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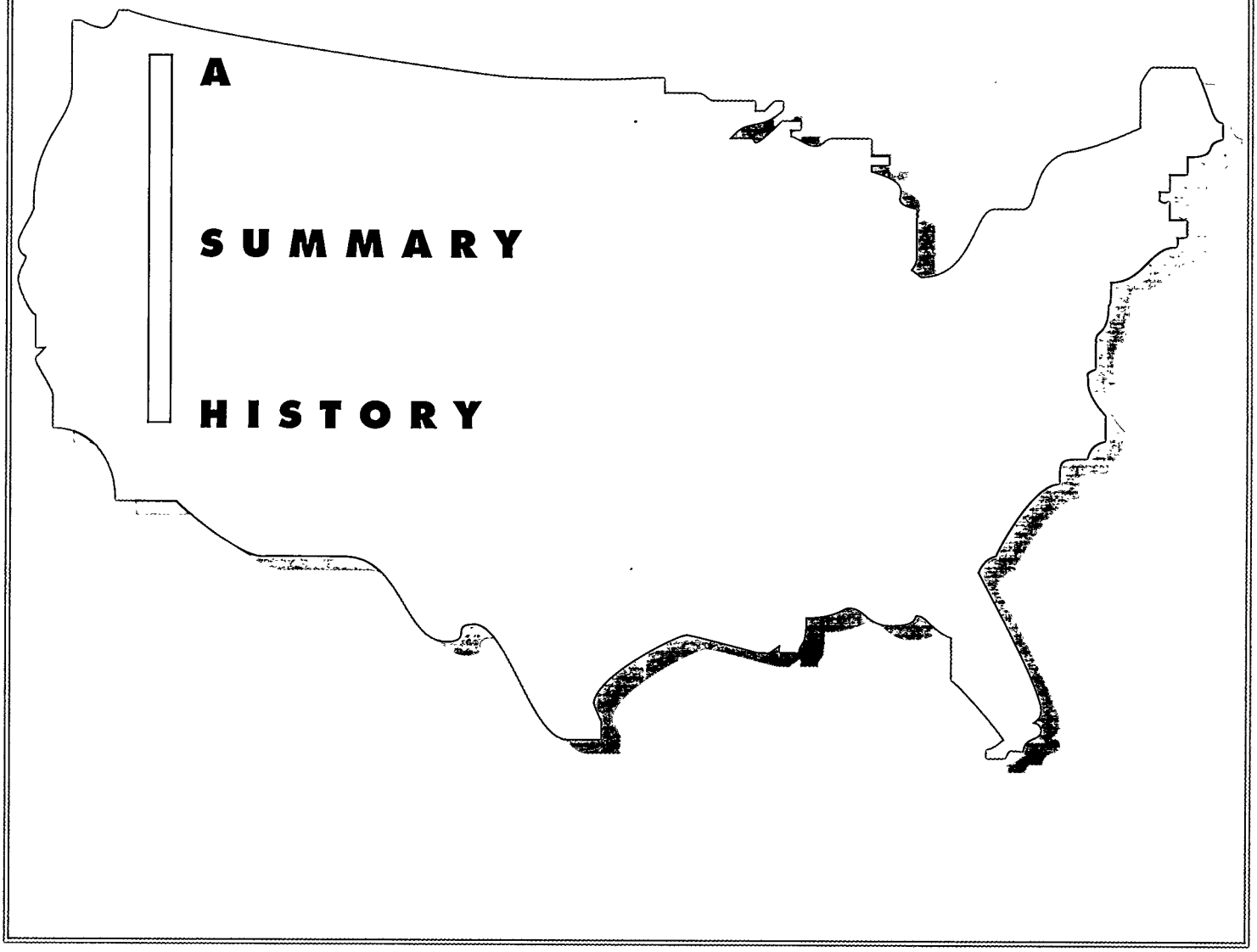

A SUMMARY HISTORY

UNITED STATES DEPARTMENT OF ENERGY

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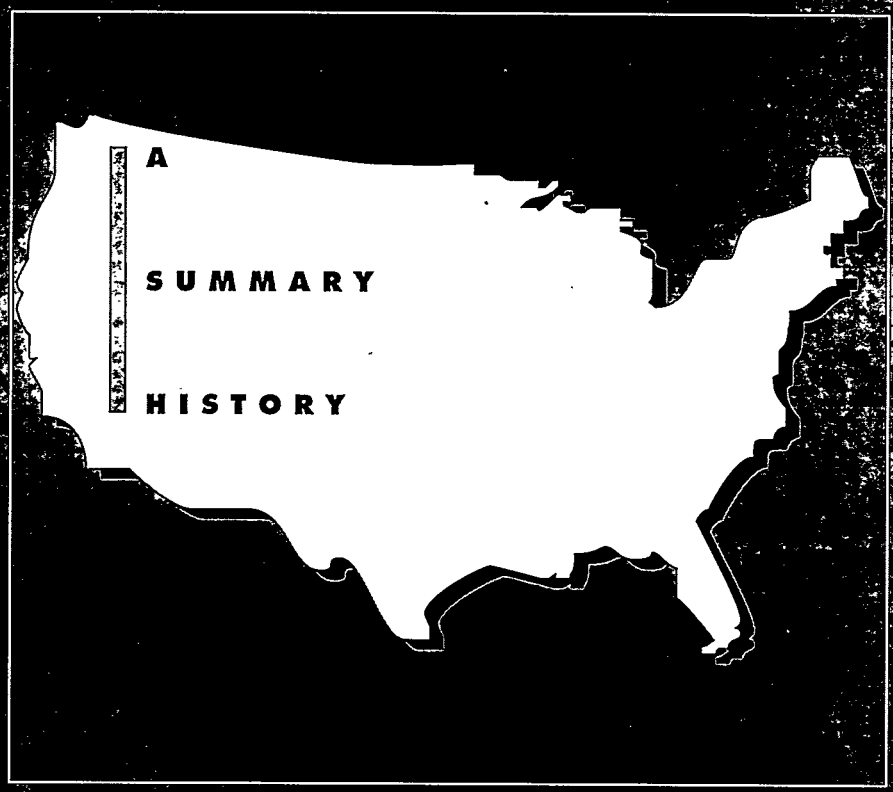

A SUMMARY HISTORY

UNITED STATES DEPARTMENT OF ENERGY

ENERGY HISTORY SERIES

Terrence R. Fehner
Jack M. Holl

History Division
Executive Secretariat
Human Resources and Administration
Department of Energy

November 1994

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FOREWORD

The Department of Energy Organization Act of 1977 created perhaps the most interesting and diverse agency in the Federal Government. The new department brought together for the first time not only most of the government's energy programs but also defense responsibilities that included the design, construction, and testing of nuclear weapons. The Department of Energy incorporated a score of organizational entities from a dozen departments and agencies, each with its own history and traditions. Uniting these seemingly disparate entities and programs was a common commitment to performing first rate science and technology. The Department of Energy sought—and continues to seek—to be one of the Nation's premier science and technology organizations.

The Department of Energy, 1977-1994, is a summary history of the origins, goals, and achievements of the Department and selected major programs. Beginning with the various fuels policies on the energy side and the Manhattan Project on the defense side, the study details how the Department was born of the energy crisis of the early and mid-1970s. The history then surveys the Department and its programs from the Carter through the Clinton administrations. As the energy crisis eased, the Department played a central role on issues as dissimilar as the Strategic Defense Initiative and the Superconducting Super Collider. With the end of the Cold War, the Department of Energy further transformed itself, moving from the building of bombs to partial dismantlement of the nuclear weapons complex and to an increased emphasis on environmental activities and technology transfer efforts.

Terrence R. Fehner is a historian working in the History Division. Jack M. Holl is a former DOE Chief Historian who currently teaches in the History Department at Kansas State University. The authors wish to thank F. G. Gosling, Dan Reicher, and Benjamin Franklin Cooling for reviewing the manuscript and making numerous valuable suggestions. Alice Buck provided early research support, and Sheila Convis contributed early project support. Ann Lavin, director of the Executive Secretariat, provided institutional and moral support for both the History Division and the summary history project. Many others within the History Division and the Department provided input that improved the end product. Finally, the authors thank Betsy Scroger for a first-class editing job and unfailing project support.

The History Division hopes that this summary history will prove useful to departmental employees and contractors, the general public, and others interested in the Department's past and future mission.

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THE UNITED STATES DEPARTMENT OF ENERGY, 1977-1994 A SUMMARY HISTORY

INTRODUCTION

On October 1, 1977, the Department of Energy became the twelfth cabinet-level department in the Federal Government. The new Department of Energy brought together within one agency two separate programmatic traditions that had long coexisted within the federal establishment.

The first tradition consisted of a loosely knit amalgamation of agencies, offices, and commissions scattered throughout the Federal Government dealing with various aspects of non-nuclear federal energy policy and programs. These included energy research, development, regulation, pricing, and conservation. Although the Federal Government had been involved in various energy programs for decades, the many entities responsible for energy research, development, production, or regulation usually had not coordinated their activities or policies.

The second tradition consisted of the Federal Government's activities in the field of nuclear energy. Beginning with World War II and the Manhattan Project effort to build the atomic bomb, the Federal Government dominated the development of nuclear energy in the United States. Bureaucratically centralized and security-oriented, federal involvement was almost exclusively of a military nature until the mid-1950s when the Atomic Energy Commission began major efforts to commercialize nuclear power.

What made marriage between these two traditions possible in the Department of Energy were two factors. First, the Atomic Energy Commission's activities in developing and commercializing nuclear energy represented the Federal Government's largest and most significant energy project from the 1950s into the early 1970s. Second, the energy crisis of the mid-1970s hastened a series of government reorganizations as both the executive and legislative branches sought to better coordinate federal energy policy and programs. The establishment of the Department of Energy brought most federal energy activities under one umbrella for the first time, but it also located a sizeable component dedicated to defense activities in the same organization.

PART I
UNITED STATES "ENERGY" POLICY TO 1973: THE FIRST TRADITION

THE FEDERAL GOVERNMENT'S LIMITED ROLE

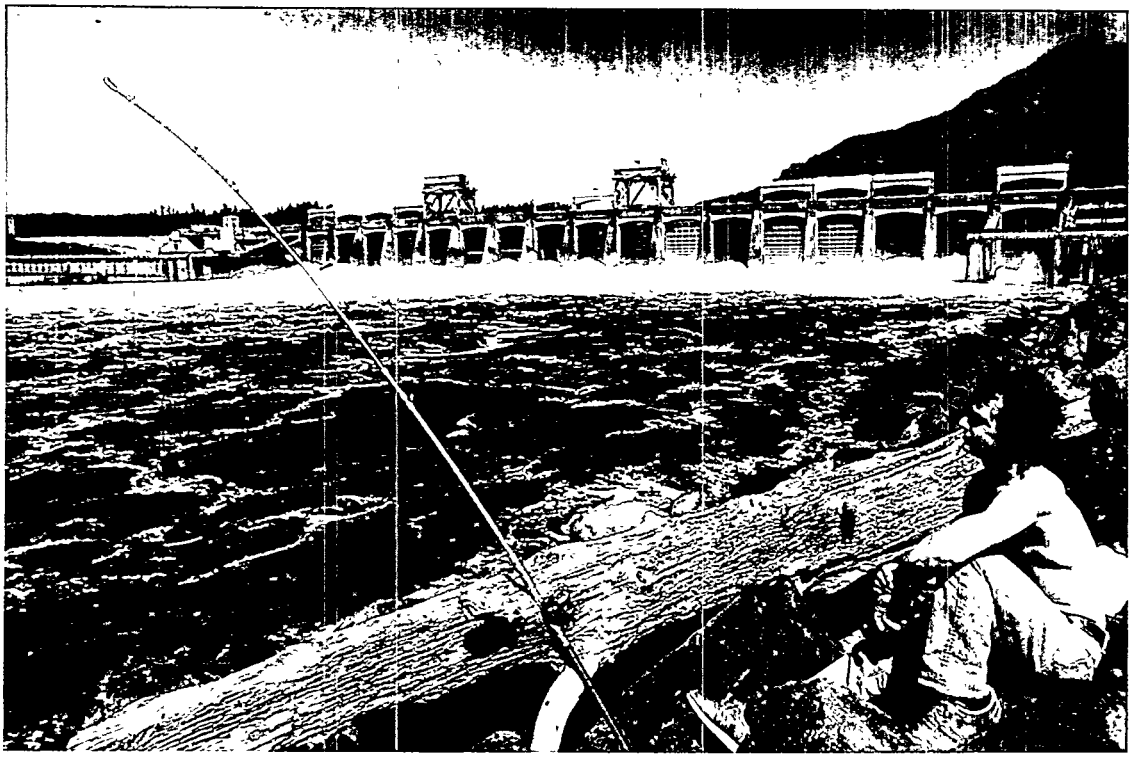
The Federal Government played a limited role in formulating national energy policy in the era of relatively cheap and abundant energy before the 1973 energy crisis. A reluctant manager and guardian of America's energy resources, the Federal Government moved cautiously in energy policy and acted more as a broker among diversified interests than as a master planner, leaving the task of long-range planning and energy utilization to private industry or state, local, and regional authorities.[1] Although always mindful of the significance of energy for national security, the Federal Government generally avoided massive intervention in the energy marketplace except in response to national emergencies. When the government imposed strict regulations and controls, including rationing, during World Wars I and II, Americans regarded such actions as emergency measures. More typically during peacetime, the Federal Government confined its role to monitoring energy data and coordinating research, development, application, and regulation of energy systems with public, private, local, state, regional, national, and international constituencies and institutions.[2]

The Nation relied on the private sector to fulfill most of its energy needs. Historically, Americans expected private industry to establish production, distribution, marketing, and pricing policies except where "natural monopolies" could not guarantee fair prices, as in the interstate transmission of gas and electricity. When free market conditions were absent, federal regulations were established to control energy pricing. On occasion, the Federal Government undertook major energy research and development projects, particularly in nuclear and hydroelectric power, when the public interest required national action. Federal programs like dam building, power marketing, and rural electrification sought to promote growth in energy industries to ensure consumers plentiful and inexpensive energy. Yet even when the government's involvement was extensive and vigorous, as in the hydroelectric development of the Tennessee and Columbia River valleys, federal energy management was regional in nature and restricted to specific energy technologies.

Through the early 1970s, energy programs scattered throughout the federal departments and agencies reflected the government's benign approach to energy management as a whole. Indeed, government officials generally thought in terms of particular fuels, technologies, and resources rather than "energy." Each fuel presented special characteristics and problems. The Departments of State and Defense, for example, sought to secure reliable sources of both foreign and domestic oil to increase national security. In some agencies, energy or fuel technologies were handled almost independently from one another, as in the Office of Oil and Gas and the Office of Coal Research within the Department of the Interior. The Bureau of Mines relationship to the highly decentralized and labor-intensive coal industry contrasted sharply with the Atomic Energy Commission's monopoly of nuclear technology before 1954. The Federal Power Commission sought to establish "fair prices" for the transmission of gas and electricity in interstate commerce, while the Department of Justice and the Federal Trade Commission attempted to promote competition within energy technologies. Energy research, primarily under the auspices of the Department of the Interior and, after 1946, the Atomic Energy Commission, was conducted at diverse energy research centers, stations, and laboratories throughout the country.[3]

Often "energy policy" became intertwined with other federal policies and programs. During the Great Depression the Army Corps of Engineers, the Tennessee Valley Authority, and the Interior Department's Bureau of Reclamation built multipurpose dams that not only generated power but also promoted conservation, reclamation, and recreation. The Bonneville Dam, which the Corps built in the 1930s on the Columbia River about thirty-five miles east of Portland, Oregon, epitomized federal energy policy. The Bonneville Dam was constructed to stimulate the regional economy and to produce inexpensive electrical energy. Meanwhile, Bonneville contributed to national security by providing reliable power to the aluminum, aircraft, and other defense industries located in the Pacific Northwest. The project was also important for flood control, irrigation, and navigation. Nevertheless, large concrete dams significantly altered the environment, particularly by blocking upstream migration of spawning fish. At Bonneville, the Corps built ingenious fish ladders and channels to help migratory fish around the seventy-foot-high dam. Although never comprising a comprehensive national energy strategy, the Federal Government's dam-building policy did promote low energy prices, stimulate local economies, and evidence concern for conservation and recreation.[4]

In an era when energy resources were perceived as almost boundless, the limited role of the Federal Government as a cautious energy broker seemed to suit the needs of the country. The American people did not call upon their government to make hard decisions about America's energy future. To be sure, conflicts between energy systems and the environment forecast the difficult and bitter choices that lay ahead. Furthermore, the Nation experienced some energy shortages, especially in the great blackout of 1965 and the "brownout" of 1971. In his first energy message to Congress in 1971, President Richard M. Nixon warned that the United States could no longer take its energy supply for granted. Since 1967, Nixon observed, America's rate of energy consumption had outpaced the Nation's production of goods and services. To help private enterprise develop an adequate supply of clean energy for the future, the President asked Congress to establish a department of natural resources



Fisherman enjoying recreational activities at Bonneville Dam. Source: U.S. Department of Energy

to unify all important energy resource development programs.[5] Nixon's plan made little headway, however. Political considerations were partly responsible, but, most important, the public just did not believe energy shortages were more than temporary or regional. Americans could not perceive of an "energy crisis" when there was an ample supply of cheap gas for their cars, electricity and fuel for their homes, and power for their industries and businesses.[6]

The Energy Crisis of 1973 and Nixon's Energy Policies

The energy crisis of 1973 underscored the necessity of developing a coordinated national energy policy and concentrating the government's various energy programs into one agency. On April 18, 1973, six months before renewed conflict in the Middle East, President Nixon noted that the United States, with 6 percent of the world's population, consumed one-third of the world's energy. In the immediate future, the President predicted, the United States might face energy shortages and increased prices. Again, as in 1971, Nixon cautioned that America's energy "challenge" could become an energy crisis if current trends continued unchecked. Declaring that the Nation's energy demands had grown so rapidly that they now outstripped available supplies, the President amended his 1971 proposal for a cabinet department by requesting Congress to establish a department of energy and natural resources with responsibility for energy policy and management as well as research and development. Meanwhile, Nixon established the Special Energy Committee of senior White House advisors, including special assistants for domestic, foreign, and economic affairs, and the National Energy Office, headed by Charles J. DiBona, to identify issues and coordinate energy analysis between the various offices and agencies.[7]

Nixon's proposal for a department of energy and natural resources stalled in Congress. The House and Senate held subcommittee hearings, but the proposal received no further attention during 1973. Although he did not abandon hope for an energy department, the President turned to immediate, interim solutions to the organizational problem. At the urging of Roy L. Ash, director of the Office of Management and Budget, Nixon established the Energy Policy Office, which combined and expanded the responsibilities of the Special Energy Committee and the National Energy Office. The new Energy Policy Office, established June 29, 1973, under the leadership of Governor John A. Love of Colorado, with DiBona remaining at the White House as Love's deputy, was responsible for formulating and coordinating energy policies at the presidential level. Nixon also proposed creating the Energy Research and Development Administration to develop the government's energy research programs and to work with industry in developing and fostering new energy technologies. The new administration would combine the energy research and development activities of the Atomic Energy Commission and the Department of the Interior. The Atomic Energy Commission's licensing and regulatory responsibilities would continue in the independent five-member Nuclear Energy Commission.[8]

By September 1973 the President, while asserting that the Nation was not yet in an energy "crisis," continued to stress America's energy "problem." Nixon especially encouraged congressional enactment of four bills to provide for the construction of the Alaskan pipeline and deepwater ports, deregulation of natural gas, and new standards for surface mining. He also expressed hope that Congress would quickly authorize the Department of Energy and Natural Resources and the Energy Research and Development Administration.[9] Unfortunately war broke out in the Middle East on October 6, 1973. America's energy challenge and problem would soon become a bona fide crisis.

The consequences of the Israeli victory in the Yom Kippur War quickly spread to North America when the Organization of Arab Petroleum Exporting Countries (OAPEC) placed an embargo on crude oil shipped to the United States. By November 1973 oil supplies were critically low, creating "the most

William Simon meets with President Nixon and White House Chief of Staff Alexander Haig on December 20, 1973, shortly after Nixon appoints Simon to head the Federal Energy Office.
Source: William E. Simon Papers, Lafayette College

acute shortages of energy since World War II."[10] Now the Arab oil embargo, subsequent long gas lines, and complex but fragmented energy projects and regulations demanded bolder action by the President. No longer regional, the energy shortages became nationwide and threatened virtually every sector of the economy.

In a televised address on the energy emergency on November 7, 1973, President Nixon launched "Project Independence" to achieve energy self-sufficiency by 1980. Urging Americans to lower thermostats, drive cars more slowly, and eliminate unnecessary lighting, Nixon pledged increased funding for energy research and development. Recalling the Manhattan Project, which had built the atomic bomb during World War II, and the Apollo Project, which had landed two Americans on the moon in 1969, the President expressed his faith that American science, technology, and industry could free the United States from dependence on foreign oil. Three weeks later, as winter cold began to grip the Northeast, the President reaffirmed "Project Independence" and announced plans to increase the production of home-heating oils, while reducing gasoline supplies and closing gasoline stations on Sundays. Communities across the Nation reduced holiday lighting and implemented various schemes for pumping short supplies of gasoline. As motorists scrambled for a place in line, in some states matching their license plates to the date on an odd-or-even system, the era of energy affluence ended.[11]

Organizing for the Energy Crisis

On December 4, 1973, President Nixon created the Federal Energy Office in the Executive Office of the White House. Although presidential concern over petroleum supply and pricing extended back to the 1950s and earlier, Nixon's executive

order for the first time institutionalized the Federal Government's response to post-World War II energy shortages. Nixon assigned to the Federal Energy Office the task of allocating reduced petroleum supplies to refiners and consumers and of controlling the price of oil and gasoline. By January 1974 the Federal Energy Office had established a comprehensive allocation program, including gasoline, aviation fuel, propane, butane, residual fuel oil, crude oil and refinery yield, lubricants, petrochemical feedstocks, and middle distillates. Under the leadership of William Simon, former deputy secretary of the treasury, the office became the center for energy policy and planning at the White House. In this role the Federal Energy Office replaced the Energy Policy Office in gathering data, coordinating policy, and carrying out "Project Independence."[12]

Simon picked John Sawhill, formerly at the Office of Management and Budget, to be his deputy. Together they drafted personnel from energy offices throughout the federal establishment, the core of the staff being recruited from the energy office of the Treasury Department. Simon and Sawhill obtained staff from four offices at the Department of the Interior: Petroleum Allocation, Energy Conservation, Energy Data and Analysis, and Oil and Gas. They also received assistance from the Oil Import Administration in the Department of the Interior, the energy division of the Cost of Living Council, and Internal Revenue Service personnel who enforced allocation and pricing regulations.[13]

A Gallup public opinion poll released in January 1974 indicated that the administration's energy planners would have a difficult time convincing Americans that energy shortages were real. Although only 7 percent of Americans blamed the Arab nations for energy shortages, 25 percent blamed the oil companies, 23 percent criticized the Federal Government, 19 percent specifically held Nixon or his administration responsible, and 16 percent thought American consumers were at fault. Virtually no one believed that depletion of national or worldwide petroleum reserves had contributed to the winter's crisis. Thus, as they fashioned emergency plans, Simon and Sawhill faced great public skepticism that identified the government itself as a major cause of the energy problem.[14]

PART II
ATOMS FOR WAR AND PEACE, 1939-1974: THE SECOND TRADITION

THE EINSTEIN LETTER AND ATOMS FOR WAR

In August 1939, on the eve of the Second World War, Albert Einstein, with the help of Hungarian emigré physicist Leo Szilard, wrote a letter to President Franklin D. Roosevelt, informing him that recent research showed that a nuclear chain reaction in a large mass of uranium could generate vast amounts of power. This could conceivably lead, Einstein wrote, to the construction of "extremely powerful bombs." A single bomb, the physicist warned, potentially could destroy an entire seaport. Einstein called for government support of uranium research, darkly noting that Germany had stopped the sale of uranium and German physicists were engaged in uranium research.[15]

President Roosevelt responded cautiously but positively to the Einstein missive. He appointed the Advisory Committee on Uranium, headed by Lyman J. Briggs, director of the National Bureau of Standards. The committee recommended funding for isotope separation, involving the separation of uranium^{235}—the isotope required for a chain reaction—from the more abundant uranium^{238}, and chain reaction work. Funding was limited and research proceeded slowly, however, because of uncertainty whether an atomic bomb was even possible. In summer 1941 British physicists reported their belief that uranium research could lead to the production of a bomb in time to affect the outcome of the war. Vannevar Bush, director of the newly created Office of Scientific Research and Development, under whose authority the Uranium Committee had been subsumed, took this information to the White House and emphasized the continuing uncertainty involving a bomb. Realizing that German research was ongoing, Roosevelt instructed Bush to move as quickly as possible on research and development. Following a year of furious activity, Bush reported to the President that atomic bombs possibly could be available by the first half of 1945. On December 28, 1942, Roosevelt authorized the construction of full-scale production plants with an initial expenditure of $500 million.[16]

THE MANHATTAN PROJECT

Security requirements suggested placing the atomic bomb project under the Army Corps of Engineers. For the project, the Army set up the Manhattan Engineer District commanded by Brigadier General Leslie R. Groves. The Manhattan Engineer District operated like a large construction company, but on a massive scale and with a sense of urgency until now unknown. Unique as well was the investment of hundreds of millions of dollars in unproven processes. By the end of the war, Groves and his staff expended approximately $2.2 billion on production facilities, towns, and research laboratories scattered across the Nation. Secrecy and fear of a major accident dictated that the production facilities be located at remote sites. Two distinct paths were chosen to obtain a bomb.[17]

One involved isotope separation of uranium^{235}. Groves located the production facilities for isotope separation at the Clinton Engineer Works, a ninety-square-mile parcel carved out of the Tennessee hills just west of Knoxville (the name Oak Ridge did not come into usage until after the war). Groves placed two methods into production: 1) gaseous diffusion, based on the principle that molecules of the lighter isotope, uranium^{235}, would pass more readily through a porous barrier; and 2) electromagnetic, based on the principle that charged

Leslie R. Groves and J. Robert Oppenheimer.
Source: Leslie R. Groves, *Now It Can Be Told* (New York: Harper & Row, 1962)

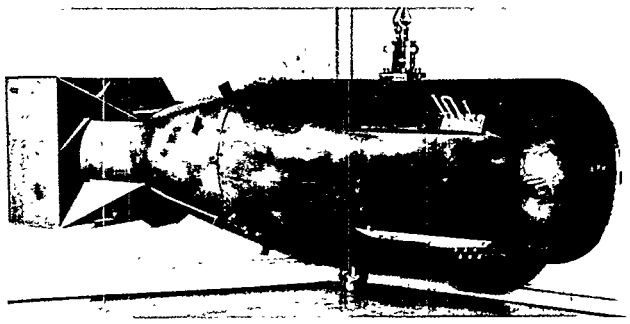
particles of the lighter isotope would be deflected more when passing through a magnetic field. Later, in 1944, Groves approved a production plant using a third method, liquid thermal diffusion, in which the lighter isotope concentrated near a heat source within a tall column.

The second path chosen to build the bomb focused on producing large amounts of fissionable plutonium in a uranium pile or reactor. On December 2, 1942, on a racket court under the west grandstand at Stagg Field of the University of Chicago, researchers achieved the first self-sustaining chain reaction in a graphite and uranium pile. Groves built a pilot pile and plutonium separation facility at the x-10 area of Clinton. Space and power generating limitations, however, precluded building the full-scale production facilities at the site. Groves chose an alternate site near Hanford, Washington, on the Columbia River, because of its isolation, long construction season, and access to hydroelectric power. Three water-cooled piles, designated by the letters B,D, and F, and corresponding chemical separation facilities were built at the Hanford Engineer Works.

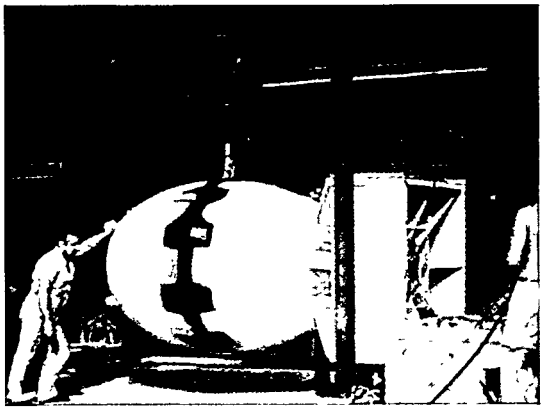
Much of the research work on producing plutonium, including design of the piles, took place at the Metallurgical Laboratory (Met Lab) in Chicago. Design and fabrication of the first atomic bombs were the responsibility of the Los Alamos Scientific Laboratory in Los Alamos, New Mexico. The laboratory, located at a virtually inaccessible site and headed by J. Robert Oppenheimer, attracted a remarkable array of scientists from universities across the United States.[18]

Trinity, Hiroshima, and Nagasaki

By spring 1945 the Manhattan Project was on the verge of success. Sufficient uranium^{235} and plutonium for initial weapons would soon be available. Los Alamos scientists were confident that the uranium gun design would work and deemed a test before combat use as unnecessary. The plutonium implosion design was more problematical. The test of the plutonium device, named Trinity by Oppenheimer, took place at precisely 5:30 a.m. Monday, July 16, 1945, at a barren site on the Alamogordo Bombing Range in New Mexico. The blast yielded the equivalent of 21,000 tons of TNT, higher than anyone had predicted.



Model of Little Boy uranium bomb.
Source: Richard G. Hewlett and Oscar E. Anderson, *The New World*, 1939-1946, Volume I of *A History of the United States Atomic Energy Commission* (University Park: Pennsylvania State University Press, 1962)



Fat Man plutonium bomb being readied at Tinian Island.
Source: Los Alamos National Laboratory

The untested uranium bomb, called Little Boy by the Los Alamos scientists, was air dropped on Hiroshima on August 6. The plutonium weapon, known as Fat Man in honor of Winston Churchill, followed three days later at Nagasaki. Within a week, the Japanese surrendered. Little Boy killed 70,000 people outright. By the end of 1945, radiation-sickness deaths pushed the total to 140,000. Five years later the total reached 200,000. Fat Man killed 40,000 people outright, with the total eventually reaching 140,000.[19]

The Postwar Atom and the Atomic Energy Commission

Planning for the postwar atom began before the war was over. In July 1944, Met Lab scientists issued a "Prospectus on Nucleonics" calling for atomic research and advocating an international organization to prevent nuclear conflict. In May 1945, President Harry S. Truman, in office less than a month following Roosevelt's death, approved the formation of an Interim Committee, chaired by Secretary of War Henry L. Stimson and with Bush and other top officials as members. Charged with recommending wartime use of atomic weapons and developing postwar atomic policy, the Interim Committee discussed these issues with its scientific panel, which included Oppenheimer, and leading industrialists involved with the Manhattan Project. On June 6, Stimson advised Truman that the Interim Committee was considering domestic legislation. Stimson also noted that the committee generally held that international agreements should be negotiated, making public all nuclear research and establishing an international system of inspections. Barring international agreements, the United States should continue to produce as much fissionable material as possible.

The following month the Interim Committee drafted legislation for a peacetime organization with responsibilities similar to the Manhattan Project. With a strong predilection toward the Federal Government's continued dominance in nuclear research and development, the draft legislation called for a nine-member board of commissioners including a strong military presence. Truman advocated speedy passage of the legislation, which became known as the May-Johnson bill in its congressional version. Groves, Bush, and Oppenheimer (with some misgivings) found the bill acceptable, but many scientists complained that the legislation maintained military control over nuclear research. This may have been tolerable during the war, they observed, but was unacceptable during peacetime when free scientific interchange should be resumed.

When support for the May-Johnson bill eroded in late 1945, Senator Brien McMahon (D-CT) introduced substitute legislation. Groves opposed the new McMahon bill, citing its weak security provisions and reduced military presence. Following often bitter debate over civilian versus military control, Congress passed the McMahon bill and Truman signed it into law on August 1, 1946. The McMahon Act, known officially as the Atomic Energy Act of 1946, transferred authority from the United States Army to the United States Atomic Energy Commission. Composed of a five-member civilian board serving full-time, the new Commission was assisted by a general advisory committee and a military liaison committee. As inheritors of the Manhattan Engineer District's far-flung scientific and industrial complex, the Atomic Energy Commission continued the government monopoly in the field of atomic research and development.[20]

The Atomic Energy Commission's paramount objective remained "assuring the common defense and security." Congress, nonetheless, possessed a vision of a peaceful atom inaugurating profound social, economic, and political changes in the American way of life. The Atomic Energy Act charged the new Commission with directing the development and utilization of atomic energy toward "improving the public welfare, increasing the standard of living, strengthening free competition in private enterprise, and promoting world peace."[21] In the late 1940s and early 1950s, limited stocks of uranium precluded the rapid development of peaceful uses including civilian power reactors. The Commission, even so, initiated a coherent peaceful uses program with limited power reactor experiments and established the National Reactor Testing Station near Idaho Falls, Idaho.[22]

Atoms for War Redux

Tensions between the Soviet Union and the United States in the immediate aftermath of the Second World War soon dashed any hopes for an international agreement controlling atomic energy. As relations deteriorated and the Cold War escalated, military requirements for fissionable materials increased accordingly. Between 1947 and 1952 the Atomic Energy Commission initiated the construction of production facilities that increased production capacities enormously. The new facilities included three additions to the Oak Ridge gaseous diffusion complex; entirely new gaseous diffusion plants at Paducah, Kentucky, and Portsmouth, Ohio; five additional reactors for producing plutonium at Hanford; and five heavy water reactors for producing tritium from lithium^6 as well as plutonium at the new Savannah River, South Carolina, site. In addition, the Commission constructed auxiliary facilities to enlarge and strengthen the production chain from ore to weapons. These included a feed material production center at Fernald, Ohio, and component plants at Rocky Flats, Colorado, and Amarillo, Texas. By summer 1952, 150,000 workers were engaged in construction activities.[23]

The Soviet Union's successful detonation of a nuclear device in late August 1949 resulted in intense debate about whether the Commission should pursue a "quantum jump" in weapon technology in an all-out effort to develop a thermonuclear device. The Commission's general advisory commission recommended against such an effort and three out of five commissioners opposed it. But with strong support from the congressional Joint Committee on Atomic Energy and the Department of Defense, as well as from prominent scientists such as Edward Teller and Ernest O. Lawrence, President Harry S. Truman on January 31, 1950, announced that the Commission should expedite work on the thermonuclear weapon. Increased weapon development efforts resulted in the establishment of a second weapons laboratory at Livermore, California, in 1952. A continental testing site was set up in the Nevada desert outside Las Vegas to complement the Pacific test site located in the Marshall Islands.[24]

Because of these efforts, the 1950s witnessed tremendous advances in the design and development of nuclear weaponry. Tactical nuclear weapons were designed and deployed. Nuclear warheads were married to various short, intermediate, and long-range missiles. On November 1, 1952, the United States achieved the first thermonuclear detonation with the *Mike* shot of the *Ivy* testing series at Enewetak Atoll in the Pacific. *Mike* yielded the equivalent of over 10 million tons of TNT. Developments during the 1954 *Castle* testing series gave the United States a deliverable thermonuclear weapon and opened the way to a whole "family" of thermonuclear weapons in a spectrum of yields. But the March 1 *Bravo* test of the series at Bikini Atoll unexpectedly exposed hundreds of Marshall Islanders to the toxic radioactivity of the fallout cloud. Increased concern regarding radioactive fallout helped spur test ban negotiations that eventually resulted in the Limited Test Ban Treaty of 1963.[25]

The Limited Test Ban Treaty banned atmospheric testing but legitimized underground testing. During the 1960s, weapons development and testing became largely routinized,

with most tests except for the largest taking place at the Nevada Test Site. In contrast to the radical innovations of the 1950s, the Los Alamos and Livermore laboratories concentrated primarily on incremental improvements in nuclear weaponry.[26]

Nuclear Propulsion

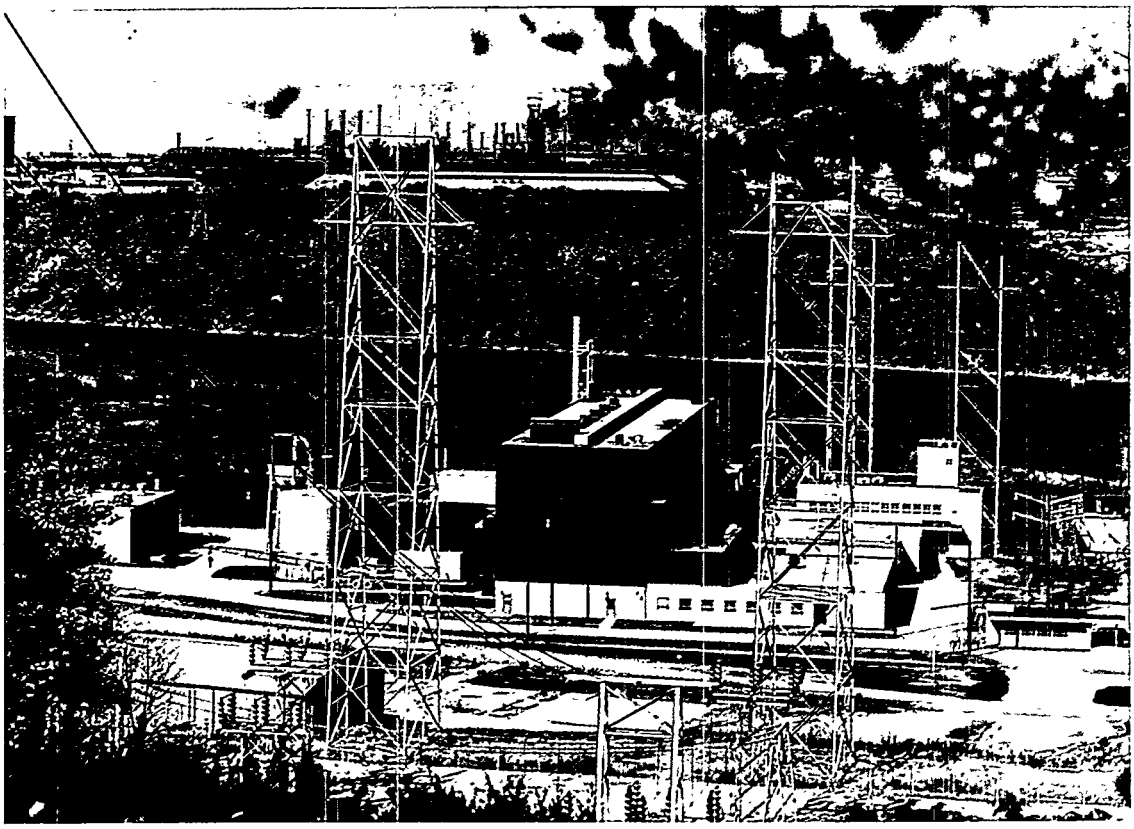
In an open hearing before the Special Senate Committee on Atomic Energy on December 13, 1945, Ross Gunn, a physicist at the Naval Research Laboratory, declared that the main function of atomic energy should be "turning the world's wheels and driving its ships."[27] During the Second World War all efforts had been directed toward building the atomic bomb, but in its aftermath a concerted program to build a nuclear powered submarine arose under the leadership of U.S. Navy Captain Hyman G. Rickover. In a unique arrangement, Rickover essentially wore two hats. As an officer in the U.S. Navy, he headed the Navy's nuclear power branch. As an Atomic Energy Commission official, he oversaw the Commission's naval reactor branch. Calling on the resources of both organizations—and often playing one against the other—Rickover with his hard-driving-anagerial style successfully developed the first nuclear-powered submarine, the *Nautilus*, launched in 1954. An entire fleet of nuclear submarines and surface vessels followed.[28]

Other nuclear propulsion programs were less successful. The first nuclear powered merchant ship, the NS *Savannah*, performed satisfactorily from a technical standpoint but could not compete economically and was decommissioned in 1971. The Commission's Pluto program sought to develop a nuclear ramjet propulsion system for a supersonic low altitude missile, but the Department of Defense in 1964 decided against pursuing a flight test. The joint Commission and National Aeronautics and Space Administration Rover program sought to develop a nuclear powered rocket, but lack of a clear mission resulted in the cancellation of the program in 1972. More successful was the space isotope power program designed to produce electrical power for space applications.[29]

Atoms for Peace

On December 8, 1953, President Dwight D. Eisenhower, in his famous Atoms-for-Peace speech before the United Nations, proposed establishing an international pool of fissionable nuclear material to be used for the development of peaceful uses of the atom and especially for nuclear power reactors. From this genesis emerged not only the International Atomic Energy Agency and other bilateral and multilateral agreements but also a nascent domestic nuclear power industry that the Eisenhower administration hoped would be closely tied to the growth of nuclear power in Europe and other areas. The Atomic Energy Commission's monopoly of nuclear sciences including reactor technology, however, required amendment of the Atomic Energy Act to include private industry. Following often bitter partisan debate, with Republicans advocating broad provisions for private ownership and initiative and Democrats fearing a "give away" to private interests of nuclear technology developed at public expense, Congress passed the Atomic Energy Act of 1954. The act would allow the Federal Government and private industry to promote nuclear power in partnership.

Even with the legal obstacles removed, the Atomic Energy Commission faced the fundamental problem of how to transfer a new technology from government control to the marketplace. The Commission did not believe that private industry would invest sufficiently in the long-term research necessary to achieve civilian nuclear power. The Commission, therefore, decided to develop and build the first full-scale nuclear power plant. Located on the Ohio River at Shippingport, Pennsylvania, and placed under the control of Admiral Rickover and the naval reactors staff, the reactor was designed by Westinghouse and owned by the government. The Duquesne Light Company provided the turbogenerator plant and operated and maintained the facility. To further spur private industry's participation in nuclear power development, the Commission initiated the Power Demonstration Reactor Program. Under the program, industry, with overall responsibility, owned, designed,



Shippingport Atomic Power Station at Shippingport, PA, which began operation in 1957, was the Nation's first full-scale nuclear generating station. Source: U.S. Department of Energy

constructed, and operated the power reactors. The Commission provided some funding and other assistance as required.[30]

By 1962 fifty-three power reactors were either being designed or under construction in the United States. President John F. Kennedy requested the Atomic Energy Commission, in cooperation with the Federal Power Commission and the Department of Interior, to take "a new and hard look at the role of nuclear power" in view of the Nation's energy needs and resources. The Commission's report concluded that light water nuclear reactors were "on the threshold of economic competitiveness" and with only moderate government assistance could cross the economic threshold into "widespread acceptance by the utility industry." The Commission nonetheless expressed concern about the long-term outlook due to a perceived future shortage of uranium. The Commission recommended that extensive research and development efforts be directed toward breeder reactors that would produce more fuel than they would consume. "Only by the use of breeders," the Commission declared, could the United States "really solve the problem of adequate energy supply for future generations."[31]

A year later the Commission's assumption that light water reactors were on the verge of commercialization appeared realized when the Jersey Central Power and Light company announced the purchase of a 515-megawatt plant from General Electric to be built at Oyster Creek, New Jersey. The plant was the first nuclear power plant selected on purely economic grounds without government aid and in direct competition with a conventional facility. A rapid growth in nuclear power—known as the "Great Bandwagon Market"—soon developed. Within four years of the Oyster Creek announcement, utilities ordered seventy-five central station nuclear power plants with a net total capacity of over 45,000 megawatts of electricity.

The Atomic Energy Commission, meanwhile, had established a modest program for developing breeder reactors. In November 1965, the Commission centered its breeder program on the Liquid Metal Fast Breeder Reactor (LMFBR) concept. The LMFBR received the highest priority among the Commission's reactor development programs. The Commission placed tight management controls over the LMFBR program, closely controlling and managing research and development and limiting participation by private industry.[32]

Regulatory, Safety, and Environmental Concerns

The 1960s witnessed phenomenal growth and development in the nuclear power industry. As promoters of nuclear power, the Atomic Energy Commission was criticized, however, for an inherent conflict of interest when the Commission acted on environmental and reactor safety issues. By 1967 utilities were ordering power reactors in sizes up to 1100 megawatts. Meanwhile, the largest operating plant was only 255 megawatts. Designs for most commercial nuclear power plants being built were therefore based on assumptions and extrapolations about safety rather than operating experience. In 1971 the Commission began open hearings on power reactor emergency cooling systems designed to prevent a major reactor accident. Following loss of cooling experiments, the Commission had learned that emergency core cooling systems might not work as designed. The hearings dramatically focused public attention on the safety of nuclear power.

