# TEXAS ENERGY ISSUES 1979

LYNDON B. JOHNSON SCHOOL OF PUBLIC AFFAIRS
THE UNIVERSITY OF TEXAS AT AUSTIN

**LYNDON B. JOHNSON SCHOOL OF PUBLIC AFFAIRS**

**POLICY RESEARCH PROJECT REPORT**

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# TEXAS ENERGY ISSUES: 1979

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# FOREWORD

The Lyndon B. Johnson School of Public Affairs has established interdisciplinary research on policy problems as the core of its educational program. A major part of this program is the nine-month policy research project, in the course of which two or three faculty members from different disciplines direct the research of ten to twenty graduate students of diverse backgrounds on a policy issue of concern to an agency of government. This "client orientation" brings the students face to face with administrators, legislators, and other officials active in the policy process, and demonstrates that research in a policy environment demands special talents. It also illuminates the occasional difficulties of relating research findings to the world of political realities.

This report is the outgrowth of a policy research project conducted at the School during 1978-1979 to examine a number of policy issues facing the State of Texas in the conservation, development, and environmental impacts of energy resources. Funded by the Lyndon Baines Johnson Foundation and the Ford Foundation, the project had as its client orientation the several state agencies represented in the Texas Energy Advisory Council, chaired by Lieutenant Governor William P. Hobby, whose full cooperation and occasional participation greatly facilitated the project.

The study of *Texas Energy Issues: 1979* was undertaken in the response to the need by Texas policymakers for a wide range of information on the technical, environmental, economic, and public interest implications of Texas response to national (as well as state) energy requirements.

It is the intention of the LBJ School both to develop men and women with the capacity to perform effectively in public service and to produce research which will enlighten and inform those already engaged in the policy process. The project which resulted in this report has helped to accomplish the former; it is our hope and expectation that the report itself will contribute to the latter.

Elspeth Rostow
*Dean*

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# PREFACE

*Texas Energy Issues: 1979* is an annual report of a continuing series of policy research projects at the Lyndon B. Johnson School of Public Affairs designed to bring the competence of graduate students and faculty of the School to bear on current policy concerns in the energy area. It is funded by grants from the Lyndon Baines Johnson Foundation and the Ford Foundation Program in Policy Analysis for State Environmental Management, and is cosponsored by the Texas Energy Advisory Council under Lieutenant Governor William P. Hobby, Chairman and Milton L. Holloway, Executive Director.

During the 1978-79 academic year, a variety of issues were investigated by the policy research seminar. These were primarily concerned with:

I. Texas deepwater port,
II. Texas state energy conservation program
III. Nuclear power
IV. National energy acts of 1978
V. Energy-related issues

In each category, individual students were assigned specific topics which are treated separately in both the Executive Brief and the Text of the report.

In a separate study within the general project, seven graduate students under the leadership of Prof. David Welborn of the University of Tennessee at Knoxville undertook an investigation of co-generation of process heat and electric power by Texas industrial concerns, a study that was supported by the Texas Public Utility Commission. The co-generation report is published separately by the LBJ School.

A parallel project under the direction of Prof. Marlan Blissett examined barriers and incentives for using on-site solar technologies. Funding for this study was provided by the Department of Energy, Office of Advanced Energy Systems Policy.

We are grateful to the many individuals whose contributions of information and assistance have served in the development of this report. In particular we wish to thank the following who briefed the project members at length.

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David White, Coordinator of Coal and Geothermal Programs, Texas Energy Advisory Council; and
Herbert H. Woodson, Professor of Electrical Engineering; Director, Center for Energy Studies, The University of Texas at Austin.

Each topic is summarized first as an Executive Brief and second in a short chapter. The same chapter numbers are used for a given topic in the summary, the executive brief, and the text. More extensive discussions are available in the files of the Lyndon B. Johnson School of Public Affairs.

# SUMMARY AND RECOMMENDATIONS

## Summary

*Texas Energy Issues: 1979* is the product of a series of studies carried on by graduate students and faculty members of the Lyndon B. Johnson School of Public Affairs at The University of Texas at Austin during the 1978-79 academic year. The selection of topics was not intended to be inclusive of all energy problems currently of importance to the state of Texas, but rather to be current, topical, and amenable to policy analysis during the allotted time period.

## Major Findings and Recommendations

(I) A deepwater port capable of servicing large oil tankers appears to be a must for Texas as the state moves from being a net exporter to being a net importer of oil. As of the summer of 1979, the Texas Deepwater Port Authority (TDPA), a state agency, has applied to the Department of Transportation for a license to construct an offshore monobuoy in the Gulf of Mexico Southeast of the Houston-Galveston area.

(1) With regard to financing, TDPA should revise its proposed agreement with potential users to eliminate as many ambiguities as possible so that the magnitude, frequency, and duration of a signatory's use obligation is clearly spelled out.

(2) Liability for oil spills occurring while ships are hooked up to the monobuoy appear to be amply protected by the fund required by present federal legislation.

3) The economic feasibility of the deepwater port project is dependent upon federal approval of a dual tariff structure in which lower rates are charged to customers who guarantee to use the port and thus expose themselves to substantial financial risk.

(4) Emissions created by the port facility will be relatively minor, but must be offset by reductions in air pollution onshore.

(II) Under the State Energy Conservation Program (SECP), Texas has committed itself to attaining a 5 percent savings in energy usage by 1980.

(5) While many states have found it desirable initially to place responsibility for the SECP in the governor's office, it is desirable in the long run to move it to an agency setting.

(6) If the program is to be successful nationally, public information programs must be balanced by the development of technological measures designed to reduce energy consumption over the long term.

(7) In Texas, the recent move to amalgamate energy and natural resources units should improve the state's capacity to deal effectively with energy matters.

(8) While the savings in energy consumption attributable to the SECP in Texas have not been large thus far, the goal of a 5 percent savings is attainable. Every effort should be made to meet it.

(III) Obviously, nuclear power has become such a sensitive political issue that policy decisions are increasingly being made on emotional rather than technological or economic grounds.

(9) While nuclear power plants already under construction are being completed, large numbers of planned facilities have been cancelled or deferred and new orders from electric utilities have not been forthcoming. If nuclear development is to continue, the federal government must come to grips with regulatory and licensing problems, take action to overcome rising public fears about nuclear safety, and speed up the development of practical new nuclear technologies.

(10) The disposal of nuclear wastes remains an unresolved problem. An alternative to be considered is to continue with above-ground management of spent fuel assemblies and solidified high-level wastes in the hope that technologies yet to be developed may provide better solutions than are available at present.

