request, GAO examined: (1) alleged December 1989 heating fuel shortages, (2) the type of data the Department of Energy's (DOE) Energy Information Administration (EIA) collected and its analyses of heating fuel supply and demand; (3) the impact of federal agencies' delayed processing of Jones Act waivers on heating fuel supplies, and (4) the impact of interruptible natural gas contracts on heating fuel supplies and availability.

FINDINGS: GAO found that: (1) in December 1989, the east coast experienced short-term heating fuel shortages; (2) two principle reasons for the shortages were increased demand due to extremely cold temperatures and the inability of the distribution system to move heating fuel stocks from refineries and storage terminals to areas experiencing shortages; (3) EIA maintained data and prepared forecasts on distillate demand and supply, but data limitations reduced EIA's ability to adequately monitor the supply shortages; (4) federal agencies took from 6 to 17 days to process Jones Act waivers that would have allowed foreign-flagged vessels to transport heating fuels between U.S. ports; (5) DOE established a new waiver process, but it was difficult to adequately determine its criteria for granting waivers; (6) in December 1989, some customers with interruptible natural gas contracts had their gas services discontinued; (7) those customers entered distillate and propane markets, reducing fuel supplies available to residential consumers; and (8) EIA began a study that would provide additional information on the impact of the interruptible gas contracts on heating fuels and supplies.

Oil Reserve: Some Concerns Remain About SPR Drawdown and Distribution (Chapter Report, 11/28/90, GAO/RCED-91-16).

BACKGROUND: Pursuant to a congressional request, GAO examined the Department of Energy's (DOE) Strategic Petroleum Reserve (SPR) drawdown plans, focusing on: (1) DOE capability for withdrawing and distributing SPR oil, (2) SPR compliance with pipeline safety requirements, and (3) the status of DOE actions to correct problems previously identified by GAO.

FINDINGS: GAO found that: (1) DOE estimated that it could withdraw and distribute SPR oil at a maximum sustainable rate of approximately 3.5 million barrels per day for 90 days; (2) if DOE withdrew SPR oil at the

maximum achievable rate, the bulk of oil would be drawn down within 200 days; (3) DOE could not reach its downgrade goal of 4.5 million barrels per day until it completed planned drawdown and distribution enhancements and stored enough oil at one of its sites to support its planned drawdown rate; (4) crude oil prices could be almost $5 per barrel higher if the withdrawal rate were 2.5 million instead of 3.5 million barrels per day; (5) insufficient availability of U.S.-flag tankers could hamper SPR drawdown and distribution; (6) DOE and oil industry officials believed that there were not enough U.S. tankers available to move the amount of oil at the higher drawdown rates; (7) DOE voluntarily attempted to comply with Department of Transportation pipeline safety standards; (8) pipeline operation problems during drawdown could have severe economic and environmental impacts; (9) SPR contractors failed to perform right-of-way and erosion control equipment inspections as frequently as required and to retain pipeline repair records; and (10) SPR was not in full compliance with Transportation safety standards. In addition, GAO found that DOE implemented several prior GAO recommendations involving: (1) conducting 20 drawdown-related tests between 1986 and 1989, (2) completing automated controls to operate valves and pumps and monitor control equipment, (3) developing a program to identify pipeline conditions and needed corrective actions, and (4) developing a logistics support system to ensure an adequate supply of spare parts.

Energy Security: Impacts of Lifting Alaskan North Slope Oil Exports Ban (Letter Report, 11/08/90, GAO/RCED-91-21).

BACKGROUND: Pursuant to a congressional request, GAO assessed the impact of removing export restrictions on Alaskan North Slope (ANS) crude oil, focusing on likely changes in the Alaskan oil trade between now and 1995, both with and without the ban, and how those changes could affect the nation's economy and energy security.

FINDINGS: GAO found that: (1) ANS crude oil distribution to eastern ports could cease in the near future due to lower ANS production and higher west coast consumption, and (2) the Energy Information Administration's computer model estimated that ANS crude exports and related price increases would be considerably smaller in 1995 than in 1988 due to decreased production. GAO also found that lifting the ANS oil export ban could: (1) divert all the oil shipped to eastern U.S. ports and some of the oil shipped to the west coast to Pacific Rim countries, (2) lead to potential economic efficiencies due to significantly lower transportation costs to U.S. eastern ports and improvements in refinery efficiency, (3) benefit

some oil producers while hurting independent California refiners and the U.S. maritime industry, and (4) increase gross U.S. imports but possibly decrease net U.S imports and improve worldwide oil market efficiency.

Natural Gas: Opportunities for Federal Cost Savings Through Competitive Purchases (Letter Report, 10/23/90, GAO/RCED-91-35).

BACKGROUND: GAO reviewed natural gas purchases by an Air Force base and two veterans medical centers to determine: (1) the extent to which the agencies used competitive procurement practices, (2) actual and potential cost savings from competitive procurement, and (3) why more agencies did not use competitive procurement practices.

FINDINGS: GAO found that: (1) the military spent over $345 million annually for natural gas, but only 63 of 600 military installations purchased it competitively; (2) federal civilian agencies spent over $160 million annually for natural gas, but there was little knowledge on how they purchased it; (3) facilities that purchased gas competitively saved 10 to 30 percent on their gas costs; (4) four agencies could have reduced their natural gas costs by 11 to 22 percent over a 12-month period if they had purchased it competitively; and (5) the Department of Defense (DOD) could save an estimated $25 million to $38 million, or 7 to 11 percent, on gas costs annually if it purchased gas competitively. In addition, GAO found that more agencies did not buy natural gas competitively because they lacked: (1) awareness of this purchase option and (2) time, staff resources, and technical expertise for evaluating the various options available and for managing the competitive bid process. GAO also found that: (1) the General Services Administration planned to initiate a program to assess federal civilian agency potential to procure natural gas competitively and (2) in January 1990, DOD established a program to increase natural gas competitive purchasing by centralizing and expanding wellhead purchases.

Electricity Supply: Older Plants' Impact on Reliability and Air Quality (Chapter Report, 09/10/90, GAO/RCED-90-200).

BACKGROUND: Pursuant to a congressional request, GAO reviewed electric utilities' life extension plans for older fossil fuel power plants and examined the effects of life extension on the reliability of the nation's power supply and air quality.

FINDINGS: GAO found that: (1) the number of fossil fuel generating units over 30 years of age will increase from approximately 2,500 in 1989 to roughly 3,700 in 1998, and their share of generating capacity will increase from 13 percent in 1989 to 27 percent in 1998; (2) plants accounting for about one-third of the total generating capacity of fossil fuel plants could undergo life extension by the year 2000; (3) proposed acid rain control legislation could discourage life extension projects; (4) utilities' plans to construct plants will produce only one-third of the additional capacity needed by 2000; (5) while life extension programs would be more cost-effective than building new plants, the long-term success of such programs was uncertain; (6) if life extension does not achieve its goal, electric supply could be impaired; (7) older plants exempt from the Clean Air Act emitted 88 percent of total sulfur dioxide emissions and 79 percent of total nitrogen oxide emissions; (8) more stringent emission requirements for currently exempt plants would eliminate those that pollute the most, but could adversely affect electricity supply in the short term; and (9) more stringent emission requirements would increase electricity production costs.

Hydroelectric Dams: Issues Surrounding Columbia River Basin Juvenile Fish Bypasses (Chapter Report, 09/06/90, GAO/RCED-90-180).

BACKGROUND: Pursuant to a congressional request, GAO evaluated the Army Corps of Engineers' program for assisting fish migration past certain river dams, focusing on the Corps': (1) use of benefit and cost analysis and a computer model to estimate benefits, (2) consideration of other factors in its benefit estimates, and (3) consideration of the views of outside groups in deciding against constructing the bypasses.

FINDINGS: GAO found that: (1) the Corps developed a computer model to estimate the number of additional adult fish that would return from the ocean if it constructed the proposed bypasses; (2) local agencies, tribes, and others noted model limitations, and researchers concluded that data limitations rendered the model inadequate for making precise economic benefit determinations; (3) the Corps acknowledged the model's data shortcomings and reliability problems; (4) the Corps did not recognize the proposed bypasses' potential for increased revenues through different electricity generation methods; (5) regulations did not require the Corps to consider noneconomic factors in constructing the bypasses, and it did not consider such potential benefits as the cultural and religious value of fish to Indian tribes; (6) the Corps did not adequately involve appropriate agencies in conducting planning studies as required; (7) the Corps could

experience difficulty in establishing a mitigation objective, since comprehensive data on fish migrations prior to dam construction did not exist; and (8) the Corps' ability to base bypass construction decisions on cost-effectiveness may be limited, since information about bypass effectiveness was scarce and inconclusive.

Long-Term Policies Needed to Address Energy Use and Price Volatility (Testimony, 09/05/90, GAO/T-RCED-90-105).

BACKGROUND: GAO discussed the oil price increases that have taken place since Iraq's invasion of Kuwait. GAO noted that: (1) between August 1 and August 23, 1990, the price for oil futures increased from $21 per barrel to almost $32 per barrel before falling to about $27 on August 27; (2) retail gasoline prices increased about 10 cents a gallon after a major oil spill in March 1989; (3) retail home heating oil and propane prices increased 29 percent between November 1989 and January 1990, due to severe cold weather; (4) the increased oil prices affected the costs of many other industrial and agricultural products; and (5) U.S. dependence on the Organization of Petroleum Exporting Countries and the Persian Gulf nations will increase dramatically if the demand for oil imports continues to rise. GAO believes that: (1) the development of a national energy strategy is sorely needed and long overdue, and (2) actions are needed to encourage improvements in energy efficiency to reduce U.S. dependence on oil and its vulnerability to potential oil supply disruptions.

Electricity Supply: The Effects of Competitive Power Purchases Are Not Yet Certain (Letter Report, 08/23/90, GAO/RCED-90-182).

BACKGROUND: Pursuant to a congressional request, GAO reviewed: (1) electric utilities' use of competitive bidding to purchase electricity from nonutility generating sources and (2) how such purchases might affect the reliability and cost of electric power.

FINDINGS: GAO found that: (1) the effects of competitive power purchases on the long-term reliability of electric services are not yet certain and are difficult to assess; (2) determining the effects of competitive bidding on the cost of power requires comparing estimates of what the future costs and demand for electricity might be; (3) utilities may incur extra costs to replace lost generating sources, which could potentially affect the ultimate cost of purchased power; and (4) a lack of access to transmission facilities, eligibility criteria specified by utilities, and certain regulatory restrictions limit the potential for competition and affect cost.

Energy Regulation: Factors Relating to Oil Overcharge Settlements Need Better Documentation (Letter Report, 08/23/90, GAO/RCED-90-181).

BACKGROUND: Pursuant to a congressional request, GAO provided information on several aspects of the Department of Energy's (DOE) Economic Regulatory Administration's (ERA) handling of the proposed settlement of overcharge litigation against an oil company.

FINDINGS: GAO found that: (1) ERA had little documentation of many of the significant events and decisions leading to the proposed settlement; (2) the proposed consent order between ERA and the oil company allowed the oil company to pay the settlement amount, plus interest, over an 8-year period; (3) ERA later determined that the oil company could pay the settlement in less than 8 years; (4) ERA did not adequately document its litigation risk analysis; and (5) ERA litigating attorney participation in the negotiations leading to the proposed consent order was very limited.

Alcohol Fuels: Impacts From Increased Use of Ethanol Blended Fuels (Chapter Report, 07/16/90, GAO/RCED-90-156).

BACKGROUND: Pursuant to a congressional request, GAO provided information on: (1) the ethanol industry's capability to expand its production capacity, (2) the effects that expanded ethanol production could have on the agricultural sector and food prices,; and (3) how increased production could affect certain aspects of the federal budget.