The growing environmental movement also began focusing scrutiny on the Commission and its activities. Commission regulations held the Commission responsible only for potential radiological hazards to public health and safety. Critics charged that this was inconsistent with the National Environmental Policy Act of 1969 and that the Commission should also consider thermal pollution and other environmental issues in the licensing process. In the *Calvert Cliffs* decision of July 23, 1971, the courts ruled that the Commission was required to assess environmental hazards beyond radiation effects. The Commission, trying to mold a new public image, decided not to appeal the landmark ruling. Rather, the Commission made substantive changes in its environmental review and reactor licensing procedures. The *Calvert Cliffs* decision helped both to create a large licensing backlog and to increase the costs of licensing a nuclear power plant.

The Commission, simultaneously, faced a growing problem concerning the disposal of high-level radioactive wastes from nuclear power plants. The only commercial reprocessing plant, located in West Valley, New York, shut down in 1972. Technical problems and opposition from local citizens and officials forced the Commission to abandon plans to dispose of high-level wastes by storing them in underground salt mines in Kansas.[33] The absence of a waste program in the early 1970s, coupled with reactor safety and environmental concerns, cast a pall over the future of nuclear power just when sporadic energy shortages began signaling the need for expanded energy resources.

PART III
ENERGY CRISIS REORGANIZATION, 1974-1977

FEDERAL ENERGY ADMINISTRATION

Immediately after the establishment of the Federal Energy Office, the White House sponsored legislation to create the Federal Energy Administration as an independent agency. The legislation, which confirmed the transfer of offices and functions to the new agency, passed the Senate on December 19, 1973, and the House on March 7, 1974. President Richard M. Nixon signed the bill into law on May 7, 1974, creating the Federal Energy Administration as a temporary agency to meet with the immediate, and presumably temporary, energy crisis. Ultimately, the Federal Energy Administration assumed responsibility for energy information and analysis, petroleum allocation and pricing,

President Gerald R. Ford signed the Energy Reorganization Act of 1974 at the White House October 11, 1974. (L to R) Rep. John W. Wydler (R-NY); Sen. Charles H. Percy (R-IL); Sen. Abraham A. Ribicoff (D-CT); Rep. Chet Holifield (D-CA); Dr. Gilbert S. Omenn, White House Fellow (back row); Rep. Frank Horton (R-NY); Jack Carlson, Assistant Secretary for Energy and Materials, Dept. of Interior (back row); Rep. Don Fuqua (D-FL); Rep. John B. Anderson (R-IL); Rep. Clarence J. Brown (R-OH); Rogers Morton, Secretary of Interior.

Source: U.S. Department of Energy

the strategic petroleum reserve, energy conservation, and the more efficient use of energy resources. Since the agency was to expire after two years, Congress passed legislation on August 14, 1976, further extending the life of the Federal Energy Administration until December 31, 1977.[34]

Ford and the Energy Reorganization Act of 1974

Federal energy policy, programs, and reorganization languished through the Watergate crisis until August 1974, when Vice President Gerald R. Ford succeeded Nixon as President. Although Nixon declared that the "energy crisis in America [had] passed" following the lifting of the Arab oil embargo in March, Ford in his initial address to a joint session of Congress asserted that the Nation "must not let [the] energy crisis happen again" and promised to push forward with "Project Independence." In his first press conference, the new President stressed the "need and necessity...to accelerate every aspect of Project Independence."

Ford moved swiftly to reestablish White House direction over federal energy activities. On October 8 he announced the creation of a national energy board charged with "developing a single national energy policy and program." Three days later, Ford signed the Energy Reorganization Act of 1974. The act established the Energy Research and Development Administration and the Nuclear Regulatory Commission, which was given the licensing and regulatory functions of the abolished Atomic Energy Commission. The legislation also formalized Ford's national energy board as the Energy Resources Council and provided for the council's termination upon creation of a department for energy or natural resources. Ford chose Secretary of the Interior Rogers C. B. Morton to serve as chairman of the Energy Resources Council, which also included the heads of the Federal Energy Administration and the Energy Research and Development Administration. Frank G. Zarb of the Office of Management and Budget was named the Council's executive director. On December 18, Zarb also became the third Federal Energy administrator when Sawhill, who had replaced Simon, resigned.[35]

Energy Research and Development Administration

President Ford appointed Robert C. Seamans, Jr., president of the National Academy of Engineering and former Secretary of the Air Force, to lead the Energy Research and Development Administration, which was created to achieve two goals:

- To focus the Federal Government's energy research and development activities within a unified agency whose major function would be to promote the speedy development of various energy technologies; and
- To separate nuclear licensing and regulatory functions from the development and production of nuclear power and weapons.

The Energy Research and Development Administration inherited by far the largest portion of its budget and personnel from the Atomic Energy Commission, including the Commission's network of field offices and national laboratories. The Energy Research and Development Administration also incorporated all energy research and development functions from the Department of the Interior's Office of Coal Research and all Bureau of Mines energy research centers. The National Science Foundation relinquished its offices involved in solar and geothermal energy development, and the Environmental Protection Agency transferred its functions relating to research, development, and demonstration of innovative automotive systems.[36]

The Energy Research and Development Administration was activated on January 19, 1975. Seamans appointed Robert A. Fri as deputy administrator and divided the new agency into traditional fuel- and resource-oriented units of fossil energy, nuclear energy, solar, geothermal, and advanced energy systems. Units were also established for environment and safety, conservation, and

national security (weapons research and production). In his first year, Seamans drafted a comprehensive national energy research and development plan and encouraged the early commercialization of synthetic fuels, development of the liquid-metal fast-breeder reactor, research in conservation, solar and fusion programs, and experiments in recovering useful heat from hot dry rock. The Energy Reorganization Act of 1974 required Seamans to collaborate with the Secretary of Defense to decide whether the nuclear weapons programs should be transferred to the Department of Defense or be retained under civilian control. As recommended in their report submitted to the President on January 16, 1976, the Energy Research and Development Administration retained oversight of the military application program. This was partly attributable to the unique capability of the weapons research laboratories to perform significant research in the energy development field.[37]

Ford Energy Policies 1975-1977

The Nation's dependence on foreign oil imports increased even as the energy crisis eased and gasoline supplies became relatively plentiful. Oil imports, as part of total petroleum products supplied, climbed modestly from 35.4 percent in 1974 to 35.8 percent in 1975, but oil imports accounted for 40.6 percent of the Nation's supply in 1976 and an alarming 46.5 percent in 1977. Meanwhile, domestic oil production declined slightly. In addition, natural gas supplies remained precarious, and the threat of serious shortages loomed in the future.

Energy thus remained a top priority for the Ford Administration. Citing the need for a "national energy plan," President Ford called for decontrol of domestic oil prices. Price controls had been imposed by Nixon in 1971 and extended by Congress in 1973 and 1974. Ford also asked for an increase in fees on imported oil and a comprehensive program of conservation taxes to reduce consumption. On January 31, 1975, he sent to Congress a proposed thirteen-part Energy Independence Act. Following nearly a year of deliberation, Congress produced the Energy Policy and Conservation Act. The act continued price controls on domestic oil into 1979, mandated federal fuel economy standards for new automobiles, and authorized the creation of a one-billion-barrel strategic petroleum reserve. Describing the act as "by no means perfect," Ford stated that it did provide "a foundation upon which we can build a more comprehensive program." The time had come, he added, to "end the long debate over national energy policy."[38]

In his first energy message of the bicentennial year, Ford asked for congressional action on legislation deregulating natural gas, increasing nuclear funding, authorizing private enrichment of uranium, amending the Clean Air Act to ease automobile emission standards and to allow greater use of coal, and authorizing production from the United States Naval Petroleum Reserves. The President concluded his energy message by renewing his proposal to establish an Energy Independence Authority. First suggested by him in October 1975, the Energy Independence Authority would assist in the construction of nuclear power plants, coal-fired power plants, oil refineries, synthetic fuel plants, and other energy production facilities still required in the twentieth century.[39] In late spring 1976, Ford asked the Energy Resources Council and the Office of Management and Budget to prepare recommendations for further reorganization of the government's energy agencies since the Federal Energy Administration would ultimately expire. In August the Energy Conservation and Production Act mandated that the President submit his recommendations to Congress.[40]

Americans also elected a president in 1976. Surprisingly, America's energy policy was not a major issue in the campaign. President Ford and Democratic candidate Jimmy Carter did not seriously clash over energy policy. Both promised that energy reorganization would be a high priority. Carter accused the Ford Administration of lacking an energy policy and proposed the creation of a cabinet-level

Energy Department, but his comments failed to strike a responsive chord with the electorate. The public continued to believe that there was no real energy crisis and that energy shortages were temporary. The public also thought that the problems had been created by Arab oil producers, the major oil companies, the Federal Government, or all three. With a Republican president and a Democratic Congress, there was no easy way for either party to exploit the energy issue.[41]

On January 7, 1977, Ford presented his last energy message to Congress. Cautioning against the dangers of a greatly expanded federal role in energy, he also warned the Nation of the high cost of delay in solving the energy problem. Ford emphasized the complexity of the issue and the difficult and extensive choices that had to be made. Besides underlining the interdependence among the United States and other consumer nations, he outlined the conflicting objectives that had to be balanced to achieve long-term equilibrium between energy supply and demand. The most difficult problems were reconciling politically popular low consumer prices with adequate and secure energy supplies and balancing environmental objectives with energy production and use. Ford also predicted that Americans might have to adjust to limited economic growth and development and also be willing to take greater environmental risks with energy technologies. Among the legislative matters he reviewed, Ford again specifically asked for the establishment of an Energy Independence Authority "to assist private sector financing of new energy facilities." Four days later, Ford submitted his energy reorganization proposal to Congress, recommending the creation of a Department of Energy.[42]

The winter of 1976-1977 turned bitterly cold. As the thermometer plunged to record lows, electric utilities responded to record demands. Natural gas supplies in New England fell critically short. In several states, plants and businesses closed or curtailed working hours, affecting over 200,000 workers. Thousands of school children received extended or unscheduled winter vacations. The Nation shivered, perhaps as much from this new energy uncertainty as from the weather. Following Carter's inauguration, Americans waited to see what the new President would do.

PART IV
THE CARTER ADMINISTRATION, 1977-1981

CARTER, SCHLESINGER, AND THE NATIONAL ENERGY PLAN

The day following his inauguration, President Carter announced that James R. Schlesinger, assistant to the President, would be his personal representative working with Congress to ease the natural gas shortage. Schlesinger, who had served as chairman of the Atomic Energy Commission, Secretary of Defense, and director of the Central Intelligence Agency, was soon recognized as Carter's new "energy czar." Housed in the Old Executive Office Building, Schlesinger assembled a team to hammer out the President's energy policy and reorganization plans, which included a new cabinet-level department of energy promised by Carter during the campaign. On February 2, Carter proclaimed a national emergency as defined in the Emergency Natural Gas Act of 1977, which he had just signed. That same evening, in a televised "fireside chat" with the American people, the President stressed the need for national sacrifice, conservation, and patience and promised to present a comprehensive energy plan to Congress by mid-April. Five days later he named John F. O'Leary to head the Federal Energy Administration.[43]

In the first ninety days of Carter's presidency, Schlesinger developed the administration's basic energy reorganization plans and energy policy strategies. On March 1, 1977, Carter presented Congress with his proposed energy reorganization legislation, which created the Department of Energy. In April Carter sent his national energy plan to Capitol Hill. In a somber note to the American people, the President said that the energy challenge would test not only American character but also the very ability of the President and Congress to govern. Indeed, except for preventing war, the President described the energy crisis as the Nation's greatest challenge. Borrowing from the philosopher William James, Carter described America's testing as the "moral equivalent to war." Carter's rhetoric was significant because only during actual wartime had the Federal Government imposed energy management similar to that now advocated by the President.[44]

Carter's National Energy Plan consisted of approximately 100 proposals ranging from administrative actions to new laws and regulations. The plan placed heavy emphasis on reducing energy consumption, implementing conservation, and developing alternative energy technologies. Although Carter abandoned hope of achieving energy "independence," he anticipated that by 1985 the United States could reduce growth in energy demand, reduce oil imports and gasoline consumption, increase coal production, and install insulation and solar energy in millions of homes and businesses. To accomplish his energy goals, the President requested speedy establishment of an energy department. "Continued fragmentation of government authority and responsibility of our energy program for this Nation," he warned, "is both dangerous and unnecessary."[45]

None of the key elements of Carter's Nation Energy Plan were original. They had been discussed in previous energy debates. Some were similar to proposals made by Ford; others drew from Democratic counterproposals. The difference was that Carter combined these elements into a unified policy framework and placed much greater emphasis on conservation. Nixon and Ford had focused primarily on increasing domestic energy supplies. Carter, through an exceedingly complex package of regulatory and tax measures, concentrated on making scarce resources go further by using less.[46]

Department of Energy Established

Legislation creating the Department of Energy passed the Senate on May 18 and the House on June 3, 1977. Congressional action, including approval of the conference report, was completed by August 3. President Carter signed the bill into law (Public Law 95-91) on August 4, 1977. The next day Carter named Schlesinger as the first Secretary of Energy. The Department was officially activated on October 1, 1977.[47]

Schlesinger's initial task was to meld all headquarters, field, and staff programs from the component agencies, including their various supporting offices and functions, into a unified Department of Energy with about 20,000 employees and an annual budget of $10.4 billion. The Department's first Secretary contended that, historically, the problem with new departments had been that they pulled together existing agencies under the same roof without integrating the activities of those agencies. The legislation creating the Department of Energy, Schlesinger believed, was broad enough to allow him to achieve the desired effective integration.[48]

Department of Energy Organization and Structure

The new Department of Energy did not simply organize existing agencies and offices under new leadership but reshaped many programs and functions to fit the national energy policy of the Carter Administration. By law, the Department would be led by three principal officers—the Secretary, Deputy Secretary, and Under Secretary. Energy technologies would not be divided by fuel type, such as fossil, nuclear, or solar, but grouped under assistant secretaries according to their evolution from research and development through application and commercialization. This approach reflected the administration's decision to formulate a comprehensive energy policy rather than to engage simply in fuel management. Thus basic research was placed in the Office of Energy Research. Individual research and development projects in solar, geothermal, fossil, and nuclear energy were placed under the assistant secretary for energy technology. After scientific and technical feasibility was determined, projects would be transferred to the assistant secretary for resource applications or to the assistant secretary for conservation

President Carter inspects new Department of Energy seal with Secretary of Energy James Schlesinger (1977-1979).
Source: U.S. Department of Energy

and solar applications, who had specialized expertise in commercialization and energy markets. The assistant secretary for environment would assure that all departmental programs were consistent with environmental and safety laws, regulations, and policies. The assistant secretary for defense programs would inherit responsibility for the nuclear weapons programs.[49]

The Department, despite its diverse origins, was structured to allow for the continuity of programs and functions from predecessor organizations while blending their expertise into new management teams. All activities of the Federal Energy Administration and the Energy Research and Development Administration were distributed among appropriate assistant secretaries, administrators, and the director of the Office of Energy Research. Also, limited functions were transferred from the Departments of Agriculture, Commerce, Housing and Urban Development, and Transportation. Additional transfer included the Alaska, Bonneville, Southeastern, and Southwestern power marketing administrations from the Interior Department and the Navy oil reserves and oil shale reserves from the Department of Defense.[50]

The Federal Energy Regulatory Commission was established as an independent agency within the Department of Energy. The five-member commission, headed by a chairman, was given the responsibility for the licensing and regulation of hydroelectric power projects, the regulation of electric utilities, the transmission and sale of electric power, the transportation and sale of natural gas, and the operation of natural gas and oil pipelines. The commission inherited most of its functions and personnel from the Federal Power Commission, which had been established in 1920. In addition, the Federal Energy Regulatory Commission's authority to regulate oil pipelines came from the Interstate Commerce Commission.[51]

Regulatory programs not included in the Federal Energy Regulatory Commission were placed under the Economic Regulatory Administration, one of two administrations created in the Department. The Economic Regulatory Administration assumed the oil pricing, allocation, and import programs, which had been administered by the Federal Energy Administration. Most of these programs had been established during the 1973-1974 oil embargo under the Emergency Petroleum Allocation Act and extended by subsequent legislation. Other regulatory programs included emergency and contingency plans, controls over importing and exporting natural gas, supervision of utilities and industry converting from oil and gas to coal, establishment of priorities for natural gas curtailment, and coordination of regional power systems.

The Department's second administration, the Energy Information Administration, consolidated the Federal Government's many diverse energy data systems. By centralizing the most important data-gathering activities, the Energy Information Administration would provide comprehensive data and timely analysis for the President, the Department, Congress, and the public. To determine reliability of data, the administration would conduct field audits. Besides projecting long-term energy trends, the administration was expected to develop systems for estimating national fuel reserves and reporting the financial status of energy producing companies.

The Department of Energy inherited about forty regional and field offices, research centers, university programs, and laboratories from the predecessor agencies. These varied from the ten regional regulatory offices of the Federal Energy Administration to the Bureau of Mines research laboratories at Bartlesville, Morgantown, Pittsburgh, and Laramie. The bulk of the Department's inherited facilities came from the Atomic Energy Commission, passed on through the short-lived Energy Research and Development Administration. These included eight operations offices and various production and weapons facilities. Perhaps the jewels in the crown were the scientific laboratories at Argonne, Berkeley, Brookhaven, Livermore, Los Alamos, Oak Ridge, and the new Solar Energy Research Institute established in Golden, Colorado. The Department of Energy thus kept intact the network of national laboratories as a valuable national resource.[52]

Carter Energy Policies, 1978

Both President Carter and Secretary Schlesinger contended that the creation of the Department of Energy did not, by itself, solve the Nation's energy problems. The Department provided the management structure for carrying out the Carter Administration's energy policies embodied in the National Energy Plan. The substance of the energy plan, according to Schlesinger, provided the "minimum" policies required for the administration to cope with the country's energy difficulties. As 1977 ended, however, Congress remained deadlocked on Carter's energy plan. Public opinion had failed to rally strongly behind the program, and, as a result, sophisticated lobbying campaigns by committed special interests proved highly successful. "The basic problem," Schlesinger concluded, "is that there is no constituency for an energy program. There are many constituencies opposed. But the basic constituency for the program is the future."[53]

Carter remarked at his last press conference of 1977 that the inability to carry out an energy policy was his administration's only major legislative failure during its first year. In his State of the Union message in January 1978, the President lamented that on energy legislation the administration and Congress had "failed the American people." He reminded the Nation's lawmakers that there could be no higher priority than the prompt legislative enactment of the National Energy Plan.[54]

Congress continued to debate the various provisions of the energy plan through spring and summer 1978, finally accepting about half of Carter's program. The President signed the National Energy Act of 1978 on November 9, a year and a half after it was initially proposed. The legislative package, almost nine inches thick, consisted of five major acts:

- The National Energy Conservation Policy Act
- The Powerplant and Industrial Fuel Use Act
- The Public Utilities Regulatory Policy Act
- The Energy Tax Act
- The Natural Gas Policy Act

Enactment of the National Energy Plan was a major political victory for the Carter Administration. "We have declared to ourselves and the world," Carter noted after the bill's final passage, "our intent to control our use of energy and thereby to control our own destiny." The Nation, he added, now had a comprehensive energy policy. Carter, nevertheless, viewed the enacted energy plan, substantially attenuated by Congress, with mixed feelings. Congress had rejected what Carter labeled the centerpiece of his program: the crude oil equalization tax designed to raise the price of American-produced crude oil to world levels, thus stimulating conservation. As an alternative to the decontrol of domestic oil, the proposed tax drew the support of neither the oil industry nor the tax-wary public. The tax, lacking a constituency, would have nonetheless significantly reduced American oil imports. As Carter ruefully noted, his original proposals would have lowered oil imports by an estimated 4.5 million barrels per day by 1985; the National Energy Act would save only 2.5 million barrels per day.[55]

Schlesinger described the National Energy Act as a historic turning point. "The era of cheap and abundant energy is recognized to be over," he observed, "[and] for the first time energy conservation is recognized as an indispensable ingredient in national energy policy." Above all, Schlesinger told Department of Energy employees, the act provided the Department with a charter and with operational guidance for at least the next five years. It tells us, he concluded, "what to do and the means by which we hope to achieve it."[56]

Consolidating the Department

Although Congress failed to pass tax measures that the administration believed would reduce oil imports, President Carter and Secretary Schlesinger, nonetheless, hoped that the energy issue would abate in 1979 and allow the Department to consolidate its energy efforts. In his State of the Union address on January 23, Carter referred only briefly to energy issues in the context of fighting inflation, calling on Congress to take action to conserve energy,

increase production, and hasten the development of solar power. Two days later in a more detailed message to Congress, he stressed that the administration would build upon the framework of the National Energy Act. Certainly, Carter's "energy team" was thinly stretched between the requirements of developing the energy plan and the task of establishing a cabinet department. Reviewing the Department's fiscal year 1980 budget, the first the Department had put together as a comprehensive document and not as a combination of requests of predecessor agencies, Schlesinger noted that the Department's activities "were a logical extension of the efforts which the administration and the Congress have successfully initiated in the past two years."[57]

The Department's 1980 budget request of $8.4 billion was an 8 percent increase over that approved for fiscal year 1979. Total funding for energy technology development fell from $3.85 billion to $3.81 billion because of reductions in nuclear fission (from $1.20 billion to $1.04 billion) and geothermal energy (from $136 million to $111 million). Fossil energy funding remained essentially level at $796 million as did magnetic fusion at $364 million. Solar energy, an administration priority, was the big winner in the energy technology field with an increase of 13 percent to $597 million. Funding in conservation, another administration priority, actually dropped from $671 million to $555 million, but this was primarily related to the delayed passage of the energy plan resulting in a large carry-over funding from the previous fiscal year. Resources for energy regulation and information activities increased from $276 million to $323 million, with much of this earmarked for implementation of the National Energy Act. Funding for the Department's defense activities increased substantially from $2.69 billion to $3.02 billion.[58]

Managing this vast and diverse multi-billion-dollar organization was not an easy task. Over a year after its founding, the Department was still settling into established patterns of operation. Critics accused the Department of being "the most screwed-up bureaucracy in Washington." But Schlesinger defended the Department, noting that it was the first department established in the midst of an ongoing crisis. "In relation to the establishment of other large departments since World War II," he added, "we look pretty good."[59]

Energy Shortages and Rising Prices, 1979

The Department could have used to good advantage a quiet year on the energy front, but in 1979 the country was again assaulted by energy shocks. Increasing trouble in Iran, including cessation of oil exports and the flight of the Shah on January 16, created a worldwide shortage of oil. Although the oil-consuming nations were using two million barrels of oil a day more than were being produced, President Carter and Secretary Schlesinger were at first cautiously optimistic that a crisis could be avoided. Iran had supplied the United States with only 5 percent of its oil, and the President, following the Shah's departure, declared that through voluntary conservation the country could cut back oil consumption by that same percentage without seriously damaging its economy. Schlesinger reiterated the call for a voluntary conservation of oil by all Americans. As oil prices soared and it became apparent that there would be no ready restoration of Iranian production, however, energy officials became increasingly concerned. In early February Schlesinger warned the Senate Energy and Natural Resources Committee that the Iranian crisis might lead to greater oil shortages than those created by the Arab oil embargo of 1973-1974. Carter noted in a February 12 press conference that the "situation is not crucial now; it's not a crisis." But, he continued, "it certainly could get worse."[60]

The Department developed standby mandatory energy conservation measures in response to the oil shortage. On March 1, Carter transmitted to Congress for its approval three conservation plans and a gasoline rationing plan. The conservation measures prohibited the sale of gasoline on certain weekend hours, restricted building thermostat settings to no

higher than 65°F for heating and to no lower than 80°F for cooling, and prohibited nonessential advertising lighting. Gasoline rationing, to be carried out only if necessary, involved ration checks redeemable for coupons issued primarily on the basis of motor vehicle registrations. These contingency plans required an affirmative vote by both houses of Congress within sixty days of their submittal. Once approved, they could be implemented by the President only if he found that the country was in "a severe energy supply interruption" or that implementation was necessary for the United States to fulfill its energy conservation obligations agreed to in the International Energy Agency.[61]

Meeting in early March, the International Energy Agency, created to coordinate the industrialized oil-consuming nations' response to the 1973-1974 oil crisis, agreed that its members would reduce oil demand by two million barrels per day. The United States, as its contribution, promised to absorb half this reduction.[62]

Meanwhile, the Nation's energy situation continued to deteriorate. One by one, oil-exporting countries raised their prices to take advantage of tightening world supplies. Federal price controls on gasoline were eased, allowing prices to rise, but in some areas spot shortages began to appear. Steep increases in energy costs threatened to induce an economic recession. A dismayed Schlesinger observed that the "call for voluntary conservation isn't working." The President and his energy advisers, as a result, began to consider additional energy measures, and plans were laid for the President to deliver his second major energy message to the American people.[63]

Three Mile Island

On the morning of March 28, as the administration concentrated its attention on dealing with the escalating energy shortage, Americans learned of the unexpected and frightening accident at the nuclear power plant at Three Mile Island, near Harrisburg, Pennsylvania. For almost two weeks the Nation watched with both fascination and apprehension as scientists, engineers, and technicians worked to shut down the plant. Following its emergency

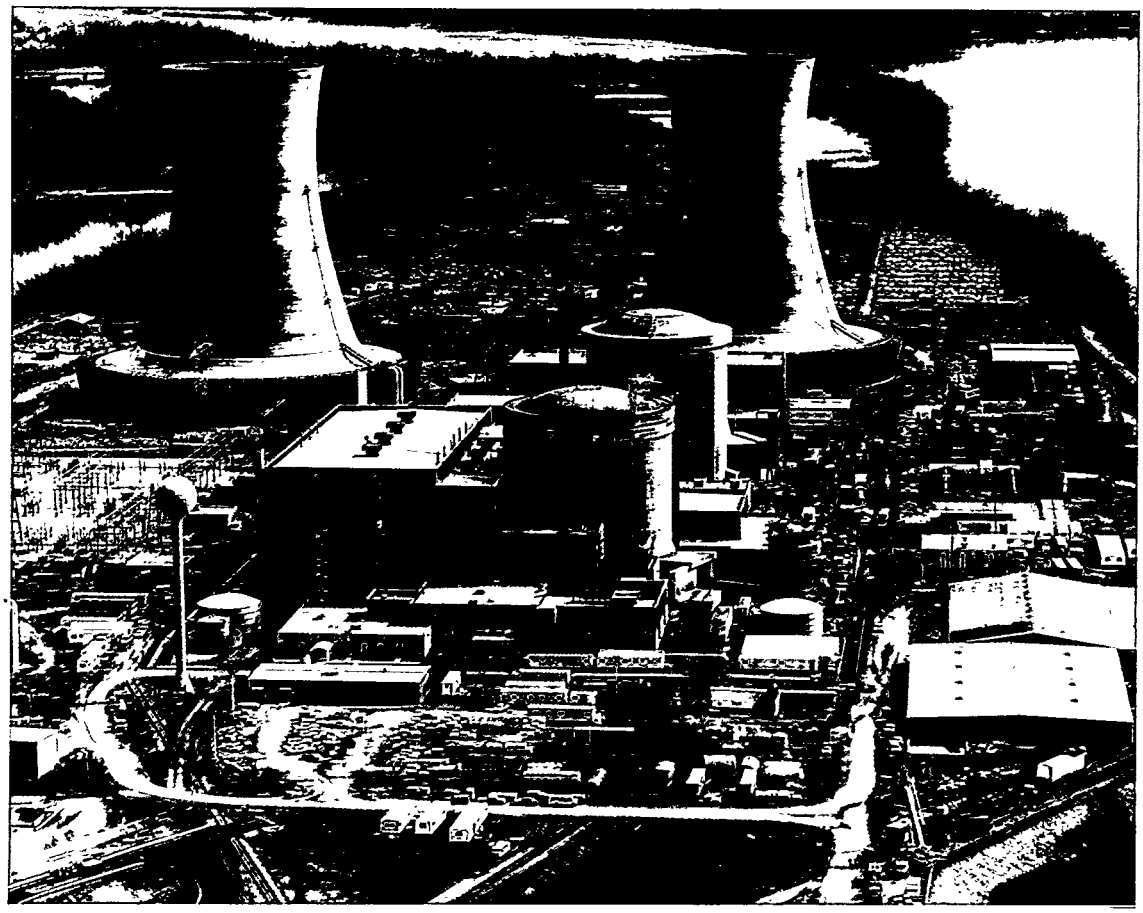
Gasoline ration coupons were printed for emergency use but never issued.

Source: U.S. Department of Energy

plans, the Department of Energy dispatched more than 200 people to Three Mile Island to help contain the crisis. In October 1979 the Presidential Commission on Three Mile Island, known as the Kemeny Commission, concluded that the crisis was the result of "people-related problems and not equipment problems" and that "except for human failures, the major accident at Three Mile Island would have been a minor incident."[64]

Three Mile Island only added to the problems faced by the Nation's nuclear power industry. By 1979 new orders for nuclear power plants were nonexistent, and problems with licensing, nuclear waste, and a growing antinuclear public plagued the industry. The Carter Administration was ambivalent in its approach to the nuclear issue. Although affirming that light water reactors played a significant role in reducing petroleum imports, President Carter throughout his four-year tenure tried to stop construction of the Clinch River Breeder Reactor—long the centerpiece of the Department's nuclear fission research and development program—because of the increased dangers of nuclear weapons proliferation presented by breeder reactors.[65]

Following the Three Mile Island accident, Secretary Schlesinger reaffirmed that the Nation had "no real alternative if we are going to maintain energy production than to make effective use of nuclear power." But the administration's second national energy plan sent to Congress in early May declared that during the last quarter-century the Federal Government had placed a "disproportionate emphasis" on the nuclear production of electricity. Carter on December 7, 1979,



The two containment buildings (center) and two of the cooling towers (background) of the Three Mile Island Nuclear Power Plant.
Source: U.S. Department of Energy

responding to the findings of the Kemeny Commission, also stressed that "we cannot shut the door on nuclear power for the United States." But, he added, nuclear power is an energy source of last resort. Once the Nation had reached its goals "on conservation, on the direct use of coal, on development of solar power and synthetic fuels, and enhanced production of American oil and natural gas," Carter observed, "then we can minimize our reliance on nuclear power."[66] The future envisioned by the Carter Administration for nuclear power was thus somewhat murky, but what was clear in the immediate aftermath of Three Mile Island was that the accident had only further complicated matters for an administration struggling to deal with an emerging energy crisis.

Energy Crisis Redux

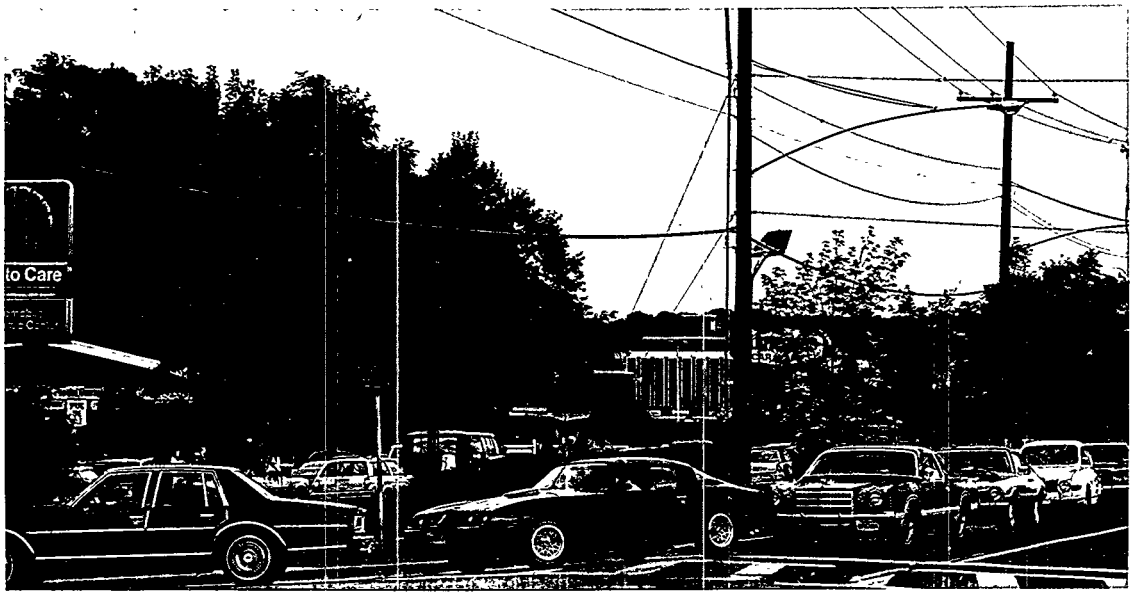
President Carter addressed the Nation concerning the renewed energy crisis on April 5, 1979. Calling on Americans to join "our battle for energy security," he declared that the energy crisis was real, with American national strength "dangerously dependent on a thin line of oil tankers stretching half-way around the Earth." The President observed that there was no single answer to the crisis, and, in a highly detailed and complex prescription, he demanded greater national effort in production, conservation, and the use of new energy sources through advanced technology. Nevertheless, the major thrust of the President's remarks was evident: controls over the price of oil produced in the United States should be reduced gradually until the domestic price equals the international price. This would reduce the consumption and increase the domestic production of oil. To reduce the profits oil companies would realize from price decontrol, Carter proposed a windfall profits tax. Castigating the oil producers, he warned that "as surely as the Sun will rise tomorrow, the oil companies can be expected to fight to

keep the profits which they have not earned." Unless they speak out, Carter told the American people, the oil companies would "have more influence on the Congress than you do."[67]

The appeal by Carter for the end of "excessive Federal Government controls" over petroleum reiterated a theme he had advanced two years earlier, but gradual decontrol of oil would have little immediate efficacy in alleviating the increasingly severe shortage of gasoline. As lines formed at service stations in California in early May, tempers flared and sporadic violence broke out. Ironically, one of the few areas in which the Department could provide relief was in the more rigorous enforcement of existing price regulations. "Strike force" teams of auditors from the Department's Economic Regulatory Administration swept down on refiners and individual service stations, searching for gasoline ceiling price violations and mandating on-the-spot price rollbacks when violations were found. Such small victories, however, did little to stem growing congressional antagonism toward the Department.

Two House subcommittees held hearings to explore the real cause of gasoline shortages and to find out if the Department's regulations had actually made shortages worse. Economic Regulatory Administrator David J. Bardin testified that they indeed had. "I daresay if Congress had mandated a similar control system for milk," he noted, "we now would have milk shortages around the country."[68]

Although eager to find scapegoats, Congress was in no mood to follow the administration's lead in resolving the energy crisis. In May Congress killed the administration's standby gasoline rationing plan, and of the three mandatory conservation measures Carter submitted in March only the proposal to restrict temperatures in buildings was approved. Undaunted by these defeats, Carter, standing on the White House roof in front of a large solar collector, announced on June 20 an ambitious program to increase the Nation's use of solar energy. The President's proposals included a solar development bank for home improvement loans to install solar energy systems,



Gasoline lines stretch as far as the eye can see in Rockville, MD, June 16, 1979.

Source: U.S. Department of Energy

President Carter dedicates the White House solar installation, June 20, 1979.
Source: U.S. Department of Energy

tax credits for new homes using passive solar technology, and increased funds for the Department's solar energy research and development program. Carter anticipated that by the year 2000 the Nation would be getting one-fifth of its energy from the sun or other renewable energy sources such as wind, wood, and water.[69]

Carter's July 15, 1979, Energy Speech

The energy crisis deepened during early summer 1979 as gasoline shortages and gasoline lines spread across the country. In late June the Organization of Petroleum Exporting Countries (OPEC) agreed to raise crude oil prices by 15 percent. The President, in Tokyo for a summit meeting of major industrial countries, angrily declared that there was "no one on earth who will fail to suffer from these extraordinary increases." Since 1973 oil prices had increased tenfold with a rise of 50 percent in the first six months of 1979. Canceling his postconference vacation, President Carter flew back to Washington, D.C. on July 1 to prepare another major energy speech scheduled for July 5. On the Fourth of July, Carter flew to the presidential mountain retreat at Camp David and postponed his energy speech without public explanation. From Camp David, Carter called over 100 national leaders to join him in a "domestic summit conference" concerning the country's problems and energy future. Finally, after ten days, the President returned to the White House to address the Nation on the energy situation.[70]

On the eve of the President's energy speech, George Gallup reported that Americans were "misinformed, bewildered, and cynical about the management of the Nation's energy supplies."[71] A growing percentage of Americans (42 percent) now blamed the oil companies for the gasoline crisis, while 23 percent (the same as in 1974) blamed the Federal Government. Interestingly, Americans now held OPEC and Arab countries (13 percent) more responsible for energy shortfalls than the American people themselves (11 percent), and only 11 percent thought the President responsible as compared to 19 percent of Americans who believed Nixon responsible in 1974. Most important, the vast majority of Americans continued to believe that the energy "crisis" was artificially and deliberately contrived by actions of the oil companies, the government, and oil-producing nations.

In his July 15 energy address, Carter soberly and insistently returned to themes that he had expounded previously. The President said that the United States stood at a major crossroad but had lost its self-confidence. If the Nation walked uncertainly down the "path that leads to fragmentation and self-interest," it would jeopardize its social and political fabric. Clearly, Carter hoped Americans would strike

out boldly on the "path of common purpose and the restoration of American values." As he had predicted two years before, the energy crisis tested the very mettle of the Nation. Now he hoped it could serve as a standard around which Americans would rally.[72] In his more detailed analysis, the President proposed establishing an Energy Security Corporation to produce oil substitutes, an Energy Mobilization Board to speed up the construction of non-nuclear energy facilities, and a ceiling on oil imports not to exceed 1977 levels.[73]

Duncan Appointed Secretary of Energy

Several days later, President Carter regretfully accepted Schlesinger's resignation and selected Charles W. Duncan, Jr., to be the second secretary of energy. A Texan with a background in chemical engineering and management, Duncan had previously been deputy secretary of defense. After Duncan took office on August 24, the President asked him to chair the Energy Coordinating Committee, which included the secretaries of state and treasury and the national security advisor.[74]

Duncan declared that his task was to carry out an energy program accomplishing the national objectives set forth by the President and assuring all Americans of a "secure energy future." The new secretary pledged to maintain an active and open dialogue with all elements in society having an interest in energy matters. He emphasized that "market forces must be allowed to regulate the price and allocation" of energy resources such as petroleum. The Department of Energy, he noted in a speech on October 29, "should not be in the energy business." This was up to the private sector, which had "the strength, the technology, the skills, the management and the marketing experience" to do the job. The proper role for the Federal Government, Duncan concluded, was directing, managing, and allocating federal resources, as well as providing "appropriate incentives for private enterprise" to undertake the necessary investments in the transition from an "oil-dependent economy" to an "energy-diversified economy."[75]

Secretary of Energy Charles Duncan (1979-1981).
Source: U.S. Department of Energy

Duncan was also expected to continue improving management at the Department of Energy. As originally conceived, the Department had been organized according to the evolution of technologies from research and development through commercialization. Instead, to streamline management and better define responsibilities for accomplishing Department objectives, Duncan moved toward the more traditional organization that managed programs by technologies or fuels. Large outlay programs in conservation and solar energy, fossil energy, and nuclear energy were now established under assistant secretaries independent from one another. In addition, the Secretary made administrative changes that essentially divided the Department into three components: (1) program offices; (2) public affairs, liaison, and other independent offices, boards, administrations, and commissions; and (3) administrative, management, and financial offices.[76]

Energy Crisis Abates

The energy crunch abruptly eased in mid-summer 1979 as Americans adjusted their energy-consuming habits to decreased supply and increased prices and long lines at gasoline service stations evaporated. With a crisis atmosphere no longer surrounding the energy issue, Congress deliberated on the Carter Administration's various energy proposals.

After nearly a year of debate, Congress in March 1980 approved a windfall profits tax on oil companies benefiting from the gradual decontrol of oil. President Carter had wanted the revenues generated by the tax to be earmarked for a special energy trust fund, but Congress chose instead to funnel the money into the general revenue fund.

Central to the President's July 15 program was an $88 billion, decade-long effort to enhance production of synthetic fuels from coal and shale oil reserves. The Energy Security Act, signed into law by Carter on June 30, 1980, established the Synthetic Fuels Corporation. The Corporation was authorized to spend $20 billion to promote, through government loans and price guarantees, the production of synthetic fuels by private industry. An additional $68 billion would be available, pending congressional approval, in 1984. The act also provided subsidies to encourage production of fuels such as alcohol and methane, and it created the Solar Energy and Conservation Bank to provide subsidized loans for the installation of solar or energy-saving equipment. Finally, the act directed the President to fill the Strategic Petroleum Reserve at a rate of at least 100,000 barrels a day. The Carter Administration's major legislative defeat was Congress's killing of the proposed Energy Mobilization Board.[77]

America's energy situation brightened considerably as the Carter Administration ended. In 1980 the Nation's energy consumption, with higher prices and a slow economy, declined by almost 4 percent in comparison with the previous year. More significantly, oil consumption declined by over 8 percent, from 18.4 million barrels to 16.9 million barrels a day, and oil imports were down more than 20 percent, from 8.0 million barrels to less than 6.4 million barrels a day. Americans could not, however, rest easy with their energy achievements. War in the Persian Gulf between Iraq and Iran was a continuous threat to embroil the world in another energy crisis.[78]

Reagan Elected

Neither federal energy policy nor the Department of Energy became a major political issue during the 1980 presidential campaign. For the most part, both candidates were satisfied to let energy issues remain in the background. President Carter emphasized the energy accomplishments of his administration. In his acceptance speech at the Democratic national convention, he noted that nothing was more crucial to the future of America than energy. With the enactment of his energy program, he added, the "battle to secure America's energy future has been fully and finally joined."[79]

Ronald Reagan, the Republican candidate and former governor of California, criticized Carter's energy policy and advocated abolishing the Department of Energy. Reagan cited an increasing threat to the Nation's energy security due to a dangerous dependence on imported oil, and he asserted that his administration would "get America producing again." Free enterprise, he declared, could do a better job of production than government. In Reagan's opinion, the Department of Energy, with a multibillion-dollar budget, had not "produced a quart of oil or a lump of coal or anything else in the line of energy."[80] Energy issues, however, were not central to Reagan's presidential agenda. His campaign focused most sharply on the economy, national defense, and the need to balance the budget and reduce federal spending and employment.

PART V
THE REAGAN ADMINISTRATION, 1981-1989

EDWARDS APPOINTED SECRETARY

Following his election as President on November 4, 1980, Ronald Reagan named James B. Edwards as the third secretary of energy. As governor of South Carolina from 1975 to 1978, Edwards established the South Carolina Energy Research Institute, chaired the nuclear energy subcommittee for the National Governors Association, and led an energy committee for the Republican Governors Association. Edwards was a strong proponent of nuclear energy and an outspoken advocate of a free market for energy. His appointment signaled a major shift from Carter's energy policies that emphasized a more activist governmental approach.[81]

Secretary of Energy James Edwards (1981-1982).
Source: U.S. Department of Energy

REAGAN BUDGET AND ENERGY POLICIES, 1981

Secretary Edwards and the Reagan Administration moved quickly to formulate a new budget for the Department and to recast the Department's mission. Two factors shaped the Reagan Administration's energy budget. First, the President was determined to bring the federal budget under control as a necessary step in controlling inflation and economic stagnation. Second, the Reagan budget reflected a fundamental change in philosophy concerning the Federal Government's role in the energy field. Thus, the administration wanted to reduce or eliminate government activities in areas where private industry and the free marketplace could set energy priorities. The new strategy especially included ending government regulations and price controls, which the administration believed inhibited domestic energy production. It also encouraged private capital, not the Federal Government, to demonstrate the commercial viability of energy technologies. The Federal Government's proper role was to support long-term, high-risk energy research and development in which industry would not invest. Edwards emphasized that "only in areas where these market forces are not likely to bring about desirable new energy technologies and practices within a reasonable amount of time is there a potential need for federal involvement."[82]

EDWARDS REORGANIZES THE DEPARTMENT OF ENERGY

Edwards's realignment of the Department of Energy, announced on February 25, 1981, reflected the administration's new philosophy. The changes were designed to improve management and to increase emphasis on research, development, and production. Edwards grouped research and development programs by major fuel sources, completing the transformation begun by Duncan. Edwards' management of fuel and technology programs was also consistent with the Reagan Administration's determination to de-emphasize commercialization. His

changes also redefined the relationship between the Department of Energy and its field offices, with headquarters responsible for program policy and planning and the Department's operations offices and special-purpose field offices responsible for program execution.[83]

One week after his inauguration, President Reagan lifted all remaining price and allocation controls on gasoline, propane, and crude oil, allowing domestic gasoline and oil prices to seek free market levels. Shortly after that, the President rescinded the National Energy Building Temperature Restrictions, which had been promulgated in July 1979. Considering the President's actions, the Department of Energy proposed withdrawing several contingencies of the Standby Federal Emergency Energy Conservation Plan since "an unregulated market may now provide sufficient assurances of an orderly adjustment to any future energy supply interruptions."[84] In effect, the Reagan Administration's actions suggested that America's energy problems had been caused by federal interference in the marketplace.