(11) Despite whatever dangers nuclear power may create, polls around the country have repeatedly shown that the majority of Americans favors its use.

(12) An international nuclear fuel repository should be established. Failing that, the U.S. should provide for the return of spent fuel assemblies.

(13) State action should be taken, preferably by passing legislation along the line of the Vermont prior-

approval model, if Texas is to have a major voice in decisions about siting nuclear disposal facilities within its boundaries.

(14) Austin provides a good example of local involvement in nuclear power decisions. Less than two weeks after the nuclear reactor accident at Three Mile Island, Austin voters approved continued participation in the South Texas Nuclear Project.

(15) Nuclear energy is rapidly becoming more expensive as the costs of capital investments, plant decommissioning, nuclear fuel, and waste disposal are continuing to increase.

(IV) The five acts that comprise the National Energy Acts of 1978 contain many provisions requiring the formulation of rules and regulations before successful implementation can begin.

(16) The National Gas Policy Act provides for higher prices for natural gas on the interstate market while imposing price ceilings on the previously unregulated intrastate market. The Texas Railroad Commission has the opportunity to manage beneficially the current surplus of natural gas in the state.

(17) The Energy Tax Act of 1978 provides tax credits to participating residential owners, for using energy conservation measures, specifies a gas guzzler tax on large cars, exempts gasohol from taxation until 1984, and provides for a variety of other tax exemptions.

(18) The National Energy Conservation Policy Act is the latest of a series of laws on the topic. It provides for residential conservation services by public utilities, loans to encourage home weatherization, the establishment of standards for weatherization, labeling of appliances as to energy efficiency, and demonstration of solar energy use in public buildings.

(19) The Powerplant and Industrial Fuel Use Act of 1978 mandates that new powerplants and industrial boilers be built to utilize coal, and that existing facilities phase out natural gas as a boiler fuel by 1990.

(20) In the Public Utility Regulatory Policies Act of 1978, Congress has suggested standards to be considered by state regulatory authorities and nonregulated electric utilities. Texas should evaluate these standards on their merits.

(V) Two other energy-related issues are water for Texas lignite mining and use, and freight rates for western coal.

(21) The cooling requirements of lignite- and coal-fired boilers are making increasing demands on the water resources of Texas. Demand for water may soon equal available public water. Legislation is needed to control to exploitation of ground water.

(22) The Interstate Commerce Commission is faced with reconciling two needs: that of reducing dependence upon oil and natural gas by shifting to a greater use of coal; and that of revitalizing America's railroads through the establishment of freight rates that reflect a commodity's contribution to the total costs of a rail carrier's system. Legislation will be needed to guide the development of a national policy.

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# PART I

## TEXAS DEEPWATER PORT

Texas petroleum and natural gas industries are increasingly being faced with the necessity of importing greater amounts of crude oil and gas. Since existing harbors will not accomodate the larger tankers, prospects of building deepwater ports in the northwestern part of the Gulf of Mexico are being explored. Current projects include the LOOP terminal offshore in Louisiana, the Galveston Wharves proposal for an onshore terminal, a liquified natural gas terminal in Matagorda Bay, an onshore deepwater port at Port Aransas, and an offshore monobuoy east of Freeport in the Houston-Galveston region. It is with this latter facility, originally proposed by a privately owned consortium of oil companies (Seadock, Inc.) and currently under development by the State of Texas Deepwater Port Authority (TDPA), that the present report is primarily concerned.

As of the summer of 1979, TDPA has applied for a license to the U.S. Department of Transportation under the provisions of the Deepwater Port Act of 1974. Current policy issues to be resolved before the proposed port can be authorized, financed, and constructed include: (1) the terms which will make it possible to obtain private financing for the project; (2) definitions of limits of liability; (3) antitrust concerns of the U.S. Government; and (4) air emission offset policy that must be resolved before the proposed port can meet regulations issued pursuant to the Clean Air Act.

### *1. Financing a Deepwater Port in Texas*

The proposed deepwater port east of Freeport in the Gulf of Mexico would be state-owned and operated as a public facility by a state agency, the Texas Deepwater Port Authority. As such, it will not be able to sell equity ownership shares to potential users as is traditionally done in financing large-scale private pipeline and deepwater port projects. Instead, the project must be financed through the issuance of revenue bonds. Constitutionally, these bonds cannot be backed by the good credit of the State. Rather, the only guarantees available to TDPA are those provided by potential users (who must be charged lower rates in return). Furthermore, the two-tiered tariff structure must meet the antitrust requirements of the United States.

The use agreements between the prospective users-guarantors and TDPA must be carefully drawn to satisfy both the governmental entities involved and the prospective purchasers of the bonds. In view of the crucial role bond marketing plays in assuring the construction of the port, TDPA should attempt to reduce potential bondbuyers' anxieties about the financial security of their investments in the port. Specifically, ambiguity in the obligations of the signatories to the proposed Port Agreement should be eliminated by means of a revised agreement. The revised agreement should state more clearly the magnitude, frequency, and duration of a signatory's use obligation.

### *2. Oil Pollution Liability and Deepwater Ports*

The construction of a deepwater port offshore will diminish pollution from oil spillage onshore but will create a potential danger of spillage from the offshore facility. The problem of oil spillage centers on the environmental and social costs affiliated with pollution as well as on the determination of liable parties. Under recent legislation, provisions for delineating and penalizing liable parties have been addressed. Affixing dollar values to damages incurred by oil pollution has proved more difficult. Environmental factions claim that current penalties are insufficient, while industry advocates stress that existing penalties are excessive and counterproductive.

The environmental aspects of a deepwater port are generally favorable. The use of large tankers offshore would greatly reduce sea traffic, collisions, and grounding. The deepwater port licensee is only liable for spillage occurring at the port when a vessel is hooked up to the buoy. For spillage when vessels are so connected, however, the liability is great. The Deepwater Port Act of 1974 requires each deepwater port licensee to have $50 million in liability insurance for potential oil spills. In addition, the act creates a separate $100 million Oil Spill Liability Fund to be funded by all the deepwater port licensees. These requirements contributed to the decision of Seadock not to go ahead with the project.

Currently, both shipowners and major oil companies participate in insurance pools to offset their several liabilities. The formation of such insurance groups indicates that the private sector is willing and able to assume its share of responsibility for damage due to oil spills. Acknowledgement of the direction being taken by private enterprise should serve to moderate the financial responsibility imposed by the federal government upon a deepwater port licensee.