FINDINGS: GAO found that: (1) in 1989, the United States produced about 1 billion gallons of ethanol, and studies demonstrated the feasibility of doubling or tripling production; (2) the largest producer operates four ethanol plants with a combined capacity of 600 million gallons, which is about 60 percent of the U.S. production capacity; (3) faced with uncertain market conditions, some ethanol plants have discontinued operations; (4) there are no technological reasons why domestic producers cannot supply the ethanol required; (5) expanded ethanol production would increase both the demand for and price of corn, but this increase would affect other sectors of American agriculture; (6) domestic soybean production would be adversely affected by increased ethanol production; (7) higher corn prices, caused by increased demand from added ethanol production, would increase cattle producers' feed costs and lower their profits; (8) in contrast, the lower prices for soybean meal and other high-protein feed could benefit poultry producers; (9) net farm cash income would increase by an average of about 1.3 percent, and consumers

would face slightly higher food prices; and (10) increased ethanol production would reduce federal outlays for farm support programs, but federal revenues from motor fuel taxes would also be reduced.

Consumers Have Limited Assurance That Octane Ratings Are Accurate (Testimony, 06/20/90, GAO/T-RCED-90-90).

BACKGROUND: GAO discussed the results of a nationwide review on gasoline octane labeling, focusing on consumer concern that gasoline will meet vehicle octane requirements. GAO noted that: (1) newer gasoline-alcohol blended fuels or future fuels that may become available to abate vehicle pollution are subject to the Petroleum Marketing Practices Act's octane posting requirements; (2) octane mislabeling is occurring and is costly to consumers, but the nationwide extent of mislabeling is unknown; (3) testing fuel to ensure that posted ratings are accurate is an effective deterrent to mislabeling; and (4) the act's provisions may limit state enforcement efforts. GAO believes that there are options for including the states in the program in a way likely to result in greater assurance that the act's objectives are achieved.

Consumers Have Limited Assurance That Octane Ratings Are Accurate (Testimony, 06/20/90, GAO/T-RCED-90-90A).

BACKGROUND: GAO provided a summary of its testimony on gasoline octane mislabeling. GAO found that: (1) responsible federal agencies had not established systems to prevent mislabeling; (2) the extent of mislabeling nationwide is unknown, and (3) not all motor fuels are covered by the applicable law.

Energy Policy: Developing Strategies for Energy Policies in the 1990s (Letter Report, 06/19/90, GAO/RCED-90-85).

BACKGROUND: Pursuant to a congressional request, GAO provided information on energy policy issues, focusing on: (1) energy consumption, (2) increased dependence on imported oil from Persian Gulf sources, (3) uncertainty over the adequacy of future generating capacity, and (4) concern for the potentially adverse environmental effects of energy consumption.

FINDINGS: GAO found that: (1) since 1983, U.S. energy consumption has increased by about 16 percent, and an upward trend is expected to continue through 2000; (2) petroleum supplies about 41 percent of total

U.S. energy consumption; (3) the United States has become increasingly dependent on imported oil from the Persian Gulf, which has increased vulnerability to potential oil supply disruptions; (4) it was uncertain whether there would be adequate generating capacity to meet future electricity needs; (5) much of the additional generating capacity projected to come online is in early construction stages and might not be completed in time to meet future needs; (6) energy consumption creates potentially serious and costly environmental, health, and safety consequences; and (7) the President has directed the Department of Energy to develop a national energy strategy that would integrate and balance concerns for energy choices against other national concerns, such as environmental protection and economic growth.

Gasoline Marketing: Uncertainties Surround Reformulated Gasoline as a Motor Fuel (Letter Report, 06/14/90, GAO/RCED-90-153).

BACKGROUND: In response to a congressional request, GAO provided information on reformulated gasoline, including: (1) when reformulated gasoline could be made available and how it would be produced; and (2) the impacts of production and use of reformulated gasoline.

FINDINGS: GAO found that: (1) reformulated gasoline has improved emissions characteristics, (2) government and industry officials agreed that reformulated gasoline would make a positive contribution to air quality by helping to reduce some vehicle emissions, and (3) reformulated gasoline offers advantages over other clean-burning alternative fuels because it can be distributed through the existing petroleum distribution system. GAO also found that negative impacts of reformulated gasoline could include: (1) increased production costs for refiners, (2) the financial failure of some small refiners and independent gasoline marketers, (3) increases in the consumer cost of gasoline, and (4) increased crude oil imports.

Nuclear Science: U.S. Electricity Needs and DOE's Civilian Reactor Development Program (Letter Report, 05/29/90, GAO/RCED-90-151).

BACKGROUND: Pursuant to a congressional request, GAO reviewed: (1) projected U.S. electricity needs through 1998, (2) whether the Department of Energy's (DOE) Civilian Reactor Development Program could help meet those needs, and (3) the views of utility company and nuclear industry officials on DOE's efforts to promote advanced reactor development.

FINDINGS: GAO found that: (1) from 1989 to 1998, the summer demand for electricity is projected to increase approximately 2 percent annually, from 522,000 megawatts in 1989 to 623,000 megawatts in 1998; (2) from 1989 to 1998, projected available electrical generating capacity is projected to increase 1 percent annually, from approximately 544,000 megawatts in 1989 to 606,000 megawatts in 1998, which could result in some regions experiencing electrical shortfalls during projected peak periods; (3) in 1989, utility companies were completing the construction of nuclear generators, adding other types of generators, and planning to use demand management programs; (4) DOE expected to obtain certification for three light-water reactors by 1995 and supported the development of additional reactors to be operational after 2000; and (5) utility company and nuclear industry officials generally supported DOE's approach to advanced nuclear reactor development but did not plan to purchase advanced reactors until after 2000 because of their high cost and public opposition.

Gasoline Marketing: Consumers Have Limited Assurance That Octane Ratings Are Accurate (Chapter Report, 04/16/90, GAO/RCED-90-50).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the Federal Trade Commission's and the Environmental Protection Agency's (EPA) implementation of gasoline octane certification and posting requirements.

FINDINGS: GAO found that: (1) the Commission and EPA did not monitor compliance with octane-posting requirements or use octane test results to prosecute violators, (2) there were no federal controls to ensure that gasoline octane postings were accurate, (3) over 9 percent of the gasoline sampled between 1979 and 1987 misstated octane ratings by more than one-half point, and (4) one-time tests of gasoline octane levels in states that did not have an octane testing program revealed that mislabeling ranged from 22 to 53 percent. GAO also found that: (1) there was more potential for mislabeling to occur at distributors or retail stations than at refineries, pipelines, or bulk terminals because those locations lacked extensive quality control programs to test octane ratings; (2) the Commission limited octane ratings to traditional gasoline fuels and excluded newer gasoline-alcohol blends from posting requirements; and (3) legislation authorized only limited civil remedies and penalties for mislabeling violations.

Alaskan Crude Oil Exports (Testimony, 04/05/90, GAO/T-RCED-90-59).

BACKGROUND: GAO discussed the potential consequences of lifting the existing ban on the export of Alaskan North Slope (ANS) crude oil, focusing on the changes in the Alaskan oil trade that are likely to occur and how those changes could affect the U.S. economy and energy security. GAO noted that: (1) removal of the ban would likely result in the export of ANS crude oil to Pacific Rim countries, since oil transport costs were low and the characteristics of ANS crude oil were more suitable to the needs of Pacific Rim refiners than to those of west coast refiners and (2) such exports and decreased Alaskan oil production would eventually result in decreased consumption of ANS crude oil by west coast refiners and the elimination of more costly shipments to the east coast, the Caribbean, and the Gulf of Mexico. GAO also noted that probable effects of exporting ANS crude oil would include: (1) an increase in the price of ANS crude oil at the wellhead and, subsequently, the price that west coast refiners paid for crude oil; (2) increased economic efficiency through reduced oil transportation costs, increased domestic oil production, better use of refinery processing resources, and the allocation of ANS oil to its highest valued uses; (3) damage to the maritime industry, since oil would likely be transported on foreign-flag, rather than U.S.-flag tankers; and (4) increased total U.S. oil imports, but decreased net imports, to the extent that oil production and refinery efficiency would increase.

Utilities' Potential Use of Clean Coal Technologies (Testimony, 03/28/90, GAO/T-RCED-90-56).

BACKGROUND: GAO discussed the results of its nationwide survey on utilities' plans to use clean coal technologies. GAO found that: (1) utilities planned to use clean coal technologies for only 5 percent of their coal-fired generating units; (2) consideration of specific technologies depended on the severity of emission reduction requirements, target dates for compliance, and present and future electricity demands; and (3) utilities considered switching to low-sulfur coal to achieve emission-reduction requirements. GAO also found that: (1) new technologies may not contribute significantly to the reduction of acid rain-causing emissions during the next 15 years, (2) the Department of Energy experienced problems and delays in formalizing cooperative agreements with project sponsors, and (3) utilities would likely test new technologies on one unit before installing them on others.

Energy Management: Extent of Crude Oil Contamination Is Uncertain (Briefing Report, 03/08/90, GAO/RCED-90-114BR).

BACKGROUND: Pursuant to a congressional request, GAO reviewed allegations of crude oil contamination, focusing on: (1) the extent and types of contamination, (2) how environmental legislation has affected the contamination issue, and (3) corrective actions that the government and the oil industry have taken concerning crude oil contamination.

FINDINGS: GAO found that: (1) oil industry officials identified 40 cases of crude oil contamination occurring from 1982 to 1989, and 3 of those cases resulted in damaged refinery equipment or refinery fires; (2) all 40 cases involved chloride, iodine, alcohol, bromine, nitrogen, or iron contamination; (3) government and industry officials could not agree on the extent of crude oil contamination, but the Environmental Protection Agency and other government agencies generally believed that refining the contaminated oil would not cause unusual risks to health and the environment; (4) although environmental legislation generally prohibited disposal of hazardous wastes in crude oil, it exempted certain hazardous waste generated from oil exploration and production, and toxic substances found in used oil; (5) eight of nine oil refineries conducted routine testing of crude oil for basic properties but limited the frequency and accuracy of testing for toxic materials; (6) three oil companies had taken legal or other actions against suppliers suspected of providing contaminated crude oil; and (7) state and federal regulatory agencies had taken only limited action to prevent crude oil contamination.

Greenhouse Effect: DOE's Programs and Activities Relevant to the Global Warming Phenomenon (Briefing Report, 03/05/90, GAO/RCED-90-74BR).

BACKGROUND: Pursuant to a congressional request, GAO provided information about Department of Energy (DOE) programs and activities associated with global warming and DOE efforts to incorporate global warming into its energy policy and planning activities, focusing on: (1) scientific understanding of the global warming phenomenon and its research efforts to fill information gaps, (2) DOE program planning and criteria it used for evaluating research and development, and (3) proposed policy or program changes for improving energy efficiency or reducing energy-related emissions with potential climate change effects.

FINDINGS: GAO found that: (1) scientific understanding of global climate systems has increased in the past few years, but uncertainties remain regarding cloud cover, oceans, and vegetation growth; (2) DOE requested $28 million for fiscal year 1990, an increase of $5 million over fiscal year 1989; (3) DOE requested about $1.3 billion for fiscal year 1990 indirectly related research, development, and demonstration programs, an increase of $330 million over FY 1989; (4) DOE established six principles to guide its approach to global warming and made the issue a central part of its National Energy Strategy; and (5) public and private organizations' proposals addressing global warming included increasing energy efficiency, switching to nonfossil fuels, and reducing emissions from fossil fuel use.

Federal Electric Power: Views on the Sale of Alaska Power Administration Hydropower Assets (Letter Report, 02/22/90, GAO/RCED-90-93).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the Department of Energy's (DOE) proposed sale of the Alaska Power Administration's (APA) assets, focusing on whether the APA divestiture method would: (1) allow the government to fully recover APA costs and (2) reveal the full value of APA assets to potential purchasers.

FINDINGS: GAO found that: (1) APA sales agreements benefited APA ratepayers at the expense of taxpayers; (2) the bids that APA received probably did not reflect the full market value of its assets, since APA limited the sale to current purchasers of APA power and to certain state and local concerns; (3) the APA present-value pricing method limited taxpayers' cost recovery by not assuming the assets' residual value following federal loan repayment; (4) the pricing method did not consider that the Department of the Treasury would not recover all interest costs of its loan to APA, since federal power interest rates were usually below the Treasury's borrowing rates; and (5) unresolved possible costs included obtaining rights-of-way across private and Native American lands, and $5.8 million for the completion of a construction project.