Edwards announced in February the formation of the twenty-two-member Energy Policy Task Force to advise him on the development of energy policy. Composed of leaders from both the private and public sectors, the task force's first assignment was to help the Secretary in developing the third national energy plan, which was submitted to the Congress in July 1981.[85]

The Reagan Administration's national energy plan, titled *Securing America's Energy Future: The National Energy Policy Plan*, broke sharply with that of the previous administration. Two basic principles unified Reagan's energy policy plan:

- The Administration's Economic Recovery Program, which reduced federal spending, taxes, and regulation; and
- The Administration's confidence that national energy decisions and policy were best made by the free market.

Self-conscious of the sharp departure they were making from policies begun in 1973-1974, the administration's energy planners observed that "all Americans are involved in making energy policy. When individual choices are made with a maximum of personal understanding and a minimum of governmental restraints, the result is the most appropriate energy policy."[86]

According to the plan, a major responsibility of the Federal Government was to foster increased energy production. As steward of the outer continental shelf and of 762 million acres of the public domain, one-third of the land area of the United States, the Federal Government controlled access to an estimated 85 percent of the Nation's oil, 40 percent of the natural gas, 40 percent of the uranium, 35 percent of the coal, 85 percent of the tar sands, 80 percent of the oil shale, and 50 percent of the Nation's geothermal resources. "The Federal role in national energy production," the plan urged, "is to bring these resources into the energy marketplace, while simultaneously protecting the environment."[87] The plan also emphasized the need for the Federal Government to help fund the development of long-term research with high risks but potentially high payoffs.

Reagan energy experts nonetheless declared in the plan that the Federal Government had no responsibility for supporting research and developing technologies that private industry could fund. Nor should the government subsidize or intervene to maintain artificially low energy prices. Not unmindful of the impact of high energy prices on the poor, the Reagan Administration argued that social policy should not be confused with sound energy policy. The needs of the poor, the energy policy plan stated, should be considered as a whole and not just in terms of the price of heating oil, gasoline, or electrical energy. The President was confident that his economic recovery plan, which dealt directly with the burdens of inflation and unemployment, would provide the greatest relief to the disadvantaged. Nonetheless, the administration pledged continued assistance to the neediest households through block grant funds to be administered by state and local governments.[88]

Reagan Recaptures Historical Role

Within the first one hundred days, the Reagan Administration took major steps to return the Federal Government to its historically limited role in national energy management. The Department of Energy was established in 1977 as a political symbol suggesting that the Federal Government would accept a large responsibility for solving the Nation's energy crisis. Four years later the Department of Energy had become an equally potent symbol of the popular perception of the ineffectiveness of "big government" in dealing with national problems.[89] For example, speaking to the Edison Electric Institute on April 8, 1981, Secretary Edwards noted that although no sector of the economy suffered more from inflation, high interest rates, and regulation than the utility industry, the Department of Energy would not engineer the needed changes. "It is an article of faith within the Reagan Administration that the reverse must be true," Edwards stated, "that the Federal Government's role in the management of the Nation's business has been too large, for too long; and that it is now time to return to the original source of American greatness: The skills, the talent, the vision, the ingenuity of the Nation's private business and industrial leaders."[90]

The administration's energy policy, Edwards explained, encompassed three traditional concerns: "national security; energy prices; and the environmental impact of energy development." These same concerns had guided the Army Corps of Engineers when it constructed the Bonneville Dam on the Columbia River in the 1930s. For the 1980s, energy conservation remained important, Edwards stressed, but conservation alone could not solve the energy problem. The Federal Government must encourage increased energy production primarily through the administration's economic program.[91] While visiting Alaska to talk with state leaders and to inspect energy resources, Edwards emphasized the need to develop a reliable inventory of national energy resources. Reflecting the commitment of the energy policy plan to develop federally held reserves, Edwards noted that Americans were comparable to someone starving in the kitchen with a cupboard of food and a key in their pocket. "We've got tremendous energy resources in America," he stated, "and all we have to do is go in and unlock them."[92]

Although the direction the Reagan Administration wished to take was unmistakable, the ultimate fate of the Department of Energy remained uncertain through 1982. Initially, Edwards had sought to dismantle and abolish the Department, perhaps creating an Energy Research and Technology Administration (ERTA) within the Department of Commerce. The Department of Energy Organization Act, which had created the agency in 1977, also included a "sunset provision," which required the President to submit to Congress a comprehensive review of the Department and its programs by January 1982. Ironically, the Reagan Administration now used the sunset provision, a hallmark of the Carter Administration's policy of "zero-based budgeting," to assault one of Carter's proudest achievements. The report to Congress, titled *Sunset Review*, reiterated the President's determination to dismantle the Department. The administration review nonetheless gave the Department generally good marks in achieving its past and current objectives. This apparent contradiction was explained by the fact that administration reviewers conceded that, for the most part, the Department's "program activities reflected the intent of enabling legislation," and, indeed, showed some "progress toward achieving objectives." The *Sunset Review* added, however, "whether the objectives and activities of many departmental programs were appropriate, then or now, is another question."[93]

Energy reorganization languished, nonetheless, through summer and fall 1982. The national economy, the federal budget, and the November elections dominated the congressional agenda. Simultaneously, the Nation's energy situation improved markedly. In his 1982 annual report to Congress Secretary Edwards credited the effectiveness of the free market in determining adequate energy production and consumption. Edwards noted that "we have come to recognize that extensive federal

intervention (such as price and allocation controls and mandatory demand-restraint measures) contribute to and exacerbate the adverse effects of fuel shortages. Furthermore, experience has shown that freely functioning energy markets not only are the most efficient allocators of supplies during emergencies but also reduce the likelihood of such emergencies."[94]

Secretary Edwards left the Department to become president of the Medical University of South Carolina on November 5, 1982. Although he had not succeeded in the administration's planned dismantling of the Department, Edwards departed with a feeling of accomplishment. He noted several areas in which the Reagan Administration had made progress during his tenure as secretary. Among the more important activities were filling the Strategic Petroleum Reserve, reducing the Department's budget and personnel, continuing a strong energy research and development program, strengthening America's position relative to OPEC, breaking ground for the Clinch River breeder reactor, reaffirming the nuclear power option, eliminating or modifying more than 350 federal regulations, and stimulating the private development of synthetic fuels.[95] In his farewell to the National Press Club, Edwards observed that when he became secretary of energy in January 1981 "energy was one of our most serious national problems. That era is behind us. We are not yet out of the woods; neither can the U.S. nor its allies afford to become complacent. But the American people know that our energy problems are being controlled. We're less vulnerable today than at any time since we started importing large volumes of oil."[96] In effect, Edwards declared the era of national energy crisis over.[97]

Hodel Named Secretary of Energy

On November 5, 1982, President Reagan named Donald P. Hodel as the fourth secretary of energy. A native of Portland, Oregon, and a graduate of Harvard University and the University of Oregon law school, Hodel came to the Department with extensive experience in energy administration. After serving three years as deputy administrator, Hodel served as the administrator of the Bonneville Power Administration from 1972 to 1977. Thereafter, he formed his own energy consulting firm, Hodel Associates, Inc., and became president of the National Electric Reliability Council.[98] Hodel served as under secretary of interior before his nomination by President Reagan as secretary of energy.

Hodel did not believe it was productive for society to tear itself apart on energy issues. He nonetheless felt strongly that energy policy was crucial to the future of the Nation. Long-term impacts on the American and world economy would be determined by how the administration handled energy policy and development. Hodel also stressed that an energy policy took precedence over specific energy organization. Although he did not advocate dismantling the Department, Hodel believed that the Department's functions could be transferred to or merged with another agency, most suitably the Department of Commerce or Interior.

What proved relatively easy to put together during the energy crisis of the previous decade proved politically impossible to undo in the 1980s. The Reagan Administration found little support in Congress for its plans to dismantle the Department of Energy. The question of what to do with the Department's nuclear weapons program became a major obstacle to all plans. Suggestions to place the nuclear weapons program in the Department of Defense met with strong congressional opposition. The nuclear weapons program had been under civilian control since the Atomic Energy Act of 1946, first in the Atomic Energy Commission, then in the Energy Research and Development Administration, and finally in the Department of Energy. Moreover, placing the nuclear weapons program in the Department of Commerce or Interior did not receive widespread support in Congress. Nor was there support for creating an independent nuclear weapons agency.[99]

Hodel remained confident, however, that the Reagan Administration had achieved most of

its energy reorganization goals. Deregulation of gasoline and oil prices, abolishment of heating restrictions, elimination of commercialization programs, reduction of departmental personnel, and restructure of the energy budget, in Hodel's view, carried out most of the Reagan Administration's energy management priorities.

Hodel Seeks "Broadened Energy Consensus"

Hodel announced at his confirmation hearing his intention to seek a "broadened energy consensus" between the Reagan Administration and Congress. Because the United States in 1983 faced "neither an immediate energy crisis, nor long-term insoluble problems," Hodel thought it was possible to forge a national consensus based upon adequate and secure supplies of energy available to Americans at reasonable prices. Hodel firmly believed not only that the Federal Government should play a minor role in regulating and controlling energy markets but that it also had a responsibility for protecting public health, safety, and the environment. America's most serious energy problem, he contended, was continued dependence on foreign oil. Hodel was thus in the historical mainstream of federal energy policy.[100]

President Reagan's 1983 national energy policy plan reflected Hodel's imprint on the administration's energy goals. Noting increasing supplies of oil and gasoline, coupled with steadily decreasing prices since 1981, the administration continued to oppose energy allocation and price controls and advocated decontrol of natural gas wellhead prices and reform of the nuclear licensing process. Concurrently, the Reagan Administration promoted a "balanced and mixed energy resource base" by supporting research and development across a broad spectrum of energy resources, technologies, and conservation. Energy security, of course, remained a paramount commitment of the Federal Government.[101]

Although Hodel identified deregulation of natural gas wellhead prices and reform of the nuclear licensing process as vital legislative goals, Congress passed neither the President's proposed natural gas legislation nor his nuclear regulatory reform legislation during Hodel's tenure. Indeed, in seeking his "broad energy consensus," Hodel found himself increasingly caught between Congress and the Office of Management and Budget.

President Reagan and Secretary of Energy Donald P. Hodel (1982-1985) meet with heads of major energy firms. Seated with the President (L to R) are W.P. Schmoe, vice chairman of CONOCO, Inc.; Michel Halbouty, chairman of the board, M.T. Halbouty Energy Co., Houston; C.C. Garvin, Jr., board chairman, EXXON Corp., and chairman of the American Petroleum Institute; and Hodel.

Source: U.S. Department of Energy

"Balanced and Mixed Energy Base"—A Budget Story

President Reagan's energy policy remained in tune with his national fiscal policy, which sought a balanced federal budget while strengthening national defense. A comparison between Carter's fiscal 1982 Department of Energy budget and Reagan's 1985 budget showed little change: $12.6 billion for Carter; $12.8 billion for Reagan. Significant differences, however, were noted in energy research and development and defense sectors. Reagan's budget halved Carter's "energy" budget while doubling expenditures for the nuclear weapons program.[102] Following the President's March 23, 1983, address to the Nation on defense and national security, Reagan's Strategic Defense Initiative (SDI), or "Star Wars" as it was popularly known, became the number-one research and development project in the Department's defense programs. Eventually, SDI, with its emphasis on a high-tech solution to the ballistic missile threat, would become the largest single item in the Department's defense budget.[103]

During the first three years of the Reagan Administration, however, Congress had repeatedly appropriated more than the President requested for conservation, fossil energy, solar energy and other renewable energies. When the Office of Management and Budget drastically slashed energy research and development funding, Secretary Hodel won reinstatement of the Department's budget at the White House. Hodel hoped his success with the Office of Management and Budget and his promotion of a balanced and mixed national energy base with emphasis on conservation and renewable energy would moderate congressional pressures to inflate the Department's budget.[104]

Nuclear, Coal, and Solar Energy

The Reagan Administration reaffirmed the need to foster nuclear power, within the mix and balance of energy systems, as part of the national energy policy. A principal objective was to create the political and institutional climate in which nuclear power could prosper. Passage of the landmark Nuclear Waste Act of 1982 offered hope that a program for the long-term management of the Nation's high-level radioactive wastes could be achieved. The administration also proposed the Nuclear Licensing Reform Act, designed to reduce the time required for nuclear plant licensing to seven years rather than twelve to fourteen years. In addition, the administration hoped that licensing reform would promote improved safety in nuclear plants, encourage more effective public participation, and provide a stable and reliable licensing process. Finally, under Hodel's leadership the Department revamped its uranium enrichment program to price the American product more competitively and recapture some of its lost world market.[105]

The Reagan Administration's nuclear energy policy was dealt a severe blow when the Senate cut all funding for the Clinch River Breeder Reactor on October 26, 1983. The House had earlier repealed language authorizing the project. The breeder reactor project, which had been the Nation's priority in nuclear reactor research and development since the Nixon Administration, had been plagued by delays, rising costs, and an easing energy crisis. The Reagan Administration viewed the breeder reactor program, once hailed as the answer to America's energy needs, as a symbol of the United States commitment to nuclear power. Yet with growing uncertainties about breeder economics, fiscal conservatives in Congress decided the breeder project at Oak Ridge, Tennessee, was both wasteful and unnecessary.[106] Following the termination of the Clinch River project, the Department of Energy's nuclear research and development program focused on near-term initiatives to develop smaller, inherently safe nuclear power plants.

Coal and solar energy also provided Hodel with two opportunities to prove the administration's commitment to a mixed energy base. On October 25, 1984, he announced Reagan's appointment of the National Coal Council, an advisory committee modeled after the prestigious National Petroleum Council. The National Coal Council would assist both government and industry to improve

HOW TO KEEP DOWN WITH THE JONESES.

Most people who want to save energy feel they're faced with a dilemma. They're fed up with paying inflated utility bills. But at the same time they're reluctant to spend money for home improvements necessary to lower them.

We'd like to show you how these home improvements can actually pay for themselves.

Take ceiling insulation for example. If you install it yourself, it can save enough money on your fuel bill to pay for itself in as little as five years.

An automatic setback thermostat, which automatically turns down your heat at night and back up again in the morning, can pay for itself in two years.

And an energy-efficient refrigerator can save enough money on your fuel bill over its lifetime to cover its entire original cost. Even though it probably costs more to purchase than a refrigerator that doesn't save energy.

There are all kinds of these new energy-saving products on the market. Everything from insulating blankets for your water heater to special electronic ignition replacement kits for the pilot light on your furnace.

Because they save energy, these products not only pay for themselves, they end up putting money back in your pocket.

If you're really serious about lowering your fuel bills, you'd be wise to invest your money in energy-saving products.

Who knows. With the money you save keeping down with the Joneses, you may be able to keep up with them.

U.S. Department of Energy.

IF IT SAVES ENERGY, IT'LL PAY FOR ITSELF.

I don't want to pay any more on my utility bills than I have to. Send me information on energy-saving products

Name

Street or P.O. Box

City State Zip

Send coupon to:
Technical Information Center
P.O. Box 62, Oak Ridge, TN 37830 B

Department of Energy advertisement designed to motivate consumers to accept energy efficient products.
Source: U.S. Department of Energy

cooperation in research, production, transportation, marketing, and use. In February 1985, after he had been appointed Secretary of Interior, Hodel dedicated the Field Test Laboratory at the Solar Energy Research Institute in Golden, Colorado. The new laboratory, Secretary Hodel noted, reflected the Department's support of state-of-the-art research and development in solar energy technology.[107]

Reagan's First-Term Accomplishments

Although not complacent about America's energy future, Secretary Hodel confidently announced in June 1984 that the Nation was much better off than in 1980. Not only had the general economic situation improved, but also oil consumption was down by 10 percent and oil imports had decreased by 33 percent. Meanwhile, energy suppliers had diversified, and only about 3 percent of America's imports were coming from the Persian Gulf. In addition, more than 400 million barrels of oil had been placed in the Strategic Petroleum Reserve.

"Compared to other Administrations," Hodel noted, "both Republican and Democrat, our energy policy is about the same." How Reagan had differed, Hodel stated, was with strategies to achieve that goal. Before Reagan, the Federal Government had increased control over energy markets. Reagan's strategy to minimize federal intervention, the Secretary contended, appeared more successful in achieving adequate energy supplies at acceptable prices.[108]

Federal Government Support for Energy Research and Development

What role should the Federal Government play in supporting and managing science and technology? This question, Secretary Hodel observed, was one of the most hotly debated public issues. In keeping with Reagan's principles, Hodel believed that the Federal Government should play a minimal role in energy research and development and should foster private sponsorship of science and technology when possible. On the other hand, Hodel conceded, the Federal Government's support of certain basic research was vital not only to assure America's preeminence in science but also to maintain her national defense and industrial leadership. Supercomputers, superconductivity, high energy physics, basic materials properties, and biotechnology represented areas of major commitment from the Federal Government. Research that was too expensive for the private sector but might yield large future returns was also appropriate for federal support. Magnetic fusion, breeder reactors, and advanced solar systems were among research areas Hodel believed should be funded by the Federal Government to explore whether they might become marketable energy resources.

The Department of Energy's chief tasks, according to Hodel, lay in exploring the uncertain and expensive frontiers of energy science and technology. He compared the government's responsibility in exploring the energy frontier with its role in opening the American West. Explorers such as Lewis and Clark, Fremont, and Bonneville had all been supported by the United States government. In turn, settlers were offered free land under the Homestead Act (1862), and transcontinental railroads were built west under government incentives, such as the "checkerboard" land grants, that attracted investors. Some prospered; others failed. But, concluded the Secretary, the West was settled without creating federal farms and communes or government railroad corporations.

Analogously, Hodel believed the Federal Government should expand and explore the energy frontier through research and development but should not build institutions to commercialize the opportunities that were discovered. Private citizens should be excited and encouraged to "homestead" the energy frontier, where some would fail but many more would succeed. Just as land transfer was a major task of the government in the nineteenth century, so technology transfer from the government to the private sector would be a significant agenda for the Department of Energy in the twentieth century.[109]

Herrington Appointed Secretary of Energy

President Reagan announced on January 10, 1985, the appointment of John S. Herrington as the fifth secretary of energy. Hodel stayed

in the cabinet, moving to the Department of the Interior. Confirmed by the Senate on February 6, Herrington pledged to continue vigorous management of the Department. A Californian and graduate from Stanford University and the University of California's Hastings College of Law, Herrington had served as assistant secretary of the navy for manpower and reserve affairs, special assistant to the White House chief of staff, and assistant to the president for presidential personnel. He brought expertise in personnel, administration, and organization to the Department, and, as the White House announced, "a combination of the knowledge of defense and civilian management and organization."[110]

Herrington's priorities were fundamentally congruent with Hodel's. Natural gas deregulation, nuclear licensing reform, energy tax policy, environment, and security were major issues requiring the Department's attention. His concern for security and environmental protection at the Department's weapons production and laboratory facilities reflected the administration's increased sensitivity to safety since the Bhopal chemical plant disaster in India.[111]

One of Herrington's first actions was to order a special report assessing environmental, health, and safety activities within the Department. The report, by a former environmental official at the Department, termed these departmental activities a "disgrace." Environment, safety, and health, the report noted, are "widely perceived as having 'o clout,' and of being ignored by senior management unless a crisis develops. Morale is low, and as successive reports recommending action are followed by no action, it sinks further."[112]

Herrington moved quickly to resolve the problem. On September 18, 1985, he announced the restructuring of the Department's environmental, safety, and health program. Previously scattered responsibilities within the Department were consolidated under the direction of a newly created assistant secretary for environment, safety, and health. Herrington observed that the "environmental problems we are finding now at DOE facilities are, for the most part, legacies from the past, from activities conducted in a different atmosphere and under different standards than today's. What was acceptable in 1945 is not acceptable in 1985." Herrington also ordered a thorough environmental survey of all departmental facilities to identify problem areas and technical safety appraisals of the Department's nuclear facilities.[113]

Energy Stability–Energy Security–Energy Strength

Secretary Herrington believed that America's energy policy through the end of the twentieth century should be directed toward achieving three objectives: energy stability, energy security, and energy strength. He noted that the first two goals, energy stability and security, had been the preoccupation of the government since the 1973 energy crisis. Conservation had become more than a slogan; it was now universally regarded as a permanent energy resource. American buildings had become 20 percent more energy efficient than they were in 1973, and American industry had cut energy use by 23 percent per unit of production. Overall, Americans burned 20 percent less oil than in 1978. Most dramatically, the United States had purchased a "National Insurance Policy," the Strategic Petroleum Reserve, which contained nearly 500 million barrels of oil, the equivalent to almost four months of import supply.[114]

Herrington looked to the future and building energy strength since energy stability and security appeared well in hand. Recent American energy history, Herrington recalled, had been primarily a history of "hydrocarbons and hydropower." While petroleum remained both the Nation's "lifeblood and liability," the electric power industry had taken important steps to reduce its dependence on oil. Coal now stood preeminent in the production of electricity, with nuclear power ranking second and conservation and energy efficiency a giant only partially tapped. Each of these resources, which made up what Herrington called the

"energy triad," would have to be fully developed to achieve energy strength in the twenty-first century.

The "Clean Coal" Initiative

Secretary Herrington contended that much of America's energy strength rested on its abundant coal reserves, which were 80 percent of the Nation's known fossil fuel resources. The Secretary, in an interview with the Associated Press, said that he was "going to make some changes" in the National Energy Policy Plan. "I don't think the current one addresses itself to some of our problems in specific enough terms," he observed. "I think coal is probably where our future is."[115]

The challenge was to develop and deploy "clean coal" technologies to increase the use of coal while reducing environmental problems such as acid rain. Following the administration's avowed energy policy, Herrington supported federal research and development but was not enthusiastic about funding applied science projects. Congress, on the other hand, supported many commercial demonstration projects that Herrington, a "budget balancer first," feared could become budget busters. Nonetheless, Herrington expressed his enthusiasm for the program once Congress established "clean coal" priorities.[116]

The Reagan Administration's support of new coal technology was outlined in the Department of Energy's report, *America's Clean Coal Commitment*. The Department calculated that since passage of the Clean Air Act in 1970 electric utilities had spent approximately $62 billion to control sulfur pollutants, including $11 billion for coal cleaning, $34 billion in premiums for low sulfur coal, and $17 billion to install stack scrubbers. The Department reported that such measures had already reduced sulfur emissions by 19 percent from 1977 to 1985. New technologies, such as fluidized bed combustion, limestone injection, advanced coal cleaning, and coal gasification, promised not only further to reduce sulfur emissions but also to reduce nitrogen pollutants thought to contribute significantly to acid rain. Following March 1987 discussions on acid rain with the Canadian government, President Reagan pledged to seek $2.5 billion over the next five years to demonstrate innovative pollution control technologies. Herrington subsequently announced that the Department of Energy would kick off Reagan's acid rain initiative with an $850 million solicitation to match industry proposals for pollution control devices that could be installed on existing coal-fired power plants.[117]

Nuclear Power

Secretary Herrington had to fend off accusations that his support for coal suggested the Reagan Administration had backed away from its support of nuclear power. "We have no change in nuclear policy," the Secretary stated. "We continue to support strong nuclear power for our energy future."[118]

In November 1985, Herrington assured the Atomic Industrial Forum and the American Nuclear Society that both the President and the secretary of energy were "irrevocably committed to nuclear energy as an option for our future." The Reagan Administration was committed to "being partners" in bringing "the full dream of nuclear energy to fruition," he noted, but the nuclear industry itself would have to take the initiative in confronting both the real and the perceptual problems besetting the industry. Herrington admitted that it was "tempting" to blame "government regulators, overzealous environmentalists, and an overly fearful public" for the industry's problems. He suggested, however, that there was "enough random evidence of problems in planning, management, construction and operator training that industry must accept its share of responsibility and become part of the solution." The Department of Energy, for its part, would continue to advocate nuclear power, seek licensing and regulatory reform, promote international agreements to secure markets for the American nuclear industry, and press on with research and development. As long-term research and development goals, Herrington targeted more advanced reactors, such as high temperature gas cooled reactors and the preservation of the breeder option,

and smaller, modular reactors that could be shop-fabricated with improved quality controls and reduced construction costs.[119]

Fallout from Chernobyl

The Chernobyl accident in the Soviet Union on April 26, 1986, focused attention on both the Department's nuclear facilities and the nuclear power industry's perceived safety problems. In the aftermath, Secretary Herrington intensified safety reviews of the Department's large production and research reactors. He also established a special safety panel to review the N-reactor near Richland, Washington, the only American graphite production reactor even remotely similar to the Chernobyl reactor. The N-reactor, a dual purpose reactor dedicated by President John F. Kennedy in 1963, produced both weapon-grade plutonium and electrical power. Besides the Department's internal safety review, Herrington requested the National Academy of Sciences and the National Academy of Engineering to make an independent assessment of the Department's production reactors in Washington and South Carolina. In response, the National Research Council formed a committee to conduct an eighteen-month study.[120]

The Department's Civilian Reactor Research and Development Program had been pursuing the development of passively safe nuclear power plants even before Chernobyl. These would be simpler to build and operate, and therefore less costly, than light water reactors. Tests of the Experimental Breeder Reactor (EBR-II) had demonstrated that the small, experimental sodium-cooled fast test reactor, operating at full capacity, would automatically shut down when power was cut off to all cooling systems. Natural laws of physics, not engineered safety systems, kept reactor core temperatures within safe limits. The successful shutdown of the EBR-II in Idaho confirmed that such passively, or inherently, safe reactors might play a role revitalizing the nuclear power industry.[121]

High-Level Nuclear Waste

Nuclear waste management became a key administration project to secure energy strength through nuclear power. Signed by the President on January 7, 1983, the Nuclear Waste Policy Act of 1982 had enjoined the Department of Energy to site, design, construct, and operate the Nation's first geologic repositories for permanent disposal of spent fuel and high-level waste from civilian nuclear reactors.

On May 28, 1986, President Reagan approved the selection of three sites for detailed study, or "site characterization": Yucca Mountain, Nevada; Deaf Smith County, Texas; and Hanford, Washington. After several years of study, the Department, according to the procedure established by the 1982 act, would recommend one site to the President, who in turn might propose the site to Congress. In addition, the Department on May 28 announced that it had postponed indefinitely nominating sites for a second repository in the east.[122] The selection of three western sites for study and at least temporary suspension of a search for a second site brought sharp criticism from western states. Herrington, a westerner himself, denied that politics had played a role in the Department's decision. Rather, based on projected levels of nuclear waste, the Department estimated that there would be no need to develop a second site study until the mid-1990s. Secretary Herrington admitted it would be easy to dodge this issue, but he saw no point in spending money on a second study with nuclear power itself in the doldrums. "The important thing is to get the first one," he advocated. Subsequently, the Department would develop monitored retrievable storage (MRS) and a second site, if necessary.[123]

Congress simplified the selection process for a high-level waste site with the Nuclear Waste Policy Amendments Act of 1987. The act designated the Yucca Mountain site in Nevada as the only candidate site to be considered. Activities at the Texas and Washington sites were halted. The Department and the nuclear

utility industry welcomed the amendments act as offering assurances that the construction of a waste repository would proceed at an acceptable pace. Nevadans were irate, however, that the site selection process had been short-circuited, and Nevada Governor Richard Bryan, terming the act a "legislative atrocity," promised the state would use every legal remedy to oppose the decision. A further complicating factor was that if the Yucca Mountain site proved unacceptable for environmental or other reasons there would be no available alternative site.[124]

SUPERCONDUCTIVITY

Major scientific discoveries in superconductivity reinforced Herrington's views that America's energy strength should also be pursued through government funding of basic research, which, in this case, offered promise of dramatic new efficiencies in electric technology. Superconductors, at very low temperatures, lose their resistance to the flow of electricity. Breakthroughs in 1986 and 1987 reduced the amount of cooling and, therefore, the cost of achieving superconductivity. White House Science Advisor William R. Graham stated, "not since the invention of the transistor, or perhaps even the electric light bulb, has there been an event in science so fundamentally important and with such enormous potential."[125] The enormous commercial potential for computers, long-distance electrical transmission lines, appliances, transportation, and other uses of electricity was evident. At a federal conference on the commercial applications of superconductivity co-hosted by the Department and the White House Office of Science and Technology Policy, President Reagan marveled how basic scientific research with apparently little practical purpose could suddenly alter our lives. For Herrington, the conference was gratifying evidence of how the Reagan energy policy worked at its best, bringing together in partnership United States business, government, universities, and laboratories for discussions and exchange of information and ideas. Indeed, the President's Superconductivity Initiative faithfully reflected the administration's policy "for the swift transfer of technology and technical information from the government to the private sector."[126]

THE SUPERCONDUCTING SUPER COLLIDER (SSC)

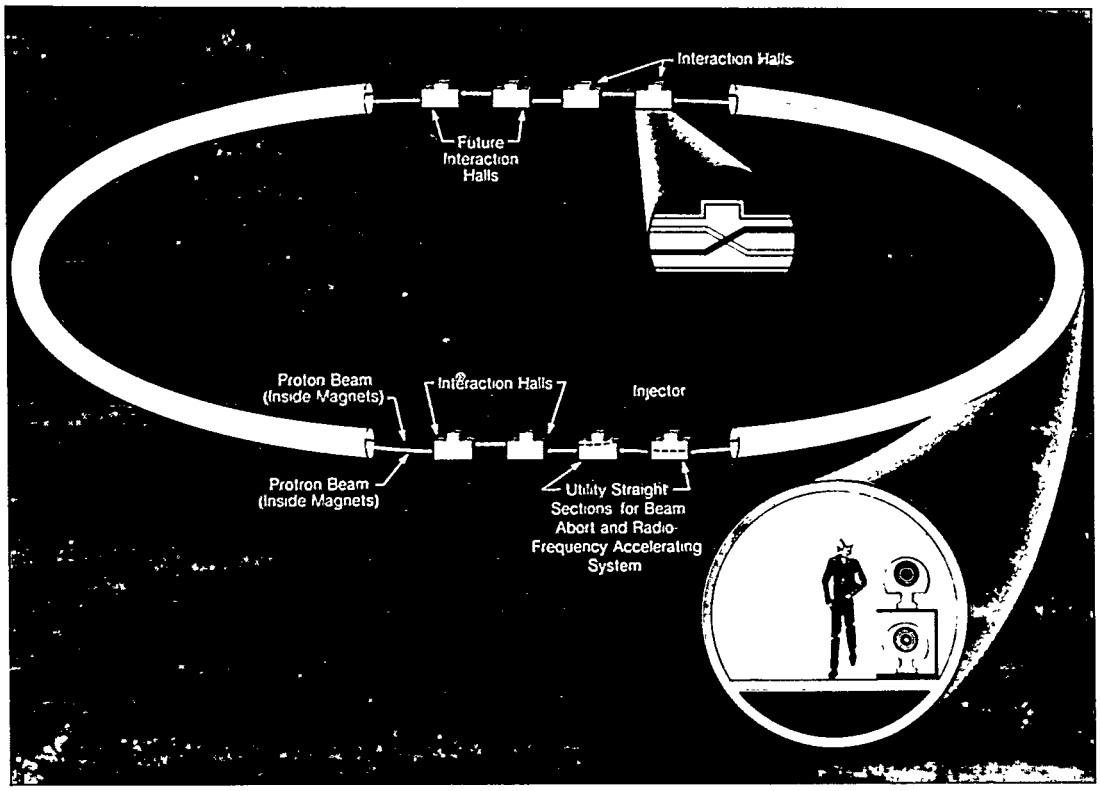
The superconducting super collider demonstrated another dimension of the Reagan Administration's support of basic science.

Secretary of Energy John S. Herrington (1985-1989), Secretary of State George Schultz, Secretary of Defense Casper Weinberger applaud President Reagan at the Federal Conference on Commercial Applications of Superconductivity, July 28, 1987. Source: U.S. Department of Defense

Texas Governor William Clements and Secretary Herrington view an artist's conception of the Superconducting Super Collider.
Source: U.S. Department of Energy

Since the days of the Manhattan Project, the Department of Energy and its predecessors had helped build most of the large particle accelerators constructed in the United States, including the Stanford Linear Accelerator (SLAC) and facilities at Brookhaven National Laboratory and the Fermi National Accelerator Laboratory. In July 1983 the Department of Energy's High Energy Physics Advisory Panel recommended that the building of a super collider be given the highest priority. Endorsed by the President's science advisor, the project to build the largest and most expensive scientific instrument in history would strain limited research budgets. Nonetheless, the Reagan Administration recognized, as others had before it, that Americans could not maintain their preeminence in high energy physics without support from the Federal Government.

The superconducting super collider would become the world's largest particle accelerator, the basic research tool in high energy physics for studying the nature of matter and energy. Again, the Federal Government would become a patron in opening the frontiers of science. Research at the super collider would not only include study of the fundamental laws that govern the universe but also the exploration of



Artist's conception of the SSC showing the 53 mile circumference tunnel and location of related facilities.
Source: U.S. Department of Energy

the origins of the universe. Such breathtaking science would require space on earth to build a ten-foot-diameter racetrack-shaped tunnel, fifty-two miles in circumference, inside of which 10,000 superconducting magnets would guide two beams of highly energized protons in opposite directions. Racing around the track at nearly the speed of light, the proton beams would collide head-on with an energy of 40 trillion electron volts. Scientists believed that the resulting temperatures and pressures would simulate the "big bang" at the creation of the universe. Recently detected subatomic particles would surely help to answer remaining questions about the ultimate building blocks of matter and the basic forces that govern the transformations of matter and energy.[127]

President Reagan approved construction of the super collider on January 30, 1987. Describing the President's decision as "a momentous leap forward for American science and technology," Herrington noted that in the field of high energy physics, building the super collider was equivalent to "putting a man on the moon." He estimated that the total project would cost $4.4 billion and authorized the Department to develop a site selection procedure based primarily on scientific and technical criteria.[128]

The Department issued an invitation for site proposals in April 1987. The states responded with alacrity in the competition for the lucrative prize of hosting the super collider. By the deadline of September 2, 1987, the Department received forty-three site proposals from twenty-five states. After screening by the Department against the previously established qualification criteria, thirty-six proposals were forwarded to an expert committee of the National Academy of Sciences and the National Academy of Engineering for an independent review. The committee's report recommended a final list of seven best qualified sites in Arizona, Colorado, Illinois, Michigan, North Carolina, Tennessee, and Texas. On November 10, 1988, Herrington announced that the Texas site, located twenty-five miles south of Dallas, was the Department's preferred site. The Department hoped to build the superconducting super collider by 1996.[129]

Securing America's Energy Future

Dark clouds gathered on the Nation's energy horizon as the Department of Energy entered its second decade. Prolonged warfare in the Persian Gulf between Iraq and Iran, continued depression in the domestic oil industry, and increased dependence on imports of foreign oil raised concerns about America's energy future among government officials and private energy analysts. Secretary of Interior Hodel warned that "the United States and the rest of the world [were] being set up for a major oil price shock," while Theodore R. Eck, chief economist at Amoco Corporation, observed that "everyone" agreed there would be serious energy problems in the next ten years. At issue, *Science* reported, was not only national security but also inflation, economic growth, and the Nation's trade deficit.[130]

The Department of Energy, at President Reagan's direction, initiated a review of United States energy security. The review examined all aspects of energy supply and demand and their implications for national security. The Department reported to the President that increasing dependence on imported oil could have potentially serious implications for national security for the rest of the century. The precipitous decline in oil prices in 1986 was good news for all energy consumers; but as prices fell and demand slackened, American oil producers were devastated by the collapse of the domestic oil market. The United States appeared less vulnerable to an energy crisis in 1987 than it had been in 1977. Yet rising oil demand, coupled with a fall in production from a crippled American oil industry, could potentially make the United States and its allies dependent upon suppliers from the Persian Gulf, which had two-thirds of the world's known reserves. "Even with continued conservation and efficiency and substantial contributions from other energy resources, like coal, nuclear energy, and renewables," Secretary Herrington observed, "our economic and energy security is inextricably tied to the fate and fortunes of our domestic petroleum industry through this century."[131]

At the Energy Security Conference in May 1988, Herrington offered his assessment of the Federal Government's progress in achieving energy security for the Nation during the previous eight years. Pointing to the fact that the country's economic expansion was in its sixty-fifth month, he noted that this represented "the longest peacetime economic expansion in U.S. history." The inflation rate in 1980 had been 13.5 percent, but in 1987 it was only 3.7 percent. Similarly, the maximum prime rate had dropped from 21.5 percent to 9.2 percent and mortgage rates from 13.8 percent to 10.2 percent. During this period, Herrington explained, the real gross national product had gone up, real disposable income per capita had doubled, and business productivity had gone up three times. Not only was unemployment at its lowest level in ten years, but also exports were the highest in the country's history. These were "things to be proud of . . . things to build on," Herrington declared.

It was evident to the Reagan Administration that the energy security of the United States would be tied to the oil and gas industry for the future. Yet oil and gas alone could not "shoulder the burden for energy security," Herrington added. The Secretary of Energy believed that nuclear power and coal would be an essential part of the equation. Nor, he concluded, should there be any "quick fixes." In the years ahead, America's energy stability, energy security, and energy strength would be determined by the sound economic solutions of the Federal Government, as well as by the ingenuity and determination of the private sector.[132]

Environmental and Safety Problems in the Weapons Complex

Environmental and safety concerns with the Department's weapons production complex continued to mount. In mid-June 1987, Under Secretary Joseph Salgado informed the Senate Governmental Affairs Committee that the Department would conduct a year-long study detailing environmental conditions at all federal nuclear facilities. "We made mistakes in the past," Salgado told the Senate committee. "We are committed to bringing our complexes into compliance, [but] we have an enormous legacy of misuse of the environment in the past."[133]

On October 29, 1987, the National Research Council's special committee, commissioned by Secretary Herrington in the aftermath of Chernobyl, released its long-awaited assessment of safety issues at the Department's production reactors. The committee conceded that the Department's contractors had emphasized the prevention of accidents. In addition, the production reactors had been operated for more than a quarter century without a major accident. Nevertheless, the committee cited the Department for not having "clearly articulated" safety objectives. The Department, the committee noted, "has failed to specify its safety requirements clearly, has failed to apply them uniformly at the two production reactor sites, and has failed to implement them in a timely manner." Part of the problem, according to the committee, was that the Department lacked an adequate technical understanding and capability. Equally serious, however, were the Department's managerial shortfalls. "Weaknesses of management," the committee stated, had "led to a loose-knit system of largely self-regulated contractors." Finally, the committee cited the "acute aging" of the production reactors as an issue that had not been adequately addressed by the Department.

The committee concluded that the Department could "accomplish the reactor safety functions assigned to it by Congress if the Department dedicated itself to the task." The committee recommended that the Department clarify its safety objectives, increase the involvement of the Office of Environment, Safety, and Health, and establish an independent, external safety oversight committee advisory to the secretary. The committee also recommended that the Department accelerate planning for new production reactors or other alternatives.[134]

Secretary Herrington said that he "welcomed" the committee's findings. He stressed that the Department had long been aware of safety concerns and "action was long overdue."