### *3. Antitrust Aspects of the Texas Deepwater Port Proposal*

The collapse of the Seadock proposal to construct and operate a Texas offshore deepwater port was due in part to extensive restrictions specified in the license offered by the U.S. Department of Transportation (DOT). These limitations were designed to ensure against anticompetitive practices on the part of Seadock's owners, who were also to have been the principal users of the facility.

TDPA's project differs from Seadock in that it will be wholly publicly owned. Vertically integrated oil companies will not share ownership and thus one major concern of the antitrust officials is eliminated. Nevertheless, it remains a natural monopoly. As such, though requiring less stringent regulation than a privately owned port, it will still be subjected to much scrutiny by federal officials in the DOT, the Federal Trade Commission (FTC), and the Federal Energy Regulatory Commission (FERC) to insure the provision of good service to all who wish to use the facility at the lowest possible price.

Much of TDPA's future action on the deepwater port project will be determined by DOT's ruling on the license application, and FERC's ruling on the proposed two-tiered tariff structure. Major problems may arise with regard to onshore connecting pipelines and tariff issues.

In the case of the connecting onshore carriers, the Port Authority should encourage private interests to invest in the construction of adequate pipelines. The availability of adequate inland transportation facilities will be of concern to antitrust officials. The TDPA should be prepared to resolve any problems arising from this need, even to the extent of considering building further onshore facilities needed to make the overall project both legally sound and economically feasible.

The proposed dual tariff structure is designed to charge the customers who guarantee to use the facility lower rates than those who do not do so on the grounds that the former expose themselves to substantial financial risk and therefore receive less service than those who elect to

receive the use of the facility on an essentially risk-free basis. Obviously, the proposed dual tariff structure will receive close scrutiny to ensure that signatories are properly compensated for the risks they assume. The dual tariff structure is an absolute necessity, and to disallow it might kill the project. Without a financial incentive to the users, there can be no bonds. Without the bonds, there can be no port.

### *4. Air Emission Offset Policy and the Texas Deepwater Port Proposals*

The Clean Air Act Amendments of 1970 established ambient air standards for six pollutants, one of which is hydrocarbons. The Environmental Protection Agency (EPA) requires that emissions from new facilities be offset or balanced by at least an equal reduction in existing emissions in areas that have not attained the standards.

TDPA's tankfarm is proposed to be in Brazoria County, currently a nonattainment area for hydrocarbons but being considered for reclassification to attainment status. If this does does occur, the facility will have to comply with EPA's prevention of significant deterioration requirements. TDPA hopes that, even if the reclassification effort is not successful, the projected emission of 1437 tons per year can be offset by an allowance provided to the Texas Air Control Board in its State Implementation Plan.

Another potential source of new emissions would arise at the monobuoy to the extent that tankers using the deepwater port wash out their tanks with water rather than segregated ballast. Annual additions from this source could run as high as 7800 tons per year.

Should the Texas Air Control Board not provide the needed offsets through its State Implementation Plan, TDPA must obtain the needed offsets elsewhere. This can be done either through persuading an appropriate state agency (such as the Highway Department) to reduce its emissions in the vicinity, or by buying emission-control equipment for private industrial operations.

Quite possibly, a free market may develop from the banking of offsets by firms which reduce emissions but which do not need the savings as offsets to their own operations. Should such a market fail to develop, the State should provide services to help locate offsets needed in the public good.

## PART II

## TEXAS STATE ENERGY CONSERVATION PROGRAM

The Energy Policy and Conservation Act of 1975 authorized and provided federal funding for a State Energy Conservation Program (SECP) in each state and territory. The SECP is a voluntary program in which states accept responsibility for formulating and implementing comprehensive state plans tailored to their unique situations and aimed at attaining a five percent savings in projected energy usage by 1980. Each state plan must include five mandatory program measures:

- lighting efficiency standards for nonfederal public buildings;
- thermal efficiency standards and insulation requirements for new and renovated nonfederal buildings;
- standards and policies relating to energy efficiency for state and local procurement practices;
- programs to encourage the availability and use of carpools, vanpools, and public transportation; and
- a traffic law or regulation permitting a right turn on red.

Additional conservation measures that may qualify for supplementary funding include: public education, intergovernmental coordination, and energy audits for buildings and plants.

Part II examines the State Energy Conservation Program both at the national level and in Texas, and presents an analysis of its administration, implementation, programs, and effectiveness.

### *5. Administration and Implementation in the United States*

Fifty-four states and territories are receiving federal funding for state conservation programs. In order to identify the advantages and disadvantages for the various administrative organizations, a questionnaire was mailed to the participating governmental units.

Of the forty state governmental agencies that responded (75 percent), responsibility for administering the SECP was assigned to an independent agency in thirteen, to a division of an agency or department in fifteen, and to the governor's office in twelve.

The state energy plans were largely developed in-house (20 states), administered by a combination of in-house inputs and external contracts (36 states,) and audited both in-house and through contracts (20 states).

Initially, the SECP may advantageously be located in the governor's office, but once a program is underway, states may find it desirable to move it to an agency setting.

Regardless of the agency or office administering the plan, it is suggested that a variety of inputs be used in the development phase; that contracts be issued for program implementation; that the office administering the program be actively involved in both of these phases; that close monitoring of all contracted measures be performed by the administering body; and that objectivity be the primary consideration in determining the audit arrangement to be used.

### *6. Programs and Effectiveness in the United States*

Since the mandatory program measures in most states will save relatively small amounts of energy, states must employ additional conservation measures to meet their 1980 savings goals. This affords them the opportunity to develop plans adapted to their own particular energy consumption and resource situations. A review of all the state plans indicates that many states are taking advantage of this by employing innovative program measures in their plans. Also, most state plans are comprehensive in that they address a wide variety of energy end-use sectors.

How effective have the various state Energy Conservation Programs been in reducing energy usage? It is too early to tell, since most state plans were not approved by the federal government until the summer or fall of 1977 and most states spent a good portion of calendar year 1978 gearing up their programs and stimulating public awareness of energy conservation opportunities. Consequently, the validated nationwide energy savings thus far amount to only about one-eighth of the 1980 savings goal of 6.7 percent. Even so, there seems to be widespread agreement that the vast majority of states will be successful in meeting their 1980 goals.

A quantitative assessment of the state prorams according to their cost effectiveness (expressed in terms of Btus saved per dollar of cost) is not a sufficient mechanism through which to pass judgment of the project.

Generally, it is recommended that federal funding of the SECP be continued past 1980 and that the scope of the program be increased. Incentives that will encourage more extensive research and development as well as long-range planning are also recommended. There seems to be a need for states to balance public information programs, necessary to stimulate public awareness of conservation, with more concrete technological measures designed to reduce energy consumption over the long term.