Federal Electric Power: Bonneville's Residential Exchange Program (Chapter Report, 02/06/90, GAO/RCED-90-34).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the Bonneville Power Administration's (BPA) implementation of the Residential Exchange Program, which would reduce the disparity in

power rates charged to residential consumers, focusing on: (1) the significance of the program to the participating utilities, the utilities' residential and small-farm customers, and BPA and its customers; and (2) BPA efforts to ensure that participating utilities passed the exchange energy cost savings to their customers.

FINDINGS: GAO found that: (1) the exchange program provided benefits to utilities that had higher costs than BPA; (2) BPA estimated exchange benefits totaling about $1.3 billion between 1989 and 1995; (3) program benefits reduced the cost of electricity provided to residential and small-farm customers by between 10 and 25 percent in 1988; (4) although the program reduced the disparity in electricity rates, BPA more than tripled its rates between 1981 and 1987, which increased the cost of BPA power relative to the costs of utilities' power; (5) BPA needed about 9 percent of its operating revenues to cover $1.37 billion in program costs through 1988, of which it charged 45 percent to its industrial customers, 29 percent to its investor-owned utilities, and the remainder to its public utilities; (6) BPA relied on state utility regulatory commissions and public utility boards to determine whether utilities receiving program benefits passed the benefits to customers; (7) there were no independent reviews covering public utility districts, municipal utilities, and electric cooperatives, since those entities did not fall within the states' jurisdictions; and (8) although a BPA review of two public utilities showed that the utilities either did not pass on sufficient benefits or passed benefits to customers other than residential customers, BPA did not discuss its findings with the utilities.

Perspectives on Potential Agricultural and Budgetary Impacts From an Increased Use of Ethanol Fuels (Testimony, 02/01/90, GAO/T-RCED-90-23).

BACKGROUND: GAO discussed the potential effects of expanded ethanol production on the domestic ethanol industry, the agricultural sector and consumer food prices, and certain aspects of the federal budget. GAO noted that: (1) there were no technological impediments to increasing the domestic ethanol industry's production capacity to 2.2 billion or 3.3 billion gallons per year over the next 8 years; (2) American farmers could supply the corn necessary to produce those amounts of ethanol, although industry officials believed that farmers would require continued government incentives to maintain such growth; (3) corn producers would benefit from the increased demand for corn to make ethanol and the resulting higher corn prices; (4) the conversion of corn into

ethanol-generated byproducts, including poultry feed, that would compete with and possibly lower the demand and prices for soybean products; (5) increases in corn feed costs could hurt cattle producers, although the lower cost of poultry feed could benefit poultry producers; (6) overall, net farm cash income would increase, but not in all sectors; (7) expanded ethanol production would cause a slight increase in consumer food prices; (8) expanded ethanol production would decrease federal farm program outlays by an average of about $1.4 billion per year; and (9) the increased use of ethanol fuels could reduce federal motor fuel tax revenues by an average of about $813 million per year.

Technology Transfers: Benefits of Cooperative R&D Agreements (Letter Report, 12/16/94, GAO/RCED-95-52).

ABSTRACT: Technology transfer between federal laboratories and industry is increasingly viewed as a significant factor in the economic growth and well-being of the United States. Cooperative Research and Development Agreements (CRADA) define the terms and the conditions of collaboration by federal laboratories and private industry on research and development. Although all CRADAs may not achieve the same level of benefits, both the federal agencies and private firms GAO reviewed benefited from the collaborations. The CRADAs offered opportunities for federal laboratories and industry to collaborate on research while meeting their missions. Technology from federal laboratories was transferred to the private sector, resulting in commercial products. Research and development programs were advanced. The sharing of resources helped federal laboratories and private companies accomplish the CRADA's objectives. In addition, some CRADAs showed long-term potential to improve the U.S. economy, health, and environment.

Department of Energy: Procedures Followed in Awarding Grants to Study Uses of Collider's Assets (Letter Report, 12/13/94, GAO/RCED-95-53).

ABSTRACT: The Department of Energy (DOE) generally complied with federal regulations and its own procedures in awarding grants to study future uses of the Superconducting Super Collider's assets. GAO's review of DOE's grant award processes did not disclose any departures from applicable regulations and procedures in selecting the grantees and making the grants. However, when notifying applicants that they had not been chosen, DOE did not follow its regulation that applicants be told in writing that they could ask for more detailed information on DOE's decision. Instead, DOE officials assumed that they would be contacted by the unsuccessful applicants if more information was desired. The 11 solicited grants that DOE awarded varied in terms of the funding and technical support provided to the grantees because the scope, nature, and complexity of the studies varied although the grants were generally comparable in timing. The grantees generally received the level of funding and technical support they requested and were generally satisfied with the amount of support they received. Although grantees residing in Texas had the obvious advantage of being near the collider site, no other advantages for Texas grantees were identified.

National Test Facility: Civilian Agency Use of Supercomputers Not Feasible (Letter Report, 12/09/94, GAO/AIMD-95-28).

ABSTRACT: On the basis of its interviews with the civilian agencies cited in the House Armed Services Committee report accompanying the National Defense Authorization Act for fiscal year 1995, GAO concludes that none of the agencies would be able to make effective use of the National Test Facility's excess supercomputing capabilities. These agencies said that they could not use the resources mainly because (1) the facility's supercomputers are older machines whose performance and costs cannot match those of more advanced computers available from other sources and (2) some agencies have not yet developed applications requiring supercomputer capabilities or lack funding to support such activities. In addition, future support for the hardware and the software at the National Test Facility is uncertain, making any investment by an outside user risky.

National Laboratories: Are Their R&D Activities Related to Commercial Product Development?(Letter Report, 11/25/94, GAO/PEMD-95-2).

ABSTRACT: In response to congressional interest in how the national laboratories of the Department of Energy (DOE) can best be focused to help solve the problems faced by the nation during the 1990s, this report presents an inventory of the human and capital resources housed in the national laboratories that will provide baseline data for future GAO reports on DOE laboratory policy issues. This report addresses congressional interest in the current balance of the research efforts in 10 laboratories' research programs. The 10 laboratories are as follows: Argonne, Brookhaven, Idaho Engineering, Lawrence Livermore, Lawrence Berkeley, Los Alamos, Oak Ridge, Pacific Northwest, Sandia, and the Solar Energy Research Institute. GAO also examines the extent to which these national laboratories are now engaged in basic and applied research or in research linked to commercial product development.

High Performance Computing and Communications: New Program Direction Would Benefit from a More Focused Effort (Chapter Report, 11/04/94, GAO/AIMD-95-6).

ABSTRACT: The federal High Performance Computing and Communication Program seeks to accelerate research and development of high performance computers and networks and promote their use in both

the federal government and the private sector. If successful, the program could significantly extend U.S. technological leadership and enhance national competitiveness. This report examines (1) the effectiveness of the program's management structure in setting goals and measuring progress and (2) how extensively private industry has been involved in the program's planning and execution. GAO also identifies opportunities to improve the program and makes recommendations to focus the program on its new role in developing new technology in support of the national information infrastructure.

U.S. Government Aid to Business: Federal Government Programs That Provide Management and Technical Assistance (Fact Sheet, 10/14/94, GAO/GGD-95-3FS).

ABSTRACT: This fact sheet provides information on federal government programs that give management and technical assistance to businesses. GAO (1) identifies, given the limited time constraints of the assignment, as many federal government programs that provide such help as was possible; (2) briefly describes these programs and identified the target customers that these programs were designed to serve; and (3) reports the current funding levels for these programs.

Precollege Math and Science Education: Department of Energy's Precollege Program Managed Ineffectively (Letter Report, 09/13/94, GAO/HEHS-94-208).

ABSTRACT: Public policymakers and U.S. industrial leaders have expressed grave concern about precollege students in other industrialized countries significantly outperforming American students on recent international mathematics and science tests. In recognition of the Department of Energy's (DOE) world-class scientists and engineers as well as its state-of-the-art research facilities, the Congress made mathematics and science education a major mission for DOE in fiscal year 1991. DOE's precollege mathematics and science budget has grown about 1,250 percent—reaching about $27 million in fiscal year 1993. In the early 1990s, DOE did not effectively manage this program. First, DOE jeopardized the program's success by not using a risk management strategy to run the program's projects. Second, DOE forfeited an invaluable management tool by taking a lax approach to program evaluation. Third, DOE greatly reduced its chances of helping achieve National Education Goal 5—"By the year 2000, U.S. students will be first in the world in mathematics and science achievement"—by launching a variety of projects that did not clearly seek

to improve student achievement. DOE has announced steps to substantially improve the program's management and evaluation functions; however, the depth of executive support for these measures and their subsequent staying power are uncertain.

National Science Foundation: Better Use of Existing Resources Could Improve Program Administration (Letter Report, 06/24/94, GAO/RCED-94-95).

ABSTRACT: The National Science Foundation (NSF), through its Directorate for Education and Human Resources, exercises the unique federal role of advancing science, mathematics, engineering, and technology education programs. For fiscal years 1990 through 1993, money available for these programs more than doubled, from about $243 million to $512 million, while resources to administer and manage the programs grew by less than one-fourth, or from about $6 million to $7.3 million, adjusted for inflation. This report examines (1) how the Directorate sets priorities for its education programs, (2) how the Directorate evaluates the results of its programs and how these evaluations are used to set future priorities, and (3) whether the Directorate has obtained the resources it needs to run its programs effectively.

Fossil Fuels: Lessons Learned in DOE's Clean Coal Technology Program (Letter Report, 05/26/94, GAO/RCED-94-174).

ABSTRACT: The Department of Energy's (DOE) Clean Coal Technology Program, which has been underway since 1986, is a unique partnership between government and industry for sharing the costs of commercial-scale projects demonstrating innovative technologies for using coal in a more environmentally sound, efficient, and economical way. DOE funds up to half of a project's cost, with the project's sponsor and other nonfederal participants picking up the tab for the rest. This report reviews the lessons DOE has learned in implementing the clean coal program and the changes it has made that would be useful to other federal agencies that share in the costs of developing and demonstrating technologies. GAO also obtained information on DOE's plans for the future direction of the clean coal program. Although it is too soon to judge the commercial success of the innovative technologies developed, the program has shown that the government and the private sector can work together to develop and apply new technologies.

Texas's Collider Claim (Correspondence, 04/22/94, GAO/RCED-94-199R).

BACKGROUND: Pursuant to a congressional request, GAO provided information about the Department of Energy's (DOE) settlement of Texas' claim for its investment in the terminated Superconducting Super Collider project. GAO noted that: (1) DOE has not estimated the cost of settling Texas' claim for project investment and cannot predict when it will be able to estimate those costs, (2) DOE agrees that Texas invested about $500 million, and is negotiating with the state to reach a settlement, and (3) a previous GAO report concluded that DOE does not currently need additional funds to cover its estimated costs for project termination activities. GAO believes that, when DOE determines that the costs of settling with Texas exceed its funds, it could then ask the Congress for additional money.

Technology Transfer: Improving the Use of Cooperative R&D Agreements at DOE's Contractor-Operated Laboratories (Letter Report, 04/15/94, GAO/RCED-94-91).

ABSTRACT: Technology transfer between federal laboratories and industry is increasingly viewed as a major factor contributing to the economic strength and competitiveness of the United States. In 1986, the Congress sought to enhance the effectiveness of this transfer by authorizing cooperative research and development agreements as another form of technology transfer. This report compares the Department of Energy's (DOE) process for implementing cooperative research and development agreements to the approaches used by the Army and the National Institute of Standards and Technology to determine why some federal laboratories had entered into more agreements than DOE's laboratories.

Federal Research: Additional Funds for Terminating the Super Collider Are Not Justified (Letter Report, 04/08/94, GAO/RCED-94-153).

ABSTRACT: A request from the Department of Energy (DOE) for an additional $180 million to cover termination costs for the Superconducting Super Collider in Texas, on top of $735 million already available, is not adequately justified and is not needed for currently estimated termination activities. The $735 million available for terminating the super collider exceeds DOE's latest cost estimate, made in March 1994, by $167 million; this estimate pegs termination costs at $568 million. This amount omits the costs of settling Texas' demand for a $539 million refund from DOE for its

investment in the project. DOE has not yet determined what is owed to Texas and is now negotiating with the state on a settlement. DOE's $180 million request for fiscal year 1995 to cover termination costs and to potentially fund new uses of the collider's assets is justified at this time. Additional funds are not needed for currently estimated termination activities, and it is premature to fund yet-to-be-determined future users of the collider's assets.