Salgado observed that the report was really about "a department in transition. It's about how we are making changes and how we are meeting our responsibilities and obligation. This report is a continuation of what we began more than two years ago." In response to the committee's recommendations, Herrington directed that an independent oversight panel be established and action plans be prepared by the assistant secretaries for environment, safety, and health and for defense programs.[135]

On July 1, 1988, Salgado forwarded the promised study detailing environmental conditions at the Department's nuclear facilities to the Senate Governmental Affairs Committee. Salgado told the committee that the environmental issue represented a "major challenge for the Department, the Congress, and the Nation. . . . [requiring] a significant investment over a long period of time." The Department's study focused on seventeen sites and examined efforts both to clean up environmental contamination and to assure and maintain compliance with environmental, safety, and health standards. The study estimated "expected" clean up and compliance costs of $66 billion through fiscal year 2025. Under a "high" clean up and compliance scenario, estimated costs rose to $110 billion through fiscal year 2045. Senator John Glenn (D-OH), chairman of the Governmental Affairs Committee, observed that the "high" estimate was more likely to be a "floor . . . than a ceiling." The Department, he added, could not "assume that it will continue to be treated as a royal exception to the laws, standards and regulations that all other hazardous industrial enterprises in the United States are subject to."[136]

New Production Reactor

Following the National Research Council committee's recommendation that the Department accelerate planning for a New Production Reactor (NPR), Secretary Herrington asked the Department's Energy Research and Advisory Board to conduct a review and assessment of reactor options. The primary mission of the NPR would be to produce tritium used in nuclear warheads to boost explosive yield. Herrington limited the board's consideration to four reactor types: low temperature heavy water reactor, light water reactor, high temperature gas-cooled reactor, and liquid metal reactor. Among the evaluating criteria to be used were ability to produce tritium in a timely and cost-effective manner, ability to meet safety and environmental requirements, and contributions to the advancement of nuclear technology.[137]

The Energy Research Advisory Board submitted its report to Herrington in late June 1988. The board stated its conviction that it was "urgent for DOE to begin the long process to acquire new production capacity." The board found that the heavy water reactor has "the most mature technology" for tritium production. "If there is a need for full tritium production as early as possible," the board noted, then the heavy water reactor "appears to have the best chance of quickly providing the needed capacity because of the existing facilities, personnel, and experience at Savannah River." Nonetheless, the board declared the high temperature gas-cooled reactor the leading candidate with "potential to contribute substantially to the advancement of new commercial designs through the application of passive safety technology."[138]

This was no mean consideration. With no firm order to build a commercial reactor in the United States since 1974, reactor manufacturers clearly were eager for a new construction project, especially one that might prove out a new civilian reactor design. The design for the high temperature gas-cooled reactor used a modular concept being developed under the Department's Advanced Reactor Program. A standardized modular design would include maximum factory fabrication, transportability to site, and minimum site installation and construction, thus shortening construction time and reducing costs. The high temperature gas-cooled reactor's passive reactor shutdown feature, the Energy Research Advisory Board stressed, "eliminates the possibility of core meltdown and . . . provide[s] an opportunity for a potentially significant advancement in the level of safety over current commercial reactor experience."[139]

In early August 1988, Herrington proposed building two new production reactors: a heavy water reactor at Savannah River and a modular high temperature gas-cooled reactor at the Idaho National Engineering Laboratory. According to Herrington, this would establish "some sort of flexibility and back up . . . so we can keep [weapon production] options for future governments open. The dual approach, he observed, would assure that production capability was not rendered inoperative by unforeseen problems. The heavy water reactor, to be constructed on an "urgent schedule," and the modular high temperature gas-cooled reactor would produce 100 percent and 50 percent of expected tritium requirements respectively. "We don't know today what is in the future in the next 10 years," added the Secretary. "So it is a matter of assessing the risks. What is the tritium we are going to need or the plutonium we are going to need? We make our best guess today and it may not be our answer in the next 10 years. So I want some back up [capacity]." The Department estimated that it would take ten years to build the new plants at an estimated cost of $6.8 billion.[140]

A new production reactor office was established within the Department in October. The future of the two-reactor program, however, remained somewhat uncertain. Following Herrington's announcement, several influential senators expressed doubts that the Nation could afford to build two reactors. In addition, tritium requirements beyond two or three years were unclear. A new arms reduction treaty, for example, could significantly curtail tritium requirements.[141]

Global Warming

In summer 1988 Americans suffered through record-breaking heat and drought. As a result, the greenhouse effect, caused by increased amounts of primarily carbon dioxide in the atmosphere, and its role in global warming attracted growing attention from scientists, politicians, and the media. Implications for energy policy were enormous. Public rhetoric included strong calls for reduced use of fossil fuels and especially coal. In late July a dozen senators led by Timothy Wirth (D-CO) introduced legislation to combat global warming by refocusing energy policy away from oil and coal and toward conservation, renewable energy, and nuclear energy. Global warming, declared Wirth, was "largely an energy problem."[142]

Reagan Administration officials generally agreed that global warming was a potentially serious problem and responded by forming an interagency task force to study the issue. Under Secretary Donna Fitzpatrick, the Department's representative on the task force, cautioned against hasty and precipitous action before global warming had been scientifically confirmed. Noting that the Department was examining long-term policy options, she said that any action would have to be "done internationally on a global basis" with "a very credible scientific assessment that other nations can accept." The key to action was solid scientific information. "We may beat our brains out and do all kinds of expensive and disruptive things," Fitzpatrick observed, "for which people will necessarily suffer by a reduced standard of living or something like that—and a reduced standard of living always means reduced health. We may do something to stop greenhouse gas accumulation and discover too late, as much as it cost us—in different kinds of costs—that we were simply watching a bigger cycle, the bigger trend caused by we don't know what."[143]

Secretary Herrington, President Reagan, and an official of the American Gas Association waiting to give their speeches before a joint meeting of the Gas Association and the World Gas Conference.
Source: U.S. Department of Energy

The Department's own research and analytical efforts on global warming were not inconsiderable. Carbon dioxide research within the Department operated on a $14 million annual budget, representing 45 percent of total federal funding in the area. In fall 1988, the Lawrence Livermore and Los Alamos laboratories joined forces with the Scripps Institution of Oceanography in a global study to determine how pollution changes world climate. In November, a draft departmental report analyzed the potential for long-term emissions reduction of carbon dioxide. The report indicated that to hold emissions to 1985 levels through 2050 would require rapidly replacing fossil fuels for electricity generation with nuclear and solar power. To reduce emissions by 40 percent by 2020 would require aggressive policy intervention, applying existing and undeployed technologies along with intense conservation efforts.[144]

The Weapons Complex Under Siege

The implications of Secretary Herrington's "sweeping" environmental and safety reforms came into sharper focus during the last half of 1988. In August, unexpected power surges occurred during attempts to restart the P production reactor at Savannah River. Departmental safety officials, who had been belatedly and inadequately briefed on the incident, recommended that the reactor be shut down. Subsequent studies showed that no significant safety risk or threat to public safety resulted from the incident, but departmental safety officials were highly critical of operational and managerial procedures at the Savannah River site. John Ahearne, chairman of the Department's newly created independent oversight panel, the Advisory Committee on Nuclear Facility Safety, indicted officials from both the Department and its Savannah River contractor, E.I. du Pont de Nemours and Company, for "years of ingrained complacency and self-satisfaction. . . . One conclusion is that operating practices at Savannah River have built up over so many years and the operators had believed they have done so very well, they did not keep abreast of what was going on in the commercial world." Deputy Assistant Secretary for Safety, Health and Quality Assurance Richard Starostecki in a tough internal memo, later made public, said that some senior departmental managers have "an attitude towards production reactor safety which on the face seems to be similar to that which existed in the space program prior to the *Challenger* accident. . . . Such a mindset presumes reactors are safe unless demonstrated otherwise."[145]

What began as an internal debate quickly spilled over into the public arena. Congressional hearings investigated the incident and the subsequent safety debate. The media eagerly pursued the issue. In October, the shutdown of the plutonium fabrication plant at Rocky Flats, Colorado, for safety code violations and revelations of radiation leaks at the uranium processing plant at Fernald, Ohio, heightened public scrutiny and expanded it to include the entire weapons complex. Environmental groups filed a lawsuit to prevent the Department from restarting the Savannah River K reactor before completing an environmental impact statement. Articles appeared almost daily in the *New York Times* and the *Washington Post*. The weekly news magazine *Time* did a cover story headlined, "'They Lied to Us': Unsafe, Aging U.S. Weapons Plants are Stirring Fear and Disillusion."[146]

An embattled Secretary Herrington handled the growing controversy with equanimity. He noted that the Department over the past three years had been its own harshest critic, and he announced a series of phased safety and management initiatives leading to the restart of the production reactors at Savannah River. "President Reagan, and myself as Secretary of Energy, will not operate unsafe reactors," Herrington declared. "We will meet the defense needs of this country in a safe and environmentally sensitive manner."[147]

In December the Office of Environment, Safety, and Health completed a preliminary study of 160 sites at the sixteen weapons complex facilities, ranking them according to their potential threat to the public. The rankings were intended to assist the Department in developing a long-range cleanup

program. The same month, the Department forwarded to the White House a draft report intended for Congress on the retirement and modernization of the facilities in the weapons productions complex. This study, known as the *2010 Report*, estimated that operation and maintenance of the weapons complex would cost $244 billion over the next twenty years. These costs included new production plants, waste facilities, and environmental and safety corrective action and compliance. The *2010 Report* recommended ending all materials production at Hanford and closing down the Rocky Flats and Fernald facilities as well as the Mound nuclear material plant near Miamisburg, Ohio. The report reiterated the Department's commitment to constructing two new production reactors and a $500 million special isotope separation plant in Idaho that would convert fuel-grade to weapon-grade plutonium.[148]

In one of his last addresses as Secretary, Herrington noted that no departmental reactor was producing tritium for nuclear weapons. Under current planning, he stated, "we are not going to be in a serious problem." The Department's biggest challenge, nonetheless, was to make certain equipment modifications and improvements in training so that the production reactors could be restarted. "Nuclear deterrence remains at the heart of our national security policy," Herrington observed. "This means that a healthy, viable nuclear weapons complex is not an option for this country, it is a necessity." He also warned that the Department's contractors must share in the commitment to safety: "Any private contractor that does business with the Department of Energy had better realize that with us as a customer comes the obligation of fair and responsible dealing."[149]

1988 Election

On November 8, 1988, George Bush was elected president of the United States. Energy issues again played a minimal role in the presidential campaign. The energy spokesperson for Democratic candidate Michael Dukakis noted that there really was not much difference between the two candidates on the issue of solving the Nation's energy problems. Both viewed oil imports as a serious threat to American security; both saw clean coal technologies as part of the solution to acid rain; and both agreed that alternative transportation fuels could affect the causes of global warming. A Bush spokesperson agreed that "there's not a huge difference in philosophy" between the two candidates, although he did suggest that "there is so in details." Bush advisers admitted that Dukakis was no "Jimmy Carter" on energy policy, but they contended that he would not adopt the "hands off" approach of the Reagan administration.[150]

Perhaps surprisingly, the growing controversy surrounding the Department's weapons complex never became an election issue. A White House official noted that "the Department of Energy is managing the situation very well." Another administration source confided to the *New York Times*: "If the news is going to be really bad, don't you want to make it an Energy Department disaster rather than a White House disaster?"[151]

The Department Under President Reagan

Secretary Herrington, having served longer than any secretary in the history of the Department, resigned in January 1989. In an exit interview, he observed that some accomplishments of the Department during his tenure included securing presidential authorization and congressional funding for the superconducting super collider, continuing to fill the Strategic Petroleum Reserve, and "putting in place a strong environment, health and safety plan" at the weapons complex. He noted that the failure to win decontrol of natural gas prices was a disappointment. Herrington acknowledged that President Reagan had been unable to obtain the elimination of the Department, but he asserted that the Department of Energy was now more to the President's liking. "I think the President is proud of how things ended up," Herrington stated. "The President was campaigning against [the Economic Regulatory Administration], federal regulation of refining capacity and petroleum production—those things that

caused the gas lines and artificial shortages. . . . We are out of the regulatory functions and we are doing the things an agency like this should be doing—administering R&D funds, national laboratories and the weapons facilities."[152]

As the 1988 election suggested, and in stark contrast to the partisan disputes of the 1970s, the controversy over energy policy had receded largely into the background during the Reagan Administration. But as the political discourse had evolved, so had the Department of Energy. Since its inception in 1977, the Department had witnessed significant organizational, policy, and budgetary changes. Not the least of these was the increasing proportion of the Department's budget dedicated to defense activities and the decreasing proportion allocated to energy research and development. In the Department's 1980 budget, defense activities accounted for 36 percent and energy research and development for over 45 percent of the total budget. In the final Reagan budget for 1990, these figures were 60 percent (including 7 percent for defense waste management) and 16 percent, respectively.[153]

PART VI
THE BUSH ADMINISTRATION, 1989-1993

WATKINS APPOINTED SECRETARY

One sensitive appointment facing President-elect Bush was that of secretary of energy. As attention continued to focus on the Department's besieged weapons complex, reports emerged of the ongoing "fierce fight" within the Department over balancing national security with health and safety needs. In addition, the new administration and its secretary of energy faced the long-term challenge of modernizing and cleaning up weapons production sites and facilities. Transition team officials indicated that "competent management" was the most important component in choosing the new secretary. Bush said that he was looking for someone with experience in nuclear energy. By Christmas secretary of energy was the only cabinet position left unfilled. Serious consideration briefly was given to James R. Schlesinger, Carter's energy secretary, but Schlesinger's unpopularity with the oil and gas industry and doubts about his secretarial performance during the Carter years soon derailed his candidacy.[154]

Not until January 12, 1989, the same day that the White House released the *2010 Report,* did Bush appoint Admiral James D. Watkins as secretary of energy. Former chief of naval operations until his retirement in 1986, Watkins was a nuclear engineer and had served in Rickover's nuclear-powered submarine program. His most recent role had been as chairman of the presidential AIDS commission. In announcing the appointment, the President-elect observed that both he and Watkins believed that "protecting the environment . . . is not at all inconsistent with advancing both energy security and national security needs." On energy policy, Bush noted that the Nation could not rely on one energy source, and he specifically singled out the use of nuclear power as a necessity. On the troubled weapons complex, the President-elect said that he was not committed to the *2010 Report* but he was committed to having Watkins formulate a policy that included safety and cleanup aspects. Watkins underscored Bush's comments with his personal commitment to safety and the environment. "I am confident," he told the press, "I can help find that desired and balanced formula wherein safety is never subverted, the environment is adequately protected, and national security and other energy objectives are achieved in harmony." Restarting the production reactors, he assured his audience, would "not be done at the expense of safety."[155]

Watkins' appointment as secretary was generally well received. The *New York Times* described Watkins as an "unusual leader" with "forceful opinions and [a] record of independence." The *Washington Post* cited his "political skill" and "competence." Bush attempted to assuage concerns in the oil and gas industry over his choice of a secretary with a nuclear power background by noting that "they got a president of the United States that came out of the oil and gas industry." Bush also nominated W. Henson Moore, former six-term congressman from Louisiana with ties to the oil and gas industry, to be deputy secretary. Less enthusiastic about Watkins' appointment was the environmental sector. A spokesperson for the Natural Resources Defense Council declared that the appointment "signals that cleaning up the bomb plants and developing a sound national energy policy will continue to be sacrificed in the name of nuclear weapons production."[156]

SETTING PRIORITIES

At his confirmation hearing, Admiral Watkins left no doubt that his initial priority would be cleaning up the contaminated weapons complex and putting defense operations "back on track." The primary problem, according to Watkins, was in the management area. Partly this was organizational. "I'm seeing a management system that is antique, it's out of date,

it's back in fifties technology," the Secretary-designate lamented. "If you look at our organization chart, you'll be aghast at the lack of attention to implementing policy. We are great on policy documents, but very poor on following up to see if they are implemented properly." The situation, Watkins added, "is a mess." But part of the managerial problem was also attributable to what Watkins described as the DOE and, more specifically, the defense program, "culture"—the set of values permeating the work atmosphere within which operations take place. "There is an urgent need to effect a significant change in its deeply imbedded thirty-five-year culture," he asserted, which has "evolved from such heavy emphasis on achieving production goals, made within an atmosphere of collegial secrecy, that problems relating to safety, health, and the environment have not only been backlogged to intolerable levels but, in effect, hidden from public view until recently." The sympathetic chairman of the Senate Energy Committee, J. Bennett Johnston, responded that it was "the most daunting management task I think we've ever given anybody in government since I've been here."[157]

Watkins, nonetheless, did not intend to limit his activities to the defense side of the Department. He told the Senate Energy Committee that he would be extremely active in all parts of departmental management and policy development. The day before his unanimous Senate confirmation, Watkins met with the Department's senior staff and targeted his "near term priorities." These included: 1) developing a new national energy plan, 2) funding the superconducting super collider, 3) issuing a third solicitation for the clean coal technology program, 4) completing safety upgrades at the Savannah River plant so that tritium production could be resumed, 5) lifting remaining

Admiral Watkins sworn in as Secretary of Energy (1989-1993) on March 9, 1989. (L to R) Watkins, Mrs. Watkins, President Bush, and Chief Justice William H. Rehnquist. Source: U.S. Department of Energy

Admiral Watkins and South Carolina Governor Carroll Campbell in front of the K production reactor at the Savannah River site. (L to R) Paul Lego, President and Chief Operating Officer for Westinghouse Electric Corporation; James S. Moore, President of Westinghouse Savannah River Company; Watkins; P.W. Casper, Manager of DOE's Savannah River Operation Office; Campbell. Source: *DOE This Month*, June 1989

price controls on natural gas, 6) obtaining legislative withdrawal of public lands used for the Waste Isolation Pilot Plant in New Mexico, and 7) restructuring the uranium enrichment operations.[158]

President Bush made clear, however, the top priority when he addressed Department employees at Watkins's swearing-in ceremony on March 9. Modernization and cleanup of the weapons production facilities were the most pressing of the many challenges facing the Department. Referring to Watkins, he noted that the Department faced "big challenges ahead, so I selected a big man to do a big job." Attempting to raise departmental morale, the President emphasized that the Department of Energy would not close. "There's been talk in the past that perhaps this Department was not necessary, was redundant, or its responsibilities could be taken over by others," he said. "You have important work to do. You're on the cutting edge now and this Department is here to stay." Watkins, in turn, called for a new "commitment to excellence" and asked employees to "help form a subculture that rejects mediocrity and substandard work."[159]

Priority One: The Weapons Complex

Admiral Watkins moved quickly to carry out his "first priority": corrective actions on the waste and environmental problems within the weapons production complex. Two weeks after taking office, he announced the appointment of a special assistant for coordination of DOE defense waste management. In addition, he ordered the preparation of a five-year cleanup plan to "characterize and prioritize" all waste cleanups at departmental sites. The focus of the plan would be to confine and correct immediate problems, ensure the basing of long-term cleanup plans on credible science and technology, and mandate compliance with all applicable laws. The plan, according to Watkins, would establish "agreed-upon milestones" with Congress and the states.[160]

In late April, Watkins toured the troubled Savannah River site. With the earliest restart of the tritium production reactors now pushed back to sometime in 1990, he declared that

production would not resume until a culture was established that made "safety the coequal of production." Three weeks later Watkins announced a reorganization under which the manager of Savannah River Operations, who had previously reported directly to the secretary, would now report to the assistant secretary for defense programs. As part of a "new management concept" emphasizing navy-style "line management accountability," Watkins removed responsibility for environmental and safety issues at Savannah River from the Department's Office of Environment, Safety and Health and placed it under the jurisdiction of the assistant secretary for defense programs. Defense programs would thus be "fully responsible" for its own activities. This caused consternation among environmental groups and within Congress, but Watkins reiterated that accountability and responsibility needed to be "clearly fixed in the DOE line management at all levels." He also offered reassurance that activities would continue to be subject to both internal and external oversight.[161]

In late June, Watkins announced his Ten-Point Plan to strengthen environmental protection and waste management activities at the Department's production, research, and testing facilities. The goal of the plan, the secretary declared, was to "restore credibility" to the Department by creating "a new culture of accountability." The plan's initiatives included establishing independent "tiger teams" to conduct environmental compliance assessments, forming a new management team within defense programs to emphasize safety over production, establishing a comprehensive epidemiological data repository containing information on past and present departmental workers, and accelerating the cleanup of the Department's facilities. One month later, Watkins announced the completion of the five-year cleanup plan. Through fiscal year 1995 the plan called for spending $16.5 billion at the highest priority sites with total costs for the same period set at $19.5 billion. In the fall, Watkins established the Office of Environmental Restoration and Waste Management, consolidating environmental cleanup, compliance, and waste management activities identified in the five-year plan.[162]

Despite Watkins' initiatives and efforts, however, environmental and safety problems continued to plague the Department. On June 6, the Justice Department announced that it was conducting a broad criminal investigation into possible violations of federal environmental laws at the Rocky Flats Plant. Simultaneously, agents from the Federal Bureau of Investigation, together with investigators from the Department and the Environmental Protection Agency, began seizing records and obtaining air, water, and soil samples at the site. Three weeks later an exasperated Watkins declared that he was "not proud nor pleased" with what he had seen during his first months in office. "The chickens have finally come home to roost," he stated, "and years of inattention to changing standards and demands regarding to the environment, safety and health are vividly exposed to public examination, in fact, almost daily."[163]

Watkins's efforts were further hampered by delays in filling key environmental and defense positions within the Department. Nonetheless, after a year in office the secretary stated his conviction that the Department had begun to resolve its difficulties now that clear directives were firmly in place. "Our attempt to get a grip on our Savannah River and Rocky Flats facilities has already proved successful," he declared. "They are both, in my opinion, now under what I call management control. This does not mean that we have achieved all of our objectives, but that we are aware of the problems we face and we know how to deal with them."[164]

Cold Fusion, Confusion, Fusion

In March 1989, two scientists from the University of Utah made the startling claim of having discovered a sustainable room-temperature nuclear fusion reaction. The process, known popularly as cold fusion, drew immediate worldwide attention. If proven and if subject to industrial-scale application, cold fusion provided promise of a virtually limitless source of clean, inexpensive energy. Scientists across

the country and throughout the world attempted to duplicate the Utah scientists' research results. Admiral Watkins ordered the Department's national laboratories to conduct intensified research efforts to more clearly understand the phenomenon. He also requested the Department's Energy Research and Advisory Board (ERAB) to establish a panel to conduct an independent review of the cold fusion claims. In May, the Los Alamos National Laboratory sponsored a scientific workshop on the subject and entered negotiations with the two scientists looking toward a collaborative effort to confirm cold fusion.[165]

Following an initial rush of enthusiasm, most scientists reported that they could not duplicate the cold fusion results. In an interim finding issued in mid-July, the ERAB cold fusion panel recommended against the establishment of any new cold fusion program at the Department. The experiments reported to date, the panel noted, "do not present convincing evidence that useful sources of energy will result from the phenomena attributed to cold fusion. Indeed, evidence for the discovery of a new nuclear process termed cold fusion is not persuasive. Hence no special programs to establish cold fusion research centers or to support new efforts to find cold fusion are justified at the present time." The panel's final report issued in November confirmed this assessment but with the added disclaimer that the cold fusion phenomenon could not be ruled out completely.[166]

While the cold fusion claims were reverberating throughout the scientific community, efforts were underway to redirect and restructure the Department's fusion program. In June 1989 Robert O. Hunter, director of the Department's Office of Energy Research, informed the Senate Energy and Natural Resources Committee of plans to transfer $50 million from the magnetic confinement fusion program to create an inertial confinement fusion program.[167] He also placed the construction of the next generation magnetic fusion research machine, the Compact Ignition Tokamak (CIT) to be built at Princeton, on hold.

Resistance to Hunter's plan was immediate. Supporters of magnetic fusion complained that the program, which had been funded at a constant $350 million for most of the past decade, was already under budget strains. Congress, seeing that the Department itself was advocating cutting back on magnetic fusion, trimmed the magnetic fusion budget without funding inertial confinement fusion. Watkins generally supported the proposal to set up a competition between the two fusion technologies, noting the need to inject some "excitement" into the research endeavor and to strengthen congressional support. Because of the controversy, the secretary in March 1990 established the Fusion Policy Advisory Committee to map out future goals for fusion research.[168]

Despite warnings from Watkins that expectations should be pared in the face of prolonged budget difficulties, the advisory committee, in its report released in September, recommended doubling the Department's fusion budget over the next seven years. The committee called for the creation of a single office to oversee both magnetic and inertial confinement research. "Pursuing both options at this time," the committee stated, "reduces the technical risk."[169]

Budget strictures, however, soon intervened. Only a month later, Congress unexpectedly slashed almost $50 million from the magnetic fusion program. In December Watkins announced the closing of experimental reactor facilities at Oak Ridge and Los Alamos. In the face of these budget realities, the Department in fall 1991, upon the recommendation of the Fusion Policy Advisory Committee, canceled the CIT—since renamed the Burning Plasma Experiment. Strong support for the fusion program, nonetheless, continued within the Department. In October 1991 the Department established an inertial confinement fusion program to proceed in parallel with the magnetic fusion program until one proved to be technically superior. The Department's 1993 budget request for fusion totaled almost $360 million—$350 million for magnetic fusion and $9 million for inertial confinement fusion.

Representatives of the four signatory parties on July 21, 1992, sign the international agreement design plan for an International Thermonuclear Experimental Reactor (ITER). Signers (L to R) are Viktor Mikhailov of Russia, Hiroshi Hirabayashi of Japan, Andreas van Agt of the Commission of European Communities, and Admiral Watkins. Standing (L to R) are Akihiro Aoki of Japan, Helen Donoghue of the European Communities, Michael Roberts of the U.S. Department of Energy, and Anatoliy Shurygin of Russia. Source: U.S. Department of Energy

Department also sought to reprogram funds from the Burning Plasma Experiment to design work on the Tokamak Physics Experiment, a steady state tokamak reactor. In addition, the Department pledged to continue and increase participation in the International Thermonuclear Experimental Reactor program. This multi-billion-dollar joint effort with the European Community, Japan, and the Russian Republic envisions the construction of an international test reactor to be completed about 2005. The Department's long-range strategy foresees an operating demonstration plant about 2025 and an operating commercial plant about 2040.[170]

Nuclear Power

Expectations that Admiral Watkins with his background in the nuclear navy would be a strong advocate of nuclear power were not disappointed. On March 28, 1989, the tenth anniversary of the Three Mile Island accident, Watkins stressed the administration's commitment to a strong and viable nuclear power industry. The Nation, he declared, was at a "crossroads" at which it "must push beyond the threshold into a new era of nuclear progress." Technological "know-how" was not the problem according to Watkins. Rather, the promise of nuclear power was limited by a "political consensus that continues to stifle a commitment to move forward."[171]

Watkins immediately moved to challenge this consensus. In one of his first public appearances after becoming secretary, he denounced efforts by New York State officials to acquire and dismantle the recently completed Shoreham nuclear power plant on Long Island. State and local officials did not believe that the 810-megawatt Shoreham plant, which had been built at a cost of nearly $6 billion, could be operated safely. Noting the serious concerns in the Northeast with electricity supply, Watkins declared that "it is very difficult for me to understand, as a nuclear trained person who came from a very strict environment, how we could do something like this." Two days later in a Long Island newspaper editorial page column entitled "The Shoreham Deal Is Stuff and Nonsense," he said that "to move ahead on the dismantling of Shoreham would be utterly irresponsible." In his first press conference, Watkins pledged to do "everything within my power" to prevent the dismantlement. "There is no way I will give up on this battle," he asserted. "I plan to get myself involved every step of the way. If activists can stop something from being built, then, by God, I can try to prevent something from being torn down."[172]

Part of Watkins' efforts to prevent the Shoreham dismantlement involved informing and educating interest groups, Congress, and other organizations. More actively, Watkins asked the Nuclear Regulatory Commission to prepare a comprehensive environmental impact statement on New York's dismantlement plan. He hoped the Commission would examine significant environmental impacts associated with alternative energy sources and energy reliability problems on Long Island. In addition, the Department asked the Department of Justice to intervene in the New York State courts to prevent the transfer of the plant to the state. Watkins, nonetheless, was not sanguine about the possibility of Shoreham ever opening and operating. What he was trying to do, he admitted, was to keep the plant from being dismantled so that it would be possible to revisit the issue at a future date. Even this, however, was an uphill battle. By spring 1992, prospects for saving Shoreham looked dim. The Department and other Shoreham supporters had prolonged the controversy, but the Nuclear Regulatory Commission decided to allow closure without requiring a full environmental impact statement. Other recourses, as well, were running out, and the state was laying plans for immediate dismantlement.[173]

More promising for the future of nuclear power were the Department's reactor development activities. "A nuclear renaissance," as Acting Assistant Secretary for Nuclear Energy Jerry D. Griffith put it, "is inevitable," and the Department thus continued its efforts to develop passively safe advanced reactor designs that would automatically shut down in an emergency. The Department's civilian reactor program comprised two "parallel and complementary" elements: 1) development of a standardized advanced light water design, and 2) research and development for the modular high-temperature gas reactor and the advanced liquid metal reactor. The Department projected that the advanced light water design would be available by 1995, with the objective of having the first new plant operational by 2000. The Department hoped to demonstrate the commercial potential of the modular high-temperature gas reactor by 2010.[174]

Nuclear Waste: Yucca Mountain

A resurgent nuclear power industry depended upon successful management of the nuclear waste program. At Admiral Watkins' confirmation hearing, Senator Johnston charged that the Department's program lacked aggressive leadership and was in "shambles." Some of the Department's difficulties were attributable to the State of Nevada's continued opposition to the proposed Yucca Mountain high-level waste repository. Ongoing delays caused the Department to announce in 1988 that it would be unable to accept spent reactor fuel by the 1998 date established under the Nuclear Waste Policy Act. This prompted a nuclear utility steering group to consider but narrowly reject a recommendation that the industry sue the Department for alleged violations of the act.[175]

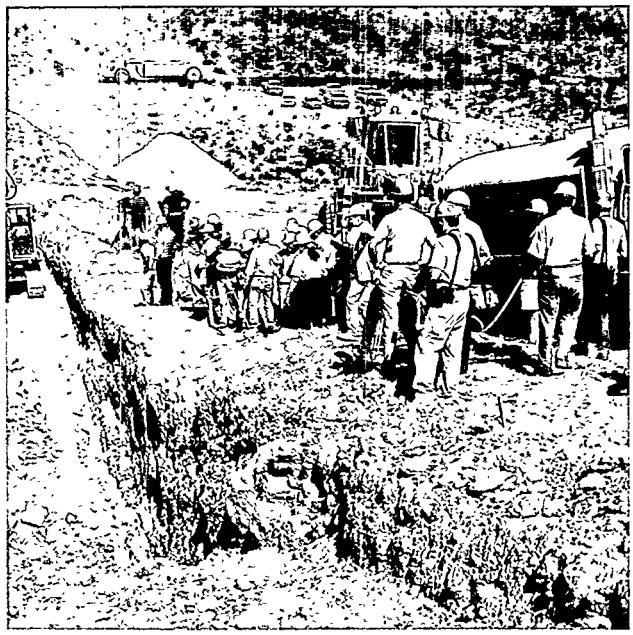
In his Three Mile Island tenth anniversary statement, Watkins noted that the success of the waste management program was of the "utmost importance." A month later, he told reporters that the Department would probably have to "restructure the program" and announce "some kind of new approach." One aspect of this new approach involved offering an olive branch to Nevada. "I think we were moving too aggressively and did not give them a chance," Watkins observed, "and they really felt they were being put upon. And, I think to a certain extent they were right." In late May, Watkins met with Nevada Governor Robert Miller and the State's congressional delegation. He assured the Nevadans that Yucca Mountain was "not a done deal" and the final decision on the repository would be made on scientific rather than political considerations.[176]

Nevada officials, nevertheless, were not eager to cooperate with the Department. In July, Miller signed into law a bill declaring it "unlawful for any person or governmental entity to store high-level radioactive waste in Nevada." Two months later, Miller formally "vetoed" the repository, citing provisions in the Nuclear Waste Policy Act providing veto powers to the state chosen as the repository host. Meanwhile, Nevada Senator Richard Bryan, angry over legislation restricting federal funds for the

State's study of the waste site, blocked confirmation of four of the Department's assistant secretary-level nominees. Most significantly, however, in November Miller invalidated the Department's applications for state air and water permits necessary to conduct studies to determine site suitability.[177]

The Department fought back. In late November, Deputy Secretary Moore announced an "integrated, all inclusive, responsible" high-level waste management plan. The Department's new initiatives included restructuring the Department's Office of Civilian Radioactive Waste Management and redirecting lines of responsibility. The Department also pushed the opening date for the high-level waste repository back from 2003 to 2010. In addition, Moore noted the end of Watkins' hoped-for entente with Nevada. "We've talked, we've offered compromise, we've sought to meet legitimate concerns," the deputy secretary observed. "But we have a responsibility to the Congress, and to the American people. We have sought in a responsible manner permits which should have taken 75 days to receive. It has been 2 years and we have not received the first one requested. . . . This is not a reasonable response . . . . enough is enough." Accordingly, Moore stated, the Department was asking the Justice Department to file suit to obtain the necessary permits.[178]

Site characterization work at Yucca Mountain remained stalled while the legal battle between the Department and Nevada worked itself through the courts. In late December 1989, Nevada asked a federal court to order the Department to halt all work at Yucca Mountain. Nevada claimed that the Department was violating the Nuclear Waste Policy Act by continuing efforts despite the State's legal veto of the site. A month later, the Department sued Nevada, claiming that the State's veto was "premature and without merit." The Department asked the Court to order the State to process the necessary permits for site characterization. In September 1990 the United States Court of Appeals rejected Nevada's suit, a decision upheld by the Supreme Court in March 1991. Meanwhile, the courts ordered the State to



Preliminary digging begins on July 8, 1991, for Yucca Mountain site evaluation following the State of Nevada's issuance of an air quality permit.

Source: U.S. Department of Energy

begin processing the permits. Site characterization began in July following the State's granting of the first permit. The last of the permits in question was not obtained until March 1992.[179]

The high-level waste program, as John W. Bartlett, director of the Department's Office of Civilian Radioactive Waste Management, noted, was now showing "significant progress." But the process, Bartlett added, was "still vulnerable to delaying tactics." Indeed, Nevada officials, in spite of their legal setbacks, had hardly acquiesced to the Yucca Mountain repository. As a spokesman for Senator Bryan observed following the Supreme Court decision, it was "just one skirmish in what has been and will be a long battle."[180]

Nuclear Waste: MRS and WIPP

The Department was also engaged in "long battles" in attempting to carry out two additional waste management projects: the Monitored Retrievable Storage (MRS) site and the Waste Isolation Pilot Plant (WIPP). The National Waste Policy Act envisioned the MRS as an interim storage site for high-level waste until a permanent site was open and operating.

With long-term slippage in the projected opening of a permanent site, the Department viewed the MRS site as a way to fulfill legal requirements under the act to begin accepting spent reactor fuel from nuclear utilities by 1998. The Department also believed that selection of an MRS site would show progress in solving the waste management problem and therefore serve as a possible basis for the start of new nuclear power plant orders. The problem with MRS siting, however, was the same as with the permanent site: finding a willing host. The Nuclear Waste Policy Act created the position of nuclear waste negotiator to identify a state or Indian tribe amenable to hosting a MRS facility. As of February 1992, seven entities had applied to the Department for grants to study the feasibility of a MRS siting.[181]

The Department spent $700 million and seven years constructing the WIPP facility at a site located about twenty-five miles east of Carlsbad, New Mexico. Designed as a permanent disposal facility for 800,000 barrels of transuranic defense wastes, including contaminated clothing, plutonium fabrication hardware, and wastewater treatment sludge, WIPP was scheduled to begin receiving waste shipments in fall 1988. Safety and environmental concerns, however, delayed the opening. In October 1989, Watkins unveiled a restructured program for WIPP. The Department now anticipated placing experimental amounts of waste in WIPP by mid-1990. Delays, nonetheless, continued, and the Department pushed back the scheduled opening. In January 1991, the Department obtained from the Department of Interior an administrative land withdrawal giving the Department full control of the WIPP site. Congressional complaints prompted Interior to suspend the withdrawal, thus providing Congress the opportunity to develop its own withdrawal. As Congress debated, and as New Mexico officials attempted to gain more safeguards and benefits for the State, Watkins grew increasingly impatient. In early October, he announced that WIPP was ready to commence its experimental phase, and he again sought an administrative withdrawal of the land. The State of New Mexico filed suit, requesting an injunction against proceeding with the experimental phase, and in late January 1992 a Federal judge ruled that a congressionally approved land withdrawal was necessary. The Department appealed the decision. After further legislative and judicial wrangling, Congress passed and, on October 30, 1992, President Bush signed the WIPP Land Withdrawal Act.[182]

Making of the National Energy Strategy

Section 801 of the Department of Energy Organization Act required the President to submit his biennial national energy policy plan to Congress by April 1, 1989. Like its predecessor, the Bush Administration stressed that the Nation's energy security relied on a mixture of energy sources, including coal, nuclear power, oil and natural gas, alternative fuels, renewables, and conservation. But, as Admiral Watkins complained, there seemed to be "no common thread" permitting conversion to an action plan, "no integrated link" leading to a strategy to bring programs and policies to fruition over time. Seeking a new approach and hoping to build a national consensus, the new administration did not meet the April 1 deadline for submitting the national energy policy plan. Watkins, nonetheless, affirmed the Department's intent to develop a sound national energy policy, coupled with an integrated strategy to carry out that policy. "I think you will agree that the time has come to turn the frequently divisive fifteen-year-old energy debate into a sensible plan of action," he told the Western Governors Association. "In the past the Department of Energy has not assumed a national leadership role in this effort—on my watch it will."[183]

On July 26, President Bush, accompanied by Watkins, announced that the Department was developing a comprehensive National Energy Strategy. "We cannot and will not wait," the President declared, "for the next energy crisis to force us to respond." He said that

the "keystone" of the strategy would be the continuation of the "successful policy of market reliance." In his mandate to the Department, Bush noted that the need for reasonably priced energy, a safer and healthier environment, a vital economy, and reduced dependence on unreliable energy suppliers must all be "balanced" in the strategy. Watkins seconded the President's enthusiasm, observing that the development of an integrated National Energy Strategy was among the "highest priority actions" that the Department and administration would undertake. The secretary detailed a "top-down, bottom-up" process consisting of public hearings, energy modeling, departmental task forces, including participation by the national laboratories, and interagency give-and-take. Watkins projected that an interim report would be to Congress by April 1, 1990, with final submission to the President by December 1990.[184]

The Department held five "fact-finding" hearings in August and September 1989. The Department designed these hearings to set the stage, seek information, and define the nature and the scope of the issues. Ten "issue-oriented" hearings were held during winter 1989-1990. The Department organized these hearings around specific energy-related themes: the domestic energy resource base, national security, environment, transportation, industrial productivity, international competitiveness, agriculture, energy regulations, science, and taxes.[185]

Following seven months of gathering information, the Department issued its interim report in April 1990. The Department had originally intended to include in the report several "first step" action items, including measures calling for enhanced energy efficiency and increased use of renewable resources. Opposition from other agencies concerned with inadequate time to review the items, however, caused the cabinet-level Economic Policy Council to delete the action items from the report. Instead, the report was a compilation of the public comments received by the Department. The interim report identified 49 goals, 449 obstacles, and 756 options. In summarizing the public comments, the Department noted that the "loudest single message was to increase energy efficiency in every sector of energy use."[186]

A third round of hearings, examining in particular energy and public health and energy pricing as a policy tool, were held during summer 1990. A total of 499 witnesses presented testimony at eighteen hearings. In addition, interested parties submitted more than 2,000 written comments. Also during the summer, the Department held workshops on energy efficiency, renewable energy, and energy technology for developing countries. Simultaneously, the Department began its internal analysis, attempting to winnow down the available options and prepare a draft strategy to present to the President. At the interagency level, an Economic Policy Council working group, headed by Deputy Secretary Moore, formed subgroups to focus specifically on energy security, electricity, and the environment. In October, the Department presented its draft options to the Economic Policy Council. Five cabinet meetings were held, two of which were led by the President. On December 21, Watkins and other members of the Economic Policy Council presented President Bush with a report that included some sixty options for the new strategy. Watkins noted that it was "a very good document in the making," and he predicted that the President would present the new National Energy Strategy, with budget and legislative proposals, to Congress by early February.[187]

The Persian Gulf Crisis

In the midst of the making of the National Energy Strategy, a major international crisis loomed suddenly in the oil-rich Persian Gulf. Following several weeks of saber-rattling, the troops of Iraqi President Saddam Hussein on August 2, 1990, invaded and occupied Kuwait. The United Nations condemned Saddam's illegal seizure of Kuwait and embargoed both Iraqi and Kuwaiti oil. Meanwhile, President Bush spearheaded Operation Desert Shield, the buildup of a coalition military force in the Persian Gulf to prevent further aggression.

The Department's role in the crisis was to calm the oil market, reassure the public and inform the press on energy issues, enhance energy coordination with United States trading partners and especially with the International Energy Agency (IEA), and stimulate energy conservation and domestic energy production.

The Department's response to the August 2 invasion was immediate. The Energy Information Administration began distributing a daily oil-supply report. The Department established close liaison with other federal agencies, the IEA, and NATO. Departmental policy makers decided to maintain the existing schedule for completing the National Energy Strategy. Any short- or mid-term proposals developed to deal with the gulf crisis, however, would have to be consistent with the completed National Energy Strategy.[188]

On the day of the invasion, Admiral Watkins declared that oil supplies were adequate to meet current demand. World inventories, he added, were high. Other departmental officials emphasized that there was no threat to oil availability and no "supply-and-demand" reason for price increases. Iraqi and Kuwaiti production, nonetheless, constituted some 4.3 million barrels per day, or approximately 9 percent of the daily consumption of the "free world." Spot prices on crude oil thus rose rapidly, as did domestic gasoline prices. On August 6, the Departments of Energy, Justice, and Transportation expressed "concern" with the price increases. "We at DOE," noted Deputy Secretary Moore, "have no authority to dictate prices, nor should we, but we do have a responsibility to the American public to monitor and report market trends." Three days later, Watkins met with representatives of oil-producing and -consuming industries. They discussed ways to counter the Iraqi-Kuwaiti oil losses, and Watkins asserted that the crisis was the Department's "top priority."[189]

On August 15, Watkins and Moore held a news conference to announce plans developed by the Department to increase oil production and decrease consumption. In attempting to, in Watkins' words, "essentially finesse" the 4.3 million barrels-a-day production loss, the secretary said that oil producers had agreed to increase production on Alaska's North Slope by 50,000 barrels per day. He also anticipated incremental production increases from other domestic fields. Watkins noted, in addition, that the President had asked other nations, including Saudi Arabia, the United Arab Emirates, and Venezuela, to increase production. On the conservation side, Moore urged Americans to reduce gasoline use by increasing tire pressure, observing the speed limit, using more efficient automobiles, and joining car pools.[190]

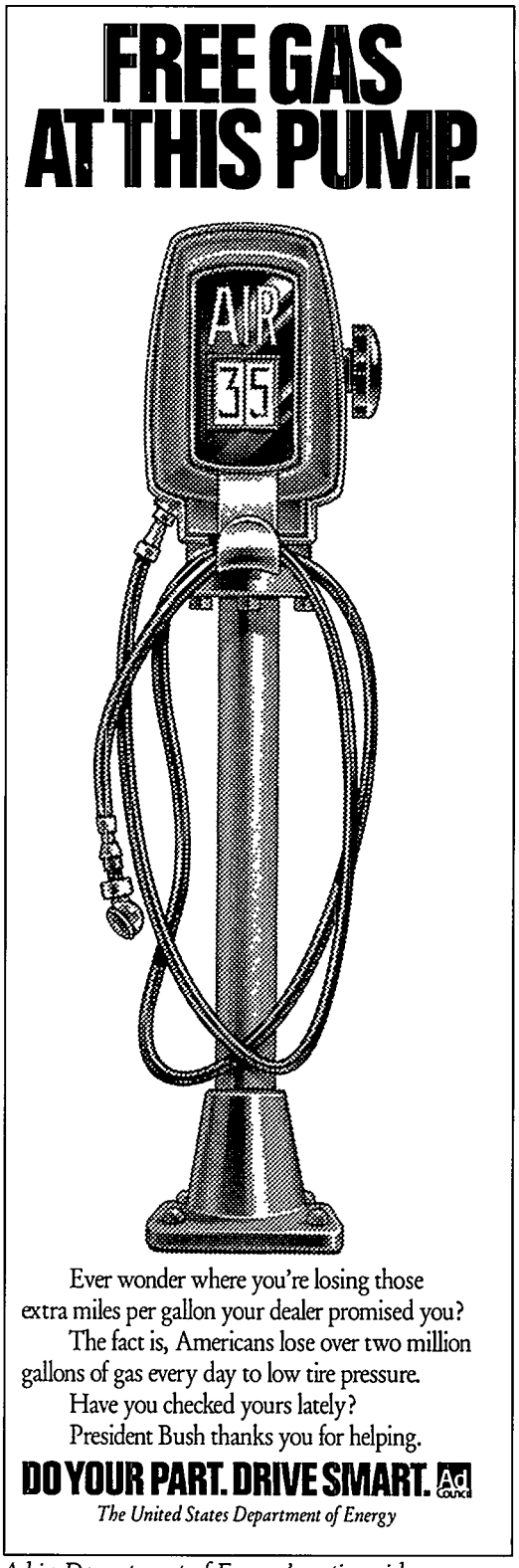
The following week, the Department, after sustained internal debate, recommended that the United States draw down its strategic reserves. The Strategic Petroleum Reserve consisted of 590 million barrels of oil stored in Texas and Louisiana. This was an amount equal to approximately three months of oil imports. The Department argued that a drawdown would steady prices and calm public fears of shortages. The White House, however, rejected the recommendation. White House Chief of Staff John Sununu and Office of Management and Budget Director Richard Darman opposed a drawdown, according to the *Wall Street Journal*, because the oil supply situation was not drastic enough to warrant such a dramatic step. A drawdown without a physical shortage of oil was unacceptable because it would involve price-rigging and tampering with the market.[191]

The Department, nevertheless, continued its efforts to increase production and decrease consumption. On August 29, the Department sent proposals to the White House for tax credits for alternative energy investments and for opening the Arctic National Wildlife Refuge in Alaska for oil exploration. Two days later Watkins announced that the Department would begin a nationwide energy conservation campaign ("Do Your Part. Drive Smart"). On September 13, the secretary presented the Senate Energy Committee with a list of "medium-term" actions the Department planned to take over the next eighteen to twenty-four months. These included expediting production

and pipeline projects, working with state and other regulatory organizations to reduce the use of oil-fired electricity, and converting government automobile fleets to operate on alternative fuels. Watkins predicted that these actions, with the "short-term" actions announced August 15, could reduce United States oil imports by more than one million barrels per day.[192]

World oil prices continued to climb until they began to level off in late September. A barrel of oil, at $35 to $40, now cost twice as much as it had three months earlier. Nonetheless, it was apparent that "surge" production from foreign oil producers had replaced the lost Iraqi and Kuwaiti oil. Markets calmed as it became clear that the $60, $80, or even $100 per barrel prices predicted by some analysts would not be realized. Over the next few months, the Department continued to exercise a soothing influence on the markets. On November 29, Watkins reported that the steps taken by the Department to increase oil production and cut oil consumption were working. "The reduction in U.S. imports and demand for oil," Watkins concluded, "is the result of price increases and the conservation, efficiency and production measures we have taken."[193]

As the price of oil stabilized in fall 1990, the Department's attention shifted from responding to the oil shortage produced by the Iraqi invasion to developing response options if war began between coalition and Iraqi forces. In late September-early October, the Department conducted a "readiness test" of the Strategic Petroleum Reserve by selling five million barrels of oil. During the fall, Department officials engaged in five gaming exercises based on various scenarios to test the Department's emergency management preparedness. In early December, Admiral Watkins visited the Persian Gulf and met with General Norman Schwarzkopf, commander in chief, U.S. Central Command, who assured him that the Saudi oil fields would be safe from Iraqi attack. Watkins also established a special communications link between the



Ad in Department of Energy's nationwide energy conservation campaign following Iraqi invasion of Kuwait. Source: Advertising Council

Department and the U.S. embassy in Saudi Arabia as a mechanism for obtaining "real time," credible information, thus increasing the Department's ability to puncture rumors that could produce significant oil price fluctuations.[194]

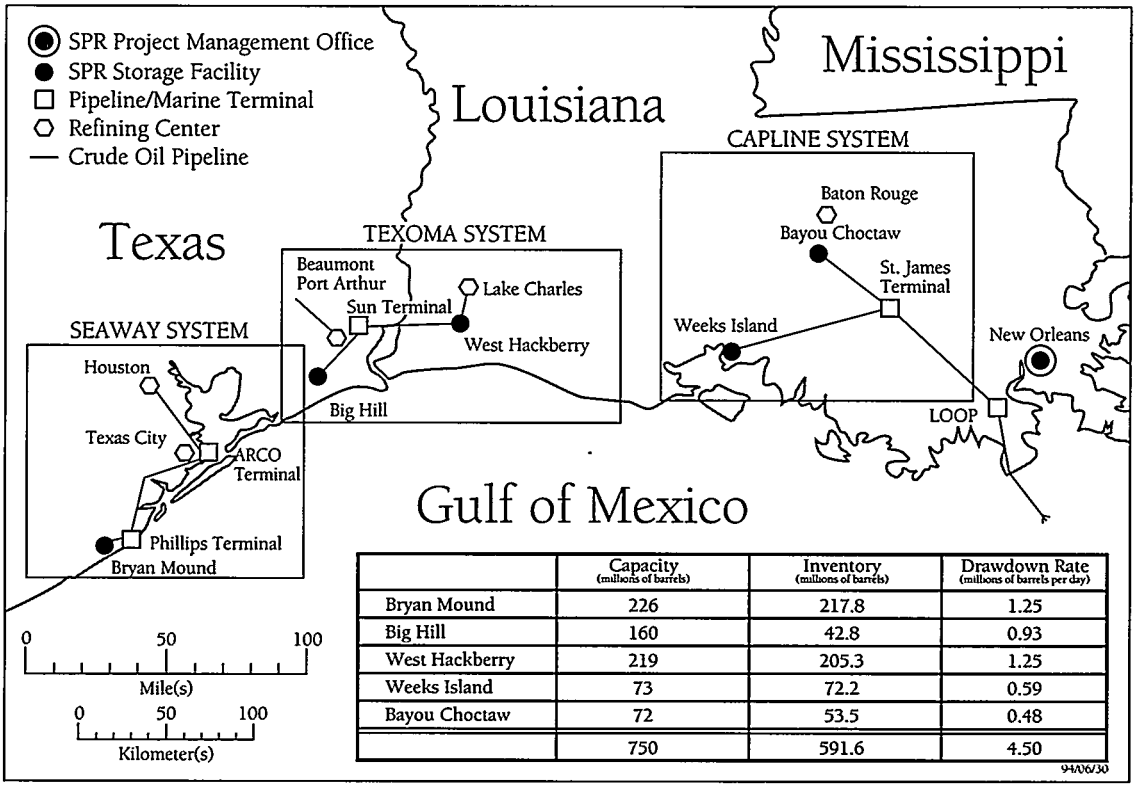
Convinced that a sharp oil price increase would invariably result at the beginning of conflict, Department officials believed that increases could best be reduced through a coordinated IEA response. In late December, Watkins instructed Assistant Secretary for International Affairs and Energy Emergencies John Easton to work with the State Department to gain agreement for a coordinated stock drawdown with the IEA. On January 11, 1991, the IEA Governing Board agreed to a contingency plan combining a stockdraw with demand restraint measures. The overall plan amounted to 2.5 million barrels per day, with a 1.9 million barrels per day stockdraw. The United States portion of this, to be drawn from the Strategic Petroleum Reserve, was 1.1 million barrels per day.[195]

As the Department's response options were coming together, Watkins redoubled his efforts to reassure a worried public. On December 7, before the Council on Foreign Relations, he declared that oil markets were stable, supplies were plentiful, and large price increases could be avoided in case of a gulf war if common sense prevailed. "We have our act together," he asserted. "There is just no reason for a substantial increase in oil prices should hostilities develop."[196]

A month later, on January 11, Watkins informed the state governors that "oil production and inventories are more than satisfactory to meet our energy needs." He promised that the Department would keep a careful watch on energy supplies and would distribute "real-time" information. He also described the contingency plan adopted by the IEA Governing Board to protect supplies upon war.[197]

Operation Desert Storm

The United Nations had set January 15, 1991, as the deadline for Saddam Hussein to withdraw



	Capacity (millions of barrels)	Inventory (millions of barrels)	Drawdown Rate (millions of barrels per day)
Bryan Mound	226	217.8	1.25
Big Hill	160	42.8	0.93
West Hackberry	219	205.3	1.25
Weeks Island	73	72.2	0.59
Bayou Choctaw	72	53.5	0.48
	750	591.6	4.50

94/06/30

The Strategic Petroleum Reserve complex as of January 1991. Source: U.S. Department of Energy

from Kuwait. When this deadline was ignored, coalition forces launched Operation Desert Storm during the night of January 16-17. The Department, meanwhile, had activated a round-the-clock Gulf Crisis Watch Team. Headed by an official at the assistant secretary level, the Watch Team was tasked with keeping the secretary fully informed, coordinating the response to all incoming inquiries, overseeing all outgoing communications, and developing the Department's response actions. The Watch Team kept in daily contact with the Gulf.