### *7. Administration and Implementation in Texas*

In January 1977, Governor Briscoe announced that the State of Texas had accepted federal grant funds to develop and implement a State Energy Conservation Plan consistent with the federal guidelines and requirements. The task of developing the plan was assigned to a private consulting firm, and the Governor's Office of Energy Resources (GOER) was created as the lead administrative agency for the plan.

Within the SECP, nine composite program areas have been identified: thermal and lighting standards, ride-sharing, government purchasing, industrial processes, residential consumption, commercial consumption, local government, educational institutions, and agriculture.

Administratively, dividing responsibilities among the GOER, the Texas Energy Advisory Council, (TEAC) and other state agencies creates difficulties of co-ordination and sometimes authority. The Texas State Legislature, however, in 1979 amalgamated the GOER and TEAC with the state's natural resources council. Hopefully, this action will improve the state's capacity to deal efficiently with energy matters.

Texas should maintain its current policy of implementing the SECP on a shared in-house and external basis. Suggested changes in implementation techniques include: (1) more detailed program monitoring; (2) a centralized information source of updated programs within the Governor's Office of Energy Resources, (3) placement of greater emphasis on information sharing among local government units, and (4) the extension of some innovative grants beyond a one-year period.

### *8. Programs and Effectiveness in Texas*

It is too early to assess the success of the Texas State Energy Conservation Program. The first independent

audit was published in November 1978. As part of that evaluation, a survey was conducted of more than two hundred people out of approximately twenty-four hundred who had participated in one or more of the programs.

Although the survey indicated a generally favorable response to the SECP, achieving a 5.64 percent savings by 1980 is not assured. In 1978, energy savings achieved by the SECP totaled about 2 trillion Btus, compared to the 1980 goal of 526 trillion Btus. Savings were greatest for existing residential buildings and public schools. Savings were also recorded for existing commerical buildings and in the area of government purchasing.

Despite the problems and barriers that exist, officials at GOER remain confident that they will meet or surpass the 1980 goal.

Desirable modifications of the conservation program include continuing the trend toward the use of more technical conservation programs, while maintaining and increasing public information and awareness programs.

Conservation must be a key component of our energy policy, at both the state and national levels. While increased domestic production is vitally important, without a considerable reduction in the traditional growth rate of energy consumption our energy shortfall will continue to increase.

# PART III

# NUCLEAR POWER

As 1980 approaches, some thirty-five years after the nuclear era began, many people in the United States are questioning current nuclear policies. Policymakers in federal, state, and local governments are being forced to contend with what is now a highly sensitive political issue.

The resolution of nuclear issues has increasing importance for Texas as it considers the consequences of nuclear power production and proposed nuclear waste disposal sites in the state.

Of the many aspects of nuclear power policy options that deserve careful study, seven were selected for consideration in *Texas Energy Issues: 1979.*

### *9. The Continuing Federal Role in Nuclear Power Production*

The development of nuclear power was at first exclusively a government effort. Since 1954, the federal government has been regulating and promoting the growth of the nuclear industry. Today, however, the nuclear industry is at a standstill. Plants already under construction are being completed, but large numbers of planned facilities have been cancelled or deferred and new orders from electric utilities have not been forthcoming.

The industry blames excessive government regulation and the long licensing process for obstructing growth. If nuclear development is to continue, the federal government must come to grips with regulatory and licensing problems, take action to overcome rising public fears about nuclear safety, and speed up the development of practical new nuclear technologies.

For the rest of this century, the only large scale alternatives to new nuclear reactors on any large scale are coal-fired plants. Any decision to forego or minimize further nuclear construction should fully consider the economic and social costs of the coal alternative.

### *10. Management and Isolation of Nuclear Wastes*

Nuclear wastes exist in large quantities today as a result of over three decades of production of nuclear materials for strategic weapons and from commerical electrical generation. Many nuclear wastes are long-lived and highly radioactive, and therefore could represent substantial risk to following generations if they are not adequately isolated from the biosphere.

Past mismanagement of radioactive wastes, as well as lack of any cohesive national policy for their disposal, has led to widespread skepticism of the government's and industry's ability to isolate them effectively. The issue cannot be ignored. Even if all military and commercial activities which generate radioactive wastes were stopped today, accumulated wastes would still present a major disposal problem.

Nuclear waste disposal is not just a technical matter; to ensure security, it also requires nearly fail-safe performances from everyone involved in the construction and operation of processing facilities, transportation and monitoring of wastes, and surveillance. Economically, the costs of the entire waste processing system when added to the expenses of plant decontamination and decommissioning may well make the costs of nuclear power much higher than presently envisioned. Taking into account the uncertainties that still exist, we may be better off for the time being to continue with above-ground management of spent fuel assemblies and solidified high-level wastes. Technologies yet to be developed may provide better solutions a decade or more in the future.

### *11. The National Politics of Nuclear Power*

Nuclear power plants, and incidents that have occurred in them, have spawned political activity since their inception. The recent accident of Three Mile Island seems certain to intensify this activity. Regardless of the safety record of plants to date and their relatively economical operation, the antinuclear political issue has become so well-entrenched that many decisions being made on nuclear power are so politicized that rational judgments are unlikely.

Despite whatever shortcomings nuclear energy may have, national polls have repeatedly shown that the majority of the American public favors its use. Referenda in seven states in 1976 favored nuclear power by a two to one margin. Less than two weeks after the crisis at Three Mile Island, voters in Austin, Texas, approved their continuing participation in the South Texas Nuclear Project.

Although nuclear opponents have a propaganda advantage because they have assumed the position of underdogs espousing environmental concerns, avoidance of catastrophe, and public health protection in the face of big industry and big government, the fact remains that nuclear energy, along with coal, is one of only two viable energy options we have for large-scale electric power production for the decades immediately ahead. Congress and the public must decide whether or not the potential harm from nuclear power outweighs its tangible benefits. Certainly, the Three Mile Island incident has assured that the nuclear issue will continue to have high political visibility.

### *12. United States Policies Affecting International Control of Nuclear Technologies and Materials*

The primary international concern over nuclear energy is the potential for the proliferation of nuclear weapons. As one of the major suppliers of nuclear technologies and materials, the United States has a responsibility to establish policies which are sensitive to proliferation possibilities. Recent executive announcements regarding nuclear reprocessing and breeder prgrams are a step in the right direction. The most effective control, however, would be the establishment of an international nuclear fuel repository which would store fuel elements both before and after their use.