Federal Research: Interim Report on the Pilot Technology Access Program (Letter Report, 03/07/94, GAO/RCED-94-75).

ABSTRACT: As part of the federal effort to bolster U.S. industries' competitiveness, the Pilot Technology Access Program provides small businesses with access to: (1) computerized data bases containing technical and business information that they typically are unaware of, or cannot afford, and (2) experts knowledgeable in a wide range of technical fields. The program is being implemented at several small business development centers, which provide counseling, training, and research assistance to small businesses nationwide. The centers are run by the Small Business Administration. In 1991, six centers in Maryland, Missouri, Oregon, Pennsylvania, and Wisconsin were chosen to implement the program. This report discusses the status, implementation, and evaluation of the program. GAO also includes the views of the directors of the participating centers on the program's effect on small businesses' productivity and innovation.

Advanced Technology: Proposal Review Process and Treatment of Foreign-Owned Businesses (Letter Report, 01/18/94, GAO/RCED-94-81).

ABSTRACT: This report reviews the implementation of the Advanced Technology Program, which seeks to help U.S. businesses create and apply the generic technology and research necessary to rapidly commercialize major scientific discoveries and new technologies and to refine manufacturing technologies. Funding for the program, which is run by the National Institute of Standards and Technology, rose from $68 million in fiscal year 1993 to $200 million in fiscal year 1994—a 194-percent increase. GAO discusses (1) how the program limits its awards to research and development on "precompetitive generic technology" and (2) the treatment of foreign-owned businesses that submit proposals for awards.

Metric Conversion: Future Progress Depends Upon Private Sector and Public Support (Chapter Report, 01/13/94, GAO/RCED-94-23).

ABSTRACT: Metric use among the U.S. government, private sector, and public is only inching along, despite the fact that the Congress sanctioned the use of the metric system in this country as far back as 1866. Most federal agencies have made great strides in establishing guidelines and issuing reports on metric conversion but still face hurdles in putting their plans into practice. For instance, under the procurement system, most products are nonmetric, and the government's total market share is too small to stimulate private industry conversion. These difficulties have prompted the National Aeronautics and Space Administration and the Pentagon to request waivers from metric requirements in cases affecting entire ships and satellites. Mixed progress has been made toward metric conversion in the areas of federal grants and other business activities. GAO notes that the federal government alone cannot achieve the goal of metric conversions. A broader national dialogue between the government, the private sector, and the public is needed to discuss the next steps in the metric conversion process.

Technology Transfer: Improving Incentives for Technology Transfer at Federal Laboratories (Testimony, 10/26/93, GAO/T-RCED-94-42).

ABSTRACT: GAO supports the provisions of the Technology Commercialization Act of 1993, which would increase the up-front royalty payments to investors and limit the amount of remaining income that can be used for nonscientific purposes. GAO believes that these measures should stimulate federal scientists' interest in reporting inventions and spur federal laboratory directors to encourage technology transfer. Although GAO is uncertain what the impact would be of assigning title to intellectual property to Cooperative Research and Development Agreement collaborators, industry representatives told GAO that ownership and control over technology is important to developing new products. In addition, procedural impediments, such as the lack of ready access to advice on patenting inventions or the slow and arbitrary nature of selecting inventions to patent, continue to diminish incentives for technology transfer at federal laboratories.

Federal Research: Assessment of the Financial Audit for SEMATECH's Activities in 1992 (Letter Report, 10/13/93, GAO/RCED-94-17).

ABSTRACT: In reviewing the audit of SEMATECH's 1992 financial statements, GAO found no indication the Price Waterhouse's report on the internal control structure or its report on compliance with laws and regulations cannot be relied on. SEMATECH is a U.S. semiconductor manufacturer-Defense Department consortium that seeks to advance semiconductor manufacturing technology. In January 1993, DOD began providing advance payments to SEMATECH on a monthly instead of a quarterly basis. This procedure, adopted in response to an earlier GAO recommendation, appears to provide enough working capital funds while minimizing the amount of unexpended government funds that SEMATECH holds.

Nuclear Science: More Planning Needed to Support Future Needs for Electric Power in Space (Letter Report, 10/07/93, GAO/RCED-94-6).

ABSTRACT: The Department of Energy (DOE) builds radioisotope thermoelectric generators to produce electricity for use in deep space and remote terrestrial areas. The power systems have been critical to both the National Aeronautics and Space Administration and Department of Defense missions for more than 30 years. DOE is considering moving its generator operations from its Mound Plant in Ohio to a new facility being built at the Hanford Reservation in Washington. This report answers the following questions: Where does DOE plan to assemble generators in the future? How much would it cost to overhaul the Mound Plant facility to make it suitable for long-term generator assembly? How will DOE address previously cited public safety concerns about Mound doing nuclear work in a residential area? How much money has DOE spent to modify Hanford's Fuels and Materials Examination facility in preparation for the assembly of generators? How much will it cost to complete this changeover?

Federal Research: Aging Federal Laboratories Need Repairs and Upgrades (Testimony, 09/23/93, GAO/T-RCED-93-71).

ABSTRACT: Most federal research laboratories are experiencing common problems associated with aging facilities—leaking roofs and gutters, drafty window frames, power outages, and poor ventilating systems that do not meet industry standards for air circulation. Most of the laboratories GAO visited are more than 30 years old. Although facility managers generally believe that funding for laboratory maintenance is adequate, the eight

agencies GAO reviewed reported backlogs of more than $3.8 billion in needed laboratory repairs. Moreover, funding to renovate existing laboratories or build new ones is often minimal. Four of the eight agencies recently started up task forces to reexamine their research and development missions and improve the effectiveness and efficiency of their laboratories. Their findings should help in deciding whether to realign, consolidate, or close laboratories and whether to boost funding for laboratories doing essential work.

Federal Research: Aging Federal Laboratories Need Repairs and Upgrades (Letter Report, 09/20/93, GAO/RCED-93-203).

ABSTRACT: Most federal research laboratories are experiencing common problems associated with aging facilities—leaking roofs and gutters, drafty window frames, power outages, and poor ventilating systems that do not meet industry standards for air circulation. Most of the laboratories GAO visited are more than 30 years old. Although facility managers generally believe that funding for laboratory maintenance is adequate, the eight agencies GAO reviewed reported backlogs of more than $3.8 billion in needed laboratory repairs. Moreover, funding to renovate existing laboratories or build new ones is often minimal. Four of the eight agencies recently started up task forces to reexamine their research and development missions and improve the effectiveness and efficiency of their laboratories. Their findings should help in deciding whether to realign, consolidate, or close laboratories and whether to boost funding for laboratories doing essential work. GAO summarized this report in testimony before the Congress; see: Federal Research: Aging Federal Laboratories Need Repairs and Upgrades (GAO/T-RCED-93-71, Sept. 23, 1993) by Jim Wells, Associate Director for Energy and Science Issues, before the Joint Economic Committee (8 pp.).

Federal Research: Advanced Technology Program's Indirect Cost Rates and Program Evaluation Status (Letter Report, 09/10/93, GAO/RCED-93-221).

ABSTRACT: The Advanced Technology Program, run by the National Institute of Standards and Technology (NIST), is meant to help U.S. businesses rapidly commercialize major new scientific discoveries and technologies and refine manufacturing technologies. The program's goals are to improve the competitive position of U.S. businesses, give preference to discoveries and technologies that have great economic potential, and avoid providing undue advantages to specific companies. Since 1991, NIST

has funded 60 projects proposed by individual or joint ventures. The administration has proposed boosting program funding to $200 million in fiscal year 1997—a 194-percent increase over the year before. This report provides information on (1) program awardees' indirect cost rates, (2) completed projects, and (3) NIST's plans to evaluate the program's effectiveness.

Federal Research: Superconducting Super Collider's Total Estimated Cost Will Exceed $11 Billion (Testimony, 06/30/93, GAO/T-RCED-93-57).

ABSTRACT: Management problems continue to hinder accurate and timely reporting of the Superconducting Super Collider's cost and status. Although the project's total cost cannot be reliability estimated, GAO believes that costs have more than doubled since the Super Collider was first proposed to the Congress in 1987—from $5.3 billion to more than $11 billion. Because the project's prime contractor and the Department of Energy (DOE) have been slow to disclose project costs and anticipated cost increases, the Congress has not been receiving timely and complete information. The project is now at a crossroads, and key funding decisions must be made. The federal share of the project's cost, now capped at $5.6 billion, will have to increase. DOE now expects to receive only $1.4 billion from nonfederal sources—$400 million from foreign sources and $1 billion from Texas. As a result, the Congress will have to boost federal funding substantially if the project is to be completed.

Technology Transfer: Implementation of CRADAs at NIST, Army, and DOE (Testimony, 06/10/93, GAO/T-RCED-93-53).

ABSTRACT: Cooperative research and development agreements (CRADAs) are one of several mechanisms that federal laboratories use to transfer technology to the private sector. Under a CRADA, federal laboratories and collaborators agree to share resources as they conduct research and development. The CRADA defines the terms and conditions for the collaboration, including who will own, use, and commercialize a technology. This testimony compares the Department of Energy's implementation of CRADAs with the approaches used by the Army and the National Institute of Standards and Technology.

Federal Research: Minor Changes Would Further Improve New NSF Indirect Cost Guidance (Letter Report, 06/03/93, GAO/RCED-93-140).

ABSTRACT: The National Science Foundation (NSF), an independent federal agency with a budget of about $2.7 billion, promotes science in the United States through grants to research institutions. The grants pay for both direct costs, such as the salaries of the investigators and the equipment needed for a project, and indirect costs or overhead, which include utility and accounting expenses. In April 1992, GAO reported that several large universities receiving federal grant money were charging inappropriate indirect costs to the government, including entertainment expenses, depreciation of a 72-foot yacht, and the operating costs of a shopping center. This report provides information on, and identifies improvements needed in, (1) the indirect cost guidance that NSF provides to small organizations and small businesses, (2) NSF's procedures for establishing indirect cost rates, and (3) the extent to which NSF's audit guidelines and audits cover indirect cost charges.

Federal Research: Superconducting Super Collider Cost and Schedule (Testimony, 05/26/93, GAO/T-RCED-93-47).

ABSTRACT: The Superconducting Super Collider will be the world's largest particle accelerator, a basic research tool for seeking fundamental knowledge about matter and energy. The Department of Energy's (DOE) estimate to build the super collider grew from $5.3 billion in 1987 to $8.25 billion in 1991. The super collider is not expected to produce any direct national security benefits, although national security may indirectly benefit from the potential but unpredictable practical applications of research discoveries or from technological spin-offs. Although the United States and other countries have smaller accelerators operating, no existing or planned accelerator will be exactly the same as the super collider. Known cost increases suggest that the total cost for the super collider will exceed $11 billion. To preclude the cost and schedule from continuing to increase beyond $11 billion, annual funding levels would need to increase dramatically over that projected in the President's budget. In fact, DOE is assuming in its projection that there will be no funding constraints after fiscal year 1998—an assumption that could prove unrealistic unless the budget deficit improves markedly.

Federal Research: Super Collider—National Security Benefits, Similar Projects, and Cost (Letter Report, 05/14/93, GAO/RCED-93-158).

ABSTRACT: The Superconducting Super Collider will be the world's largest particle accelerator, a basic research tool for seeking fundamental knowledge about matter and energy. The Department of Energy's (DOE) estimate to build the super collider grew from $5.3 billion in 1987 to $8.25 billion in 1991. The super collider is not expected to produce any direct national security benefits, although national security may indirectly benefit from the potential but unpredictable practical applications of research discoveries or from technological spin-offs. Although the United States and other countries have smaller accelerators operating, no existing or planned accelerator will be exactly the same as the super collider. Known cost increases suggest that the total cost for the super collider will exceed $11 billion. To preclude the cost and schedule from continuing to increase beyond $11 billion, annual funding levels would need to increase dramatically over that projected in the President's budget. In fact, DOE is assuming in its projection that there will be no funding constraints after fiscal year 1998—an assumption that could prove unrealistic unless the budget deficit improves markedly. GAO summarized this report in testimony before the Congress; see: Federal Research: Superconducting Super Collider Cost and Schedule (GAO/T-RCED-93-47, May 26, 1993) by Victor S. Rezendes, Director of Energy and Science Issues, before the House Committee on Science, Space, and Technology (16 pp.).