Oil prices, to almost everyone's surprise, soared briefly and then dropped dramatically soon after the initial coalition air strikes. So overwhelming was the success of the first strikes that the markets became convinced that Saudi production facilities would not be disrupted. With supplies ample and prices low, the IEA stockdraw contingency plan, nonetheless, went forward. The Department received fifty-six offers from twenty-six firms for Strategic Petroleum Reserve oil. Because of buyers' lack of interest, however, the Department withdrew half the offered oil.

Operation Desert Storm drove Iraqi forces from Kuwait with little attendant oil supply disruption. The Department, therefore, played a relatively minor role during the conflict. The Department did provide support and technical assistance to the Defense Department and other government agencies during both the war and its aftermath when international efforts were turned to restoring Kuwait's oil-producing capacity and ameliorating the environmental damage done by the Iraqis.[198]

The National Energy Strategy

On February 20, 1991, President Bush presented the National Energy Strategy to the Congress and the American people. Noting that the plan reflected his administration's commitment to "the power of the marketplace," the President declared that it offered the Nation an energy future that was "secure, efficient, and environmentally sound." The proposals would "maintain an uncompromising commitment to energy security and environmental protection," he observed, "and put America on the road to continued environmental growth."[199]

Admiral Watkins, who met with reporters after Bush announced the plan, concurred with the President. Calling the National Energy Strategy "powerful ideas for America," Watkins said that it was the first such effort designed to provide energy security, environmental quality, and affordable energy through "free market incentives, reduced regulation, and increased federal investment in research and development." Past attempts at charting an energy policy, the secretary of energy noted, "have relied on controls, taxes, subsidies, and regulation. Government alone cannot be the answer. This strategy lays the foundations for our future by protecting and improving our standard of living and increasing the international competitiveness of American industries. It addresses the challenge of supplying our necessary energy without imposing harsh command and control measures, such as taxes, on our people and restrictive regulation on our business and industry."[200]

Specifically, the 214-page *National Energy Strategy* offered what it termed a "balanced" program of greater energy efficiency, alternative fuels usage, and "environmentally responsible" development of all energy resources. Noting that the Nation's basic energy vulnerability involved oil, the strategy called for a "broad array" of actions to reduce the vulnerability. These included maintaining adequate energy reserves, increasing transportation efficiency, increasing domestic petroleum production, and further deregulating natural gas. Fossil fuels, nuclear power, and renewables would all play a role in the energy mix. Domestic petroleum production could be increased by 1.8 million barrels per day above projected levels for the year 2000—and 3.8 million barrels for the year 2010—partly by advanced oil recovery technology and partly by opening the outer continental shelf and the Arctic National Wildlife Refuge (ANWR) for production. Domestic petroleum consumption could be decreased by 1.3 million barrels per day by 2000—and 3.4 million barrels by 2010—largely by using alternative fuels in vehicles.

Admiral Watkins, assisted by Donald J. Hein, Chairman of Washington Gas, gases up a government staff car at the opening on capitol hill of a natural gas fueling station. The fuel goes in under the hood.

Source: U.S. Department of Energy

During the drafting of the National Energy Strategy, the administration had examined oil import fees, large gasoline taxes, subsidies for certain fuel production, mandated use of alternative fuels, and sharply higher fuel efficiency standards for cars. Implementing these measures could reduce oil imports substantially, but the administration rejected them because "the cost would be very high—in higher prices to American consumers, lost jobs, and less competitive U.S. industries."[201] Indeed, certain measures promoting energy efficiency and renewable energy production for which the Department had pushed hard were stricken from the National Energy Strategy because they would have cost the federal treasury too much money. J. Michael Davis, the Department's assistant secretary for conservation and renewable energy, noted, however, that eventually some of these measures would "probably be added back in some form or another."[202]

Implementing the National Energy Strategy

Public response to the National Energy Strategy was mixed. Environmentalists decried what they perceived to be the strategy's pro-production bias at the expense of energy efficiency and conservation. Missing, according to environmental and consumer groups, was the one essential measure: increases in the corporate average fuel economy (CAFE) standard for automobiles. The oil, gas, and nuclear power industries, in contrast, widely acclaimed the pro-production strategy. The American Petroleum Institute said that the plan "appropriately encourages" domestic oil and natural gas exploration and production, and the Interstate Natural Gas Association of America expressed its pleasure with provisions concerning expediting construction of new pipelines and increasing exploration for new gas supplies.[203]

Congressmen praised Energy Secretary Watkins for his efforts, but few Democrats were too enthusiastic with the plan itself. House Majority Leader Richard A. Gephardt (D-MO) charged that the plan would leave the Nation as dependent on foreign oil in the year 2001 as it was in 1991. Senator Timothy Wirth (D-CO) commended Watkins but blamed the White House for "whittling away" the Department's proposals until little was left but "a rehash of oil ideas and unsound policy." House Energy and Commerce Committee Chairman John Dingell (D-MI) said that the emphasis on production was the "one needed component of any energy policy." He added, however, that the energy problem would not be solved without the imposition of energy taxes—a position also taken by various editorial page pundits, most conservative, free-market economists, and a growing number of environmentalists. Some Democratic leaders were more positive in their reaction to the National Energy Strategy. Senator Johnston declared that the President "put out a good package." Congressman Philip Sharp (D-IN), chairman of the energy and power subcommittee of the Energy and Commerce Committee, said that Bush had taken a "dramatic step" on energy

issues. Republicans on Capitol Hill were generally favorable, although some had misgivings. Senator Pete V. Domenici (R-NM), for example, hailed the strategy as an "important first step" but said that it could be improved if it contained an oil import fee and stronger conservation incentives.[204]

In spite of the passions engendered in interest groups and on the Hill, and even though energy supply played a major role in the Gulf war, the public itself was largely apathetic on energy issues. A public opinion poll found that only 12 percent of those surveyed rated energy as one of their three most important areas of concern. By contrast, 36 percent claimed environmental protection as among their top concerns. With public sentiment wavering, Congressman Sharp noted, Congress was not in a position to make the United States energy-independent. But "incremental progress," he quickly added, "is still progress."[205]

Nearly three-quarters of the National Energy Strategy measures could be carried out without congressional action. Legislation, nonetheless, was "essential" to fully achieve the plan's objectives. On March 4, 1991, Watkins transmitted the administration's comprehensive bill to the House and Senate. This soon languished, but many National Energy Strategy measures were included in an omnibus energy bill co-sponsored by Johnston and Senator Malcolm Wallop (R-WY), the Energy Committee's ranking Republican. In late May, the committee approved the Johnston-Wallop bill—the first comprehensive energy package reported by the committee in a decade. President Bush praised the legislation, and Watkins hailed it as "a monumental achievement." Opponents, however, criticized the bill as being too pro-production. The bill opened Alaska's Arctic National Wildlife Refuge to oil and gas exploration and eased controls on the nuclear, gas pipeline, and electric industries. The bill did not contain stricter CAFE standards, but Johnston promised to introduce such standards before the full Senate. Nonetheless, when the bill came to the Senate floor in October, a group of senators backed by consumer and environmental organizations launched a filibuster. An attempt to defeat the filibuster fell ten votes short. Deputy Secretary Moore urged Johnston to seek a second vote on cloture, but the senator conceded defeat and offered to discuss a compromise with opponents to the bill.[206]

Deputy Secretary W. Henson Moore (left) examines ground zero *prior to the* Distant Zenith *nuclear weapons effects test at the Nevada Test Site.*

Source: Johnson Controls World Services Inc., Mercury, NV

The Weapons Complex and the End of the Cold War

In November 1990 President Bush formally declared that the Cold War was over. A dizzying series of events, including the breaching of the Berlin Wall, the collapse of Communism in Eastern Europe, and the reunification of Germany, had heralded the end of the four-decade long struggle. More surprises followed as the world witnessed the dissolution of the Soviet Union itself in fall 1991. These events, coupled with ever more dramatic arms control initiatives, had an impact, as Admiral Watkins observed, felt around the world, across the Nation, and particularly at the Department of Energy.[207]

The impact of the end of the Cold War fell most directly on the Department's national security programs. The *2010 Report* on the modernization of the nuclear weapons complex, submitted to Congress in January 1989, assumed, among other things, a relatively constant nuclear weapons program. The rapidly evolving international situation, however, soon called this assumption into

question. Consequently, Watkins, in September 1989, established a Modernization Review Committee to review the assumptions and recommendations of the *2010 Report*. The following August, the secretary issued additional guidance to the committee that emphasized a future weapons complex that would be smaller, less diverse, and less expensive to operate. Simultaneously, the Department's fiscal year 1991 budget request asked Congress to cancel the special isotope separation plant because weapon needs could be met using existing plutonium resources.[208]

In February 1991, Watkins released the report of the Modernization Review Committee, since renamed the Complex Reconfiguration Committee. The committee presented two options for a reconfigured weapons complex, to be in place early in the twenty-first century, called Complex-21. The first approach, characterized as "downsize and modernize in place," called for upgrading, replacing, or consolidating most facilities at their current site. The exception to the "relatively minor" consolidations and closeouts under this option would be the relocation of the manufacturing operations of the Rocky Flats plant. The second approach, characterized as "maximum consolidation," envisioned consolidating much of the materials production and nuclear manufacturing elements at a single site. Under both options efforts would be made to privatize much of the non-nuclear manufacturing operations. Neither option anticipated a complete relocation or consolidation of the weapons laboratories, although the committee did call for an elimination of "duplicative" efforts to reduce costs. Projected costs ranged from $6.7 billion to $15.2 billion, depending on the option. Predicted weapon stockpile levels ranged from 15 percent to 70 percent of the fiscal year 1990 stockpile.[209]

The Complex-21 report foresaw a phased implementation process. Initial attention focused on the preparation of a Programmatic Environmental Impact Statement (PEIS), as required by the National Environmental Policy Act, to analyze the environmental consequences of alternative long-term configuration strategies and to be completed by late fiscal year 1993. This would lead to a Record of Decision selecting a specific configuration for Complex 21 by early fiscal year 1994.[210]

The end of the Cold War and the unraveling of the Soviet Union, nonetheless, continued to reshape the process. The signing of the Strategic Arms Reduction Treaty (START) on July 31, 1991, promised to reduce nuclear weapon stockpiles to 6,000 "accountable" warheads. Following the failed coup attempt in the Soviet Union, President Bush on September 27 announced further unilateral major cuts in the nuclear weapons arsenal. A month later the Department, with tritium requirements now much reduced, announced a two-year delay in selecting the technology and location for the New Production Reactor. The Department also incorporated the NPR environmental impact statement into the general Complex-21 PEIS. In December, Watkins announced funding reductions for the NPR program and asked William Happer, Jr., his science and technology adviser, to examine the possibility of using a linear accelerator to produce tritium. Watkins, in addition, declared the Department's intent to accelerate the downsizing of the weapons complex. Non-nuclear component manufacturing operations would be consolidated at the Kansas City plant. Facilities at Pinellas and Mound would be closed by 1995. As Watkins observed, the Nation's nuclear weapons complex would never look the same again.[211]

The Energy Policy Act of 1992

In February 1992, Senator Johnston brought a revamped energy bill to the Senate floor. Shorn of both ANWR and CAFE measures, the bill sailed through the Senate by a vote of 94 to 4. The comprehensive bill contained measures reforming utility and natural gas regulations, streamlining the licensing process for new nuclear power plants, and encouraging oil and gas exploration along the Nation's coastlines. In a bill with something for nearly everyone, environmentalists won tougher energy-efficiency and alternative-fuel provisions. Although the administration was disappointed by the excision of the ANWR provision, Watkins declared that the bill was a "great step" toward

full implementation of the National Energy Strategy. Warning that there was still a long way to go, however, he urged the House to follow the Senate's example. Coincident with the Senate action, Watkins released a "one year later" update of the National Energy Strategy. Noting that the administration was a year ahead of Congress, he said that "while the Congress has spent the last year debating, the administration has been solidly moving forward to implement important energy initiatives."[212]

The following month, the House Energy and Commerce Committee approved its own version of the energy bill. Nine separate House committees claimed further jurisdiction over the bill. In late May, the House finally passed the measure by a vote of 381 to 37. The House bill differed most significantly from the Senate bill in that it contained tax-related provisions, including tax incentives for renewable energy and a fee on electric utilities to pay for the decontamination and decommissioning of uranium enrichment facilities. The House bill also allowed the Federal Government to preempt Nevada's authority to issue environmental permits pertaining to Yucca Mountain. The Department for the most part was pleased with the House's actions. The House excised, for example, five of six provisions—including a requirement that oil importers and refiners contribute 1 percent of their stocks to the Strategic Petroleum Reserve—that President Bush had stated would cause him to veto the measure. Still troublesome, however, were severe restrictions on oil and gas development of the Outer Continental Shelf. These "restrictive policies," Watkins complained, were "inconsistent with the President's desire to sign a pro-growth energy bill."[213]

Congress did not immediately go to conference to reconcile the two energy bills. Because of the tax provisions, the Senate referred the House bill to the Finance Committee. Two issues imperiled the legislation. First, Nevada Senators Richard Bryan and Harry Reid threatened a filibuster over the bill's Yucca Mountain provisions. Johnston placated the two Nevadans by promising that the conference report would contain no reference to federal preemption of Nevada's rights. Second, the Finance Committee approved an amendment by Senator John D. Rockefeller IV (D-WV) that imposed a tax on coal production to fund health benefits for coal industry retirees. The administration opposed the amendment because it would create a new entitlement, raise energy and utility bills, and benefit eastern coal companies at the expense of those in the west. Watkins and Secretary of Labor Lynn Martin warned Johnston that the amendment was "a highly objectionable provision, which, if it remains in a final energy bill, will cause us to recommend a veto of the legislation." The Senate, nonetheless, forged ahead, placing the Department in the ironic position of supporting a filibuster against the energy bill. Watkins was livid. "This type of gridlock," he asserted, "is another example of a Congress unable to reject parochial interests in favor of the greater national good." Unable to invoke cloture, the Senate compromised on the Rockefeller amendment and on July 30 approved a revised version of the House bill.[214]

The House-Senate conference faced a daunting task. With the November elections imposing an early October adjournment and 100 representatives and 32 senators on the conference, slogging through the 1000-page bill would not be easy. "We don't have a lot of time here for foreplay," Johnston noted. Following weeks of slow-going negotiations, conferees approved a scaled-back measure. Gone were most natural gas provisions, as were restrictions on oil and gas drilling on the Outer Continental Shelf. This eliminated the likelihood of a presidential veto. The conference, nonetheless, inserted a provision on Yucca Mountain that resulted in a filibuster by the Nevada senators. The provision called for the National Academy of Sciences to recommend radiation emission standards that the Environmental Protection Agency would be required to adopt. Senators Bryan and Reid objected that the Academy was too easily influenced by the Department and would therefore recommend weakened standards. This would then make it easier for the Department to establish a high-level waste repository at Yucca Mountain. Johnston did not deny this, but he said that the provision was necessary because current EPA standards required the Department to use

President Bush signs Energy Policy Act of 1992 in ceremony at Maurice, LA, while Admiral Watkins and oil rig workers look on.
Source: U.S. Department of Energy

specially designed waste canisters adding costs of $3.2 billion without increasing health and safety protection. The Senate agreed with Johnston and voted 84 to 8 to cut off debate on the bill. The Senate then approved the measure on a voice vote, and the House passed the bill by a vote of 363 to 60.[215]

Senator Johnston termed the act "a legislative miracle" and praised the bipartisan support for the measure. "The president can't call it his bill, the Democrats can't call it their bill, and the Republicans can't say it's their bill," Johnston observed. "This is a model for how things need to be done." Admiral Watkins was also pleased with the first major piece of energy legislation in over a decade. The act did not carry out all of President Bush's original proposals, he noted, but on balance was "pro-energy, pro-environment, and pro-growth." According to Watkins, the measure would stimulate domestic energy production, promote energy efficiency, increase competition in the electricity sector, and reduce consumer costs. The act had the potential to reduce oil imports by some 4.7 million barrels per day by the year 2010, saving about $400 billion from flowing overseas in payment. In addition, consumers would reap a windfall of $250 billion in electricity costs over the next fifteen years. The legislation, Watkins concluded, would "create hundreds of thousands of jobs and increase our gross domestic product by over $500 billion."[216]

Major provisions of the Energy Policy Act of 1992 included:

- Promoting energy efficiency through tax exemptions for energy conservation investments.
- Supporting nuclear power by reforming the nuclear power plant licensing process and encouraging the development of advanced nuclear power plant designs.
- Establishing a government-owned corporation with a five-member board to take over the Department's civilian uranium enrichment operation.
- Promoting mass transit and vanpools by increasing the tax free limit on employer-provided benefits to $60 per month.
- Streamlining regulation of oil pipelines.
- Supporting the environmentally sound use of coal through research and development of advanced technologies.
- Providing alternative minimum tax relief worth over one billion dollars over five years for independent oil and gas producers.

- Removing obstacles to increased competition in electricity generation by amending the Public Utilities Holding Company Act of 1935 and increasing transmission access.
- Promoting greater use of ethanol by extending tax exemptions for more ethanol blends.
- Promoting the development and use of clean-burning alternative motor fuels by providing tax incentives for alternative fuel vehicles and refueling facilities, establishing an alternative fuel fleet program, setting up electric vehicle demonstration programs, and providing financial support for demonstrations of alternative fuel use by urban mass transit systems.
- Promoting greater use of "clean-burning" natural gas by providing the natural gas industry with expanded market opportunities in areas such as electricity generation and natural gas vehicles.
- Encouraging increased research and development on a wide range of energy technologies, including high efficiency heat engines and advanced oil recovery.

The Department would take the lead role in carrying out these provisions. As Deputy Secretary Linda Stuntz noted, the new law, at the Department of Energy alone, required sixty-one reports, twenty-one solicitations, fifteen regulations, eight programs, and four advisory panels. In addition, the act authorized more than $1.8 billion in spending for new initiatives in fiscal year 1994.[217]

Industry's response to the new law was generally favorable. The trade journal *Nuclear News* described the act as "very pronuclear." Major oil firms were disappointed that the law did not open the Arctic National Wildlife Refuge to exploration, but the *Oil and Gas Journal* noted that there were even so a "number of worthwhile minor provisions." Independent Petroleum Association of America President Denise Bode asserted that the act meant "more production, more jobs and more energy independence for America." The American Gas Association viewed the legislation as a vehicle for jobs creation, improved energy security, clean fuels promotion, and energy conservation.[218]

Environmentalists were not so sanguine. A Greenpeace spokesperson admitted that the act contained some "positive" measures that would increase efficiency standards and spur development of renewable energy. He nonetheless charged that the balance of the act was "devastating" for the environment and offered "immense giveaways" to the nuclear and fossil fuel industries. Jessica Mathews, vice president of World Resources Institute, observed that the act would be "markedly beneficial" in only the electricity sector. Other provisions were likely to be "marginal." The act, she contended, did not "address the cost of energy or, therefore, energy productivity and competitiveness. It will do little to reduce oil imports, which would improve national security and the trade balance. And it will do little to set energy use on a new trajectory toward lower greenhouse gas emissions." The act's greatest achievement, Mathews concluded, was "to have swept the decks clean of hundreds of peripheral issues."[219]

The Department Under President Bush and Admiral Watkins

During President Bush's term in office and under Admiral Watkins' tenure as secretary of energy, the Department continued to undergo significant organizational, policy, and budgetary changes. Perhaps the most striking of these was the reversal of the trend of defense activities occupying an increasing proportion of the Department's budget. In the 1990 budget (the last Reagan budget), defense activities, excluding defense waste management, accounted for 53 percent of the total budget. In the 1993 budget request, the figure for defense activities was only 38 percent. The end of the Cold War played a major role in this decline. As Watkins testified before the Senate Armed Services Committee in early May 1992, for the first time since 1945 the United States was not building any nuclear weapons. Scaled back and "greatly reduced" as well were the nuclear-directed energy programs of the Strategic Defense Initiative.[220]

With defense activities undergoing retrenchment, environmental restoration and waste management became the fastest growing

President Bush speaks at Rose Garden signing of joint agreement by the Department of Energy and the Big Three automakers to develop a light-weight battery system for electric vehicles.

Source: U.S. Department of Energy

program area in the Department. The 1993 budget proposal of $5.3 billion was more than three times the amount spent in 1989 and represented 27 percent of the Department's total budget. As one commentator put it, the Department's defense activities were "giving way to green."[221]

In other areas, the Bush Administration continued strong support for two of its predecessor's initiatives: the superconducting super collider and the clean coal program. The 1993 budget request for the superconducting super collider was $650 million, up from $250 million requested for 1990. Total project costs had risen to an estimated $8.2 billion, with completion now scheduled for 1999. Trying to defray costs, the Department solicited funding from various foreign governments. The State of Texas also agreed to contribute the land and $1 billion. The Department projected that one-third of the general funding would come from non-federal sources.[222]

Watkins in early 1989 had declared that clean coal was one of his "greatest personal interests." Within months, he accelerated departmental review of additional clean coal projects, and the clean coal program became the Federal Government's largest energy initiative. The 1993 budget request for the program was $500 million, as compared with $325 million for 1990.[223]

Energy research and development, in general, received greater emphasis during the Bush/Watkins era. Although funding for nuclear fission and fusion remained relatively constant, the 1993 budget request of $325 million for fossil energy research and development, excluding the clean coal program, was nearly twice that of the 1990 budget. Research in the basic energy sciences, such as materials research involving superconductivity, increased by over a third, from $590 million to $814 million. Renewables, too, received increased attention. The 1993 budget request for renewables—solar, wind, biomass, geothermal, and hydroelectric—was $210 million, up from $114 million in 1990. Most significant, however, was the rekindled interest in conservation. When Representative Sidney Yates (D-IL), chairman of the House Appropriations Subcommittee on Interior, in early April 1989 charged that the Department had all but abandoned conservation programs in favor of defense and civilian nuclear projects, Watkins promised to give conservation "more attention" in the budget. As a result, budget requests for conservation increased every year during the Bush Administration. The 1993 budget request for conservation of $351 million was four times that for 1990. One exciting conservation project was the Department's support, with a 1993 request of $41 million, for the U.S. Advanced Battery Consortium developing batteries for electric cars.[224]

Similarly, the Department under Bush and Watkins placed increased emphasis on researching global climate change. Agreeing with its predecessor, the Bush Administration opposed drastic action until the relationship between the greenhouse effect and global warming had been scientifically proven. The administration, nonetheless, realized the potential seriousness of global warming, and the Department's activities were part of a larger, ongoing effort within the Federal Government. In 1992 the Federal Government spent $1.11 billion to support global climate change research. The Department's share of this was $77 million, with a 1993 budget request of $113 million. As C. Boyden Gray,

the President's counsel, pointed out, the United States funded as much climate research as the rest of the world combined. Critics complained, however, that this was not enough. They charged that the administration failed to carry out measures that would reduce carbon dioxide output and "watered down" the global warming treaty signed at the Rio de Janeiro Earth Summit in June 1992.[225]

Managerial Reform and Culture Change

Funding, of course, was not the only indicator of departmental activity. As Watkins noted at his confirmation hearing, the primary problem he faced was managerial. Accordingly, he tasked the deputy secretary and the under secretary with reviewing the organizational structures and management practices throughout the Department, and he made many managerial changes during his tenure. He expanded the Office of the Secretary. He established new offices, including the Offices of Nuclear Safety and Environmental Restoration and Waste Management, and reorganized existing components into new entities, such as consolidating portions of the functions of the Office of the Assistant Secretary for International Affairs and Energy Emergencies and the Office of Policy, Planning and Analysis into the Office of the Assistant Secretary for Domestic and International Energy Policy. In the area of global climate change, he centralized the Department's global warming analysis functions and established the Global Climate Change Executive Committee. Watkins, in addition, instituted and strengthened "line management control and accountability," which he described as the "linch pin" for effective management. Program officers were now responsible for safety and environmental protection within their respective programs. Field offices were assigned to individual program officers who in turn were accountable directly to the secretary. As the General Accounting Office observed, Watkins' organizational and management changes provided "a framework for establishing the clear lines of responsibility needed" within the Department.[226]

Less measurable was the success of Watkins' effort to reform the Department's "culture." Instilling the "right attitude," as the chairman of the Department's Advisory Committee on Nuclear Facility Safety noted, was a "slow process." Referring specifically to the "safety culture," the General Accounting Office in February 1992 recognized the "strides" the Department had made but also stressed that the Department needed "to do more." Watkins himself often lamented the vestiges of the "old culture." Nonetheless, as he began his fourth year as Secretary of Energy, Admiral Watkins was optimistic. "Based on our efforts . . . and the progress we have made to improve the culture, management, and operation throughout the Department," he declared. "I believe the DOE is now well positioned to address . . . changes, opportunities and challenges."[227]

1992 Election

On November 3, 1992, William Clinton was elected President of the United States in a three-way race with George Bush and independent candidate Ross Perot. Energy issues once again played a minor role in the presidential campaign. The candidates only rarely mentioned energy topics. What debate took place was engaged in by surrogates for Clinton and Bush. "Energy itself is not a hot button issue for most Americans," one Bush Administration official noted. But, he added, the "interaction of energy and environment is." Also significant was the interaction of energy and the economy, and the Bush campaign attempted to tie Clinton's energy proposals to loss of jobs while presenting the administration's pro-production policies as creating jobs. Clinton spokespersons sought to link energy with other issues as well. Bill Burton, a Clinton energy adviser, contended that Clinton would integrate economic, energy, and environmental policy to a greater degree than Bush had. "Critical to a good environmental policy is a strong energy policy," Burton stated. "We don't have that right now."[228]

Bush and Clinton squared off directly over CAFE standards in the third televised debate between the candidates. Bush accused Clinton of favoring fuel efficiency standards of 40 to 45

miles per gallon that "would break the auto industry and throw a lot of people out of work." Clinton admitted that he favored raising fuel efficiency standards but said that the standards should not necessarily be written into law if the standards could not be achieved. He stressed that he was "a job creator, not a job destroyer." In their stated positions, the Republican and Democratic candidates differed on several other energy issues as well. Bush favored oil and gas drilling in the Arctic National Wildlife Refuge and on the Outer Continental Shelf. Clinton opposed. Bush defended nuclear power as a "proven electricity-generating technology that emits no sulfur dioxide, nitrogen oxides, or greenhouse gases." Clinton criticized the "proliferation" of nuclear power plants because of safety concerns and questioned the long-term environmental and safety viability of Yucca Mountain and the structural integrity of WIPP. "Both of these proposals," he asserted, "must be rethought."

Equally interesting, however, were the similarities between the two major candidates. The Bush and Clinton proxies tried to outdo one another in extolling their man's depth of commitment to energy efficiency, natural gas, and renewable energy. Burton claimed that Clinton would be "a lot more pro-active" in these energy areas. "You'll find a Clinton energy department," he observed, " paying more than lip service to things like energy efficiency and conservation standards. You'll see an effort in renewable energy like you haven't seen in fifteen years. It's part of a big picture strategy." Bush loyalists defended the President's record. Deputy Secretary Stuntz noted that spending on conservation and renewable energy had gone up dramatically during the Bush Administration, with the renewable energy budget up by approximately two-thirds since 1989. John Easton, Jr., assistant secretary for domestic and international energy policy, asserted that Clinton "would like to do what the administration is already doing, increasing energy efficiency and natural gas use." Easton added that it was "hypocritical" for the Clinton campaign to favor natural gas and oppose drilling on the outer continental shelf.[229]

Both candidates also opposed extensive new energy taxes. Clinton's vice-presidential running mate, Senator Albert Gore (D-TN) had advocated a carbon tax on fossil fuels, but Clinton did not support this concept unless it was "revenue neutral" and could be accomplished without hampering industrial competitiveness or raising consumer utility rates. Bush said that he would not support a carbon tax because the relationship between greenhouse gas emissions and global climate change was not yet well understood. Both candidates opposed increases in the gasoline tax as well. Clinton viewed the gasoline tax as regressive, and Bush favored the free market and opposed any new taxes. In contrast, Perot, in one of his rare energy pronouncements, called for a $.50-per-gallon increase in gasoline taxes.[230]

GRADING THE DEPARTMENT

In the waning weeks of the Bush Administration, Admiral Watkins provided the media and the public with a retrospective evaluation of his four-year tenure as secretary of energy. He noted that when he took the helm the Department had been a "rudderless vessel." Field activities were not attached to Headquarters. The Department had "no discipline, no conduct of operations, no reports coming in operationally, no five-year waste management plan." Reactors were shut down for safety problems. "We had lost our compass somewhere," Watkins observed. "We had no oversight. . . [T]he culture was . . . production of weapons and no attention to environment, safety, and health issues."[231]

Watkins assessed that after four years he had cleaned up a "bit more than 50 percent [of] the mess." The foremost accomplishment, according to the outgoing secretary, was the implementation of "a new management culture that understands the need for compatibility between our defense mission and protection of the environment." In the area of environmental cleanup, the Department had given "first priority" to rectifying past problems and bringing all facilities into environmental compliance. Also important were the development of both a "smaller, less diverse, and less expensive" nuclear weapons complex and the

National Energy Strategy that became the "template" for the Energy Policy Act of 1992. Watkins concluded that under his watch the Department had achieved a "Level 2" of excellence, with a grade of C+ or B-. The new secretary of energy, he observed, would "inherit a Department that has become one of the finest in all of government."[232]

Environmentalists and the "special interest groups," as Watkins termed them, were not so charitable. The Military Production Network, an alliance of groups primarily local and regional concerned with weapons complex issues, complained that the production-first, secrecy-oriented culture still prevailed. Watkins, the umbrella group contended in its December 1992 report, "Rhetoric v. Reality," "was not able to fundamentally reform the Department of Energy." Following four years, the report stated, "tangible results are minimal." Mismanagement, failure to control contractors, and wasteful spending still characterized the Department.[233]

A different perspective was expressed by Comptroller General Charles Bowsher, head of the General Accounting Office. He noted that Watkins' self-grading of C+/B- was "reasonable." The Department of Energy had been an agency "in really big trouble," Bowsher observed, but Watkins had "really started to tackle some of the problems." Before Watkins could even begin to consider policy issues, the comptroller stated, he had to solve the management problems. Bowsher added that the Department was not yet where it should be and the new administration would have to "work hard" to move forward from Watkins's accomplishments.[234]

Ironically, Watkins never carried out many high-priority missions facing him when he became secretary of energy. His most urgent task had been to resume the full-scale manufacturing of nuclear weapons. To do this, he needed to restart plutonium milling at Rocky Flats, open WIPP, build a plutonium separator in Idaho, and began producing tritium again. None of this happened, and at the close of Watkins' tenure the Department was not capable of producing nuclear weapons.

What did happen was that the end of the Cold War and major arms reduction agreements completely reoriented priorities. "World events have changed things tremendously," Watkins observed, "and actually helped me in a situation that would have been really something." Had the need to produce nuclear warheads not abated, he noted, President Bush would have had to use emergency powers to override safety regulations and environmental laws to allow production to resume at facilities that would have been "safe enough, but not at a desirable level." The end of the Cold War, however, eliminated the "produce or else" mandate that had driven the Department's nuclear weapons complex for over forty years.[235]

PART VII
THE CLINTON ADMINISTRATION, 1993-

ENERGY AND THE ECONOMY

In his first post-election press conference, President-elect Bill Clinton said that the Department of Energy would play a major role in stimulating the Nation's economy and creating jobs. Clinton told reporters that he considered the secretaries of energy and commerce, in his opinion marginal players in many past administrations, to be crucial appointments. Given his economic policy pronouncements during the campaign and the economic changes these suggested, the President-elect noted, energy and commerce would be "very major appointments." He added that how the energy and commerce secretaries "pursue the missions of those departments will affect the success or failure of this administration's economic efforts."[236]

Clinton's energy advisers reiterated the centrality of the Department of Energy in the incoming administration's thinking. "Obviously the economy is job one," noted Bill Burton, and "energy will be part and parcel of economic policy." Burton observed that the Department had "gotten far away from its original mission as a centerpiece for energy policy." Under Clinton, he added, the Department would not be "a boutique agency anymore." In addition, Clinton's choice for presidential science adviser, John Gibbons, possessed an impressive energy background. The new director of the Office of Science and Technology Policy spent nineteen years at Oak Ridge National Laboratory and one year at the Federal Energy Administration. As director of the congressional Office of Technology Assessment, Gibbons dealt extensively with energy issues, maintaining that an energy policy should meet three overarching national goals: economic vitality, environmental quality, and strategic security.[237]

O'LEARY APPOINTED SECRETARY

If secretary of energy was a critical cabinet slot for Clinton, his ultimate choice to fill the position was perhaps the biggest surprise of the cabinet selection process. The President-elect sought greater diversity in his cabinet, attempting to bring in more women, blacks, and Hispanics than his predecessors had. He also attempted to achieve "personal compatibility" among and with all his cabinet, and he sought "team players." Early speculation as to whom Clinton would name for energy included, among others, Texas Land Commissioner Gary Mauro, Rep. Philip Sharp (D-IN), and Jessica Matthews of the World Resources Institute, but by early December the odds-on favorite was Senator Timothy Wirth (D-CO). Wirth, as chairman of Energy and Natural Resources's Subcommittee on Energy Regulation and Conservation, had long experience in both energy and environmental issues. For various reasons, none of these potential candidates proved the right fit for secretary of energy. Clinton then turned his attention to Hazel Rollins O'Leary. She had been on few lists of potential candidates, and she had not even met the President-elect until he asked her to Little Rock to meet with him on December 18. Three days later, Clinton announced O'Leary's appointment as secretary of energy.[238]

As an African-American woman, O'Leary helped Clinton fulfill his commitment to diversity, but the new secretary of energy-designate also held very impressive energy credentials. She joined the Federal Energy Administration in 1974, serving as director of the Office of Consumer Affairs and then as assistant administrator for conservation and environment. She was present at the creation of the Department in October 1977 when she

became deputy administrator of the Economic Regulatory Administration. In 1980, she became administrator. From 1981 to 1989, O'Leary was vice-president and general counsel for O'Leary Associates, an energy consulting firm founded by her late husband, John F. O'Leary, who had served as deputy secretary of energy during the Carter Administration. In 1989, she joined Northern States Power Company of Minneapolis, Minnesota, and became senior vice president of corporate affairs in charge of environmental affairs, the legal and personnel departments, and public relations.[239]

O'Leary's appointment received mixed reviews from environmental and various activist groups. Some groups expressed disappointment with her lack of experience regarding weapons complex and cleanup issues. "We are concerned at this point," noted Daryl Kimball of Physicians for Social Responsibility, "that [O'Leary] does not appear to have extensive experience in [the nuclear weapons] area, which is about two-thirds of DOE." One environmental source expressed fear that O'Leary's inexperience could lead to her "getting rolled" by the Department's contractors. Other groups were more optimistic. The Safe Energy Communication Council, a coalition of environmental groups, applauded O'Leary's energy expertise and her apparent commitment to energy efficiency and renewable sources. The coalition expressed caution, however, "in light of her past support of [Northern States Power's] position favoring nuclear power."[240]

Trade groups and journals were more positive in their response to the energy appointee. The Interstate Natural Gas Association of America declared her to be "extremely capable." The American Gas Association was "pleased and proud" to see an executive from a member company nominated as energy secretary. The *Oil and Gas Journal* observed that O'Leary had more energy experience than any past energy secretary and said that she would reflect Clinton's "proconsumer, proconservation plans" for the Department. The journal also noted that the appointment, while of interest to the oil and gas industry, was "far from crucial." The Environmental Protection Agency administrator, and not the energy secretary, was the key player on United States energy issues. The nuclear industry, according to *Nucleonics Week*, viewed O'Leary as a "mixed blessing." On the one hand, O'Leary possessed "first-hand knowledge" about nuclear operations and problems in the high-level waste program. On the other, the new secretary indicated that energy conservation, renewables, and natural gas would be high on her agenda. "We have no quarrel with these," stated Carl Goldstein of the U.S. Council for Energy Awareness, the nuclear industry's public relations arm, as long as their promotion was not at the expense of more "traditional" energy sources like coal and nuclear. "Traditional energy sources are still the mainstay," observed Goldstein.[241]

Clinton and O'Leary Set the Tone

In announcing his selection of O'Leary as secretary of energy, President-elect Clinton noted that in the past the Department of Energy had been "sorely underutilized." For two decades, he continued, energy was the "Achilles' heel" of the economy. Money sent overseas for energy imports accounted for between one-half and two-thirds of the annual trade deficit, and "wildly gyrating" energy prices resulted in a destructive cycle of boom and bust in energy producing regions. The United States, Clinton contended, had "even fought a war, at least in part, because of our dependence on foreign oil." For "too long," he asserted, "we've gone without an energy policy."[242]

The President-elect observed that although most of the Department's budget currently was devoted to nuclear issues, the future demanded "a different direction and a different policy." During the campaign, he declared, he had made clear his energy priorities: "greater reliance on American natural gas, greater energy efficiency, greater development of alternative energy resources, a greater commitment to making good energy policy and good environmental policy good economic policy for America." The major task of the next secretary of energy, therefore, was to "redirect the Energy Department in these priorities." Of all the people he considered, O'Leary, in his opinion, possessed the "best mix" of "hands-on experience in both business

Hazel O'Leary is sworn in as the seventh Secretary of Energy on February 5, 1993, by U.S. District Court Judge Anne Thompson. Holding the Bible is the Secretary's son, Carl Rollins. At far left is Vernon Jordan, head of the President's Transition Team, and Dennis Bakke, President of the AEC Corp. Second from right is Harley Goodbear, an official of the Native American Church, who offered the invocation.