The international fuel repository concept may also provide a solution to the proliferation problems posed by

weapons-grade plutonium present in spent fuel assemblies. In the event that an international storage facility fails to come into being, the U.S. should provide for the return of spent fuel assemblies.

Finally, the U.S. has a role to play in providing an adequate security environment for its allies in order to discourage these countries from developing their own nuclear weapons capabilities.

### *13. States' Rights and Radioactive Wastes*

The delay in demonstrating the practicality of a permanent nuclear waste repository, combined with fears about the safety of containment technologies, has increased skepticism over federal radioactive waste storage policy. Seventeen states now restrict the siting of repositories within their boundaries. Many others have similar bills under consideration.

Whether or not states have the authority to impose restrictions on waste storage facilities is unclear. The federal government claims exclusive jursidiction over radioactive waste disposal pursuant to the Atomic Energy Act of 1954 as amended. Many states, however, reject the notion that they do not have final approval over nuclear facility (including waste repository) siting and land usage.

Increasing state concern over waste disposal siting will not be abated by court challenges nor by the federally proposed consultation/concurrence process. A resourceful, safe, and timely federal waste management policy is required to quiet growing public anxiety over the handling of radioactive waste.

State action should be taken now if Texas, or any state, is to have an adequate role in determining the location or size of a radioactive waste disposal facility located within its borders. While the courts may eventually determine that any state action in this field is preempted by the Atomic Energy Act, the federal government will find it much harder to impose its will on states which demand some say in radioactive waste management. State action need not be so restrictive as to ban disposal facilities or injure the proposed consultation/concurrence process of waste disposal siting. Adoption of the Vermont prior-approval model would provide the best guarantee that Texas will have a major, if not final, voice over disposal facilities within its boundaries.

### *14. Austin and the South Texas Nuclear Project*

Austin provides a good example of the politics of nuclear power at the local level of government. Voters have been to the polls five times in seven years to make their choice about the City's participation in the South Texas Nuclear Project (STNP). At times, interest in the issues surrounding nuclear power has surpassed even issues considered in conjunction with mayoral and city council elections. In the latest election held on April 7, 1979, less than two weeks after the nuclear reactor accident at Three Mile Island, voters approved continued participation in the project by a margin of almost 3400 votes, with 34 percent of those registered voting.

The politics of nuclear power in Austin are not unlike those found elsewhere. The questions have generally involved issues of nuclear power everywhere: health, safety, and the environment; economics; future demand; and the proper "mix" of energy sources. a number of other factors, however, have also contributed to the decisions about Austin's participation in the STNP: the "democratization" of the decisions; the role of the City's leaderhip; and, the timing of the decisionmaking process.

### *15. Economic and Regulatory Problems of Nuclear Facilities in Texas*

The construction of nuclear power plants in Texas has been plagued by cost overruns, delays due to federal regulatory changes, changes in the scope of work required, high costs of capital, high rates of inflation, and what utilities feel are inadequate rate decisions. Initial cost estimates, which were actually only tentative, have been exceeded by over 100 percent for all the nuclear units being built in the state.

Although part of this cost increase has been due to administrative shortcomings, most can be attributed to unforeseeable circumstances. For example, the number of regulations pertaining to nuclear facilities started to skyrocket in 1972 and there is little prospect that the trend will change.

Although the large-scale nature of construction work involved in building a nuclear powerplant makes construction errors almost unavoidable, these for the most part do not seem to have contributed substantially to overruns.

Economic forces, which were originally expected to make nuclear energy seem irresistable, have instead been one of the major contributors to the stagnation of the nuclear industry. Inflation has invalidated initial cost estimates and has made delays in construction very expensive. The costs of constructing the highly capital-intensive facilities have risen at a rate higher than the rate of inflation. Once the costs of decontamination, decommissioning and waste disposal have integrated into the rate base, the economic advantage of nuclear energy may well be substantially reduced or even erased.

## PART IV

## NATIONAL ENERGY ACTS OF 1978

The five acts that comprise the National Energy Acts of 1978 are complex and sometime ambiguous. Each act contains provisions that require elaborate formulations of rules and regulations before successful implementation can begin.

## 16. Natural Gas Policy Act of 1978

Drafted as a series of compromises between those who favored deregulation of prices to foster production and those who wanted to keep prices under regulatory control, the Natural Gas Policy Act (NGPA) provides for higher prices for natural gas on the interstate market while imposing price ceilings on the previously unregulated intrastate market. Some observers consider this action partial deregulation. The maximum lawful price for various categories of gas will increase slowly until 1985. In that year, certain categories of gas will be deregulated unless the President or Congress reimposes price controls for one eighteen-month period.

Responsibility for making the initial policy decisions in connection with the Natural Gas Policy Act rests with the Federal Energy Regulatory Commission (FERC). Litigation or amending legislation will ultimately resolve the most troublesome ambiguities and questions as to congressional intent. The State of Texas can pursue the complaint filed jointly with Okalhoma and Louisiana through the federal court system for a determination of the constitutionality of the NGPA. This case is now pending.

The Texas Railroad Commission has the opportunity for regulating the current surplus of natural gas in the state. In making decisions as to the existence and size of the surplus, it must take into account the complex pricing of gas established by the NGPA, the needs of both the consumers and the producers, and the revenue needs of the state. The Railroad Commission retains its authority to restrict production in the interests of gas conservation and may use this power beneficially.

## 17. Energy Tax Act of 1978

To provide incentives for increasing energy conservation and production, Congress passed the Energy Tax Act of 1978. Rejecting President Carter's request for a standby gasoline tax, a crude oil equalization tax, and a user tax on industrial consumption of oil and natural gas, Congress finally approved a residential energy tax credit for homeowners installing insulation, a solar energy equipment tax credit, a weakened gas guzzler tax, a gasohol tax exemption, business energy tax credits, and tax credits for the drilling and exploration of geothermal deposits.

The residential energy credit is 15 percent of the first two thousand dollars spent on qualifying energy components for the taxpayer's principal residence, including insulation, a more efficient heating system, and weatherization. It is an open question as to the extent that this credit will result in increased investments in household energy conservation, but the potential reduction in energy use is enormous.

Also available to residential owners is a credit against federal income tax liability for investments in solar, wind, and geothermal energy systems, amounting to 30 percent of the first $2000 and 20 percent of the next $8000. Energy savings through this incentive in Texas are expected to be relatively low since the state's primary use of household energy is for air conditioning.

The gas guzzler tax is imposed on manufacturers for cars which fail to meet specified standards. For 1980 model cars, the tax is two hundred dollars for those whose rated consumption is fourteen miles per gallon, three hundred dollars for thirteen miles per gallon, and five hundred fifty dollars for those rating lower than thirteen. It should have relatively little effect on the car-buying habits of Texans.