Fossil Fuels: Ways to Strengthen Controls Over Clean Coal Technology Project Costs (Letter Report, 03/31/93, GAO/RCED-93-104).

ABSTRACT: The Department of Energy's (DOE) program for clean coal technology, under way since 1986, has earmarked $2.75 billion to produce innovative technologies that use coal in a highly efficient, environmentally sound, and economically competitive way. DOE has adequate procedures and has made a good effort to review the reasonableness of industry sponsors' projected costs before projects began. In all but one case, project files contained information on how questionable cost estimates had been resolved. After projects were under way, however, incurred-cost audits were not done promptly to ensure that sponsors submitted only allowable costs for reimbursement. Options exist that could yield more timely audits. DOE could also better protect the government's interest by withholding part of federal project funds until necessary cost records are provided and incurred-cost audits are finished. DOE allows sponsors to include third-party contributions in the sponsors' share of project

financing, rather than sharing such contributions with DOE, a practice that increases DOE's investment and financial risk in projects while decreasing the sponsors' investment and risk.

Federally Funded Research: Controlling Inappropriate Access to Research Results (Testimony, 03/11/93, GAO/T-RCED-93-19).

ABSTRACT: GAO believes that generally the public interest is better served if appropriate controls and safeguards are in place governing who gets access to and ultimately benefits from the results of federally funded research. GAO's May 1992 report (GAO/RCED-92-104) recommended that the National Institutes of Health and the National Science Foundation require their grantees to have procedures in place to effectively manage potential conflicts of interest, such as by requiring investigators and other key personnel to disclose any outside interests as part of the grant award process. GAO also believes that the government should at least be consulted about any major, multimillion-dollar agreement that a university, hospital, or other nonprofit research group seeks to negotiate with a private company if that institution receives substantial federal funding and rights to resulting commercial technologies.

Science and Technology: Federal Efforts to Collect and Analyze Information on Foreign Science and Technology (Testimony, 02/23/93, GAO/T-RCED-93-8).

ABSTRACT: A whole host of federal offices and laboratories collect information on foreign science and technology. Scattered throughout the government, these organizations are concerned primarily with defense, intelligence, commerce, and science. Generally, the groups obtain their information from the public. In some cases—particularly in the intelligence community—the organizations analyze it and restrict access to their analyses. No central federal agency is responsible for coordinating either the collection or the monitoring of information on foreign science and technology. Agencies with common interests, however, are trying to coordinate the collection and monitoring of relevant information. It is unclear at this point how valuable these data might be to U.S. businesses and whether firms would have much interest in obtaining the information from the government.

Federal Research: Super Collider Is Over Budget and Behind Schedule (Chapter Report, 02/12/93, GAO/RCED-93-87).

ABSTRACT: The Superconducting Super Collider—a potential source of basic knowledge about matter and energy—will, when completed, be the world's largest particle accelerator. The prime contractor for the multibillion dollar project, which is being built about 30 miles south of Dallas, Texas, still has not come up with a fully functioning cost and schedule control system. Such a system—with trend analysis showing the estimated cost and schedule for completing the project—is not expected to be up and running until July 1993 or later. Analysis of the major subcontractors' work in progress showed that the project is over budget and behind schedule. For example, trend analyses show that costs at completion for architect and engineering services and conventional construction will be $630 million over the baseline cost estimate of $1.25 billion. Furthermore, it is unclear how much these increases will ultimately change the project's total cost and schedule. To counter cost increases, the Department of Energy (DOE) plans to follow a build-to-cost strategy. This effort is intended to hold construction costs to baseline cost estimates by eliminating, reducing, or deferring some components. Such actions would reduce the Super Collider's experimental capabilities, could harm the experimental research, and could increase overall costs to the government. DOE recently advised the Congress that it may only be able to obtain about $400 million of the $1.7 billion that it is seeking from foreign contributors—leaving a shortfall of $1.3 billion. As a result, the Congress faces the prospect of having to substantially boost federal funding to complete the project.

Federal Research: Foreign Contributions to the Superconducting Super Collider (Letter Report, 12/30/92, GAO/RCED-93-75).

ABSTRACT: The Department of Energy (DOE) may have a hard time getting the foreign contributions needed to meet its $1.7 billion goal for the Superconducting Super Collider. As of the end of fiscal year 1992, DOE had received about $15 million in foreign contributions consisting of pledges and contributions of labor and materials from India, Russia, and China. This amount is close to the $20 million DOE estimated that it would receive by the end of fiscal year 1992. The Superconducting Super Collider funding profile, however, calls for DOE to obtain an additional $1.1 billion in foreign contributions through fiscal year 1996. Although most of this money will have to come from Japan, Japanese officials have said that they are still studying the merits of the project and have yet to decide whether to

contribute. If the foreign contributions do not materialize, the tab for U.S. taxpayers will increase regardless of whether the Congress decides to make up for the funding shortfall or let the project's schedule slip. According to DOE, a 1-year slippage in the project's overall completion schedule would boost costs by about $400 million—or roughly $1 million a day.

Federal Research: Assessment of the Financial Audit for SEMATECH's Activities in 1991 (Letter Report, 12/11/92, GAO/RCED-93-50).

ABSTRACT: GAO found no indication during its review that the opinion of Price Waterhouse on SEMATECH's 1991 financial statements, its report on internal control structure, or its report on compliance with laws and regulations cannot be relied upon. In its report on SEMATECH's 1990 financial statements, GAO recommended that the Pentagon require funds to be disbursed through a letter of credit instead of being disbursed in advance through quarterly payments to SEMATECH. The Department of Defense has agreed to modify its procedure in January 1993, when it revises the grant agreement, by providing advance payments to SEMATECH on a monthly basis. Five member companies acknowledge including part of their SEMATECH contributions as overhead costs on government contracts that they held. Although allowable under government cost accounting principles, reimbursing members' contributions through overhead serves indirectly to increase the government's overall support for SEMATECH. GAO notes, however, that even if the amounts included as overhead were added to federal and state government contributions, member companies would still have paid their required 50 percent of SEMATECH's costs.

Technology Transfer: Barriers Limit Royalty Sharing's Effectiveness (Chapter Report, 12/07/92, GAO/RCED-93-6).

ABSTRACT: Despite the introduction of royalty-sharing programs at government laboratories, federal scientists' interest in patenting has not increased. Many scientists said that the small financial rewards, such as those paid under some royalty-sharing programs, offer little incentive to patent. For example, 17 of 21 agencies GAO reviewed use royalty-sharing formulas that often pay an individual only a few hundred dollars for an invention. GAO also found inadequate financial controls over payments to inventors. In addition, agency management is using virtually all of the laboratory's share of invention income to cover the administrative costs of

transferring federal technology to U.S. companies, meaning that the benefits of royalty sharing are not visible to other potential inventors.

Federal Research: Lessons Learned From SEMATECH (Letter Report, 09/28/92, GAO/RCED-92-283).

ABSTRACT: SEMATECH—formed in 1987 to help the United States regain its leadership role in semiconductor production—has shown that a government-industry research and development alliance can help improve a U.S. industry's technological position while protecting the government's interest that the consortium be managed well. Whether this feat can be replicated and what conditions would lead to this result in other cases is uncertain. This report discusses the specific strengths and weaknesses of SEMATECH and makes suggestions to the Congress in considering any future support for consortia intended to improve the competitive position of U.S. manufacturers.

High-Technology Competitiveness: Trends in U.S. and Foreign Performance (Chapter Report, 09/16/92, GAO/NSIAD-92-236).

ABSTRACT: Debates about U.S. policy on everything from trade to education have increasingly focused on the ability of American producers to compete successfully in global markets. High-technology products have received considerable attention because their strong performance has been linked to increases in overall economic performance and growth. This report assesses U.S. competitiveness in high-technology areas, considering, in particular, trends in U.S. performance over the last decade and comparisons with Japan. GAO considers several basic questions. First, what is the significance of high-technology performance and how well can it be measured? Second, what do measures of overall U.S. performance in high-technology areas suggest? And third, for 11 industries—pharmaceuticals, civilian aircraft, telecommunications equipment, fiber optics, semiconductors, semiconductor equipment and materials, robotics, flexible manufacturing systems, supercomputers, advanced materials, and consumer electronics—what has been the relative performance of U.S. producers and U.S. research efforts during the past decade?

Federal Research: System for Reimbursing Universities' Indirect Costs Should Be Reevaluated (Chapter Report, 08/26/92, GAO/RCED-92-203).

ABSTRACT: For every dollar spent on federally funded university research, the government pays another 50 cents for overhead, or indirect costs. Because of inadequate federal guidance and oversight and weak internal controls at the universities, the government has been charged millions of dollars for unallowable and questionable overhead costs, including entertainment, foreign travel, and utility bills. Although the universities and government have sought to address problems with overhead billing, their actions could escalate indirect costs even further. For example, the universities will likely try to bill the government for any costs associated with (1) improving their accounting systems and internal controls and (2) responding to new government requirements. In GAO's view, the depth and persistence of the problems and the upward trend in indirect charges over the years make this an opportune time to consider basic changes to the reimbursement system. This report discusses advantages and disadvantages of several alternative approaches to restructuring the reimbursement system. GAO believes that regardless of any long-term solution chosen, it is inefficient to have both the Department of Health and Human Services (HHS) and the Department of Defense (DOD) running the program, particularly when they are using fundamentally different approaches. HHS negotiates indirect cost rates that limit the federal reimbursement, resulting in an average indirect cost rate of about 50 percent, whereas DOD provides for full recovery of the universities' claimed allowable indirect costs, resulting in a cost rate of 59 percent.

Federal Research: Implementation of the Super Collider's Cost and Schedule Control System (Letter Report, 07/21/92, GAO/RCED-92-242).

ABSTRACT: The Superconducting Super Collider project, estimated to cost $8.25 billion and to be completed over a 10-year period ending in 1999, is designed to produce intense proton collisions, thereby providing insights into the fundamental components of matter. In April 1992 testimony (GAO/T-RCED-92-48), GAO indicated that the Department of Energy (DOE) lacked an integrated system for monitoring cost and schedule performance. DOE argued that GAO's testimony relied on 1990 audit work and did not accurately reflect present conditions. This report provides information on (1) the time frame and the basis of GAO's data that supported the April 1992 testimony and (2) the status of both GAO's review

and DOE's system for managing the Superconducting Super Collider's cost and schedule.

Federal Research: SEMATECH's Technological Progress and Proposed R&D Program (Briefing Report, 07/16/92, GAO/RCED-92-223BR).

ABSTRACT: SEMATECH—the government-industry research and development consortium formed in 1987 to help the United States regain world leadership in semiconductor manufacturing by the end of 1992—appears to be on schedule for achieving its objective, but the Pentagon plans to phase out future direct funding for the consortium despite member companies' support for continued funding. The 1992 goal of producing state-of-the-art semiconductors using only U.S. equipment will likely be achieved, although this capability will enable U.S. industry to only reach parity with—not surpass—the Japanese. U. S. semiconductor manufacturers and equipment suppliers seem to have stemmed the decline in their worldwide market share. How much credit SEMATECH should get for this turnaround is unclear, however. The Department of Defense (DOD) has proposed phasing out funding earmarked for SEMATECH at the end of this year. Under the proposal, projects at SEMATECH and other groups would be funded on a case-by-case basis. The agency plans to spend $80 million annually on semiconductor research during the next 5 years. SEMATECH member companies, citing both national defense and economic benefits, support continued federal backing for SEMATECH. This report also details SEMATECH's expenditures during its first 5 years and its proposed budget after 1992.

University Research: Controlling Inappropriate Access to Federally Funded Research Results (Letter Report, 05/04/92, GAO/RCED-92-104).