Source: U.S. Department of Energy

and government" to lead the Department through the upcoming period of change. Clinton added that O'Leary was sensitive to one of the Department's "biggest problems": its "very little credibility out here in the heartland. Ask any governor of either party," Clinton argued, "and he or she will probably be able to cite some example when they've had dealings with the Department of Energy which were exceedingly frustrating, where the credibility of the Federal Government was suspect and where the states felt they weren't being treated in an upfront, open and reasonable manner."[243]

O'Leary, in her own statement and at her confirmation hearing on January 19, echoed the words of the President-elect. She agreed that energy policy decisions were central to creating jobs, maintaining the health of the economy, and improving the quality of the environment. Looking at her own experience, she noted that after being "twenty years in this business" the Nation was no better off in terms of dependency on foreign oil than it was in 1974. "That's unconscionable for this nation," the new secretary asserted, "and it's also unconscionable for those who have attempted to set policy. It has not worked." Like Clinton, O'Leary stated, "I believe we need change in the Department of Energy. Change is necessary because I know the same tried-and-true strategies do not work." O'Leary's own goals for the Department were, in her words, "very simple [but] very difficult to undertake—to maximize all energy conservation, efficiency, and alternative energy, to

provide flexibility and response to crises through an adequate and reliable supply of traditional energy sources."[244]

Amid all this talk of change, O'Leary did stress certain continuities. She pledged to continue the cleanup of contaminated waste sites and the emphasis on environment, health, and safety. Using the language of her predecessor, she committed herself to "changing the culture" within the Department by "clarifying personal values, the vision I have for the Department, and its mission." She expressed the intent to use the national laboratories to "spur and support industrial competition." She stated her support for the clean coal technology project and the filling of the Strategic Petroleum Reserve. Finally, as had all the secretaries of energy before her, she decried government "command-and-control regulation" of energy production and distribution. "I have learned through bitter experience," she observed, "that it's very hard to mandate on high."[245]

Clinton's Economic Plan

On February 17, in his State of the Union address, President Clinton revealed his economic recovery plan. The plan consisted of a short-term "jobs investment" economic stimulus package, a long-term investment program, and a deficit reduction program consisting of spending cuts and tax increases. Energy figured in all three aspects of the plan, but in his speech Clinton focused primarily on a "broad-based" energy tax increase. He recommended adoption of a BTU tax on the heat content of energy not only to raise revenue to reduce the deficit but also to combat pollution and promote energy efficiency and independence. He praised the BTU tax because it would not "discriminate" against any particular region of the country. He rejected both a carbon tax that would be "too hard on the coal States" and a gas tax that would be "too tough on people who drive a long way to work." He pointed out that the United States had "maintained far lower burdens on energy than any other advanced country. Even with the BTU tax, the Nation would "still have far lower burdens."[246]

In a statement following the address, Secretary O'Leary asserted that the Department would play a critical role in implementing the President's economic plan. The $30 billion short-term stimulus package contained over $200 million of energy-related expenditures, including funding for weatherization grants, the federal energy management program, technology transfer partnerships between the Department, industry, and academia, and the purchase of alternative-fueled vehicles. The $160 billion long-term investment program covering fiscal years 1994-1998 contained almost $5 billion of energy-related expenditures. The administration earmarked $1.9 billion of additional funding for conservation and renewable energy research and $1.2 billion to initiate construction of the Advanced Neutron Source, a next generation research reactor at Oak Ridge National Laboratories. Natural gas research and development initiatives also increased substantially, with $263 million of additional funding.[247]

The Department also sustained cuts of over $8 billion in the $703 billion deficit reduction program covering fiscal years 1994-1998. The bulk of the cuts—$4.5 billion—came in defense programs, a reduction made possible, O'Leary noted, "by recognizing that the Cold War is over." The administration slated cuts of $1.8 billion for the Department's uranium enrichment enterprise, which under the Energy Policy Act of 1992 was being converted from a Department program to a government-owned corporation. Savings would come from the phase out by 1996 of the Portsmouth Gaseous Diffusion Plant, lower power costs, and accelerated purchases of highly enriched uranium from the republics of the former Soviet Union. Perhaps the most controversial proposed cuts involved phasing out $1.2 billion of funding for research and development of advanced nuclear reactors "that have no commercial or other identified application."[248]

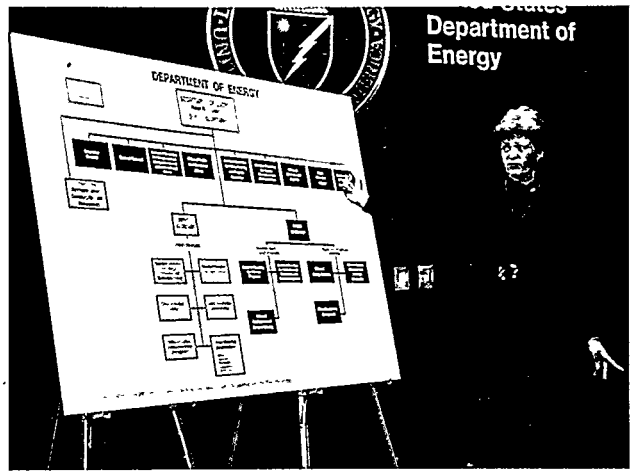
Secretary O'Leary applauded the President's BTU tax proposal. Noting that the proposal demonstrated "leadership and a deep understanding of the energy problems facing our nation," she said that the tax would increase energy efficiency and reduce reliance on unstable foreign sources of oil. Oil imports

Secretary O'Leary speaks at the Department's budget briefing for the media. Source: U.S. Department of Energy

would be reduced about 350,000 barrels per day in the year 2000, shrinking the trade imbalance about $18 billion. Estimated annual revenue from the BTU tax would be $22 billion by 1997. In addition, O'Leary observed that the tax would result in a cleaner environment. The administration expected greenhouse gas emissions to be reduced about 25 million metric tons in the year 2000. O'Leary noted that this would help the United States fulfill commitments made at the 1992 Rio de Janeiro Earth Summit.[249]

THE DEPARTMENT: BUDGET AND REORGANIZATION

The administration's proposed fiscal year 1994 budget for the Department, sent to Congress in early April, reflected the changed priorities



Secretary O'Leary on April 2, 1993, announces restructuring of the Department. Source: U.S. Department of Energy

of President Clinton's economic plan. Overall, the Department's request of $19.6 billion was slightly more than the estimated fiscal year 1993 budget of $19 billion. As anticipated, national security programs, including naval reactors, received a significant cut from $7.7 to $6.6 billion. Nuclear energy research and development was cut nearly in half, from $345 million in fiscal year 1993 to $182 million. Energy efficiency, natural gas research and development, and technology transfer all received sizeable funding increases. The environmental restoration and waste management program request totaled $6.5 billion, up $1 billion from the previous year, and, with the decline of the nuclear weapons program, was now the single largest program in the Department.[250]

Meanwhile, Secretary O'Leary sought to place her own stamp on the Department by restructuring. O'Leary's reorganization plan, announced on April 2, divided the Department into three "mission teams" with related responsibilities: energy, weapons and waste cleanup, and science and technology. The energy mission team consolidated energy supply and demand programs, enabling "close integration of efforts" in energy efficiency, production, supply, and commercial nuclear waste management. Assistant secretaries headed the Office of Fossil Energy and the Office of Energy Efficiency and Renewable Energy. The top nuclear energy official, however, was now a director rather than an assistant secretary. The weapons and cleanup mission team brought together the two major organizations—defense programs and environmental restoration and waste management—active in the Department's far-flung nuclear weapons complex. Together, these two offices headed by assistant secretaries still accounted for well over half the Department's budget. The Office of Intelligence and National Security was also included within this mission team. The science and technology mission team consisted of energy research, science education and technical information, and laboratory management. No assistant secretaries were assigned to this area. The energy mission team reported to the deputy secretary, who was also the chief operating officer of the

Department within the Office of the Secretary. The other two mission teams reported to the under secretary. Legislation that would have provided the Department with three under secretaries to oversee the three mission areas failed to clear Congress in 1993.[251]

O'Leary consolidated "crosscutting" functions serving all offices of the department under the Office of the Secretary. These included general counsel; public and consumer affairs; congressional, intergovernmental, and international affairs; and policy, planning, and program evaluation. Assistant secretaries headed the latter two offices. O'Leary placed within the Office of the Secretary the assistant secretary for environment, safety, and health to "emphasize the importance placed on safety and health," and the newly elevated assistant secretary for human resources and administration to "emphasize the importance of efficient and cost-effective management." She also created an office for field management to "track" overall operations and performance of the Department's laboratories and other facilities. Her intention, she noted, was to delegate more authority to the Department's field operations.[252]

The Secretary described the new arrangement as a "much flatter organization" that would be more rational and easier to understand. The old organization, O'Leary noted, was "a mess" and not much changed since the Carter Administration. "When I left the department in 1981," she observed, "it pretty much looked like that—layers and layers of people sort of split evenly between the deputy and the under secretary. In my experience . . . it set up open warfare between the two units because there was no attempt to rationalize who was in what pod." The old organization, as well, reflected the Department's "major function" of producing nuclear weapons. "We have been successful in that endeavor," O'Leary concluded. "Now we must rationalize the structure of the department to enable ourselves to achieve as much success in new missions that mirror the priorities of a changed world."[253]

As for her own role as secretary, O'Leary stated that she would be "responsible for vision, for mission, for leadership in dealing with our outside constituencies, certainly for dealing with the Congress, and most importantly for dealing with major program areas." She added that she had long understood that "you cannot lead and manage day to day." The secretary was not unaware of the difficulties ahead in bringing her vision for the Department to fruition. "We are underway," she told departmental employees at a town meeting, but she cautioned that it would require some time to complete. "I'm in this for the long haul," she declared. "Think of this process as a marathon, not a sprint."[254]

The Energy Tax

During his first six months in office, President Clinton focused his administration on pushing through Congress the budget and deficit reduction package embodying his economic plan. The energy tax proved to be a major issue of contention. Under Clinton's initial BTU tax proposal, all forms of energy—except for solar, geothermal, and wind—would pay a base rate of 25.7 cents per million BTUs. A supplemental rate of 34.2 cents per million BTUs would apply to gasoline and other refined petroleum products. Opposition from interest groups and both congressional Republicans and Democrats, however, forced the administration to issue a revised proposal on April 1. In response to senators and representatives from the northeast, the administration exempted home heating oil from the higher oil tax rate. Midwestern members of Congress obtained a tax exemption for ethanol and methanol. Over a dozen additional exemptions appeared in the revised proposal. The administration perceived that the exemptions were necessary to win support for the economic package, but critics feared that the changes would only encourage other special interests to seek exemptions. "The proposal is riddled with special interest exemptions," noted Edwin S. Rothschild, an energy analyst at Citizen Action, a consumer advocacy group. "It's going to create an incentive to other special interests to seek further exemptions or reductions as this tax moves through the legislative process."[255]

Opposition to the BTU tax from energy-intensive industries such as aluminum and

President Clinton is briefed by Los Alamos National Laboratory Director Siegfried Hecker during a May 17, 1993, visit to the lab, as Secretary O'Leary looks on.
Source: U.S. Department of Energy

major energy producers, particularly the petroleum industry hit by the supplemental tax, was countered by only lukewarm support from environmental and advocacy groups. Many environmentalists praised the energy tax as a step that would slowly move the Nation toward cleaner fuels and more-efficient manufacturing processes. Nonetheless, by the administration's own calculation, energy consumption would be reduced by only 2 percent, and some environmentalists were unimpressed. "It's not going to change energy-use patterns much," observed Douglas Bohi of Resources for the Future. "The tax rates are very small. The effect is going to get lost in the background noise." Moreover, most economists predicted that the tax, amounting to about an additional 8 cents per gallon of gasoline, would have little effect on use of automobiles. "The problem with automobile efficiency is that fuel costs are such a small percentage of the cost of owning and operating a car," noted Daniel A. Lashoff of the Natural Resources Defense Council. "The federal government definitely needs to do something more on fuel efficiency beyond the package that Clinton has here." The administration did not necessarily disagree with this assessment. Secretary O'Leary contended that the tax was one of many economic tools being considered in the long-term campaign to wean the Nation from its dependency on fossil fuels. "This is not the last proposal with respect to how to send that signal," she stated. "Outside of taxing the energy itself, I think there are other things you could do at the [gasoline] pump to force price signals about behavior, and I'm going to be thinking about some of those in the coming year."[256]

Congress, meanwhile, took up consideration of the BTU tax. Special interests descended on the House Ways and Means Committee, winning further exemptions and concessions. Most notable was the shifting in the collection point for the tax from producers to consumers. This weakened the tax as an energy efficiency measure, as Alden Meyer of the Union of Concerned Scientists observed, because homeowners and small business were less likely than a major industry or utility to improve energy efficiency in response to a 5 or 6 percent increase in costs. Environmentalists nevertheless continued to support the tax, lobbying for passage of the administration's five-year deficit reduction and reconciliation bill. On May 27, the administration scored a major—albeit narrow and, for the BTU tax, costly—victory when the bill passed the House by a vote of 219 to 213. To secure passage, the administration offered assurances that the BTU tax would be modified further either in the Senate or in a House-Senate conference. Unyielding Senate Finance Committee opposition to the BTU tax, led by John B. Breaux (D-LA) and David L. Boren (D-OK), soon convinced Senate leaders, with the acquiescence of the administration, to drop the BTU tax altogether. In its place, the Senate substituted a 4.3 cents-per-gallon increase in the tax on gasoline and other transportation fuels. Reduced were the modest oil import and energy consumption savings and the environmental improvements offered by the BTU tax. In addition, whereas the BTU tax promised deficit reduction of $72 billion over five years, the fuels tax would bring in only $24 billion.[257]

O'Leary was philosophical about the apparent demise of the BTU tax. In a late June one-on-one interview with television host John McLaughlin, O'Leary noted that the way

Washington worked was that you begin with a proposal and deliver it to Congress where "many people have an opportunity to shape and reshape." She declared that President Clinton favored an energy tax that "does equity" across both income and regional lines and "makes a meaningful contribution" to both increasing energy efficiency and reducing imported oil. The administration would support, however, a compromise that seemed "to make the most sense to all." The preferred tax, O'Leary concluded, was "the tax we can get out of committee." In the end, the House-Senate conference committee settled on the 4.3 cents-per-gallon increase, and in early August the reconciliation bill squeaked through the House by a vote of 218 to 216 and the Senate by 51 to 50.[258]

Energy and the Environment: Global Warming

Environmentalism achieved mainstream status with the incoming Clinton Administration. Environmentalists had cheered Clinton's electoral victory, and the Clinton Administration, much more than its predecessor, inclined itself toward environmental activism. Environmentalists, for the first time, secured positions of real power within the executive branch. Vice President Albert Gore, Jr., had been perhaps the Senate's premier environmentalist, and his best-selling book, *Earth in the Balance*, called for major economic restructuring to curb global warming. Nor was the Department of Energy exempt from the upwelling environmentalism in the new administration. Secretary O'Leary directly linked energy policy decisions to the "health and quality" of the environment, and her personnel decisions reflected a heightened environmental consciousness. She brought into the Department a number of environmentalists, including Dan Reicher, a lawyer with the Natural Resources Defense Council, who became her deputy chief of staff and environmental counselor.[259]

Not surprisingly, global warming became a focal point for the Clinton Administration. The Bush Administration had remained skeptical about global warming, sponsoring significant research but rejecting as too expensive the setting of specific targets for reducing greenhouse gas emissions. The incoming administration made action on global warming a priority. As Gore noted, global warming was "the highest-risk environmental problem the world faces today." In his first Earth Day address on April 21, President Clinton announced that the United States would stabilize greenhouse gas emissions at 1990 levels by the year 2000. This would not be an easy task. In 1990, carbon-equivalent greenhouse gas emissions were 1,464 million metric tons. Without stabilization efforts, greenhouse gas emissions would increase about 7 percent by the year 2000 to 1,568 million metric tons. Clinton offered no specifics on achieving stabilization, and critics, some within the administration, complained about making such a commitment without knowing what new measures would be needed and what their effect would be on the economy. As Senate Committee on Energy and Natural Resources Chairman J. Bennett Johnston (D-LA) admonished, "You ought to consider sensible policy first before you adopt a goal because a goal may not then be achievable by a sensible policy." To "fill in the policy," the White House formed the Interagency Climate Change Mitigation Group composed of the Department of Energy and other key agencies and tasked with developing an emissions action plan. With energy playing a central role in any stabilization of greenhouse gas emissions, the Department emerged as the lead agency.[260]

Secretary O'Leary and the administration emphasized consensus and voluntarism in preparing the action plan. On June 10 and 11, the White House staged the Conference on Global Climate Change attended by representatives from the private sector, the environmental community, academia, and others. O'Leary told the conference that the plan offered "a unique opportunity to come together." The plan, she added, had to "make sense to all of us." Although admitting that the administration had no preconceived notions and that "everything is on the table," the secretary stressed that she was "not so impressed that command and control will get us all the

answers." As Assistant Secretary for Policy, Planning and Program Evaluation Susan F. Tierney reiterated to the House Energy and Commerce Committee, the Department was looking "first and most creatively at voluntary options, in which consumers, firms, States and localities, even Federal agencies, could choose for themselves whether and how to pursue emissions reductions in conjunction [with] their own private or institutional needs." Any inclination the administration might have had toward command and control solutions was further deflected when the Senate rejected the BTU tax. In addition, defeat of the tax complicated emissions stabilization. The BTU tax would have reduced emissions by 25 million metric tons. Projected emissions reductions for the enacted 4.3 cent-gasoline tax increase were only 4 million metric tons. The administration had to make up the difference in its emissions action plan.[261]

Two energy sectors carefully scrutinized by the administration as candidates for possible major reductions in emissions were transportation and the electric utility industry. Each contributed approximately a third of the total emissions of carbon dioxide, which accounted for over 95 percent of the Nation's greenhouse gas emissions. In the transportation sector, raising the corporate average fuel economy (CAFE) standard was again considered. The administration concluded, however, that the auto industry, given the long lead times required, would not be able to implement greater fuel efficiency standards—and therefore reduce emissions—before the end of the decade. Greater short-term reductions in the electric utility industry seemed more promising. Department officials began meeting with executives from major electric utilities in an effort to reach an agreement on a voluntary program for reducing emissions. Utility executives, along with some in Congress, pressed for "joint implementation" projects under which utilities and other industries would receive emissions credits for projects undertaken in developing countries. Joint implementation, according to its promoters, would be much more cost effective than domestic efforts because emissions reductions overseas, where no previous attempts to reduce pollution had been made, could be achieved more readily. O'Leary personally opposed joint implementation, at least in the short term, noting that the Clinton Administration had made a commitment to achieve the goal using domestic reductions. The administration agreed and in the action plan called for the development of joint implementation only as a pilot program.[262]

Following a delay of several months, President Clinton and Vice President Gore on October 19 unveiled *The Climate Change Action Plan* at a White House ceremony. "In concert with all other nations, we simply must halt global warming," the President declared. "It is a threat to our health, to our ecology, and to our economy." The action plan emphasized voluntary cooperation by businesses and industries and consisted of nearly fifty individual initiatives, ranging from accelerating tree planting to developing fuel economy labels for tires. Energy efficiency and conservation measures counted for some 70 percent of the plan's anticipated emissions reductions. Government expenditures would be relatively modest. The action plan called for $1.9 billion in federal spending through the year 2000. The administration contended that the relatively small amount of federal money would leverage an estimated $60 billion in private investment in cost effective, energy saving actions.[263]

At a briefing following the White House ceremony, O'Leary stated that the Department would spend $222 million annually to implement the plan. "I fully expect to take that out of my own hide," the secretary noted. She did not specify which departmental programs would be cut to make room for the new initiatives. O'Leary also stressed the elective nature of the program, noting that "voluntary is not a dirty word." She warned, however, that the administration would consider stronger measures if voluntary actions were not forthcoming. "If this doesn't get it," she declared, "we'll go back and find out how to get it through mandates."[264]

Reaction to the emissions reduction plan was mixed. Business and industry, which had feared a command and control approach,

praised the plan widely. "The plan is a good first step," stated Thomas Kuhn, president of the Edison Electric Institute, the trade organization for major utilities. The utilities, he observed, are "committing to work with administrative representatives to see what kind of programs companies can undertake to limit overall emissions." The Global Climate Coalition, a major trade association representing business groups, similarly endorsed the plan for its "reliance on business/government partnerships and voluntary initiatives to reduce greenhouse gas emissions." Environmental and advocacy groups were less enthusiastic, criticizing the plan for its heavy reliance on the goodwill of the private sector. "This tells the international community that they don't have to use tough measures to fight global warming," said Steve Kretzman of Greenpeace. "It tells them that voluntary measures are enough and that's the wrong signal." Dan Becker of the Sierra Club agreed, declaring that "what we need is tougher measures to achieve real reductions." Even the Environmental Defense Fund, with a reputation for taking moderate positions and favoring market-based approaches to pollution control, responded skeptically, noting that the plan did not contain backup measures if voluntary efforts proved inadequate. Other analysts, however, were more equivocal, contending that too many uncertainties still surrounded global warming to be sure that benefits from mandatory measures would outweigh the costs. "Until we know more about the science," stated Doug Bohi of Resources for the Future, a Washington think-tank, "it might be better to have a purely voluntary program."[265]

Energy and the Environment: Energy Efficiency and Renewables

The Department of Energy's program offices were responsible for implementation of a significant portion of the administration's energy/environmental policies.[266] This was certainly true for the emissions reduction plan. The Department was accountable for three-fourths of the plan's budget requirements,

Secretary O'Leary briefing the media following the release of the Climate Change Action Plan at the White House on October 19, 1993. Source: U.S. Department of Energy

and new energy efficiency and conservation initiatives formed the bulk of this. These new initiatives included cost-shared demonstrations of new technologies, "Golden Carrot" partnerships with non-profit organizations, utilities, and environmental groups to accelerate the commercialization of advanced energy efficient appliances, and the "Motor Challenge"—a collaborative program to test and verify the cost-saving potential of industrial motor systems. In addition, negotiations with the electric utilities bore fruit with a program dubbed "Climate Challenges." Utilities voluntarily agreed to either return greenhouse gas emissions to 1990 levels (or below) or limit emissions under strict performance measures. By October, the Department had reached tentative agreements with fifty-seven utilities representing 60 percent of the Nation's electricity generation. On the energy supply side, the emissions reduction plan directed the Department to initiate collaborative efforts with private industry to accelerate market acceptance of renewable technologies. The administration earmarked $432 million for this program through the year 2000.[267]

Emphasis on energy efficiency, conservation, and renewables, as well as natural gas, formed the core of the Clinton Administration's energy strategy. The fiscal year 1994 budget request of $789 million for energy efficiency activities

was 35 percent higher than the fiscal year 1993 appropriations. Solar and renewables at $327 million for 1994 was up by 30 percent. Partly the increase was attributable to new requirements of the Energy Policy Act of 1992, which called for new energy efficiency standards and authorized enhanced research programs and new demonstration/commercialization programs. Beyond this, however, the administration committed itself to an "aggressive" program of research and development, with the largest funding increases going to technology transfer and commercialization, advanced materials, industrial wastes and materials processing, electric hybrid and alternative-fueled vehicles, and advanced building systems technologies. Despite the sizeable funding increases, some environmentalists called for much greater expenditures for energy efficiency and renewables. In November, Representative Philip Sharp (D-IN) introduced a resolution in Congress calling for a $1 billion shift in the Department's budget from "conventional energy and other programs" to energy efficiency and renewable energy programs. Critics also expressed dismay with the administration's delay in appointing an assistant secretary for energy efficiency and renewable energy. Not until late fall did the administration fill the position with Christine A. Ervin, formerly director of the Oregon Energy Department. At her confirmation hearing, Ervin promised to "quickly find out [the] barriers and obstacles" to designing "responsive programs," and she stressed the need "for brokering the kind of creative partnerships President Clinton and Secretary O'Leary are committed to expand at the federal level."[268]

Energy and the Environment: Environmental Management

With meteoric annual funding increases, environmental management headed by the Office of Environmental Restoration and Waste Management had emerged as the Department of Energy's largest single program area. Charged with cleaning up the Nation's nuclear weapons complex, environmental management comprised fully one-third of the Department's budget. The environmental restoration program made up one-fifth of the world's remediation activity. Extraordinary program growth, however, had created significant managerial problems.

Secretary O'Leary tours the Waste Isolation Pilot Plant (WIPP) near Carlsbad, NM, 2,150 feet beneath the surface. She is escorted by Manager George Dials. Source: Waste Isolation Pilot Plant

Spending over $6 billion annually on a still-coalescing program taxed the Department's ability to use funds wisely. Senator Johnston characterized the cleanup effort as a "grand and glorious mess." Critical of what he described as the program's failure to make real progress, Johnston stated that there was "no function of government that has been as mismanaged as our waste cleanup." Thomas P. Grumbly, the Clinton Administration's new assistant secretary for environmental management, acknowledged that the program had not achieved enough in terms of concrete results but pointed out that "it's important to understand that everything we do is driven by compliance agreements." Over the past half-dozen years, the Department, the Environmental Protection Agency, and various states had negotiated environmental compliance agreements for all major cleanup sites. Essentially cleanup blueprints, the agreements specified enforceable milestones for each site. The difficulty, as Grumbly noted, was that at many sites the problems were "larger, more complex, or simply different than we had originally expected." Simply put, funding might not be sufficient to fulfill all the agreements. Nor was substantially greater funding likely. The cleanup budget, according to T. J. Glauthier, director of the Office of Management and Budget's natural resources, energy and science division, would remain near fiscal year 1994 levels. Likening cleanup to the video game "Pac Man" because "it can just keep eating away at the budget," Glauthier stated that "we will stabilize [the cleanup budget] at something like this level, while we work on how to manage it better."[269]

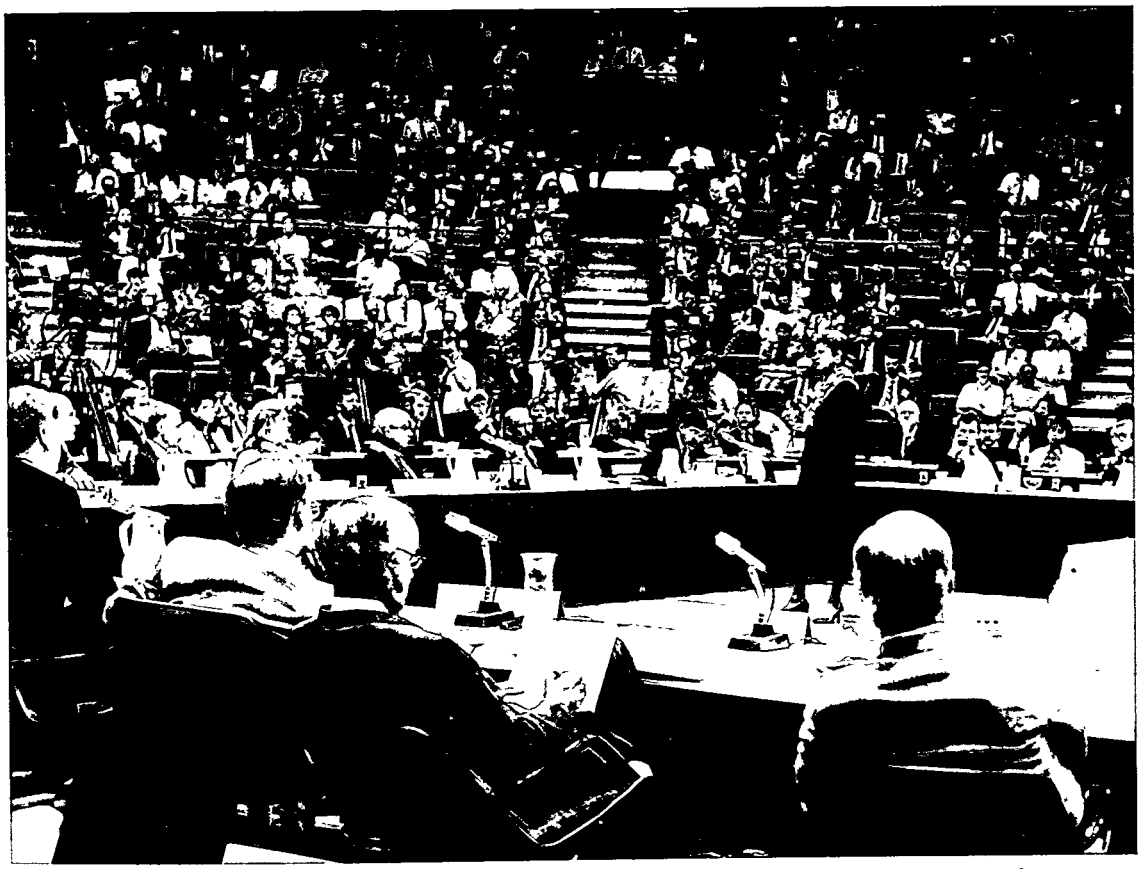
Given these budget realities, Grumbly advocated an "action-oriented approach" to cleanup. "Truly urgent risks," ranging from high-level waste tanks at Hanford to worker safety and health issues, required immediate attention. Less urgent risks called for only "interim remedies" to slow or halt migration of contamination until appropriate technology had been developed to deal with the situation. This approach, Grumbly argued, would "avoid the temptation to throw money at problems that do not present any exposure risk merely to appear to be doing something.'" Public participation in decisionmaking was critical to the success of the approach. Both Grumbly and Secretary O'Leary envisioned an open and accessible process in which "stakeholders"—state and local governments, local citizenry, Native Americans, environmentalists, and others—contributed to decisions on cleanup priorities, budgetary allocations, and land use policies. Stakeholder participation was especially critical if compliance agreements had to be renegotiated. Indeed, such negotiations were already underway. In November 1993, the Department, EPA, and the State of Washington, relying on substantive input from stakeholders, reached tentative agreement on a revised Hanford Tri-Party Agreement, first signed in 1989. "We have carved out a new regional consensus about Hanford, and we have changed the political equation in the Northwest," declared Gerald Pollett, executive director of Heart of America Northwest, a local advocacy group. "We are in agreement on a new cleanup approach that no one believed was possible."[270]

Further success, according to Grumbly, depended on "three critical tools": cleanup standards, land use policy, and new technologies. The program's "biggest uncertainty," noted the assistant secretary, was lack of standards for residual radioactivity at cleanup sites. Absence of standards made it impossible to either estimate costs or choose remedies and appropriate technologies. Closely connected was the absence of a land use policy. Without such a policy, cleanup levels could not be established. The implicit assumption that sites would be released for unrestricted use, Grumbly argued, stopped remedial actions in the study phase "because no technology exists to meet unrestricted use standards." Technology was the key, nonetheless, to doing more with a stabilized budget. Grumbly stressed that more incentives would be provided for sites to use innovative technologies, and he singled out the national laboratories' efforts to assist cleanup by developing new technolgies.[271]

Peaceful Science: Applied vs. Basic Research

Cleanup technology was only one of many ways the Department of Energy's national laboratories and other research facilities sought to respond to the end of the Cold War by diversifying and seeking new research roles. With the new administration emphasizing jobs and the economy, Secretary O'Leary attempted to steer the Department's efforts toward greater applied research. Technology transfer from the laboratories to private industry was the perceived key. Although the Department under President Bush had pushed hard for technology transfer, President Clinton and Secretary O'Leary appeared even more committed to hastening the process. Under authority of the National Competitiveness Technology Transfer Act of 1989, Admiral Watkins had overseen the implementation of more than 300 Cooperative Research and Development Agreements (CRADAs) between the Department and industry, academia, state governments, and others. During O'Leary's first year, the number of negotiated CRADAs doubled. O'Leary also increased technology transfer spending by 68 percent and decreed that the laboratories should devote at least 10 percent of their budgets to technology transfer.[272]

Emphasis on technology transfer raised fears that basic research at the Department consequently would suffer. The administration in its fiscal year 1994 budget request proposed an increase of only three percent for basic research in the civilian sector. For the Department, this meant less-than-projected funding for basic research programs such as high energy physics. Building projects, including the superconducting super collider (SSC), would be "stretched out." For the super collider, the Department estimated a reduction in planned outlays through fiscal year 1998 resulting in a three-year delay in schedule and a $2 billion increase in project cost.[273]



Secretary O'Leary delivers keynote address at the Hanford Summit, a conference with Department of Energy "stakeholders" on environment, technology, and the economy. The conference was held September 14-15, 1993, at Kennewick, WA. Source: Westinghouse Hanford Company

Demise of the Superconducting Super Collider

The Department of Energy's basic research program took a much greater and direct hit when Congress in fall 1993 terminated funding for the superconducting super collider. In 1992, congressional supporters had averted a super collider funding cut-off in conference committee after the House voted down appropriations for the project. Fearing further assault on the super collider during the 1993 congressional session, high energy physicists and other super collider supporters lobbied heavily on the Hill. Supporters were critical, however, of what they perceived as lack of full administration support for the project. The administration's proposed "stretch out" of super collider construction raised doubts, and Secretary O'Leary's statement that she was not "passionate" about the project did little to calm uneasiness. Nonetheless, prior to the June 25 vote in the House, the administration attempted to make clear that the super collider was a high priority. O'Leary invited forty-nine mostly undecided lawmakers to visit the site. The secretary and Vice President Gore made telephone calls to uncommitted House members. President Clinton appealed to the House to approve super collider funding, noting that "abandoning SSC at this point would signal that the United States is compromising its position of leadership in basic science—a position unquestioned for generations." Despite these lobbying efforts, the House voted 280 to 150 to end funding for the super collider. The margin of defeat was significantly greater than that in the previous year's vote of 232 to 181.[274]

Efforts by O'Leary and the Department to reverse the decision in the Senate were hindered by several factors projecting the super collider in a negative light. Ongoing reports of mismanagement of the super collider dogged the project throughout spring and summer. In February, the General Accounting Office asserted that the project did not have a fully functioning cost tracking system and that some project areas were running 50 percent over budget. Following the vote

Secretary O'Leary autographs a display magnet during her tour of the Superconducting Super Collider construction site near Waxahachie, TX. Source: U.S. Department of Energy

in the House, O'Leary admitted that the Department had provided little oversight of a contractor who demonstrated poor business practices. The project, she informed the Oversight and Investigations Subcommittee of the House Energy and Commerce Committee, "has been managed very gently. By that, I mean inappropriately." A month later, O'Leary announced that the super collider's prime contractor, the Universities Research Association, would be stripped of construction responsibilities.[275]

Ever-increasing funding estimates also contributed to the negative image burdening the super collider. In January 1991, the Department informed Congress that the estimated cost for the project was $8.25 billion, a considerably higher amount than the 1989 estimate of $5.9 billion. In early August 1993, O'Leary pledged that the super collider's cost would be held to the $8.25 billion figure plus $2 billion in stretch-out funding. Only a month later, however, a seventy-five-member committee headed by the Department's procurement officer reported that without management actions to curb cost growth the total price tag for the super collider would be $9.94 billion plus stretch-out costs. In October, in a last ditch effort to rescue the

project, O'Leary informed the House that the Department tentatively estimated that the project would cost less than $11 billion. If the super collider cost more than $11 billion, she promised, the Department would "present options" to Congress ranging from more funds to killing the project.[276]

The super collider, in addition, ran afoul of the applied *versus* basic research debate. Critics claimed that the project was too expensive and benefited too small a segment of society—namely, high energy physicists—at a time when the Nation faced economic hardships. One opponent termed the super collider a "pork barrel project of unparalleled dimensions, a wacky science project run amok, a black hole for greenbacks, and a full employment program for university physicists." Such attacks left the administration grasping, almost by the logic of its own rhetoric, for some sort of practical application for the super collider. President Clinton declared that technologies developed for the super collider's magnets would "stimulate production of a material that will be critical for ensuring the competitiveness of United States manufacturers, for improving medical care and a variety of other purposes," adding that the project would produce "critical employment and educational opportunities for thousands of young engineers and scientists around the country." In a similar vein, O'Leary contended that the super collider would provide not only "the answers to the origins of the universe" but also "great science in [the] medical treatment of cancer." More realistic was Burton Richter, director of the Stanford Linear Accelerator Center (SLAC), who, when asked if there would be practical benefits from the super collider, replied "probably not, maybe yes."[277]

Ultimately, the burden carried by the super collider proved too much. On September 30, the Senate voted 57 to 42 for funding the super collider. House Speaker Thomas Foley (D-WA) declined to name any super collider opponents to the ensuing conference committee, and, as a result, House and Senate negotiators agreed to fund the super collider. But on October 19 the House voted 283 to 143 to return the funding bill to the conference committee with instructions to kill the project. With no hope of seriously narrowing the large margin of opposition, super collider proponents admitted defeat. "I think the last rites have been said, the coffin has been nailed shut and we're waiting for the funeral," observed Representative Jim Chapman (D-TX), a leader in the effort to save the super collider. The Department formally terminated the project following President Clinton's signing on October 28 of the appropriations bill ordering that the super collider be killed.[278]

The demise of the super collider produced consternation, within both the high energy physics community and the Department. Leon Lederman, the Nobel Prize-winning physicist who first proposed the super collider, stated "It's disheartening that a large number of fairly intelligent people could do such a dumb thing." O'Leary called the congressional decision "a devastating blow to basic research and to the technological and economic benefits that always flow from that research." The House, she noted, made the decision on the basis of reducing the federal deficit but the outcome would be "the loss of an important, long-term investment for the Nation in fundamental science." Looking ahead constructively was SLAC's Richter. "The message from Congress," he observed, "is that very large projects of this scale that are done for pure science are going to have to be done internationally. In the future, we're going to have to figure out how to do these things jointly with other regions of the world."[279]

Reinventing Government

If the termination of the super collider implied the need for new *modi operandi*, both the Clinton Administration and the Department of Energy zealously embraced changing the way government works. On March 3, 1993, President Clinton announced that Vice President Gore would head a team of mostly federal employees to conduct a six-month review of the Federal Government. According to the President, the goal of the National Performance Review, as it was termed, was "to make the entire federal government both less expensive and more efficient, and to change

the culture of our national bureaucracy away from complacency and entitlement toward initiative and empowerment. We intend to redesign, to reinvent, to reinvigorate the entire national government."[280]

Gore and his team approached "reinventing government," as it was popularly known, with alacrity. Subteams examined cross-cutting systems and individual agencies. Departments and agencies created "Reinvention Teams" to lead internal transformations and "Reinvention Laboratories" to experiment with new ways of doing business. (By fall, the entire Hanford reservation and five other Department of Energy organizations had been designated Reinvention Laboratories.) Gore spoke with federal employees at every major agency, including those at the Department of Energy on July 13. Citizens were invited to comment. A summit conference gathered the "best minds" from business, government, and academia.[281]

The result was a "vision of a government that works for people, cleared of useless bureaucracy and waste and freed from red tape and senseless rules." Encapsulated in a report released on September 7 and entitled *From Red Tape to Results: Creating a Government that Works Better and Costs Less*, the review highlighted four key principles: 1) cutting red tape by streamlining budgets and bureaucracies and stripping away unnecessary regulations and paperwork; 2) putting customers, whether they be citizens, businesses, organizations, or whatever, first; 3) empowering employees by giving them more responsibility and a greater role in decisionmaking; and 4) producing better government for less by eliminating duplication and ending special interest privilege. The review delineated roughly one hundred of the "most important" steps and actions deemed necessary to begin reinventing government. Quantitatively, the review estimated that if the steps and actions were implemented, $108 billion could be saved through fiscal year 1999.[282]

Total Quality Management

The managerial approach of the National Performance Review closely resembled that of Total Quality Management (TQM), the management philosophy founded by W. Edwards Deming and credited with transforming Japanese industry following the Second World War. Heartily embraced by America's private sector in the late 1980s and early 1990s, TQM advocated "Putting Customers First" and stressed the pursuit of quality above all. Practitioners of TQM theorized that most problems were built into the system, frustrating workers, yielding poor products, and enraging customers. The TQM philosophy focused on workers, who knew better than anyone what the problems were. The National Performance Review paid tribute to TQM, noting the commonalities of approach. But the Gore team also pointed out that conditions in government were quite different from the private sector. Market incentives operative in the private sector did not exist in government. Lacking a bottom line and obsessed with process rather than results, government required a management approach that went beyond private sector methods.[283]

Vice President Gore addresses Department of Energy employees at interactive "Town Hall Meeting" on July 13, 1993.
Source: U.S. Department of Energy

Secretary O'Leary was on the forefront of the administration's reinventing government/ quality management effort. Gore described her as "one of the leaders of [the] whole process." Trained in TQM while an executive for Northern States Power Company, O'Leary quickly brought her extensive experience in "market

dynamics and quality management" to bear in managing the Department and changing its "work culture." She arrived hoping to create "a new spirit of inclusiveness, communication, and openness" in an effort to "reinvent government" at the Department. Her first one hundred days in office witnessed a whirlwind of activity. In her attempt to "fundamentally change the way the Department functioned," she initiated a cabinet-level "Breakfast Club," including the secretaries of interior and agriculture and the head of the Environmental Protection Agency, to "foster team spirit and communication." She emphasized reaching out to "customers" and "stakeholders." She initiated "the Green Team," bringing together public affairs representatives from agencies involved with natural resource and environmental issues to "coordinate the administration's public outreach efforts." She brought a new openness in the relationship between departmental employees and the Office of the Secretary, holding question-and-answer discussions and giving in-house speeches in an attempt to give employees "a sense of mission, inclusion, and pride." She established satellite "link-ups" with the Department's field offices to "bring them closer to the decision-making process at headquarters." Gore acknowledged these efforts in his July visit to the Department. "Since the earliest days of this administration," he noted, "the Department of Energy has been helping to lead the way in identifying new ideas and new approaches and efforts to bring what the private sector has called the quality revolution into the federal government."[284]

Motorola University and Strategic Planning

By summer 1993, O'Leary's efforts to remake the Department hit full stride. O'Leary chartered a "Leadership Group", with herself as chair, to operate as a "Board of Directors" overseeing the Department's quality initiatives. She established a "Quality Council," a diverse group consisting of both management and employees and headed by Archer Durham, assistant secretary for human resources and administration, to set the direction and approach for the quality initiatives. In July and August, the secretary and sixty of the Department's top executives, including laboratory directors, field managers, and key program managers, attended six days of quality improvement training at the Motorola-Milliken Quality Institute in Schaumburg, Illinois. The purpose of the sessions was to begin building a management cadre dedicated to meeting customer expectations by providing quality products and services.[285]

Preceding the July quality training, Department and laboratory executives held a strategic

Headquarters, field, and laboratory leaders attend August 1993 work session at Motorola University. Deputy Secretary William H. White is at the far right, front row. Source: U.S. Department of Energy

planning session focused on the Department's mission, core values, and future trends. At the August Motorola session, Department officials developed a framework for producing a departmental strategic plan. In addition, participants reached a consensus on new directions and priorities for the Department. Suitably armed, the Department's executives returned from Motorola to spread the quality gospel and begin the strategic planning process. Videotapes of the Motorola training sessions were shown. Monthly articles on quality management appeared in *DOE This Month*, the Department's Newsletter. The Department distributed to all employees a booklet setting forth the Department's "Mission" and detailing the Department's "Core Values." The strategic planning process, headed by Assistant Secretary for Policy, Planning, and Program Evaluation Susan Tierney, sought to include input from headquarters and field officials and employees, the national laboratories, and external stakeholders. Strategic planning and quality management training sessions were held for mid-level managers. These gave birth to similar sessions designed to inform, and receive input from, employees.[286]

The New Culture and Nuclear Weapons Testing

The thrust of Secretary O'Leary's new initiative was the creation of a "new culture" within the Department of Energy. With its emphasis on "inclusiveness, communication, and openness," this new culture stood in stark contrast to the insularity and secretiveness of the "old culture" descended from the Atomic Energy Commission. More than this, the old culture was a weapons culture. From the Manhattan Project to the Department of Energy, the development and production of nuclear weapons had been the dominant agency mission. Even Admiral Watkins, with his well-publicized campaign to reform the old culture, was at the same time part of that culture. He had been chosen secretary because of his military and nuclear power background. His mandate had been to resume the full-scale production of nuclear weapons. And for all his reformist rhetoric, Watkins emphasized a command and control approach to managing the Department. O'Leary truly was different in this respect. Coming out of the energy side of the two departmental traditions, she had little background in defense and nuclear weapons matters. And the mandate she received from President Clinton, with his demand for "a different direction and a different policy," was clearly something new for the Department.

If any doubts existed that O'Leary was genuinely the Department's first post-Cold War secretary, they were soon dispelled by her approach to nuclear weapons testing. In fall 1992, Congress, despite President Bush's vigorous opposition, imposed as part of the energy and water appropriation a nine-month moratorium on the testing of nuclear weapons. Following the moratorium, Congress allowed for as many as fifteen nuclear tests through 1996. Imminent expiration of the moratorium forced the incoming Clinton Administration to consider resuming testing. The Joint Chiefs of Staff and the Defense and State Departments initially favored conducting fifteen large shots. Opposition subsequently pared the proposal to only nine tests directed toward safety improvement and stockpile reliability. The "crucial turning point" on the testing issue, according to the *Washington Post*, came at a May 14 meeting of the National Security Council when O'Leary, instead of wholeheartedly endorsing the proposal, "startled" the group by urging further study. "I have never," one official present noted, "felt more frigid air in the room at an NSC meeting."[287]

No secretary of energy had ever come out against nuclear testing, and O'Leary certainly was not speaking for a united Department. The directors of the nuclear weapons laboratories argued the clear and present need for testing for safety and reliability purposes. The secretary's doubts were buoyed, however, at a seminar she convened on May 18 and 19. Against strong objections from the lab directors, physicist Frank Von Hipple and former Secretary of Energy and of Defense James Schlesinger argued that proposed safety tests would bring little benefit and there was no reason for warhead reliability tests when there

was no indication that warheads had deteriorated. In the administration debate, O'Leary then joined with Thomas Graham, acting director of the Arms Control and Disarmament Agency, and John Gibbons, White House science adviser, in advocating a "no-first-test" policy. It was this position that President Clinton adopted. On July 3, Clinton announced that he was extending the testing moratorium for at least fifteen months. He called on other nations to observe a similar moratorium while negotiating a permanent test ban. The President also stated that the United States would "explore other means" than testing to maintain the safety, reliability, and performance of the nuclear arsenal.[288]

Clinton's announcement was a personal victory for O'Leary. As Deputy Energy Secretary William White explained, laboratory officials in the past frequently predominated not only in technical matters but also in budget priorities and policy disputes. The testing announcement signaled a different approach. "The administration," White proclaimed, "is proud that it is not letting the laboratories manage the Department." Current departmental leadership, he added, viewed the practice of deferring to the laboratories as a mistake that had led to "debacles" like the Strategic Defense Initiative program. Although committed to maintaining a cadre of top laboratory scientists, White observed, the administration would make sure their work was subordinated to "national interests such as nonproliferation" and maintaining a smaller nuclear arsenal.[289]

Nuclear Weapons: Beyond the Cold War

Secretary O'Leary on the nuclear testing issue had publicly distanced herself from the weapons culture within the Department of Energy. Nonetheless, nuclear weapons and the need to maintain and equip those weapons would not soon go away. Long-term national security strategy still assumed the existence of a nuclear deterrent. Like it or not, the Department would be deeply involved in the nuclear weapons business for the foreseeable future. Both the administration and O'Leary were well aware of this. In his testing announcement, President Clinton directed the Department to maintain a capability to resume testing in the event another nation did so first. The wisdom of taking a precautionary approach was made clear only three months later when China, in spite of considerable urging—some of which came from O'Leary—to forego testing, on October 4 detonated underground a nuclear device. Ignoring the provocation to immediately resume testing, Clinton issued a directive to the Department to maintain readiness to test. O'Leary agreed that this was "prudent and necessary."[290]

What remained at issue was the ultimate size and capability of the nuclear arsenal needed in the post-Cold War environment. Two major studies of the Nation's future nuclear strategy and capability were pending. The Defense Department was undertaking a "comprehensive study of U.S. Nuclear forces," and the National Security Council was analyzing how far below the START II limit of 3500 strategic warheads the United States could safely go.