Gasohol, gasoline with at least 10 percent alcohol added, is to be exempt from federal excise tax until 1984. This measure should apply some stimulus to gasohol production and use.

Other tax credits are authorized in the areas of transportation, business, and geothermal energy development.

## 18. National Energy Conservation Policy Act

The latest of several laws passed to stimulate energy conservation is the National Energy Conservation Policy Act of 1978 (NECPA). Although lengthy and detailed, NECPA's major provisions are limited to four areas: (1) residential conservation services; (2) indirect and direct assistance; (3) standards, labels, and targets; and (4) federal agency demonstration projects.

Under the Residential Conservation Service Program, a public utility must provide consumers with information on energy conservation, perform energy audits, and arrange for the financing, installation, and payment of energy conservation measures. The logic of this approach is that it takes advantage of a utility's service structure. The service could contribute to considerable energy savings, but on the other hand could result in an increased bureaucratic load with the costs of the service being passed on to the customer.

Loan programs supervised by the Government National Mortgage Association are designed to implement home weatherization, but have not as yet been funded by Congress. Direct assistance will consist of grants to states, who then will allocate funds to public institutions for weatherization.

Standards are set for the weatherization of houses; a target is established to hold the growth of the use of gasoline by trucks to 13 percent by 1985; labels are

required on energy-using appliances; and goals are established to improve the efficiency of energy used by industry. Four industries (metals, textiles, paper, and rubber) are currently being monitored by the Department of Energy with regard to their efforts to increase their use of recoverable materials.

The federal agency demonstration program allots $45 million for the demonstration of solar energy. In addition, the President has ordered all federal agencies to reduce energy use by 5 percent in 1979.

### *19. Powerplant and Industrial Fuel Use Act of 1978*

This act mandates that new powerplants and industrial boilers be built to utilize coal, and that existing facilities phase out natural gas as a boiler fuel by 1990. This conversion process, however, may be complicated by economic and environmental issues. In addition, the oil and gas users tax, designed to apply economic pressure for conversion, was stripped from the legislation before passage by Congress.

Impacts of this act in Texas could be quite harsh since natural gas represented about 87 percent of the energy used as a boiler fuel in 1976. Conversion is actively underway in the state, however. By 1985 it is estimated that about 60 percent of Texas's electricity production will be from lignite and coal.

The environmental impacts of coal conversion in Texas could be significant. There will be an increase in particulate matter, sulfur oxides, and nitrogen oxides in the atmosphere as a result of increased coal use.

The key to the impacts of the act on Texas, as well as on the nation as a whole, rests with the exemptions permitted. There are seventeen allowable exemptions contained in the act, with wide discretion given to the Secretary of Energy in issuing them. Terms used in the exemptions such as "in the public interest" and "financially feasible" must be fully defined before the impacts of the act can be fully determined.

### *20. Public Utility Regulatory Policies Act of 1978*

This act addresses policies for the conservation of electric energy, improved efficiencies for power generation, and equitable rates for electricity consumers.

Title I establishes federal rate-making standards that state regulatory authorities and nonregulated electric utilities must consider. These include: (1) cost of service, (2) declining block rates, (3) time-of-day rates, (4) seasonal rates, (5) interruptible rates, and (6) load management techniques.

Since Congress was unwilling to overrule state authority beyond the point of requiring the states to consider the standards, implementation of those standards will remain at the discretion of each state. The effectiveness of the act, therefore, may not be measurable until the fifty states report back to the Department of Energy.

# PART V

# ENERGY-RELATED ISSUES

Numerous factors affect the role of coal and lignite as boiler fuels for industries and electric utilities. Several were addressed in a 1977 report of the LBJ School of Public Affairs entitled *Public Policies Affecting Lignite Development in Texas* and in a 1978 report on *Texas Energy Issues: 1978.*

In the present report, two energy-related issues dealing with water needs for lignite and freight rates for western coal delivered to Texas are treated briefly.

## 21. *Water for Texas Lignite Mining and Use*

The cooling requirements of lignite and coal-fired boilers are making increasing demands on the water resources of Texas. Since Texas is approaching a point where demand for water will soon equal available public water, it is critical that the institutional framework governing the allocation of available water be examined.

Texas's current system of water management and allocation is generally not well suited to meet the increasing demands for water within the state. To be fair and equitable in distribution it is imperative to have greater regulation of water sale and rates. Two suggestions are: (1) to increase the exchange of information between river authorities and the Texas Department of Water Resources (TDWR) concerning the sale of water, and (2) to increase TDWR's capability of reviewing water rates and rate structure.

The surface water policy in Texas, based on the appropriation doctrine, is well suited for the hydrological and economic environment in Texas. The policy for diffused water does not seem to need any changes at present.

The main problem with water availability in Texas concerns ground water law. The present policy needs to be changed because it encourages the exploitation of water. The best way to change the law is to recognize the interrelation between surface and ground water. What is needed is statewide control of withdrawal rates for all water. The main responsibility should be vested with regional or local authorities, with the TDWR serving in an oversight capacity.

## 22. *Freight Rates for Western Coal*

A major portion of the coal that is being and will continue to be used in Texas to fire electric power plants and industrial boilers lies in the Rocky Mountain states. This western coal can be economically transported to Texas at present only by rail. The rates charged for movement of this coal are being investigated and set by the Interstate Commerce Commission (ICC). The ICC is faced with reconciliating two conflicting national policies: (1) reducing dependence on oil and natural gas by shifting to greater use of coal, and (2) revitalizing America's railroads by authorizing freight rates that reflect a commodity's contribution to the total costs of a rail carrier's system.

Present ICC practices tend to be lengthy and time-consuming. Furthermore, the issues of coal freight rates involve conflicts beyond the transportation issues of the ICC's domain.

Congress is currently considering legislation that would speed up the final decision and yet leave the ICC free to rule on technical issues. It could, of course, remove the decision-making authority from the ICC, thus politicizing the process. Such action would open up the process of reconciling conflicting principles to political and regional interests rather than isolating the rate-setting process in a quasi-independent regulatory body.