ABSTRACT: During the 1980s, the increasing importance of university research to technological innovation forged new links among industry, academia, and government. The federal government spent $9.6 billion sponsoring research at universities in fiscal year 1990, while business outlays for such research topped $1 billion that year. Closer ties between universities and the private sector raise concerns, however, about possible conflicts of interest or other relationships that might give businesses inappropriate access to and therefore an unfair advantage in commercializing the results of federally funded research. Requiring that investigators and other key personnel disclose outside interests as part of the grant award process, which both the National Institutes of Health and the National Science Foundation are considering, is an essential first step

toward improving university management controls over potential conflicts of interest. But GAO believes that additional steps are warranted to strengthen these controls and to address the ability of industrial liaison program members to get advance access to the results of federally funded research.

Energy R&D: DOE's Prioritization and Budgeting Process for Renewable Energy Research (Testimony, 04/30/92, GAO/T-RCED-92-57).

BACKGROUND: GAO discussed the Department of Energy's (DOE) planning and budgeting processes for renewable energy technology research and development. GAO noted that: (1) the Office of Management and Budget (OMB) provides DOE with overall policy and budgetary direction, including budget planning targets that are based primarily on the preceding year's budget; (2) using the preceding year's budget request as a guide, DOE allocates OMB spending targets among DOE program offices and the Secretary meets with each of the Assistant Secretaries to review program office priorities and funding levels; (3) the Secretary sends the approved budget proposal to OMB for review before it goes to the Congress; (4) starting with its fiscal year 1993 budget request, the Secretary has directed the Office of Policy, Planning and Analysis to rank civilian energy research and development activities according to their projected contributions to the National Energy Strategy's objectives; (6) within the Office of Conservation and Renewable Energy, the Assistant Secretary determines budget allocations developed by each of the five Conservation and Renewable Energy offices; (7) the offices base their proposals on a process that incorporates strategic and multiyear program plans and the views of national laboratories, renewable energy industries, and end-users of renewable energy; and (8) although the Office of Conservation and Renewable Energy has no written procedures for ensuring compliance with congressional spending directives, program officials make provisions for following through on the directives.

Energy R&D: DOE's Prioritization and Budgeting Process for Renewable Energy Research (Letter Report, 04/29/92, GAO/RCED-92-155).

ABSTRACT: This report examines how the Department of Energy (DOE) plans and budgets research and development projects for renewable energy technologies. Such technologies include electricity generation from solar, wind, and geothermal energy sources. GAO discusses how DOE (1) determines the annual budget for energy technologies, including renewal, fossil, and nuclear energy, and the role played in this process by

the Office of Management and Budget; (2) allocates research and development funds among renewable energy technologies; and (3) ensures that specific congressional directives for research and development projects for renewable energy technology are followed. GAO summarized this report in testimony before the Congress; see: Energy R&D: DOE's Prioritization and Budgeting Process for Renewable Energy Research (GAO/T-RCED-92-57, Apr. 30, 1992) by Victor S. Rezendes, Director of Energy Issues, before the Subcommittee on Investigations and Oversight, House Committee on Science, Space, and Technology (15 pp.).

Federal Research: Assessment of the Financial Audit for SEMATECH's Activities in 1990 (Letter Report, 04/09/92, GAO/RCED-92-97).

ABSTRACT: In this third annual audit of the financial statements of SEMATECH, Inc., a consortium of U.S. semiconductor manufacturers and the Department of Defense (DOD), GAO concludes that Price Waterhouse's opinion on SEMATECH's 1990 financial statements and its reports on internal control structure and compliance with laws and regulations should be reliable. While it has incorporated GAO recommendations in its 1990 financial statements, SEMATECH did not disclose postemployment payments to its former chief operating officer as GAO had suggested. An earlier GAO report found that at least two of SEMATECH's member companies had included part of their SEMATECH contributions for reimbursement as overhead costs on government contracts they held, a practice that indirectly boosts the federal government's overall outlay for SEMATECH's research and development activities. One of these companies has changed its accounting practices so that its SEMATECH contributions are now primarily expensed against profits from its commercial business. SEMATECH retains larger on-hand balances of government funds than it needs to meet normal operating expenses, reimbursing interest earned on these cash balances to the U.S. Treasury. If DOD continues to fund SEMATECH activities or participate in other joint industry-government consortia, it should disperse funds through a letter of credit rather than by advance payments to the consortium.

Federal Research: Concerns About the Superconducting Super Collider (Testimony, 04/09/92, GAO/T-RCED-92-48).

ABSTRACT: So far, the Congress has provided about $1.3 billion toward construction of the Superconducting Super Collider and is now considering the President's request for another $650 million for fiscal year 1993. GAO testified that several factors could delay the project, increase its

cost to the U.S. government, or reduce potential benefits. GAO believes that, as the investment increases and construction advances, it is more likely that project funding will continue even if costs increase and other countries do not help pay for it. Accordingly, correcting the problems cited by GAO and obtaining firm funding commitments from other nations are necessary to protect the U.S. investment in the project. Continuation of federal funding could also be made contingent on the Department of Energy's putting in place an integrated cost and schedule system, assessing the impact on the domestic economy of using foreign subcontractors, and obtaining firm commitments for contributions for other nations by a certain date.

DOE's Clean Coal Technology Program (Correspondence, 04/03/92, GAO/RCED-92-143R).

BACKGROUND: Pursuant to a congressional request, GAO commented on the Department of Energy's (DOE) response to a previous GAO report on improvements needed in the DOE Clean Coal Technology Program. GAO noted that: (1) DOE believes that the GAO report does not portray the larger picture of the program's successes and that the Clean Coal Technology Program is achieving significant successes and (2) of the five GAO recommendations included in the report, DOE disagrees with one, agrees with or is taking action on two others, and believes its current procedures are sufficient to meet the intent of the remaining two.

Federal Research: Small Business Innovation Research Program Shows Success but Can Be Strengthened (Testimony, 03/31/92, GAO/T-RCED-92-45).

BACKGROUND: GAO discussed the Small Business Innovation Research Program (SBIR), focusing on: (1) whether the program has met its goals, (2) the reasons for minority and disadvantaged businesses' low level of phase III program activity, (3) the level of foreign investment and attention that SBIR awardees have attracted, and (4) changes that could improve the program. GAO noted that: (1) the program is showing success in phase III activity even though many projects have not had sufficient time to achieve their full commercial potential; (2) SBIR-funded research and development is moving toward increased private-sector commercialization, since the majority of sales and additional developmental funding comes from the private sector; (3) the quality of SBIR research compared favorably with other federal research; (4) minority and disadvantaged businesses are achieving a lower level of activity than other companies in phase III and

lower sales levels; (5) domestic involvement in SBIR is substantially higher than foreign involvement; and (6) project sales averages vary by agency. GAO believes that, to strengthen the program: (1) the Department of Defense needs to increase private-sector commercialization without weakening its commitment to meeting its own mission-related goals, (2) federal officials need to clarify the contractual procedures for entering into phase III follow-on non-SBIR-funded production contracts, and (3) federal officials need to determine whether the company or the agency should perform additional post-program work.

Federal Research: Small Business Innovation Research Shows Success but Can Be Strengthened (Chapter Report, 03/30/92, GAO/RCED-92-37).

ABSTRACT: As a nation competing in a global economy, the United States depends heavily on research and development (R&D). The Small Business Innovation Research Program was created in 1982 to strengthen the R&D role of small, innovative companies. Even though many program projects have not yet had enough time to achieve their full commercial potential, the program is showing success in phase III, which involves the use of nonfederal funds for commercial application of a technology. Most pase III activity took place in the private sector, showing a trend toward one of the program's goals—increasing private-sector commercialization. Major federal agencies, however, differ in their responses to this goal, as shown by their wide variation in average sales per project and the percentage of sales to the private sector. GAO notes three issues that need to be addressed: (1) the extent of the Defense Department's commitment to the goal of increasing private-sector commercialization, (2) inconsistent practices in requiring competition for projects entering phase III, and (3) the need to clarify the circumstances under which an agency may work on its own or continue working with the company through follow-on contractors after program funding ends. GAO summarized this report in testimony before Congress; see: Federal Research: Small Business Innovation Research Program Shows Success but Can Be Strengthened (GAO/T-RCED-92-45, Mar. 31, 1992) by Jim Wells, Associate Director for Energy Issues, before the Subcommittee on Innovation, Productivity, and Technology, Senate Committee on Small Business (20 pp.).

Federal Research: Small Business Innovation Research Program Shows Success but Can Be Strengthened (Testimony, 02/26/92, GAO/T-RCED-92-32).

ABSTRACT: The Small Business Innovation Research Program emphasizes the benefits of technological innovation and the ability of small businesses to transform research and development results into new programs. Even though many of the program's projects have not yet had enough time to achieve their full commercial potential, the program is showing success in phase III, which centers on the commercial or government applications of developed technology. This is indicated by the $1.1 billion in sales and additional development funding reported as of July 1991, two-thirds of which has occurred in the private sector. In addition, the majority of phase II projects remain active in phase III, and companies expect up to $3 billion in further sales and additional development funding through 1993. GAO recommends that the following three issues be addressed to further strengthen the program: (1) the extent of the Defense Department's commitment to increasing private-sector commercialization, (2) inconsistent practices in requiring competition for projects entering Phase III, and (3) the need to clarify the circumstances under which an agency may work on its own or continue working with the company through follow-on contracts after program funding ends.

Federally Sponsored Research: Indirect Costs Charged by Selected Universities (Testimony, 01/29/92, GAO/T-RCED-92-20).

ABSTRACT: In testimony last year, GAO discussed how Stanford University charged excessive indirect research costs, or "overhead" as it is commonly known, to the federal government. (See GAO/T-RCED-91-18, Mar. 13, 1991.) This testimony focuses on three other institutions: Harvard Medical School, the Massachusetts Institute of Technology, and the University of California at Berkeley. GAO found many deficiencies in the cost allocation methods and charging practices at the three schools. In some cases, GAO discovered problems that the university, the university's external auditors, or government agencies had already reviewed but had not questioned. These problems arose because (1) certain Office of Management and Budget (OMB) Circular A-21 criteria were inadequate for determining which types of costs should be allowed or how costs should be properly allocated among different university functions, (2) universities generally lacked adequate systems and internal controls to ensure that only allowable indirect costs were charged to the government, and (3) lax oversight practices by federal agencies had resulted in universities

claiming excessive indirect costs. Since the March 1991 hearings, all parties involved have taken steps to address these problems. However, GAO believes that this is an opportune time to reexamine the federal government's approach to reimbursing universities for indirect costs. Both OMB and the Department of Health and Human Services have already established task forces on the cost reimbursement system. Several proposals have been offered, both for simplifying the process and for reducing overall expenditures for indirect costs through the application of caps or fixed rates on the various categories of indirect costs. GAO plans to revisit this issue in an upcoming report.

Technology Transfer: Federal Efforts to Enhance the Competitiveness of Small Manufacturers (Chapter Report, 11/22/91, GAO/RCED-92-30).

ABSTRACT: The United States has experienced major trade deficits in manufactured goods each year since 1983, and U.S. companies have lost significant market share to foreign competitors. In particular, small manufacturers have not kept pace with their foreign rivals because they have not upgraded their manufacturing processes with basic automated equipment like computer-aided design systems. In response, four federal programs were created during the last 3 years to help small manufacturers regain their industrial competitiveness. The primary technology need of most small manufacturers is for proven, off-the-shelf automated technologies to enable them to raise productivity, improve product quality, and respond to changing market conditions. Most small manufacturers cannot effectively use advanced, state-of-the-art automated technologies developed at the National Institute of Standards and Technology and other federal laboratories because they generally do not have the resources or trained personnel to incorporate such technologies into their operations. Overall, GAO found that the four federal programs have been only somewhat effective in addressing the technological needs of small manufacturers to improve their competitiveness. In addition, the four programs have affected only a relatively small percentage of small manufacturers; by themselves, they are insufficient to have much effect on improving small manufacturers' competitive positions. Moreover, while the federal programs offer incentives for states to start or expand technology assistance services, only seven states provide direct consultation to manufacturers—the type of help experts consider most effective in assisting manufacturers. Recently, three of these states substantially cut funding for their programs because of budget constraints.

Fossil Fuels: Improvements Needed in DOE's Clean Coal Technology Program (Chapter Report, 10/30/91, GAO/RCED-92-17).