The size and configuration of the Department's nuclear weapons production complex, however, was only partially dependent on the outcome of such studies. Whatever the size of the arsenal, any ongoing capability would require a certain minimal complex. During the Bush Administration, the Department lost the capability to produce nuclear weapons because of safety and environmental problems. Rocky Flats and other key facilities had been permanently shut down. The main defense function the Department was involved in during O'Leary's first year was the dismantlement of some 1700 warheads. Nonetheless, Pentagon planning called for enough production capability to "allow additional forces to be reconstituted in the event of a threatening reversal of events." And Robert W. DeGrasse, Jr., an advisor on nuclear weapons, confirmed to reporters that the Defense Department "has talked to us about maintaining the capability of doing small-scale production." DeGrasse added that the Department was "being asked to maintain a small production capability without knowing specifically what we'll be asked to produce." At the same time, critics

were urging the Department to defer decisions on facility construction and relocation until stockpile questions had been resolved.[291]

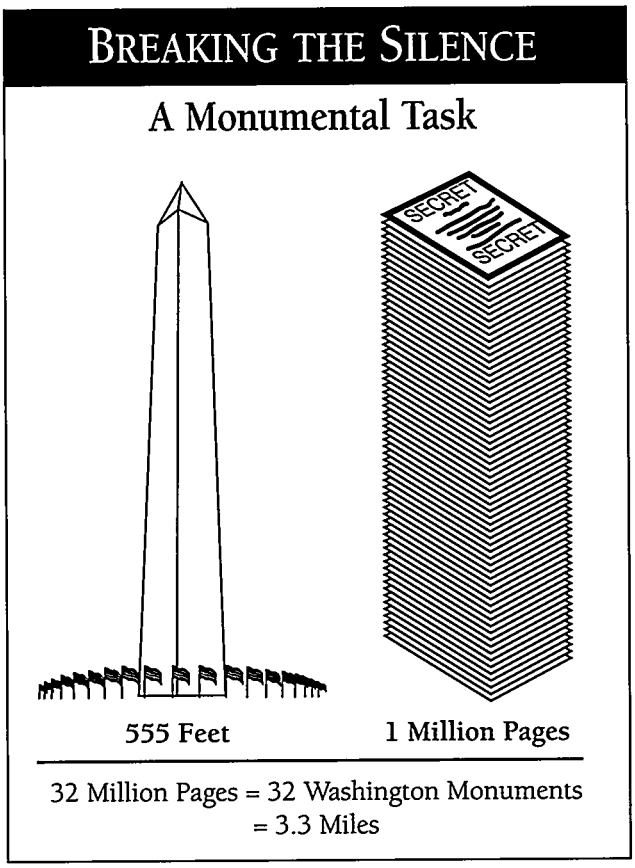
The Department, even so, continued to move ahead with the Programmatic Environmental Impact Statement (PEIS) for Reconfiguration of the Nuclear Weapons Complex begun under President Bush. Analyzing the environmental consequences of long-term configuration strategies, the PEIS would lay the basis for a record of decision on the size and shape of the future complex. Critical was the question of where plutonium would be stored and possibly fabricated into "pits" for warheads, the latter previously a function performed at Rocky Flats. Among other alternatives, the Department was considering developing a plutonium "supersite" for storage and processing. One likely location was the Nevada Test Site. "We're not talking about a shiny new weapons factory," observed Richard Mah, director of reconfiguration planning at Los Alamos. "Plutonium is unstable. We have it in ingots, oxides, metal; you'll need a new plutonium processing facility to convert plutonium from one form to another. Once you have that, the manufacturing part is trivial."[292]

O'Leary and Openness: Breaking the Silence

Secretary O'Leary's year-long quest to overturn the Department of Energy's old culture climaxed when she launched her "openness initiative" at a press conference on December 7, 1993. Before an overflow audience in the auditorium of the Forrestal building, the Department's headquarters in Washington, O'Leary announced that, as part of President Clinton's commitment to a more open government, the Department was taking the first step in lifting "the veil of Cold War secrecy." The initial step consisted of releasing previously classified material. O'Leary described it as "the biggest delivery of declassified material in the history of this department." The secretary passed out a large packet of fact sheets revealing that one-fifth of the Nation's nuclear weapons tests had been kept secret, identifying locations and quantities of weapons grade plutonium, providing information about fusion energy, and documenting the large quantities of mercury used in weapons production. O'Leary committed the Department to releasing additional material within six months. She also provided examples of how the Department was becoming a more open agency. These included encouraging whistleblowers and providing information on human plutonium experiments.[293]

Termed "breaking the silence," O'Leary's openness initiative focused on the declassification and release of information. The initiative had four goals: 1) the reduction of the amount of classified information, particularly that related to environmental, safety, and health issues, 2) the speed-up of the Department's declassification process in accordance with priorities developed with stakeholder input, 3) the review of classification policies to make them consistent with national security needs in the post-Cold War era, and 4) the establishment of an interagency process for expediting declassification and release of shared information. The Department estimated its classified documents at some 32 million pages, which if stacked would reach about 3.3 miles. Noting the paucity of resources to face the monumental task ahead, O'Leary pledged that the Department would "make improvements to give the public as much information as possible without compromising national security." Symbolically, this meant changing the name of the Department's Office of Classification to the Office of *De*classification. Substantively, it meant tripling the size of the Office of Declassification's staffing.[294]

Whatever direction the Department thought it would take, the openness initiative soon assumed a life of its own. O'Leary's press conference generated considerable media attention, most of it favorable and, at least initially, focused on the previously secret weapons tests. Attention quickly turned, however, to the issue of radiation experiments on humans, such as the plutonium injection program begun near the end of World War II. Despite the fact that some of this information had been publicly released years and even decades earlier, the media seized on the issue. As information and misinformation on radiation experiments and informed-consent issues



Openness initiative graphic illustrating the enormity of the declassification task facing the Department.
Source: *DOE This Month,* December 1993

earned top billing in both national and international newspapers and broadcasts, the Department instructed its offices to search files for anything related to human experimentation. O'Leary appeared on television's "McNeill-Lehrer News Hour," the "Today Show," and "Larry King Live." Growing public interest convinced the Department to set up an "800" telephone number. [295]

O'Leary was not hesitant in pointing out government responsibilities in the matter. "My view is that we must proceed with disclosing these facts and information regardless of whether it opens the door for a lawsuit against the Government," she noted. "And many have suggested, and I tend to agree personally, that those people who were wronged need to be compensated." Hints of compensation brought a vacationing President Clinton into the picture. The President defended O'Leary's handling of the situation, calling her release of the information "the appropriate thing to do." Shortly thereafter, the administration announced that the search for information on human experiments would be extended to all federal agencies. On January 3, 1994, an interagency task force coordinating the search for records held its first meeting at the White House. The Human Radiation Interagency Working Group included the secretaries of energy, defense, health and human services, and veterans affairs. Directors of the Central Intelligence Agency and the Office of Management and Budget were also included. Clinton established the Advisory Committee on Human Radiation Experiments on January 18, 1994, to provide advice and recommendations to the interagency group. The fifteen-member advisory group was to consist of experts in medicine, science, and ethics.[296]

O'Leary's First Year: *Dramatic Change*

DOE This Month, the Department of Energy's newsletter, in its January 1994 issue declared that Secretary O'Leary and the Department had "seized President Clinton's inaugural challenge to 'make change our friend' by taking bold action" and making 1993 "a year of dramatic change." This change included "significant progress" toward achieving the key goals of improving the Nation's industrial competitiveness, reducing the nuclear danger, enhancing energy security, protecting global environmental quality, improving the Department managerially, and increasing public trust in government.[297] Perhaps the single most significant event in O'Leary's first year in office was her "openness initiative," but this was only part of her larger effort to reorient the Department and overturn the "old culture" that had been entrenched for fifty years.

In an end-of-year interview with *Inside Energy*, O'Leary stated that she was satisfied that the Department, after years of concentrating on building bombs, had finally begun to adapt to its post-Cold War role as a major contributer to the Nation's economic competitiveness. "When I came, the universe and certainly the people I'd been running with on the outside in the energy biz felt there was no strategic focus in the department," she noted. "It occurred

to me that if that's the way others looked at us, then we'd better sharpen our mission." O'Leary and other senior officials thus spent considerable time in 1993 concentrating on the Department's new responsibilities—supporting both the economy and nuclear arms control.

This meant a somewhat different approach on the energy side of the Department's twin traditions. "In energy, I think we've turned it around in a significant way," O'Leary observed. "We look at it not just in terms of whether we have diversified energy supply . . . but also whether we have begun to use it as a mark for driving the economy. So we focus now not merely on taking the money from Congress and spending it, but actually set up for ourselves a system of measuring success, like the number of jobs created from work we've done, energy saved, pollution avoided, as well as opportunities to invest abroad."

Defense, the other major departmental tradition, remained a critical mission for O'Leary and the Department. But defense, according to the Secretary, now had a different slant. The Department was no longer preoccupied with designing and building weapons but rather with controlling arms. Developing technologies essential to monitoring possible nuclear weapons buildups throughout the world as well as dismantling existing weapons, she stated, had become departmental priorities. Cleanup of the weapons complex, too, was now a Department priority, and O'Leary was confident that appropriate steps had been taken to control the fast growing enterprise. "We finally recognized," she noted, "we weren't getting value for the dollars spent in the cleanup and established some benchmarks and methodology to insure that we get better results."[298]

FY 1995 Budget Request

The Department's changed priorities were evident in the administration's fiscal year 1995 budget request sent to Congress in early February 1994. Described by Secretary O'Leary as "lean," the overall budget of $18.5 billion was about three percent less than the estimated fiscal year 1994 funding level of $19 billion.

Science and technology programs within the Department sustained the biggest cuts. The Department's request for $2.9 billion for science and technology was about fourteen percent less than the 1994 appropriation. Nearly all of the reduction was attributable to the cancellation of the superconducting super collider. Requested funding for other high energy physics research rose only slightly from $618 million to $622 million. Within the remaining science and technology mix, basic energy sciences suffered cuts from $790 million to $741 million. Nuclear physics research dropped from $349 million to $301 million. Requested funding for biological and environmental sciences, including global climate change research, increased from $412 million to $435 million. Fusion energy research showed a marked increase from $344 million to $373 million. Funding for technology transfer also was boosted.

Predictably, national security programs decreased about 13 percent in requested funding from $6.5 billion to $5.6 billion. The request for nuclear weapons activities, including the maintenance of the existing stockpile and the dismantlement of excess weapons, decreased from $4.4 billion to $4 billion for fiscal year 1995. Naval reactors funding fell only slightly from $754 million to $730 million on the strength of ongoing efforts to develop an advanced nuclear reactor plant for the Navy's new attack submarine. Funding for verification and control technology programs, including the Department's stepped-up efforts on nuclear weapons nonproliferation, held steady at about $360 million.

Following five years of massive funding increases, the Department's fiscal year 1995 request for the environmental management program was up only $180 million to $6.5 billion. Assistant Secretary Thomas Grumbly insisted that, despite the relatively small increase, the Department would meet all legal requirements under its compliance agreements with state and Environmental Protection Agency regulators. Cleanup and restoration comprised almost $1.8 billion of the environmental management request, while waste management activities continued to

garner the largest share at $3 billion. Funding for facility transition and management, involving the coordination and oversight of the transfer of contaminated facilities primarily from defense programs, rose sharply from $672 million to $866 million. Technology development, although up from $397 million to $426 million, remained about 7 percent of the overall environmental management budget request and fell short of the 10 percent share that Grumbly, as well as his predecessor, had set as a target. On a site-by-site basis, the Department allocated Hanford the greatest share of environmental management funding at 23 percent, or $1.6 billion. Oak Ridge was next at $905 million and Savannah River third at $744 million.

The funding request for energy resources, up some 5 percent for fiscal year 1995 from $3.5 billion to $3.7 billion, perhaps most clearly reflected the Department's shifting priorities. Funding for energy efficiency and conservation increased from $699 million in fiscal year 1994 to a requested $993 million in fiscal year 1995. Solar and renewable funding was up from $347 million to a requested $398 million. By contrast, nuclear energy activities dropped precipitously from $343 million to $248 million. Asserting that research and development on reactors having no near-term commercial application should not be funded, the Department's budget request proposed shutting down the advanced liquid metal reactor and the modular high-temperature gas-cooled reactor programs. Fossil energy funding also was down from $665 million to $520 million, despite a 93 percent increase in natural gas research funding from $44 million to $86 million. Coal research and development decreased from $167 million to $128 million. The Department requested only $37 million for the clean coal program, with an already provided advance congressional appropriation of $375 million allowing the Department to meet its contractual obligations.[299]

Fueling a Competitive Economy: DOE's Strategic Plan

Culminating months of effort, Secretary O'Leary in April 1994 released the Department of Energy's first comprehensive strategic plan. O'Leary noted that the end of the Cold War and the election of President Clinton had engaged a "new national agenda." Beginning with the summer 1993 "empowerment summit" at the Motorola-Miliken Quality Institute and through the process of a "total quality management learning experience," the strategic planning process envisioned a "massive reshaping" of the Department's "missions, priorities, and business practices" to meet the challenge of the new national agenda. "Tinkering around the edges," the strategic plan declared, "was not enough." The strategic planning process thus produced, according to O'Leary, "new and more sharply focused goals: fueling a competitive economy, improving the environment through waste management and pollution prevention, and reducing the nuclear danger."

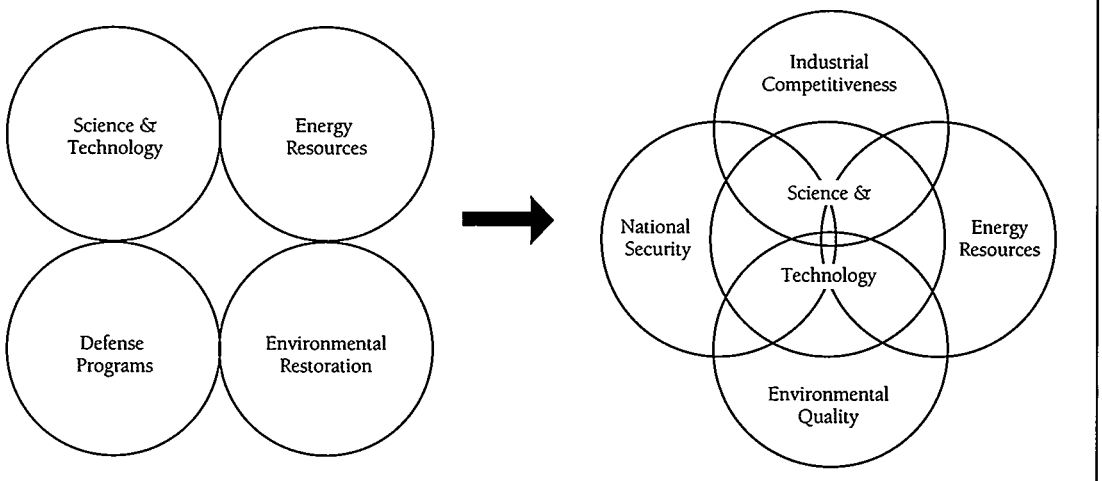
Key to meeting these goals was the effort to "define and integrate the business activities" of the Department. The strategic plan identified five core "businesses" or mission areas:

- *Industrial Competitiveness.* To assist President Clinton in achieving his vision of an investment-driven economy capable of creating high-wage jobs, the Department set as its first priority helping the Nation's industry compete in a global economy. This required "partnering" with industry in research and development to "drive" products into the marketplace and cut costs through greater resource efficiency and pollution prevention.
- *Energy Resources.* Convinced that economic growth, energy security, and environmental preservation were not irreconcilable goals, the Department reiterated support for "sustainable energy technologies" emphasizing energy efficiency, renewable resources, and the economic and clean use of fossil fuels. Favoring technological to command and control solutions, the strategic plan promoted diversity and flexibility in energy sources and stressed the need for economic and regional equity for all Americans.
- *National Security.* For nearly five decades, the defense programs of the Department and its predecessor agencies focused on the threat of nuclear conflict. The new

danger, according to the strategic plan, was the proliferation of nuclear weapons and materials into the hands of rogue states and terrorist groups. The Department's redirected national security mission therefore concentrated on nonproliferation, safe dismantlement of nuclear weapons, and maintenance of the stockpile without nuclear testing.

- *Environmental Quality.* The strategic plan stated that the Department's greatest challenge was to eliminate the risks and imminent threats posed by past departmental activities and decisions. Noting the Clinton Administration's commitment to "honoring the Government's obligation" in addressing nuclear weapons complex cleanup and high-level nuclear waste from nuclear power plants, the Department promised to reduce environmental, safety, and health risks while developing technologies and institutions required for solving domestic and global environmental problems.
- *Science and Technology.* With the Nation's industry increasingly shifting from long-term and basic research to short-term product development and improvement, the strategic plan projected the necessity not only to help industry compete effectively in the near-term but also to meet the needs for long-term research. This required "careful management" of the Department's "scientific portfolio," balancing basic and applied research needs. In addition, the Department hoped to maintain the Nation's global technical leadership through long-term, systematic reform of science and mathematics education.

Science and technology were indeed the linchpin uniting the Department and its various businesses around a common theme. Science and technology, the strategic plan noted, provided the "core competencies" that enabled all of the Department's businesses to succeed in their missions. Clearly, as Secretary O'Leary put it, the Department possessed "extraordinary scientific and technical talent and resources." These included 30,000 scientists and engineers, fifty-eight of whom, the strategic plan pointed out, were Nobel Prize winners, employed at nine major multi-program laboratories, ten single-purpose laboratories, eleven smaller special-mission laboratories, and a wide range of special user facilities. Capital value of the laboratories was $30 billion, with annual departmental expenditures of $7 billion for research and development. This represented nearly 10 percent of total federal research and development spending. In essence, the Department was a scientific and technological agency.



The Department Has Fundamentally Reoriented Its Business Lines For The Benefit of The Nation.

Strategic plan graphic illustrating centrality of science and technology in integrating the Department's business activities. Source: *Fueling a Competitive Economy: Strategic Plan*, April 1994

As the Department's new mission statement declared, the Department contributed to the welfare of the Nation by providing "technical information" and a "scientific and educational foundation."

Finally, for O'Leary and her strategic planners, the way business was conducted was as crucial as the nature of the business. Embracing "continuous quality improvement," the strategic plan identified four critical "success factors" for the operation of the Department's businesses: 1) communicating information and building trust both within the organization and with stakeholders and customers, 2) focusing on people as the Department's most important resource by providing employee training, rewarding performance, and promoting workforce diversity, 3) ensuring the safety and health of workers and the public, and protecting and restoring the environment, and 4) managing materials and operations more cost-effectively to give the Department greater flexibility. Above all, the Department needed to be customer oriented. The Department needed, O'Leary asserted, the "advice and thinking" of the broad array of stakeholders and customers.[300]

Whither the Department?

For the Department of Energy, the first year-and-a-half with a new administration and a new secretary had been an active one. Change was clearly the watchword. As the chart at Secretary O'Leary's initial budget briefing in April 1993 declared in big, bold letters: "We Changed our Priorities." Decades-old functions and activities descended through both of the Department's traditions underwent intense scrutiny to determine if they were still needed and helpful in the new post-Cold War world. Some were found wanting. Others emerged reformed and revitalized. According to many observers, a greater sense of departmental unity and purpose began to appear.

The strategic planning process was a major step in this direction. The strategic plan envisioned a "new" Department of Energy with "new priorities and a sense of purpose, a new vigilance, and a culture and values that will bear no resemblance to the previous organization that grew out of the Cold War."[301] If the long-term shape and scope of the Department remained as yet uncertain and still evolving, there was obviously no lacking of vision and a sense of the future. While the Department of Energy neither could nor should forget its history and where it came from, there was little doubt that the Department could never return to what it was.

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CHRONOLOGY

DATE	EVENT
June 29, 1973	President Nixon establishes the Energy Policy Office.
October 6, 1973	The Yom Kippur War breaks out in the Mideast.
October 17, 1973	The Organization of Arab Petroleum Exporting Countries declares an oil embargo.
November 7, 1973	President Nixon launches Project Independence.
December 4, 1973	The Federal Energy Office replaces the Energy Policy Office. William Simon is named Administrator.
May 7, 1974	President Nixon signs the Federal Administration Act of 1974. The Federal Energy Administration replaces the Federal Energy Office.
August 9, 1974	Gerald R. Ford becomes President.
October 11, 1974	President Ford signs the Energy Reorganization Act of 1974. The Atomic Energy Commission is abolished. The Energy Research and Development Administration, Nuclear Regulatory Commission, and Energy Resources Council are established.
November 25, 1974	President Ford appoints Frank Zarb as Administrator, Federal Energy Administration.
January 19, 1975	The Energy Research and Development Administration is activated. President Ford appoints Robert C. Seamans, Jr., as Administrator.
December 22, 1975	President Ford signs the Energy Policy and Conservation Act, extending oil price controls into 1979, mandating automobile fuel economy standards, and authorizing creation of a strategic petroleum reserve.
January 20, 1977	Jimmy Carter is inaugurated President.
February 2, 1977	President Carter signs the Emergency Natural Gas Act of 1977.
February 7, 1977	John F. O'Leary is named Administrator, Federal Energy Administration.
April 18, 1977	President Carter announces National Energy Plan in his first major energy speech.
August 4, 1977	President Carter signs the Department of Energy Organization Act. The Federal Energy Administration and Energy Research and Development Administration are abolished.
August 5, 1977	James R. Schlesinger is sworn in as first Secretary of Energy.
October 1, 1977	The Department of Energy is activated.

November 9, 1978	President Carter signs the National Energy Act, which includes the National Energy Conservation Policy Act, the Powerplant and Industrial Fuel Use Act, the Public Utilities Regulatory Policy Act, the Energy Tax Act, and the Natural Gas Policy Act.
January 16, 1979	Shah flees Iran.
March 28, 1979	An accident occurs at the Three Mile Island nuclear power plant.
April 5, 1979	President Carter, responding to growing energy shortages, announces gradual decontrol of oil prices and proposes windfall profits tax.
June 20, 1979	President Carter announces program to increase the Nation's use of solar energy, including solar development bank and increased funds for solar energy research and development.
July 10, 1979	President Carter proclaims a national energy supply shortage and establishes temperature restrictions in nonresidential buildings.
July 15, 1979	President Carter declares energy to be the immediate test of ability to unite the Nation and proposes $88 billion decade-long effort to enhance production of synthetic fuels from coal and shale oil reserves.
August 24, 1979	Charles W. Duncan, Jr., is sworn in as Secretary of Energy.
October 1, 1979	Secretary Duncan announces the reorganization of the Department of Energy to manage programs by technologies or fuels.
June 30, 1980	President Carter signs the Energy Security Act, consisting of six major acts: U.S. Synthetic Fuels Corporation Act, Biomass Energy and Alcohol Fuels Act, Renewable Energy Resources Act, Solar Energy and Energy Conservation Act and Solar Energy and Energy Conservation Bank Act, Geothermal Energy Act, and Ocean Thermal Energy Conversion Act.
January 20, 1981	Ronald Reagan is inaugurated President.
January 23, 1981	James B. Edwards is sworn in as Secretary of Energy.
January 28, 1981	President Reagan signs Executive Order 12287, which provides for the decontrol of crude oil and refined petroleum products.
February 18, 1981	President Reagan presents "America's New Beginning: A Program for Economic Recovery" to Congress.
February 25, 1981	Secretary Edwards announces a major reorganization of the Department of Energy to improve management and increase emphasis on research, development, and production.
February 25, 1981	Secretary Edwards creates the Energy Policy Task Force.
July 17, 1981	The Department of Energy releases third national energy policy plan, *Securing America's Energy Future: The National Energy Policy Plan.*
October 8, 1981	The Reagan Administration announces a nuclear energy policy that anticipates the establishment of a facility for the storage of high-level radioactive waste and lifts the ban on commercial reprocessing of nuclear fuel.

February 1982	Secretary Edwards sends to Congress the *Sunset Review*, a comprehensive review of each departmental program required by the Department of Energy Organization Act of 1977.
April 5, 1982	Secretary Edwards announces placement of the 250-millionth barrel of oil in the Strategic Petroleum Reserve.
May 24, 1982	President Reagan proposes legislation transferring most responsibilities of the Department of Energy to the Department of Commerce.
November 11, 1982	Donald Paul Hodel is sworn in as Secretary of Energy.
January 7, 1983	President Reagan signs the Nuclear Waste Policy Act of 1982, the Nation's first comprehensive nuclear waste legislation.
July 21, 1983	President Reagan endorses the Alternative Financing Plan and restates his support for Clinch River Breeder Reactor Plant Project.
October 4, 1983	President Reagan presents the fourth National Energy Policy Plan, with a goal of fostering an adequate supply of energy at reasonable costs, to Congress.
October 7, 1983	The Department of Energy establishes the Office of Civilian Radioactive Waste Management.
October 26, 1983	The Senate refuses to continue funding the Clinch River Breeder Reactor, effectively terminating the project.
January 20, 1984	Secretary Hodel announces a reorganization plan to improve the management of programs critical to the Nation's energy security.
May 8, 1984	Secretary Hodel gives the Nuclear Power Assembly his assessment of the state of the nuclear power industry and urges action on the administration's proposed nuclear plant licensing reform bill.
October 25, 1984	The National Coal Council is established to advise both government and industry on ways to improve cooperation in areas of coal research, production, transportation, marketing, and use.
January 3, 1985	Secretary Hodel transmits the natural gas report to Congress, urging comprehensive deregulation.
February 7, 1985	John S. Herrington is sworn in as Secretary of Energy.
September 18, 1985	Secretary Herrington consolidates the Department's environment, safety, and health activities under a newly created assistant secretary.
November 13, 1985	Secretary Herrington outlines his five-point strategy to help revitalize the Nation's nuclear industry in speech before joint meeting of the Atomic Industrial Forum and the American Nuclear Society.
February 24, 1986	Technical safety appraisals begin for more than fifty Department of Energy facilities in eleven states.
March 26, 1986	The fifth National Energy Policy Plan, outlining continued goal of an adequate supply of energy available at a reasonable cost, is submitted to Congress.
April 3, 1986	Successful reactor safety tests are conducted at Experimental Breeder Reactor (EBR-II) in Idaho.

April 10, 1986	Secretary Herrington asks Congress to open access to interstate natural gas pipelines and lift all remaining controls on natural gas prices.
April 26, 1986	A Soviet nuclear reactor accident occurs at Chernobyl.
May 14, 1986	Secretary Herrington requests the NAS/NAE to make an independent safety assessment of the Department of Energy's eleven major production and research reactors.
May 28, 1986	Three candidate sites are selected for first high-level nuclear waste repository.
Sept. 24-29, 1986	Secretary Herrington leads U.S. delegation to a special session of the IAEA General Conference in Vienna, Austria, to discuss measures to strengthen international cooperation in nuclear safety and radiological protection in aftermath of Chernobyl.
January 30, 1987	Secretary Herrington announces President Reagan's approval of construction of the superconducting super collider (SSC), the world's largest and most advanced particle accelerator.
February 18, 1987	The Department of Energy report, *America's Clean Coal Commitment,* catalogs thirty-seven projects underway or planned for clean coal demonstration facilities.
March 17, 1987	The Department of Energy report, *Energy Security*, outlines the Nation's increasing dependence on foreign oil.
April 1, 1987	The Department of Energy issues an invitation for site proposals for the superconducting super collider.
July 28-29, 1987	President Reagan announces an eleven-point super-conductivity initiative at Federal Conference on Commercial Applications of Superconductivity sponsored jointly by the Department of Energy and the White House Office of Science and Technology Policy.
October 1, 1987	The Department of Energy celebrates its tenth anniversary.
December 22, 1987	Congress approves amendment designating Yucca Mountain, Nevada, as the only site to be considered for high-level nuclear waste repository.
January 19, 1988	Secretary Herrington announces seven "best qualified" sites for the superconducting super collider located in Arizona, Colorado, Illinois, Michigan, North Carolina, Tennessee, and Texas.
August 3, 1988	Secretary Herrington announces decision to build two new production reactors: a heavy water reactor at the Savannah River Plant and a modular high temperature gas-cooled reactor to be located at the Idaho National Engineering Laboratory.
August 23, 1988	President Reagan signs omnibus trade bill that repeals windfall profits tax.
November 10, 1988	Secretary Herrington designates the Texas site for the superconducting super collider.
January 12, 1989	White House releases *2010 Report,* projecting requirements for maintaining and modernizing the nuclear weapons production complex through the year 2010.

January 20, 1989	George Bush is inaugurated President.
March 9, 1989	James D. Watkins is sworn in as Secretary of Energy
March 23, 1989	Scientists at the University of Utah announce discovery of cold fusion, drawing immediate world wide attention.
June 6, 1989	The Justice Department announces an investigation into possible violations of federal environmental laws at Rocky Flats.
June 27, 1989	Watkins announces a ten-point plan to strengthen environmental protection and waste management activities at the Department's production, research, and testing facilities.
July 6, 1989	Nevada Governor Robert Miller signs a bill declaring storage of high-level radioactive waste in the state to be illegal.
July 26, 1989	President Bush directs the Department to develop a comprehensive national energy policy plan.
August 1, 1989	Watkins announces the completion of the five-year cleanup plan to "characterize and prioritize" waste cleanups at departmental sites.
September 29, 1989	Watkins establishes the Modernization Review Committee to review the assumptions and recommendations of the *2010 Report*.
November 9, 1989	Watkins establishes the Office of Environmental Restoration and Waste Management within the Department.
November 28, 1989	The Department announces a new high-level waste management plan and requests the Justice Department to file suit to obtain necessary permits for the Yucca Mountain repository.
August 2, 1990	Iraq invades and seizes Kuwait, creating a major international crisis.
August 15, 1990	Secretary Watkins announces plans to increase oil production and decrease consumption to counter Iraqi-Kuwaiti oil losses.
November 21, 1990	President Bush declares the end of the Cold War as relations ease with the Soviet Union.
December 21, 1990	Watkins presents the National Energy Strategy to President Bush.
January 11, 1991	The IEA Governing Board agrees to a contingency plan combining a stockdraw with demand restraint measures to prevent sharp oil price increases in the event of war.
January 16-17, 1991	United Nations coalition forces launch Operation Desert Storm when Saddam Hussein refuses to withdraw from Kuwait.
January 28, 1991	The Department obtains an administrative land withdrawal from the Department of Interior, giving the Department full control over the Waste Isolation Pilot Plant (WIPP).
February 7, 1991	The Complex Reconfiguration Committee, formerly the Modernization Review Board, releases its recommendations for a reconfigured weapons complex, Complex-21.

February 20, 1991	President Bush presents the Department's National Energy Strategy to Congress and the American people.
March 4, 1991	Secretary Watkins transmits the Administration's energy bill to the House and Senate.
July 31, 1991	President Bush signs the Strategic Arms Reduction Treaty (START), which will reduce nuclear weapon stockpiles to 6,000 "accountable" warheads.
September 27, 1991	President Bush announces additional unilateral cuts in the nuclear weapon arsenal.
January 31, 1992	A federal judge rules administrative land withdrawal for WIPP invalid.
May 10, 1992	Secretary Watkins testifies before the Senate Armed Services Committee that for the first time since 1945, the United States is not building any nuclear weapons.
June 1992	Representatives from many nations attend the Earth Summit in Rio de Janeiro.
September 1992	Congress votes to impose nine-month moratorium on nuclear weapons testing.
October 24, 1992	President Bush signs the Energy Policy Act of 1992, which assists the implementation of the National Energy Strategy.
October 30, 1992	President Bush signs the WIPP Land Withdrawal Act.
November 3, 1992	William Clinton is elected president.
January 22, 1993	Hazel R. O'Leary is sworn in as Secretary of Energy.
February 17, 1993	President Clinton reveals his economic recovery plan in his State of the Union message.
April 2, 1993	Secretary O'Leary reorganizes the Department by missions: energy, weapons and waste cleanup, and science and technology.
April 21, 1993	President Clinton announces that the United States will stabilize greenhouse gas emissions at 1990 levels by the year 2000.
July 3, 1993	President Clinton extends the nuclear weapons testing moratorium for at least fifteen months.
October 1993	Congress votes to terminate the superconducting super collider.
October 19, 1993	President Clinton and Vice President Gore unveil *The Climate Change Action Plan*, emphasizing voluntary measures to stabilize greenhouse gas emissions.
December 7, 1993	Secretary O'Leary announces her "openness initiative."
January 3, 1994	The Human Radiation Interagency Working Group tasked with coordinating the search for human experimentation records holds its first meeting.
April 1994	Secretary O'Leary releases strategic plan for the Department.

APPENDIX 1

SECRETARIES, DEPUTY SECRETARIES, AND UNDER SECRETARIES OF THE DEPARTMENT OF ENERGY

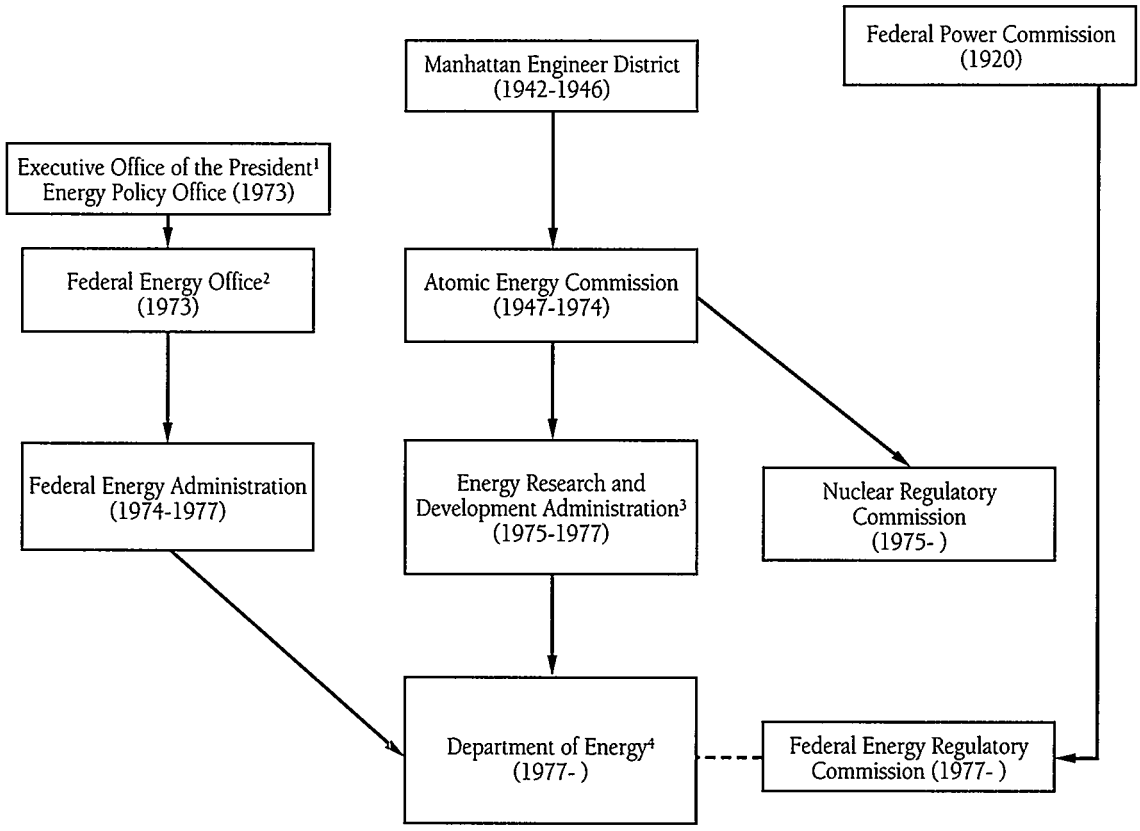
SECRETARIES	TERMS OF OFFICE
James R. Schlesinger	August 4, 1977–August 23,1979
Charles W. Duncan	August 24, 1979–January 20, 1981
James B. Edwards	January 23, 1981–November 5, 1982
Donald P. Hodel	November 5, 1982–February 7, 1985
John S. Herrington	February 7, 1985–January 20, 1989
James B. Watkins	March 1, 1989–January 19, 1993
Hazel R. O'Leary	January 22, 1993–

DEPUTY SECRETARIES	TERMS OF OFFICE
John F. O'Leary	October 21, 1977–September 30, 1979
John C. Sawhill	October 4, 1979–October 8, 1980
Lynn Coleman (Acting)	December 23, 1980–January 20, 1981
William Kenneth Davis	May 14, 1981–January 13, 1983
Danny J. Boggs	November 3, 1983–March 25, 1986
William F. Martin	June 6, 1986–June 6, 1988
Joseph F. Salgado	May 21, 1988–January 20, 1989
W. Henson Moore	April 12, 1989–January 31, 1992
Linda Stuntz	January 31, 1992–January 22, 1993
William H. White	June 26, 1993–

UNDER SECRETARIES	TERMS OF OFFICE
Dale D. Myers	October 21, 1977–May 31, 1979
John Deutch	August 8, 1979–April 1, 1980
Worth Bateman (Acting)	April 2, 1980–January 20, 1981
Raymond G. Romatowski (Acting)	February 6, 1981–July 26, 1981
Joe LaGrone (Acting)	July 26, 1981–October 4, 1981
Guy W. Fiske	October 5, 1981–June 24, 1982
Jan W. Mares (Acting)	June 29, 1982–December 15, 1982
W. Patrick Collins	August 4, 1983–March 10, 1985
Joseph F. Salgado	May 15, 1985–September 13, 1988
Donna R. Fitzpatrick	September 14, 1988–April 11, 1989
John C. Tuck	April 12, 1989–January 31, 1992
Tom H. Hendrickson (Acting)	February 21, 1992–June 30, 1992
Hugo Pomrehn	September 29, 1992–January 20, 1993
Thomas P. Grumbly (Acting)	June 10, 1993–February 9, 1994
Charles B. Curtis	February 10, 1994–

APPENDIX 2

THE INSTITUTIONAL ORIGINS OF THE DEPARTMENT OF ENERGY



INCLUDES

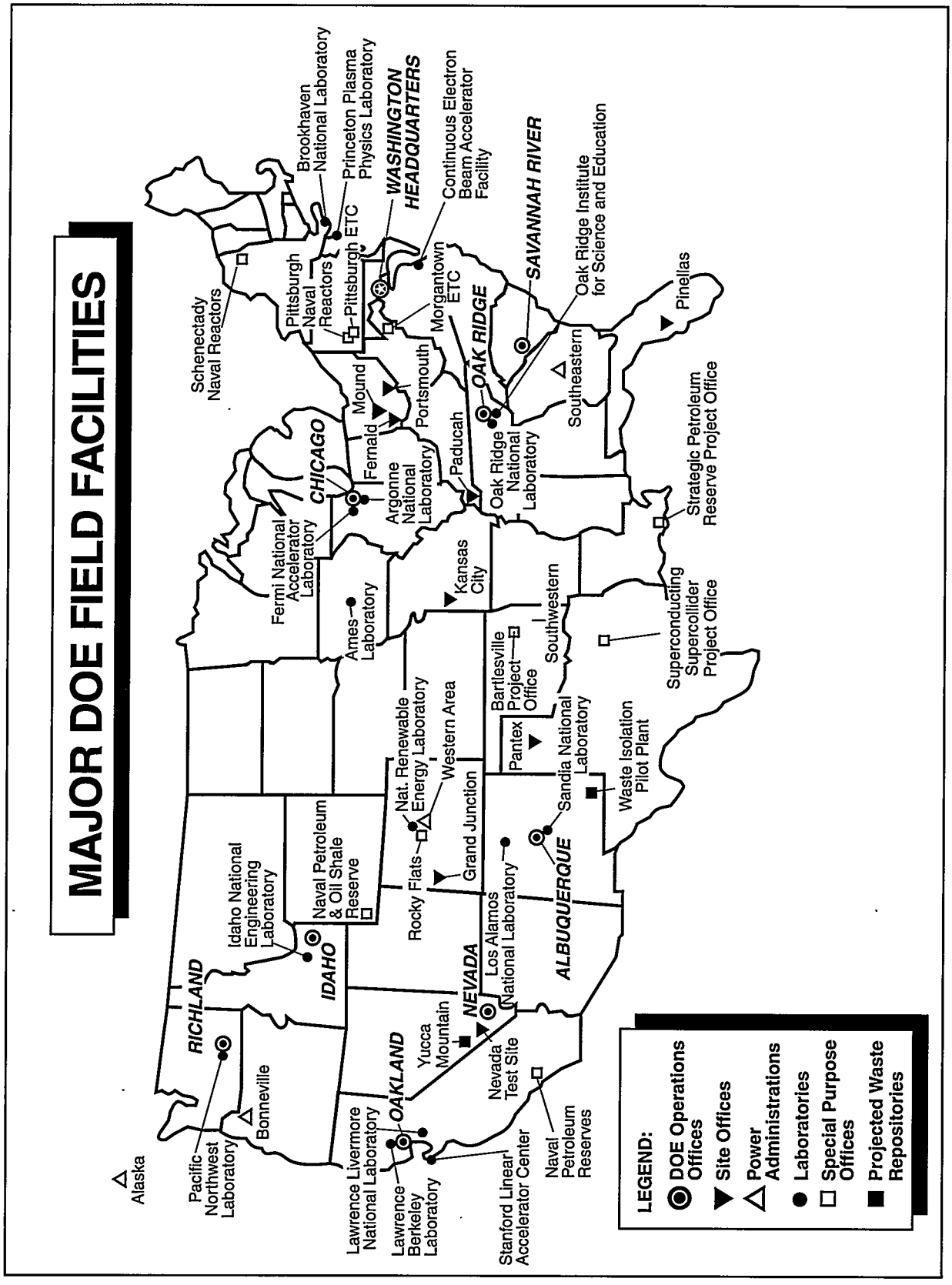
[1] Special Energy Office (1973)
National Energy Office (1973)

[2] Treasury—Energy Office
Interior—
Oil Import Administration
Petroleum Allocation
Energy Conservation
Energy Data and Analysis
Oil and Gas
Cost of Living Council—Energy Division
Internal Revenue Service—Enforcement of Allocation and Pricing Regulations