# PART I

# TEXAS DEEPWATER PORT

The increasing necessity to import crude oil into the United States, at the lowest possible cost, led to plans to build deepwater ports along the coast of the United States. The Deepwater Port Act of 1974 governs the activities and construction of deepwater ports. This Act vests the authority to issue licenses for deepwater ports in the Secretary of Transportation. In issuing the licenses, the Secretary must first consider feasible onshore deepwater ports before considering offshore deepwater ports. The Act gives highest priority to publicly owned deepwater ports, second priority to privately owned ones, and lowest priority to ports privately owned by oil companies

A deepwater port is a harbor facility with sufficient depth to accommodate very large and utltra large crude carriers (commonly called "supertankers"). The lack of natural deepwater ports on the Eastern and Gulf Coasts makes an offshore deepwater port a possible alternative. An offshore deepwater port consists of a system of buoys and a pumping platform, located in offshore waters with sufficient depth to accommodate supertankers. The crude oil is off-loaded from the tanker through the mooring buoy and transported to an onshore storage site through pipelines on the ocean floor. There are approximately one hundred deepwater ports operating in the world today.

A consortium of major oil companies, operating through a corporation named Seadock, planned to build a privately owned deepwater port twenty-six miles off the Texas coast where the Gulf is deep enough to accommodate the largest carriers. The onshore facility was to be located in Freeport, Texas. The oil companies wanted to build this facility to utilize the supertanker's economies of scale in the shipment of crude from Africa and the Middle-East to the Houston area's numerous refineries.

In 1977 Seadock was dissolved because several of the larger oil companies that were participants in the project withdrew from the consortium. In withdrawing, the companies cited as cause the multitude of onerous federal environmental and antitrust restrictions contained in the license offered to Seadock by the Secretary of Transportation. However, Louisiana Offshore Oil Port, Inc., (LOOP), another private consortium of oil companies, accepted an identical license, and is now building a deepwater port off Louisiana's coast.

Prior to Seadock's demise, the State of Texas had created the Texas Deepwater Port Authority (TDPA) to aid private entities wanting to build an offshore deepwater port; or, lacking private proposals, to build and operate a publicly owned deepwater port. When Seadock dissolved, TDPA undertook to construct and operate a facility almost identical to that in Seadock's proposal. TDPA is currently awaiting approval of its license application by the Secretary of Transportation, and of its proposed rate structure by the Federal Energy Regulatory Commission.

Since Seadock's dissolution, Galveston Wharves, Inc. has proposed, and is pursuing, an onshore deepwater port in Galveston. Their plans call for the dredging and extension of the existing channel from the present depth of 42 feet and length of 4.2 miles to a depth of 54/56 feet extending 25.6 miles. The off-loading facilities at Pelican Island would accommodate two fully loaded, very large tankers (VLCC) in the 100,000-110,000 deadweight tonnage range.

Currently, the oil companies are utilizing the supertanker's economies of scale by offloading supertankers into smaller tankers off the Texas coast. This procedure, known as lightering, is presently economically competitive with TDPA's proposal because of the world tanker market glut and the consequent low tanker rental rates.

In the future, the use of supertankers to ship crude oil to the Texas Gulf Coast may decline due to the recent Mexican oil discovery. The trip from Mexico to Houston may prove too short to realize the economies of scale normally associated with supertankers. Alternative means of transporting the Mexican crude to Houston could be through a pipeline or through the use of smaller tankers.

Among the policy issues to be considered in this section are the following:

Chapter 1. Financing a deepwater port in Texas.

Chapter 2. Oil pollution liability and deepwater ports.

Chapter 3. Antitrust aspects of the Texas deepwater port proposal.

Chapter 4. Air emission offset policy and the Texas deepwater port proposal.

The resolution of these issues will influence whether or not the Texas Deepwater Port Authority's proposed facility will be built. We are acutely aware that many other issues are important and will need to be resolved before any new facility becomes a reality. It is hoped that another group can further the investigation in another year. In the meantime, however, perhaps the present contribution will be of some value.

# Chapter 1

# Financing a Deepwater Port in Texas

## Issue Definition

Financing large-scale energy projects is a difficult endeavor. The proposed deepwater port off the Texas Gulf coast is one such project facing significant financial requirements and barriers. Though its financial arrangements have not yet been fully developed, many problems have arisen in the Texas Deepwater Port Authority's (TDPA) attempts to acquire adequate financial backing.

Of course, one major cause of the problems is the project's size: its financial requirements are estimated at $1.125 billion. But other factors also are constraining TDPA's fund-raising capabilities. First, as currently proposed, the offshore port would be owned and operated as a public facility by a state agency, TDPA. As such, it will not be able to sell equity ownership shares to potential users as is traditionally done in financing large-scale private pipeline and deepwater port projects. Instead, the project must be financed entirely by debt (i.e., through the issuance of revenue bonds) and TDPA must remain its sole owner.

A second factor constraining the project is Article III (Section 49) of the Texas Constitution, which prohibits the creation of debt by or on behalf of the State. This means the TDPA project cannot draw upon the State of Texas's financial credit or guarantees to back its bonds. Consequently, the only credit or guarantees available to the proposed public deepwater port are those of its anticipated revenues and those obtained from other sources.

One of the other sources might be the port's future customers. Following the pattern of private financing of port and pipeline projects, a public port might be able to acquire throughput or use guarantees (or some variation thereof) from some future shippers and, with these guarantees, provide sufficient security to investors to sell $1.125 billion of revenue bonds at a reasonable interest rate.

This raises the third constraint on TDPA's ability to obtain adequate financing: shippers are hesitant to promise use of the port in future years unless they receive some significant quid pro quo. However, since the port will have no equity participation, it will not be able to offer ownership shares or dividends in return for shippers' guarantees. Nevertheless, as already proposed by TDPA, one workable option might involve the port's offering a tariff discount or other preferences to shipper-guarantors to overcome the latter's reluctance to promise use of the port.

As a consequence of all these constraints, financing the offshore deepwater port sponsored by TDPA will be difficult. Indeed, assuming TDPA receives a license from the Department of Transportation and approval of its two-tiered tariff from the Federal Energy Regulatory Commission (FERC), the resolution of this financing dilemma probably will determine whether or not Texas builds a publicly owned offshore deepwater port at this time. What is required for the successful marketing of TDPA revenue bonds is a mechanism through which investors can be assured of the port's ultimate financial viability and a mechanism of legal recourse should the port find it necessary to default on all or some of its debt. Without such assurances, investors may be extremely reluctant to risk their funds on the project except at prohibitively high interest rates.

## Background

### *TDPA's Proposed Rate System*

TDPA proposes a two-tiered tariff system. Stated briefly, it would offer companies signing the Port Agreement a 15 percent discount on per barrel rates plus an opportunity to gain a return of 60 percent of the "coverage" fees it has paid.[1] These preferences would be offered in exchange for the companies' signatures on an agreement which obligates them to use the port in some unspecified amount and to be responsible for paying a pro rata share of the port's revenue deficiencies, if any.