ABSTRACT: Coal provides about one-quarter of the nation's energy needs, but emissions from coal combustion have contributed to air pollution, including acid rain. Under a program to provide more advanced, efficient, and environmentally acceptable coal utilization technologies, the Department of Energy (DOE) funds up to 50 percent of the costs of industry-sponsored projects to demonstrate commercial-scale applications of innovative clean coal technologies. As of September 1991, about half of the 32 ongoing funded projects were progressing on schedule and within cost estimates. Equipment failures, additional equipment requirements, and problems in scheduling tests were contributing factors to projects that were behind schedule or over budget. GAO believes that DOE's selection of some projects, while meeting selection criteria, may not be the most effective use of federal funds. For example, some projects are demonstrating technologies that might have been commercialized without federal assistance. GAO also identifies projects with potentially limited applications and projects that have proven economically unviable. GAO questions whether DOE has done all that it could to ensure that its investment is adequately protected. For example, DOE continued to fund some projects that it knew were experiencing financing problems and that were eventually withdrawn from the program; DOE has since improved controls over project costs.

Grant Management: Improvements Needed in Federal Oversight of NSF Grants (Testimony, 09/24/91, GAO/T-RCED-91-92).

BACKGROUND: GAO discussed grant administration at the National Science Foundation (NSF), focusing on the federal oversight process for the NSF grant program at three institutions. GAO noted that: (1) NSF has given grant recipients almost total responsibility for ensuring that funds are used in accordance with applicable federal requirements, but the effectiveness of controls over the use of grant funds varies by university; (2) although the three universities established controls over expenditures charged to NSF grants, there were instances of federal fund misuse that the institutions failed to prevent or detect; (3) other investigations identified instances of NSF fund misuse at universities that resulted in larger problems that may have gone undetected if allegations of misuse had not been reported and investigated; (4) although NSF primarily relies on required independent audits to ensure that larger institutions protect the government's interest, it has not received many of those audits because

federal guidelines do not explicitly require institutions to perform or submit acceptable audits to NSF; and (5) NSF lacks a mechanism to ensure that grantees inform it of misconduct involving grant funds.

Fossil Fuels: DOE's Effort to Provide Clean Coal Technology to Poland (Letter Report, 05/22/91, GAO/RCED-91-155).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the Department of Energy's (DOE) efforts to implement a legislative requirement that it cooperate with Polish officials to retrofit a coal-fired powerplant in Poland with advanced coal technology, focusing on DOE: (1) revision of its original definition of a U.S. firm eligible for the project and (2) reduction of its sulfur dioxide emission requirements for the project.

FINDINGS: GAO found that: (1) DOE revised its original definition of a U.S. firm to eliminate a requirement that at least 50 percent of the firm's voting stock be owned by U.S. citizens, due to comments it received from coal industry representatives before it solicited bids; (2) those comments indicated that a less restrictive definition would enable more companies to bid; (3) DOE had discretion in defining what constituted a U.S. company, and DOE's Office of the General Counsel's definition was consistent with the act; (4) DOE believed that additional complexities could arise from a more restrictive definition; (5) DOE lowered the sulfur dioxide emission reduction level from 70 percent to 65 percent because it believed that a lower level would increase the number of companies eligible to compete for the contract; (6) DOE indicated that it discussed that change with representatives from Poland, who voiced no concern; (7) lowering the sulfur dioxide level to 65 percent made no difference in the number of powerplants that would meet emission-reduction requirements if DOE used the technology at other powerplants in Poland; (8) DOE estimated that, as a result of those changes, an additional 10 companies would be eligible to compete for the project; and (9) DOE planned to award the contract in the fall of 1991.

Federal Research: Concerns About Developing and Producing Magnets for the Superconducting Super Collider (Testimony, 05/09/91, GAO/T-RCED-91-51).

BACKGROUND: GAO discussed the status of the Department of Energy's (DOE) Superconducting Super Collider, focusing on DOE's and super collider laboratory's approach in developing and industrially producing

superconducting magnets. GAO noted that: (1) although the industry produced superconducting magnets for an accelerator, it was difficult to determine whether DOE and the laboratory would be similarly successful, since they took a different approach in developing and producing the magnets for a substantially larger accelerator; (2) DOE did not build or test full-size superconducting collider dipole magnets for the current super collider design, and a significant risk remained regarding whether the magnets would work as intended; and (3) the compressed development schedule for those magnets increased the risk that they will not work as intended, since DOE did not allow enough time to resolve any problems that it may encounter.

Federal Research: Status of DOE's Superconducting Super Collider (Letter Report, 04/15/91, GAO/RCED-91-116).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the status of the Department of Energy's (DOE) Superconducting Super Collider, focusing on the: (1) stability of DOE and super collider laboratory project management, (2) uncertainties related to the super collider site geology, (3) uncertainties and risks associated with magnet development and production, and (4) Texas' proposed contribution to the project's costs.

FINDINGS: GAO found that: (1) the super collider laboratory and DOE's super collider program office experienced management instability due to high turnover in key positions; (2) Texas based its 1987 site proposal on the expectation that DOE would excavate the super collider tunnel through two types of geologic formations, but a change in the tunnel shape and location required excavation through a third type of geologic formation that has a high shrink-swell potential; (3) to better understand the site geology, the laboratory planned to construct a section of the tunnel before beginning full-scale construction; (4) DOE did not build or test full-size dipole magnets for the current super collider design; (5) because DOE changed the magnet design in December 1989, the tooling to build the full-size magnet was not yet available; (6) to reduce magnet risks, the super collider laboratory added 5 months to the scheduled production start for the magnets, but the schedule remained compressed; (7) the magnets' delayed development schedule increased performance risks, since little time will be available to resolve any encountered problems; (8) Texas offered to contribute at least $1 billion and land toward the super collider in its September 1987 site proposal; and (9) in September 1990, DOE agreed that the state would contribute $875 million

toward the $8.2-billion estimated total project cost and use the remaining $125 million for super collider-related activities.

Better DOE Controls Needed Over Contractors' Discretionary R&D Funds (Testimony, 03/19/91, GAO/T-RCED-91-25).

BACKGROUND: GAO discussed the Department of Energy's (DOE) management oversight of three multiprogram laboratories' discretionary research and development (R&D) activities. GAO noted that DOE: (1) had specific authority to approve laboratories' reasonable use of funds for discretionary R&D activities; (2) guidance was not clear enough to ensure that laboratories used discretionary R&D funds appropriately; (3) lacked effective controls and oversight over laboratories' administration and use of discretionary funds; (4) inappropriately charged $1.5 million to the discretionary R&D program for a cost overrun on a contract performed for a private firm; (5) issued revised guidance for the laboratories' discretionary R&D activities, but failed to address appropriate uses of discretionary R&D funds and guidance implementation issues; and (6) failed to formally assess the benefits of the discretionary R&D programs.

Federally Sponsored Research: Indirect Costs Charged By Stanford University (Testimony, 03/13/91, GAO/T-RCED-91-18).

BACKGROUND: GAO discussed how universities conducting federally sponsored research charged indirect costs and if those costs were in accordance with Office of Management and Budget (OMB) guidelines, focusing on Stanford University's accounting system. GAO noted that: (1) Stanford's deficient cost allocation and charging practices, and inadequate federal oversight, led to significant overcharges to the government; (2) Stanford's indirect cost rates rose from 58 percent in fiscal year 1980 to 74 percent in fiscal year 1990; (3) Stanford made $3.6 million in unallowable or inappropriate charges, with almost $1 million erroneously charged to the government; and (4) several key memorandums of understanding between Stanford and the federal government included questionable assumptions, did not provide adequate justification for allocation methods, and resulted in higher allocations of costs to organize research than the default method allowed. GAO believes that: (1) overcharges resulted because Stanford officials did not ensure the charging of proper costs to the government and either did not review, inadequately reviewed, or otherwise allowed unallowable costs; and (2) Stanford initiated actions recognizing shortcomings in its accounting

system and announced a three-step approach that could bring the identified problems under control.

Federal Research: Super Collider Estimates and Germany's Industrially Produced Magnets (Fact Sheet, 02/12/91, GAO/RCED-91-94FS).

BACKGROUND: Pursuant to a congressional request, GAO provided: (1) a chronological history of the Department of Energy's (DOE) Superconducting Super Collider's cost estimates, (2) information on Germany's experience with industrially produced superconducting magnets for its Hadron Electron Ring Accelerator (HERA), and (3) information on the super collider's approach to developing and producing superconducting magnets.

FINDINGS: GAO found that: (1) DOE presented many cost estimates for the super collider project that were not necessarily comparable since some estimates failed to include all project costs or did not have the same time frame; (2) the cost estimate grew from $4 billion in 1984 to $5.1 billion in 1989 and was reconciled at $8.2 billion in 1990 based on estimates by various DOE groups; (3) HERA officials showed that superconducting magnets could be industrially produced, despite the presence of numerous but expected minor problems during development and production; (4) HERA officials attributed their success to centralized authority for all magnet decisions, clear identification of magnet specifications, leverage over contractors, and full measurement and testing of each magnet; and (5) the super collider laboratory relied primarily on other DOE laboratories' technical expertise, solicited bids before building or testing a current prototype magnet, allowed one contractor to lead design and development, and relied on the contractor for measurement and testing of the magnets.

Energy Management: Better DOE Controls Needed Over Contractors' Discretionary R&D Funds (Chapter Report, 12/05/90, GAO/RCED-91-18).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the discretionary research and development (R&D) activities of three Department of Energy (DOE) laboratories and DOE's need for, uses of, and management controls over those activities.

FINDINGS: GAO found that: (1) DOE had specific authority to approve laboratories' reasonable use of funds for discretionary R&D activities;

(2) DOE had statutory authority to use laboratory operating funds to conduct R&D projects at the discretion of the laboratory directors; (3) DOE's order regarding the use of exploratory R&D funds was not clear enough to ensure that laboratories used funds appropriately; (4) DOE did not evaluate laboratories' discretionary R&D activities to determine the extent to which results benefited DOE programs; and (5) DOE lacked effective controls over laboratories' administration and use of discretionary funds.

Energy R&D: Conservation Planning and Management Should Be Strengthened (Chapter Report, 07/30/90, GAO/RCED-90-195).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the Department of Energy's (DOE) energy conservation research and development (R&D) program, focusing on planning and management improvements that would increase program effectiveness.

FINDINGS: GAO found that: (1) energy conservation R&D funding and staff declined substantially in 1980, reflecting the administration's view that conservation research should be conducted primarily by the private sector; (2) the 1991 budget request reflects a 9-percent funding reduction; (3) DOE's multiyear conservation R&D plan did not provide detailed information on proposed individual projects and milestones; (4) DOE has not steadily promoted technology transfer activities that effectively promote the commercialization of R&D efforts; (5) independent peer reviews of R&D activities could help ensure the continuing relevance of ongoing research activities and sharpen management decisionmaking; and (6) DOE may inadvertently overlook some relevant critical review recommendations or fail to implement them in a timely manner.

Technology Transfer: Copyright Law Constrains Commercialization of Some Federal Software (Chapter Report, 06/01/90, GAO/RCED-90-145).

BACKGROUND: Pursuant to a congressional request, GAO provided information on federal agencies' efforts to comply with the prohibition on copyrighting government works, focusing on the: (1) extent to which copyright law has constrained the transfer of federal computer software and other new technologies and (2) benefits and disadvantages of amending copyright law to allow federal agencies to copyright software.

FINDINGS: GAO found that: (1) there was no evidence that federal agencies improperly copyrighted government software; (2) top officials at six of the seven agencies GAO reviewed believed software copyrighting and licensing

constraints hurt their efforts to transfer computer software for commercial application to U.S. businesses; (3) agency officials said copyright and licensing authorities would stimulate the transfer of federal software with commercial applications to U.S. businesses by providing investment protection; (4) royalty-sharing would also give federal researchers an incentive to further develop and document the software; and (5) industry officials expressed concern that authority to copyright and license software could limit access to federal scientific and demographic databases.