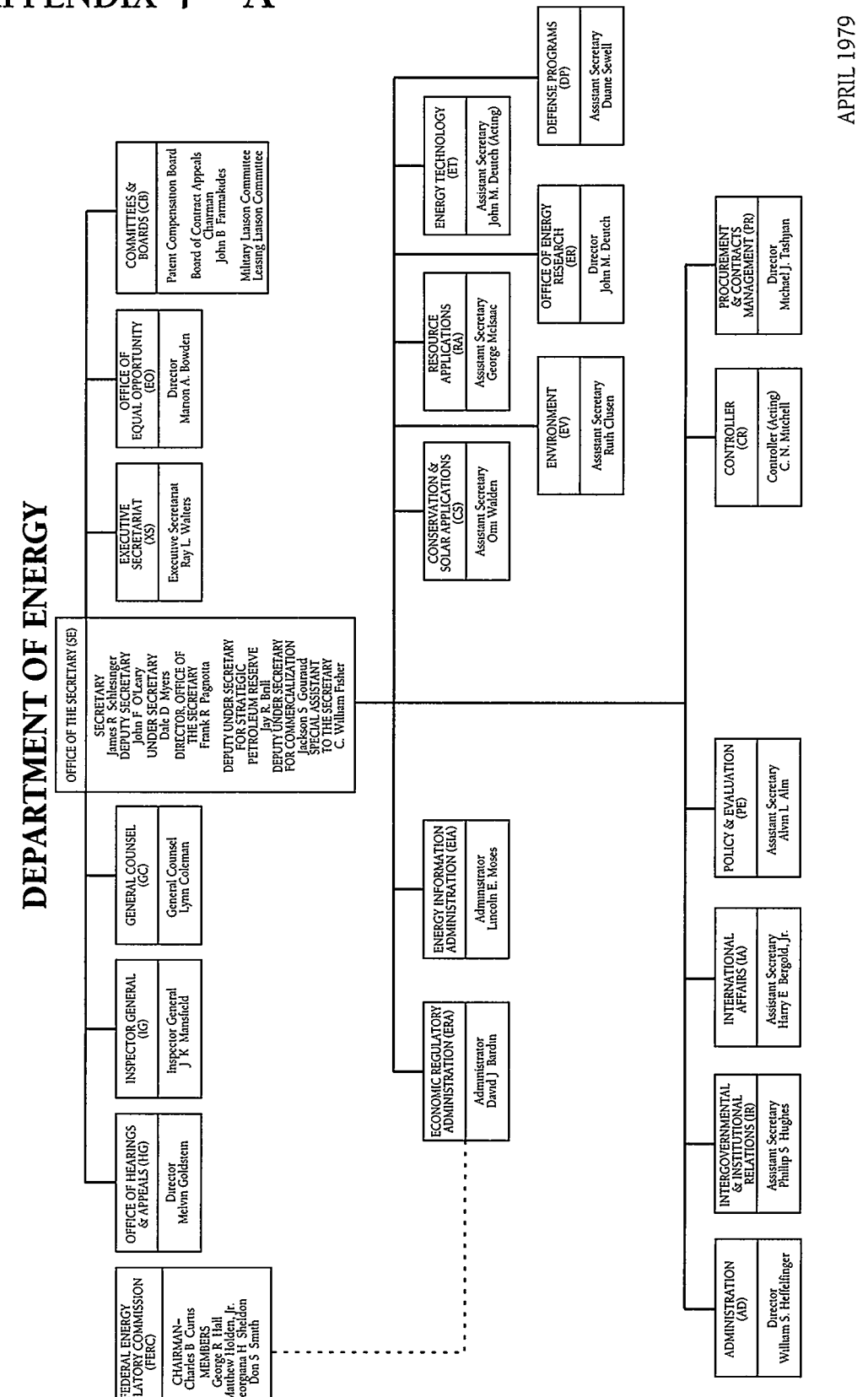
[3] Interior—
Office of Coal Research
Bureau of Mines—Energy Research Centers
Environmental Protection Agency—Research, Development and Demonstration of Innovative Automotive Systems
National Science Foundation
Solar Heating and Cooling
Geothermal Power

[4] Agriculture—REA Loans
Commerce—Voluntary Industrial Conservation
Defense—Petroleum and Shale Reserves
Interstate Commerce Commission—Oil Pipeline Regulation
Securities and Exchange Commission—Electric Utility Merger
Department of Housing and Urban Development—
Thermal Efficiency Standards
Department of Transportation—Fuel Efficiency Standards

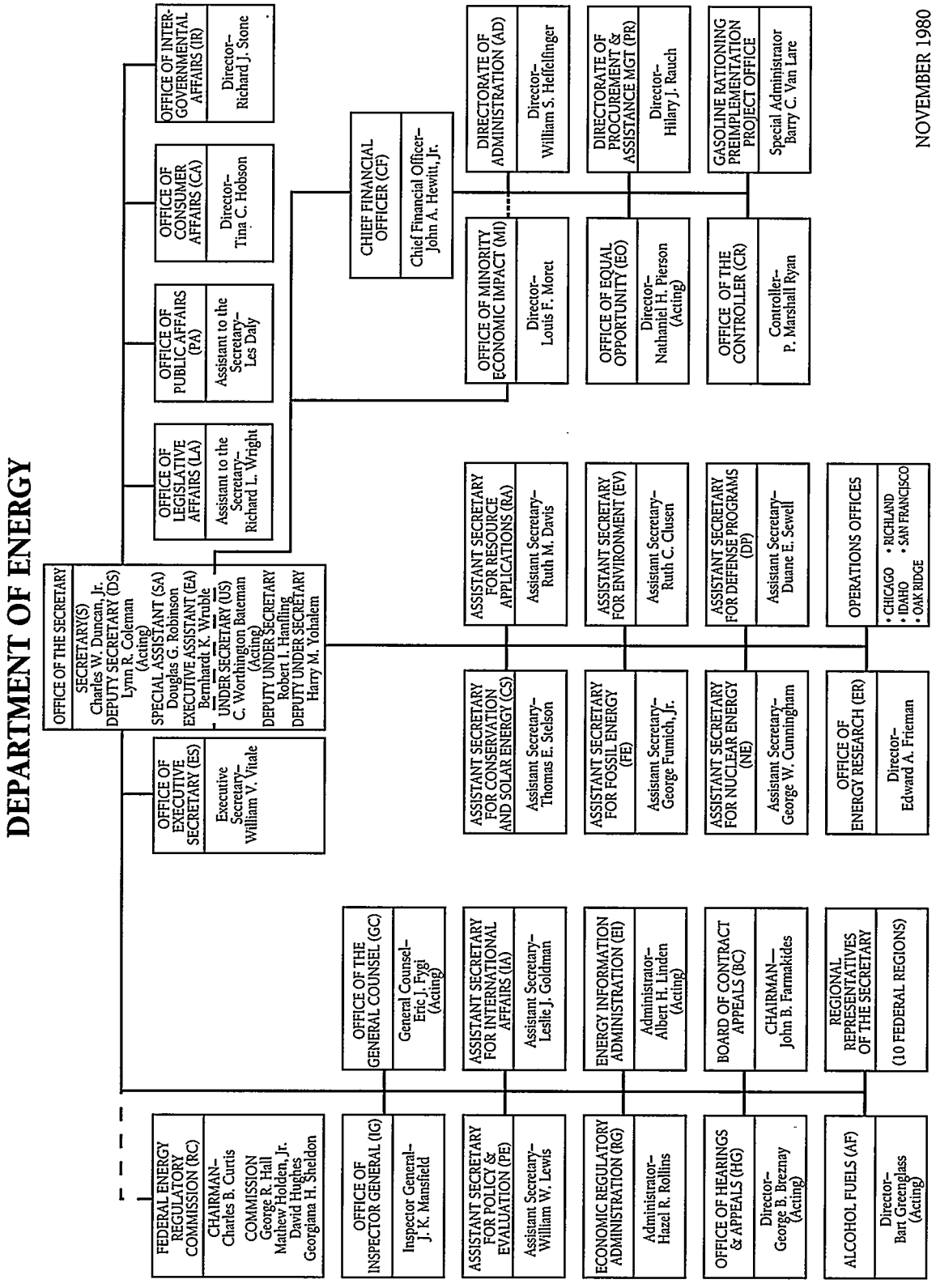
APPENDIX 3


MAJOR DOE FIELD FACILITIES
Alaska
Pacific Northwest Laboratory
RICHLAND
Bonneville
Idaho National Engineering Laboratory
IDAHO
Naval Petroleum & Oil Shale Reserve
Lawrence Livermore National Laboratory
OAKLAND
Lawrence Berkeley Laboratory
Stanford Linear Accelerator Center
Yucca Mountain
NEVADA
Nevada Test Site
Naval Petroleum Reserves
Rocky Flats
Nat. Renewable Energy Laboratory
Western Area
Grand Junction
Los Alamos National Laboratory
ALBUQUERQUE
Sandia National Laboratory
Waste Isolation Pilot Plant
Pantex
Bartlesville Project Office
Southwestern
Superconducting Supercollider Project Office
Strategic Petroleum Reserve Project Office
Kansas City
Ames Laboratory
Fermi National Accelerator Laboratory
CHICAGO
Argonne National Laboratory
Mound
Fernald
Portsmouth
Paducah
Oak Ridge National Laboratory
OAK RIDGE
Southeastern
Oak Ridge Institute for Science and Education
SAVANNAH RIVER
Pinellas
Schenectady Naval Reactors
Pittsburgh Naval Reactors
Pittsburgh ETC
Morgantown ETC
Brookhaven National Laboratory
Princeton Plasma Physics Laboratory
WASHINGTON HEADQUARTERS
Continuous Electron Beam Accelerator Facility
LEGEND:
DOE Operations Offices
Site Offices
Power Administrations
Laboratories
Special Purpose Offices
Projected Waste Repositories

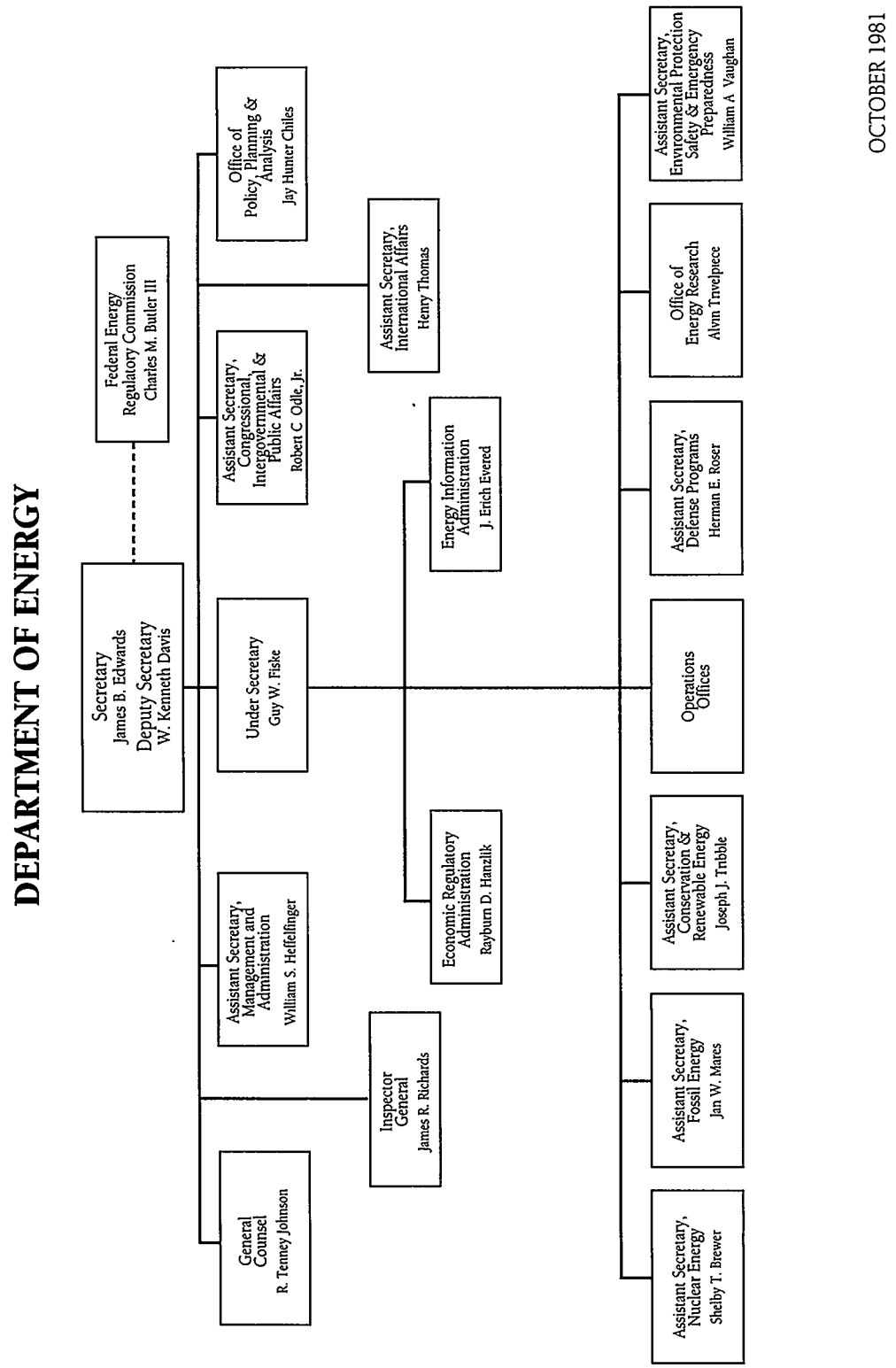
APPENDIX 4 – A


DEPARTMENT OF ENERGY
OFFICE OF THE SECRETARY (SE)
SECRETARY
James R Schlesinger
DEPUTY SECRETARY
John F O'Leary
UNDER SECRETARY
Dale D Myers
DIRECTOR, OFFICE OF THE SECRETARY
Frank R Pagnotta
DEPUTY UNDER SECRETARY FOR STRATEGIC PETROLEUM RESERVE
Jay R. Brill
DEPUTY UNDER SECRETARY FOR COMMERCIALIZATION
Jackson S Gouraud
SPECIAL ASSISTANT TO THE SECRETARY
C. William Fisher
FEDERAL ENERGY REGULATORY COMMISSION (FERC)
CHAIRMAN–
Charles B Curtis
MEMBERS
George R Hall
Matthew Holden, Jr.
Georgiana H Sheldon
Don S Smith
OFFICE OF HEARINGS & APPEALS (HG)
Director
Melvin Goldstein
INSPECTOR GENERAL (IG)
Inspector General
J K Mansfield
GENERAL COUNSEL (GC)
General Counsel
Lynn Coleman
EXECUTIVE SECRETARIAT (XS)
Executive Secretariat
Ray L. Walters
OFFICE OF EQUAL OPPORTUNITY (EO)
Director
Marion A. Bowden
COMMITTEES & BOARDS (CB)
Patent Compensation Board
Board of Contract Appeals
Chairman
John B Farmakides
Military Liaison Committee
Leasing Liaison Committee
ECONOMIC REGULATORY ADMINISTRATION (ERA)
Administrator
David J Bardin
ENERGY INFORMATION ADMINISTRATION (EIA)
Administrator
Lincoln E. Moses
CONSERVATION & SOLAR APPLICATIONS (CS)
Assistant Secretary
Omi Walden
RESOURCE APPLICATIONS (RA)
Assistant Secretary
George McIsaac
ENERGY TECHNOLOGY (ET)
Assistant Secretary
John M. Deutch (Acting)
DEFENSE PROGRAMS (DP)
Assistant Secretary
Duane Sewell
ENVIRONMENT (EV)
Assistant Secretary
Ruth Clusen
OFFICE OF ENERGY RESEARCH (ER)
Director
John M. Deutch
ADMINISTRATION (AD)
Director
William S. Heffelfinger
INTERGOVERNMENTAL & INSTITUTIONAL RELATIONS (IR)
Assistant Secretary
Phillip S Hughes
INTERNATIONAL AFFAIRS (IA)
Assistant Secretary
Harry E Bergold, Jr.
POLICY & EVALUATION (PE)
Assistant Secretary
Alvin L Alm
CONTROLLER (CR)
Controller (Acting)
C. N. Mitchell
PROCUREMENT & CONTRACTS MANAGEMENT (PR)
Director
Michael J. Tashjan
APRIL 1979

APPENDIX 4 – B


DEPARTMENT OF ENERGY
OFFICE OF THE SECRETARY
SECRETARY(S)
Charles W. Duncan, Jr.
DEPUTY SECRETARY (DS)
Lynn R. Coleman
(Acting)
SPECIAL ASSISTANT (SA)
Douglas G. Robinson
EXECUTIVE ASSISTANT (EA)
Bernhardt K. Wruble
UNDER SECRETARY (US)
C. Worthington Bateman
(Acting)
DEPUTY UNDER SECRETARY
Robert L. Hanfling
DEPUTY UNDER SECRETARY
Harry M. Yohalem
OFFICE OF EXECUTIVE SECRETARY (ES)
Executive Secretary–
William V. Vitale
OFFICE OF LEGISLATIVE AFFAIRS (LA)
Assistant to the Secretary–
Richard L. Wright
OFFICE OF PUBLIC AFFAIRS (PA)
Assistant to the Secretary–
Les Daly
OFFICE OF CONSUMER AFFAIRS (CA)
Director–
Tina C. Hobson
OFFICE OF INTER-GOVERNMENTAL AFFAIRS (IR)
Director–
Richard J. Stone
CHIEF FINANCIAL OFFICER (CF)
Chief Financial Officer–
John A. Hewitt, Jr.
OFFICE OF MINORITY ECONOMIC IMPACT (MI)
Director–
Louis F. Moret
DIRECTORATE OF ADMINISTRATION (AD)
Director–
William S. Heffelfinger
OFFICE OF EQUAL OPPORTUNITY (EO)
Director–
Nathaniel H. Pierson
(Acting)
DIRECTORATE OF PROCUREMENT & ASSISTANCE MGT (PR)
Director–
Hilary J. Rauch
OFFICE OF THE CONTROLLER (CR)
Controller–
P. Marshall Ryan
GASOLINE RATIONING PREIMPLEMENTATION PROJECT OFFICE
Special Administrator
Barry C. Van Lare
ASSISTANT SECRETARY FOR RESOURCE APPLICATIONS (RA)
Assistant Secretary–
Ruth M. Davis
ASSISTANT SECRETARY FOR CONSERVATION AND SOLAR ENERGY (CS)
Assistant Secretary–
Thomas E. Stelson
ASSISTANT SECRETARY FOR ENVIRONMENT (EV)
Assistant Secretary–
Ruth C. Clusen
ASSISTANT SECRETARY FOR FOSSIL ENERGY (FE)
Assistant Secretary–
George Fumich, Jr.
ASSISTANT SECRETARY FOR DEFENSE PROGRAMS (DP)
Assistant Secretary–
Duane E. Sewell
ASSISTANT SECRETARY FOR NUCLEAR ENERGY (NE)
Assistant Secretary–
George W. Cunningham
OPERATIONS OFFICES
• CHICAGO • RICHLAND
• IDAHO • SAN FRANCISCO
• OAK RIDGE
OFFICE OF ENERGY RESEARCH (ER)
Director–
Edward A. Frieman
FEDERAL ENERGY REGULATORY COMMISSION (RC)
CHAIRMAN–
Charles B. Curtis
COMMISSION
George R. Hall
Mathew Holden, Jr.
David Hughes
Georgiana H. Sheldon
OFFICE OF THE GENERAL COUNSEL (GC)
General Counsel–
Eric J. Fygi
(Acting)
ASSISTANT SECRETARY FOR INTERNATIONAL AFFAIRS (IA)
Assistant Secretary–
Leslie J. Goldman
ENERGY INFORMATION ADMINISTRATION (EI)
Administrator–
Albert H. Linden
(Acting)
BOARD OF CONTRACT APPEALS (BC)
CHAIRMAN–
John B. Farmakides
REGIONAL REPRESENTATIVES OF THE SECRETARY
(10 FEDERAL REGIONS)
OFFICE OF INSPECTOR GENERAL (IG)
Inspector General–
J. K. Mansfield
ASSISTANT SECRETARY FOR POLICY & EVALUATION (PE)
Assistant Secretary–
William W. Lewis
ECONOMIC REGULATORY ADMINISTRATION (RG)
Administrator–
Hazel R. Rollins
OFFICE OF HEARINGS & APPEALS (HG)
Director–
George B. Breznay
(Acting)
ALCOHOL FUELS (AF)
Director–
Bart Greenglass
(Acting)
NOVEMBER 1980

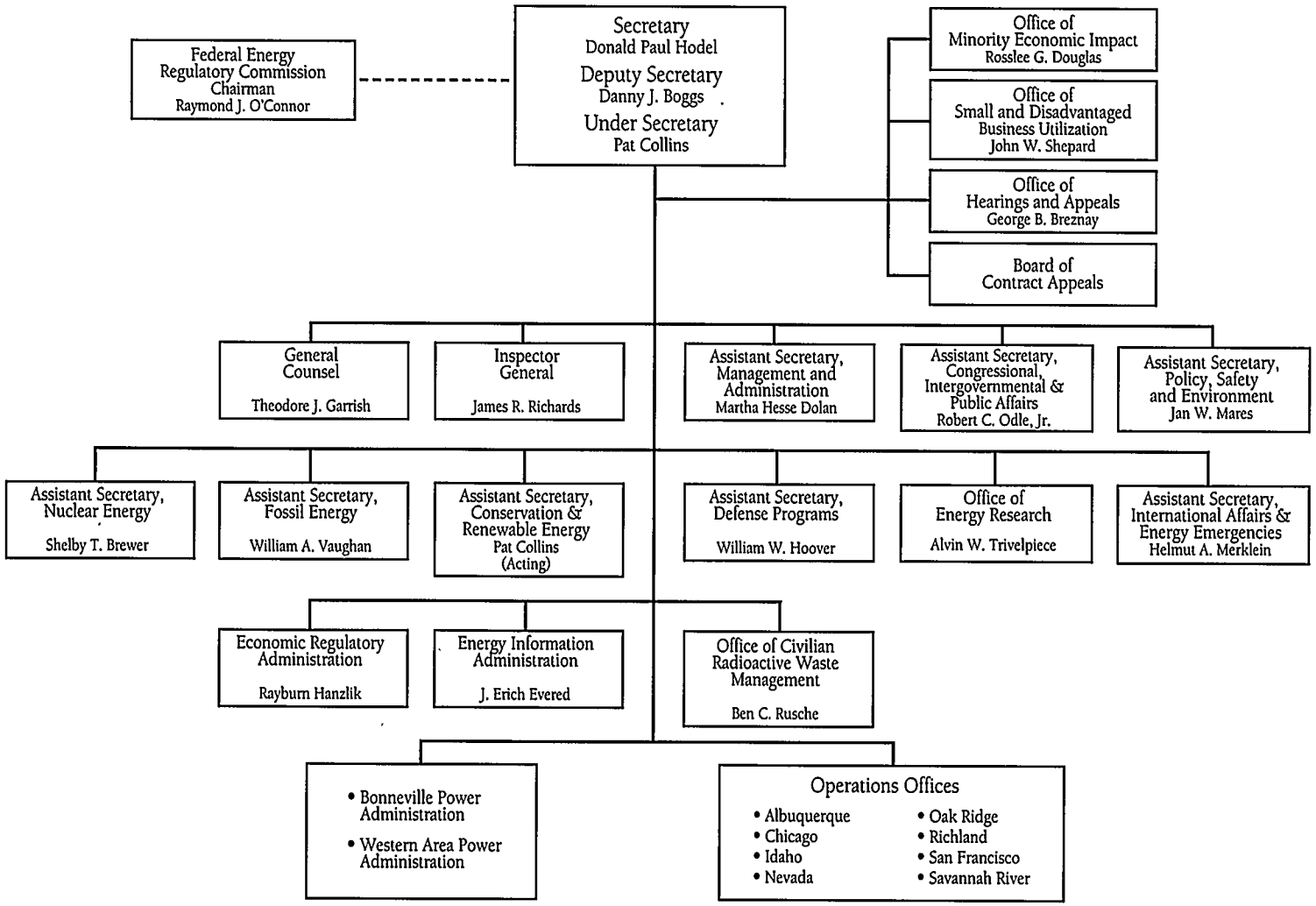
APPENDIX 4 – C



OCTOBER 1981

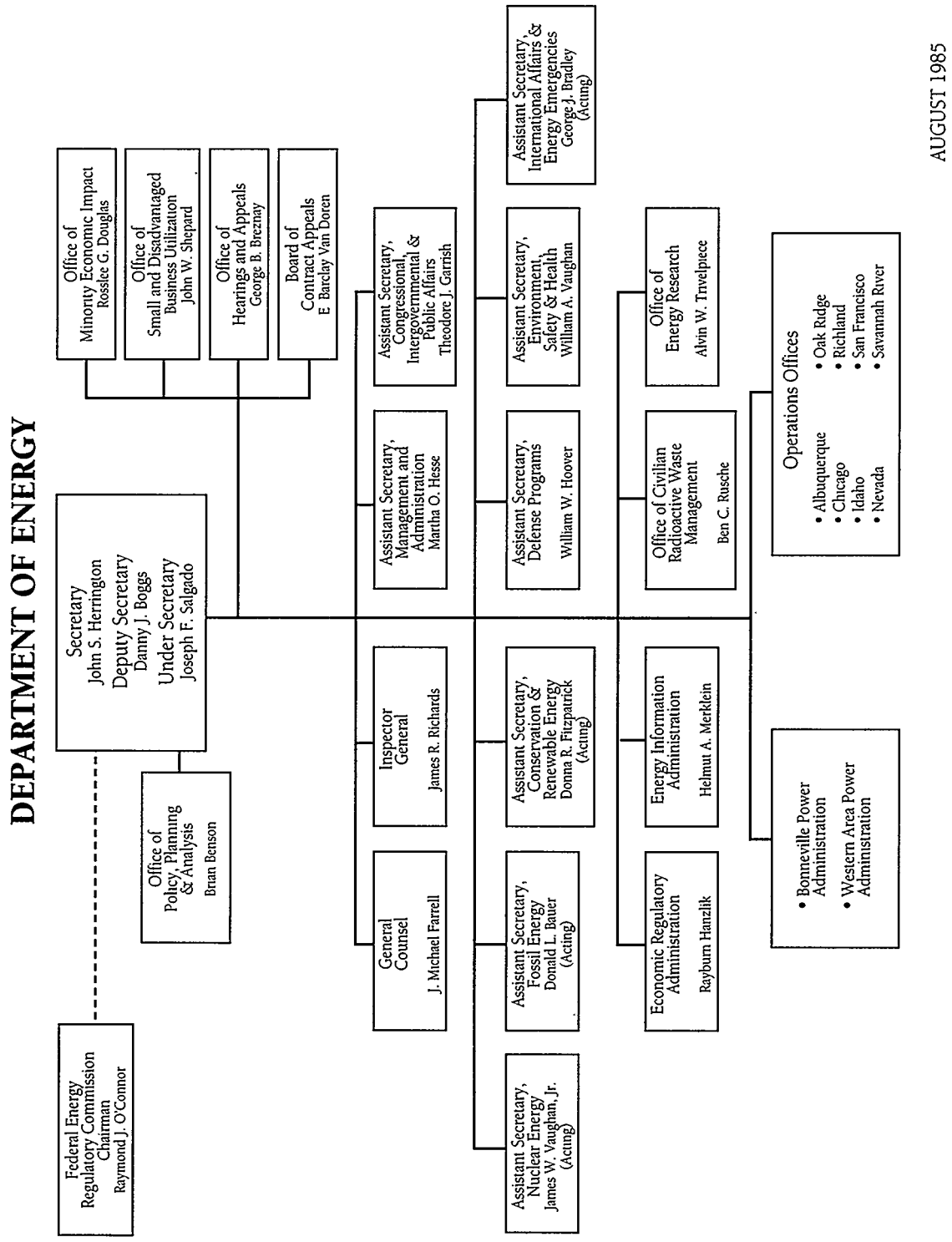
APPENDIX 4 – D

DEPARTMENT OF ENERGY



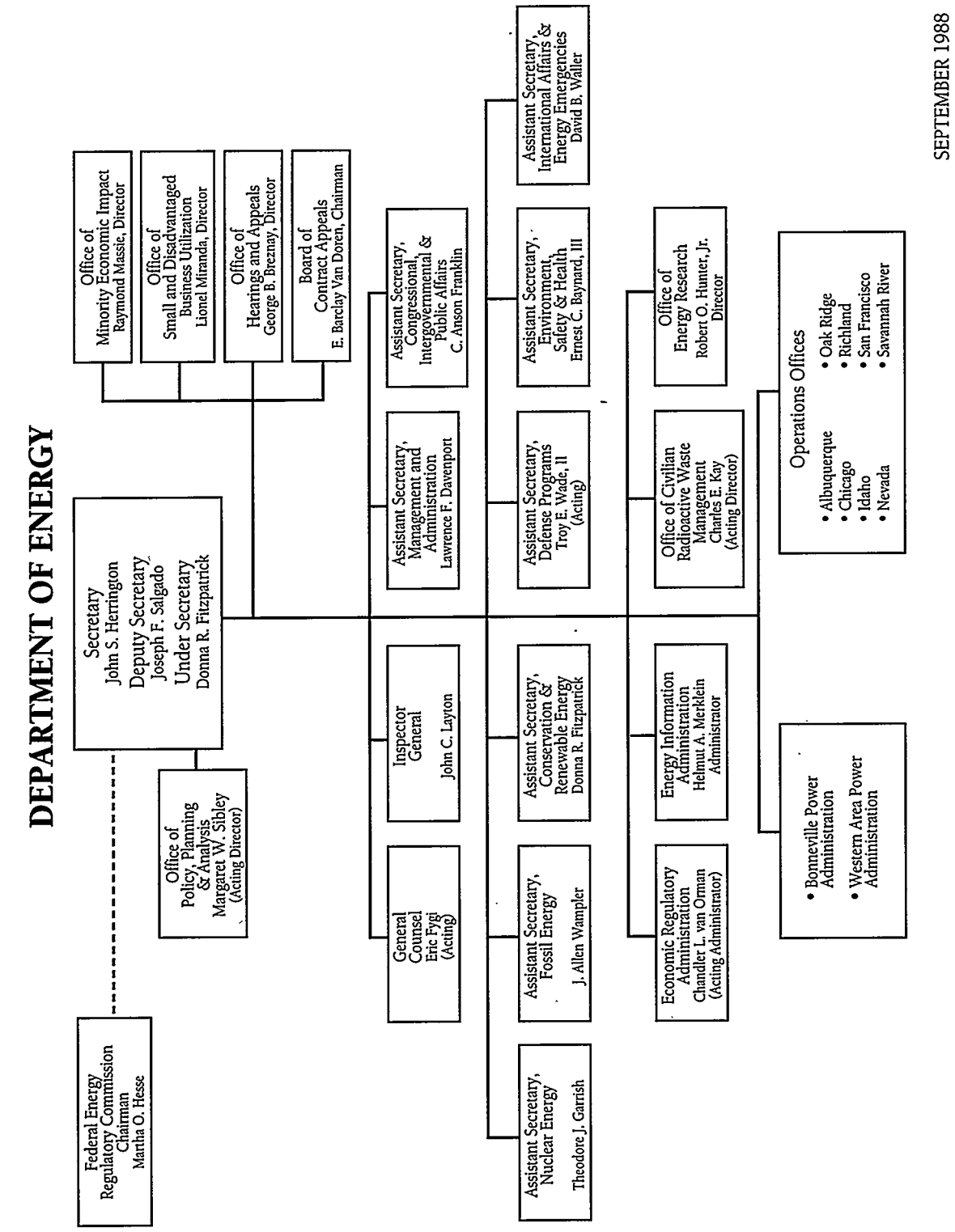
AUGUST 1984

APPENDIX 4 – E



AUGUST 1985

APPENDIX 4 – F



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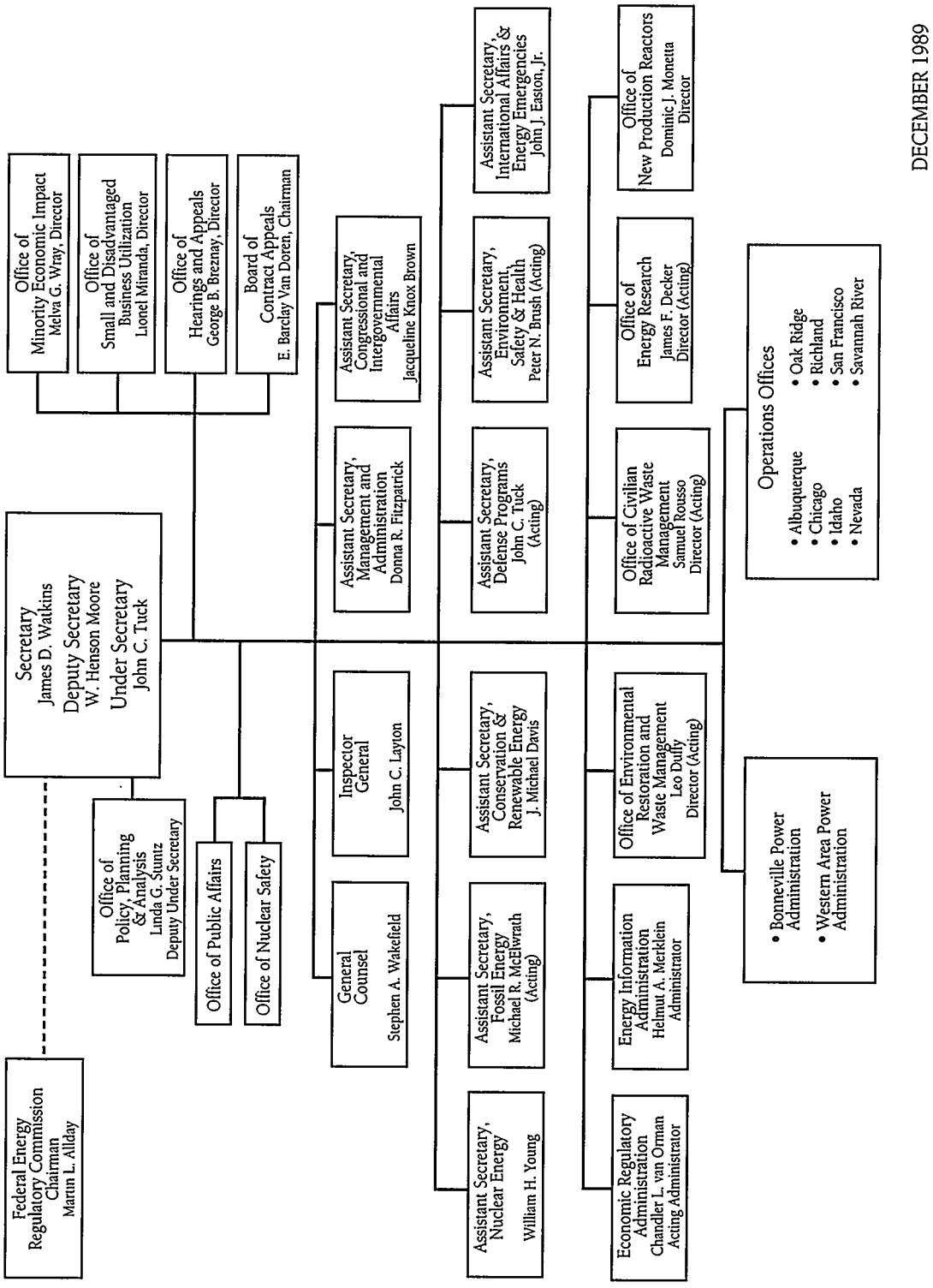
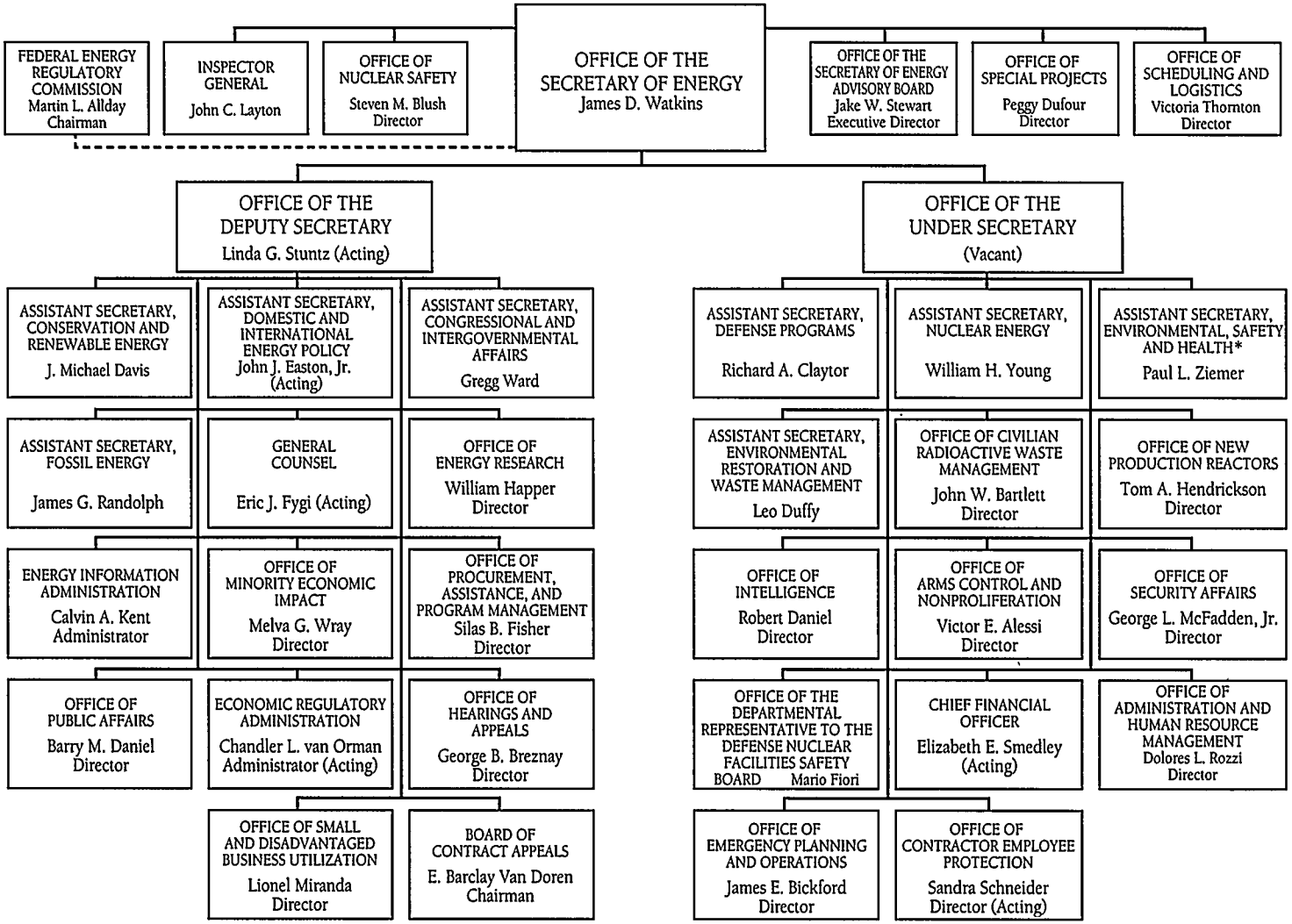


DECEMBER 1989

DEPARTMENT OF ENERGY

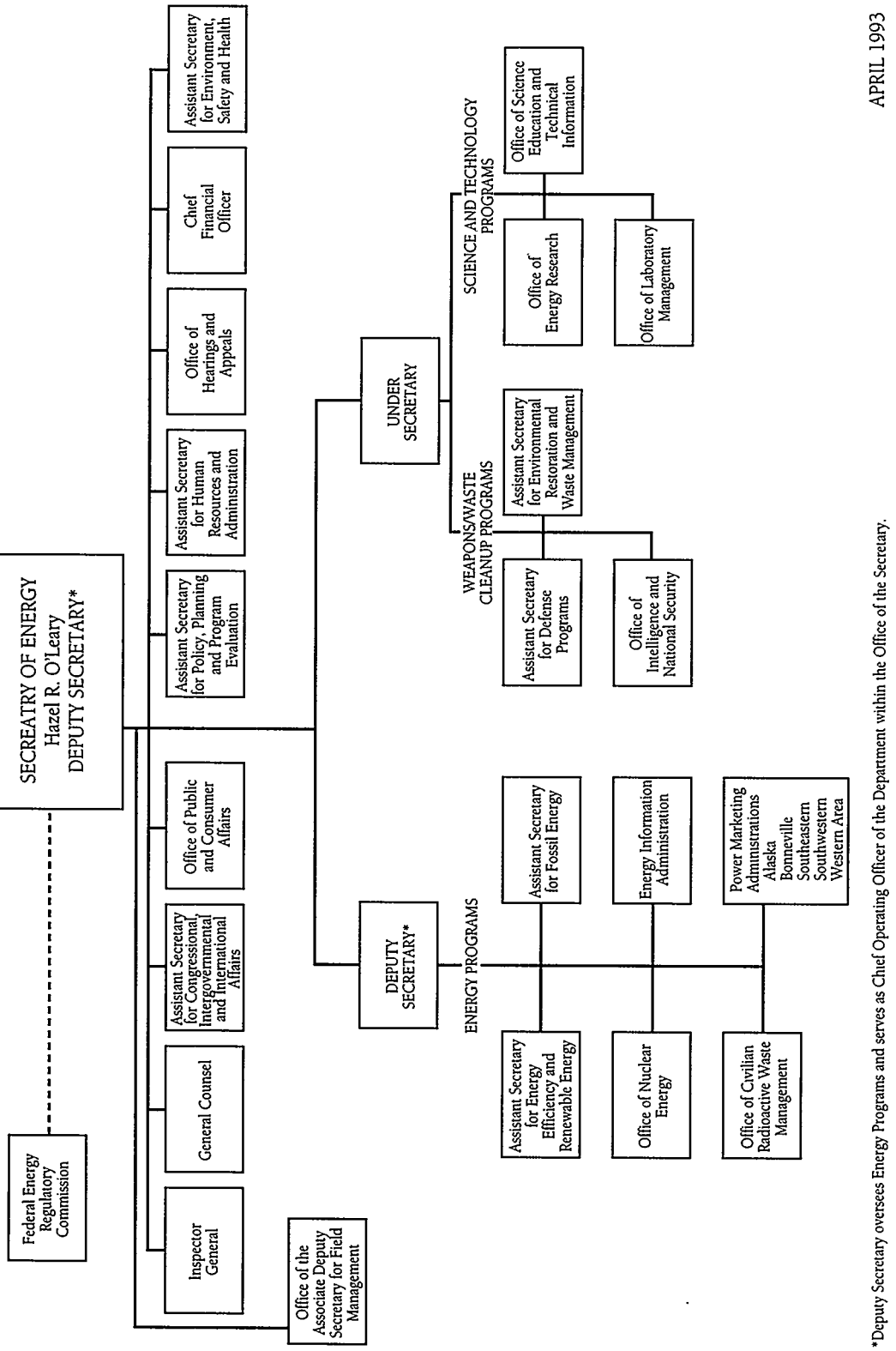


* Direct access to the Secretary on matters of independent oversight.

JULY 1992

APPENDIX 4 – I

DEPARTMENT OF ENERGY



*Deputy Secretary oversees Energy Programs and serves as Chief Operating Officer of the Department within the Office of the Secretary.

APRIL 1993

APPENDIX 5 – A

DEPARTMENT OF ENERGY BUDGET REQUESTS
FY 1980, FY 1985, FY 1990, FY 1995
(in millions of dollars)

	1980[1]	1985	1990	1995
Energy Research and Development	3810	2409	2375	3400
Basic Science (includes SSC)	474	746	1169	1337
Conservation Grants	328	252	8	325
Direct Energy Production (includes SPR)	157	1332	1134	1091
Defense	3022	7806	7882	5630
Defense Waste (Environmental Management)	—[2]	—[2]	1145	6521
ES&H and Related Functions	—[2]	—[2]	125	169
Nuclear Waste Repository	—	328	740	533
Regulation and Information	323	114	197	103
Policy, Management, and Miscellaneous	308	219	265	285
Adjustments	—	-391	-49	-941[3]
Total, DOE Budget Requests	8422	12815	14991	18453

[1] First DOE Budget request as a comprehensive document and not as a combination of requests of predecessor agencies.

[2] No figures available. Amounts subsumed in other categories.

[3] Use of prior year balances and other adjustments.

Source: Department of Energy, *FY 1980 Budget to Congress: Budget Highlights* (Washington: DOE/CR-004); Department of Energy, *FY 1985 Budget Highlights* (Washington: DOE/MA-0062/2); Department of Energy, *Fiscal Year 1990 Budget Highlights* (Washington: DOE/MA-0357); Department of Energy, *FY 1995 Budget Highlights* (Washington: DOE/CR-0019).

APPENDIX 5 – B

DEPARTMENT OF ENERGY BUDGET REQUESTS
ENERGY RESEARCH AND DEVELOPMENT
FY 1980, FY 1985, FY 1990, FY 1995

(in millions of dollars)

	1980[1]	1985	1990	1995
Energy Research and Development				
Fossil	796	273	165	483
Clean Coal	—	—	325	37
Solar	597	164	71	301
Geothermal	111	27	15	37
Hydroelectric	18	1	—	1
Fusion	364	483	349	373
Nuclear Fission	1037	618	353	248
Environmental	278	228	271	435
Basic Energy	276	480	590	741
Conservation	227	148	88	685
Other	106	40	148	59
Savings from Management Initiatives	—	-53	—	—
Total, Energy Research and Development	3810	2409	2375	3400

[1] First DOE Budget request as a comprehensive document and not as a combination of requests of predecessor agencies.

Source: Department of Energy, *FY 1980 Budget to Congress: Budget Highlights* (Washington: DOE/CR-004); Department of Energy, *FY 1985 Budget Highlights* (Washington: DOE/MA-0062/2); Department of Energy, *Fiscal Year 1990 Budget Highlights* (Washington: DOE/MA-0357); Department of Energy, *FY 1995 Budget Highlights* (Washington: DOE/CR-0019).

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