Energy R&D: DOE's Allocation of Funds for Basic and Applied Research and Development (Briefing Report, 05/24/90, GAO/RCED-90-148BR).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the Department of Energy's (DOE) process for allocating energy research and development (R&D) funds, focusing on: (1) how DOE prioritized and coordinated funding requests among R&D program areas, (2) how DOE priorities have evolved over the past 10 years, (3) how DOE distributed R&D funding, and (4) the extent to which DOE has invested in major demonstration projects over the past 10 years.

FINDINGS: GAO found that: (1) the Office of Management and Budget's (OMB) budget targets and the DOE budget process determined how DOE allocated R&D funds; (2) DOE used budget guidance and general policy statements to determine its program funding priorities; (3) DOE was planning to complete a national energy strategy by December 1990; (4) OMB's budget targets have played an important role in reducing program funds for applied technology; (5) DOE primarily coordinated its R&D agenda through the analysis of energy and program areas; (6) over the past 10 years, DOE R&D priorities have shifted from energy technology program areas and renewable R&D to basic energy program areas; (7) from 1980 to 1990, energy technology program areas decreased 45 percent and basic energy program areas increased over 140 percent; (8) from fiscal year 1983 to fiscal year 1990, congressional appropriations for the energy technology areas influenced priorities because they were greater than DOE requested; (9) over the past 10 years, basic research and applied research funds have increased, while development funds have decreased; and (10) from fiscal year 1975 through fiscal year 1990, DOE invested over $6 million for 41 demonstration projects, of which 15 were terminated for various reasons, 9 were completed, and 17 were ongoing.

Fossil Fuels: Outlook for Utilities' Potential Use of Clean Coal Technologies (Chapter Report, 05/24/90, GAO/RCED-90-165).

BACKGROUND: Pursuant to a congressional request, GAO examined: (1) the extent to which electric utilities plan to use clean coal technologies for coal-fired power generation units, and (2) how such technologies could contribute to reducing acid rain.

FINDINGS: GAO found that: (1) utilities plan to use clean coal technologies at only 5 percent of their existing coal-fired units by 2010, (2) new technologies have not been successfully demonstrated on a commercial scale, and (3) utilities have expressed concern about the technical feasibility and cost-effectiveness of clean coal technologies. GAO also found that: (1) the Department of Energy (DOE) conducted three solicitations for project proposals and experienced major delays in negotiating agreements with project sponsors; (2) three projects withdrew from the DOE program; (3) seven funded projects experienced coordination, equipment, and financing problems that caused delays in completing project phases and extensions of some completion dates; and (4) it may take 5 to 10 years for clean coal technologies to penetrate the market once they are proven and commercially available.

Utilities' Potential Use of Clean Coal Technologies (Testimony, 03/28/90, GAO/T-RCED-90-56).

BACKGROUND: GAO discussed the results of its nationwide survey on utilities' plans to use clean coal technologies. GAO found that: (1) utilities planned to use clean coal technologies for only 5 percent of their coal-fired generating units; (2) consideration of specific technologies depended on the severity of emission reduction requirements, target dates for compliance, and present and future electricity demands; and (3) utilities considered switching to low-sulfur coal to achieve emission reduction requirements. GAO also found that: (1) new technologies may not contribute significantly to the reduction of acid-rain-causing emissions during the next 15 years; (2) the Department of Energy experienced problems and delays in formalizing cooperative agreements with project sponsors; and (3) utilities would likely test new technologies on one unit before installing them on others.

Fossil Fuels: Pace and Focus of the Clean Coal Technology Program Need to Be Assessed (Chapter Report, 03/19/90, GAO/RCED-90-67).

BACKGROUND: Pursuant to a congressional request, GAO reviewed the Department of Energy's (DOE) evaluation and selection of project proposals under the second round of the Clean Coal Technology Program.

FINDINGS: GAO found that: (1) DOE formed a board to develop proposal evaluation and selection criteria and evaluate proposed projects, and (2) DOE developed evaluation criteria in accordance with congressional and other program guidance. GAO also found that: (1) DOE picked 16 projects that represented the highest-ranked proposals for the range of technologies it included, but DOE rated 12 of the 16 projects weak in meeting one or more comprehensive evaluation criteria, acid rain reduction criteria, or technical readiness criteria; (2) half of the 48 proposals that DOE evaluated fared poorly against three or more of the evaluation criteria; and (3) 14 of the 32 projects that DOE did not select had better potential for reducing acid-rain-causing emissions than the nine weakest projects DOE selected.

Energy and Science Reports and Testimony: 1993 (Letter Report, 06/94, GAO/RCED-94-176W).

ABSTRACT: GAO's Energy and Science Issue Area conducts in-depth studies of the production, regulation, and consumption of all forms of energy and analyzes federal science and technology programs. This annual index, organized by broad subject areas, summarizes these and other GAO documents issued during 1993. An order form is included.

GAO High-Risk Program (Correspondence, 01/27/94, GAO/AIMD-94-72R).

ABSTRACT: Since early 1990, GAO has been reviewing and reporting on government programs especially vulnerable to waste, fraud, abuse, and mismanagement. This report updates the 17 areas included in GAO's High-Risk Series issued in December 1992 and adds to the list the Department of Housing and Urban Development (HUD), where billions of dollars continue be at risk due to long-standing organizational, systems, and staffing problems. In GAO's view, HUD warrants the special focus that comes with high-risk designation.

Procurement Reform: Comments on Proposed Acquisition Improvement Act of 1993 (Testimony, 05/25/93, GAO/T-OGC-93-1).

ABSTRACT: Procurement reform is especially critical in today's era of federal budget austerity. Although the government spends billions of dollars on procurements, this area does not always get the attention it warrants. GAO testified in support of the Federal Acquisition Improvement Act of 1993, which seeks to bring greater efficiency and fairness to the federal procurement system.

Energy and Science Reports and Testimony: 1992 (Other Written Product, 04/93, GAO/RCED-93-131).

ABSTRACT: Included among the leading energy and science issues today are the continuing U.S. dependence on imported oil, the staggering costs to clean up the nuclear weapons complex, and the expectations for science and technology to improve U.S. competitiveness abroad. This document contains summaries of GAO reports and testimony issued during 1992 on energy and science topics. Order forms are included to obtain documents of interest.

Government Management—Report on 17 High-Risk Areas (Testimony, 01/08/93, GAO/T-OCG-93-2).

ABSTRACT: Many GAO audit reports have spotlighted the effect of management failures in the federal government—waste, inefficiency, and even scandal. Political leaders have been forced to spend too much time reacting to surprises like the Department of Housing and Urban Development debacle rather than doing the work the agencies were created to do. GAO began its high-risk program to identify those high-dollar government programs most vulnerable to fraud, waste, abuse, and mismanagement. This testimony summarizes the high-risk series of reports, which examine the federal government's efforts to identify and correct problems in 17 especially vulnerable areas, that fall into three main categories: lending and insuring, contracting, and accountability. Many of the root causes of the problems afflicting these government programs are traceable to the absence of fundamental processes and systems. GAO urges that future congressional oversight focus on the agency reports and audited financial statements required by the Chief Financial Officers Act, agency management's progress in correcting material weaknesses in program internal control and accounting systems, and federal agency efforts to develop and implement performance standards.

Department of Energy Contract Management (Letter Report, 12/92, GAO/HR-93-9).

ABSTRACT: Many GAO audit reports have spotlighted the effect of management failures in the federal government—waste, inefficiency, and even scandal. Political leaders have been forced to spend too much time reacting to surprises like the Department of Housing and Urban Development debacle rather than doing the work the agencies were created to do. GAO began its high-risk program to identify those high-dollar government programs most vulnerable to fraud, waste, abuse, and mismanagement. This report is part of the program's high-risk series of reports, which examine the federal government's efforts to identify and correct problems in 17 especially vulnerable areas, that fall into three main categories: lending and insuring, contracting, and accountability. Many of the root causes of the problems afflicting these government programs are traceable to the absence of fundamental processes and systems. GAO urges that future congressional oversight focus on the agency reports and audited financial statements required by the Chief Financial Officers Act, agency management's progress in correcting material weaknesses in program internal control and accounting systems, and federal agency

efforts to develop and implement performance standards. The Comptroller General summarized the high-risk series in testimony before the Congress; see: Government Management—Report on 17 High-Risk Areas (GAO/T-OGC-93-2, Jan. 8, 1993) by Charles A. Bowsher, Comptroller General of the United States, before the Senate Committee on Governmental Affairs (22 pp.).

Energy Issues (Letter Report, 12/92, GAO/OCG-93-13TR).

ABSTRACT: This report is part of the transition series, a set of 28 reports summarizing GAO's findings on major problems confronting federal agencies, as well as economic and management issues facing the Congress and the incoming Administration. One cluster of transition reports, including those on the budget deficit and investment, addresses broad policy issues affecting government as a whole and its relationship to the economy. Another group of reports addresses issues affecting specific federal agencies, such as the Defense Department and the Internal Revenue Service. A third group of reports looks at cross-cutting management issues—everything from financial management to information management. GAO highlighted many of these problems in a similar set of reports issued in 1988. In some instances, progress has been made; all too often, however, the problems have continued to fester and grow worse. In general, the state of management in the federal government is poor. Too many management ideas—and resulting agency structures and processes—that worked well in the past now hinder the government from responding quickly and effectively to a world in tremendous flux. Most agencies have no strategic vision of the future, lack sound systems to collect and apply financial and program information to gauge operational success and accountability, and too often do without people with the skills necessary to accomplish their missions. The Comptroller General summarized the series in testimony before the Congress; see: Major Issues Facing a New Congress and a New Administration (GAO/T-OGC-93-1, Jan. 8, 1993) by Charles A. Bowsher, Comptroller General of the United States, before the Senate Committee on Governmental Affairs (30 pp.).

Energy Reports and Testimony: 1991 (Letter Report, 03/92, GAO/RCED-92-120).

ABSTRACT: From the Persian Gulf War to the collapse of communism, world events significantly shaped GAO's work on energy topics in 1991. This annual index references GAO documents published last year in this

issue area. Summaries of GAO reports and testimony are grouped under several subject headings. To assist the reader in obtaining documents, an order form is included.

Meeting the Energy Challenges of the 1990s: Experts Define the Key Policy Issues (Letter Report, 03/91, GAO/RCED-91-66).

BACKGROUND: GAO reported on a conference it sponsored to examine emerging energy policy issues, focusing on: (1) energy supply and demand, (2) energy and the environment, (3) management challenges at the Department of Energy (DOE), (4) the DOE nuclear weapons complex, and (5) energy research and development.

FINDINGS: GAO noted that: (1) a panel on the balancing energy supply and demand discussed securing sufficient and reliable future energy supplies to meet the increased energy demand projected for the future; (2) the energy and the environment panel discussed critical choices that energy policymakers needed to make regarding the environmental effects of their energy use decisions; (3) the managing the Department of Energy panel provided an overview of the management challenges facing the Congress and DOE regarding its diverse missions; (4) a panel on producing nuclear weapons safely identified several weapons complex issues requiring resolution, such as establishing cleanup priorities and standards, the potential of wasting funds on ineffective cleanup approaches, overlapping oversight and assessment groups, and the acute and long-term health effects of radiation exposure; and (5) the opportunities for energy research and development panel noted that an expanded federal role was needed to assist in the transfer of energy technologies in the workplace.

Energy Reports and Testimony: 1990 (Letter Report, 01/91, GAO/RCED-91-84).

BACKGROUND: GAO presented an index of energy-related reports and testimony it issued between January and December 1990.

FINDINGS: GAO presented a brief synopsis of: (1) 14 reports and 4 testimonies relating to energy supply and demand, (2) 2 reports and 2 testimonies on managing the Department of Energy, (3) 10 reports and 1 testimony pertaining to energy and the environment, (4) 15 reports and 6 testimonies on safe production of nuclear weapons, (5) 5 reports on energy research and development, and (6) a special publication of

energy-related documents it issued between January 1986 and December 1989.

Energy: Bibliography of GAO Documents January 1986-December 1989 (Letter Report, 07/90, GAO/RCED-90-179).

BACKGROUND: GAO provided a bibliography of its documents directly or indirectly relating to energy that were issued between January 1986 and December 1989.

FINDINGS: GAO included references to reports, speeches, testimonies, and other documents, chosen to represent the broad interrelationship between energy and such other issues as transportation, the environment, natural resources, and national defense.

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