Article 5 of the proposed Port Agreement details the methodology to be used in the determination of shippers' tariffs. Essentially, there are three phases of rate and deficiency determination: semiannual, annual, and over the life of the bonds.[2]

Semiannually, the revenues received from shippers' rate payments must equal the sum of the port's operating and maintenance costs, debt service costs, and any other

obligations payable from the port's revenues. At the beginning of every six-month accounting period, preliminary rates will be set based upon the experience of the previous six months. At the close of each six-month period, a retroactive adjustment will be made in those preliminary rates, creating actual rates which should generate revenues sufficient to cover the costs actually incurred during the period.

The actual (after retroactive adjustment) rates thus determined will have a dual structure: signatories to the Port Agreement will pay a base rate per barrel of throughput while nonsignatories will pay a rate equal to 115 percent of the base rate. (In the Port Agreement, signatory rates are called User Fees and nonsignatory rates, Service Charges.)

Also semiannually, if the event of default has not occurred, the port operators will calculate a credit adjustment to be paid to signatory companies. This adjustment will represent a return of part of the "coverage" costs calculated as part of the User Fees and Service Charges. Sixty percent of the coverage previously paid by all shippers will be returned to signatories according to each signatory's proportion of total signatory throughput in the last six months.

At the end of each fiscal year TDPA will engage an independent CPA to undertake a "Final Audit." Such an audit will have the purpose of determining whether the port's gross revenues from the past year were sufficient to pay its total costs. If the Final Audit determines the port has generated insufficient funds, the Port Authority shall:

a) make up the deficiency from the monies in the Final Audit Reserve Account;[3] and

b) if the monies in the Final Audit Reserve Account are not sufficient to pay the deficiency, be entitled to demand a pro rata payment from every signatory company that has used the port in the past fiscal year. (Called a Final Audit charge, each signatory company's pro rata share would be equal to the proportion its past year's throughput bears to the total throughput shipped in that year by all signatory companies.)

Finally, in the event of a deficiency, if one or more signatories fails to pay the amount specified in the Final Audit charges, TDPA shall declare the signatory in default and then allocate to each nondefaulting signatory a pro rata share of the defaulted Final Audit charge.

There is no provision in the Port Agreement nor in other TDPA documents addressing the problem of deficiencies or surpluses determined for periods of more than one year and extending through the thirty-year life of the bonds. Deficiencies would arise only in the following situations:

(a) all signatories and nonsignatories default on their readjusted fees and charges;

(b) all signatories default on their annual Final Audit charges;

(c) the port is unused for a period of one year or more, and thus all pro rata shares are zero; or

(d) the port's deficits derive from an inability to service customers caused by an event of *force majeure.*

Situation (d) is provided for in the Port Agreement. Section 12.1 exempts both TDPA and the signatory companies from being considered in violation of the Agreement if either

> is prevented from performing any of its obligations hereunder by reasons of strikes, boycotts, labor disputes, embargoes, shortages of material, acts of God, acts of the public enemy, acts of superior governmental authority, weather conditions, riots, rebellions, acts of sabotage, or any other circumstances for which it is not responsible or which are not in its control; provided, however, that this Section shall not permit failures by [Signatory] Company to pay the User Fees specified in Article V.

That is, as long as the signatories pay their per barrel User Fees (which are recalculated semiannually), they will not be liable for any revenue deficiencies arising from such not-altogether-unlikely events as embargoes, severe weather conditions, terrorism, warfare, and labor disputes.[4]

## Policy Analysis

Three potential problems are evident in this proposed financing plan. They stem from the vague nature of the use guarantee, deficiencies arising from an event of *force majeure,* and deficiencies in periods of zero demand. Unless their potential negative effects are eliminated or moderated, investors may require a higher interest rate or even refuse to purchase the port's revenue bonds.

### *Vague Use Guarantee*

The Port Agreement as proposed in TDPA's license application would obligate each signatory to use the port "so long as any Bonds are outstanding." In addition, however, it states that the obligation will be limited to a signatory's share of total signatory throughput in a particular year. Consequently, a signatory might claim that a one-time patronage of the port's facilities during the thirty-year life of the bonds would fulfill its obligations to "use" the port. If such a claim were accepted, the signatory would incur risks only in years in which shipments were made. The economic success or failure of the port in all other years would be of little concern to him.

Of course, the lack of specificity in the Port Agreement might enable the port operators and bondholders to argue that signatories have agreed and are morally obligated to a more substantial usage of the port. The

opportunity for conflicting interpretations provided by the vagueness of the legal agreement will increase both prospective bondholders' and signatories' assessments of the risks of participation in the project. Alteration of the agreement so that the use guarantees are made specific as to throughput volumes and frequencies might be an effective means of reducing potential participants' reluctance, thereby enhancing the overall feasibility of the financing plan.

### *Zero Demand*

The fact that the Port Agreement provides for semiannual allocations of the port's total costs in proportion to each shipper's percentage of total throughput in the past six months creates a disincentive to use the port facilities in times of anticipated low demand. In such times, each shipper would be reluctant to join the relatively small group of shippers providing throughput because the lower the expected total throughput, the higher the expected per barrel User Fee for shippers. In these circumstances, it is not unlikely that each shipper, acting rationally to avoid excessive transportation costs, will attempt to shift his throughput to other transportation modes. In the aggregate, this spirals into a situation in which all shippers might abandon the port in a particular period, each hoping to avoid the burden of the port's revenue shortfall. The shortfall skyrockets while the number of obligated shippers diminishes extremely rapidly. Potential bondbuyers would predictably be quite concerned about the security of their investments when such a disincentive to use the facility exists.

### *Unassignable Deficiencies Due to* Force Majeure

According to the *force majeure* provision, whenever the port does not operate as a result of adverse weather conditions, the continuing operating, maintenance, debt service, coverage, and other expenses of the port will be excludable from the semiannual and annual calculations of total costs and obligations. In such circumstances, the port itself or ultimately the bondholders would have to assume responsibility for payment of those expenses. Assuming adverse weather conditions will cause shutdowns at least a few times during any given year, this assumption of financial liability would be a frequent occurrence and thus might deter lenders from investing in TDPA's bonds. This effect might be eliminated if the Port Agreement provided that some specific amount of downtime per year would not qualify for the *force majeure* provision.

## Policy Alternatives

There are several alternative means of financing large transportation projects available to those interested in developing a deepwater port in Texas. Some are most appropriate to private enterprise, others to a public entity, and still others to some mixture of the two. The discussion in this section describes several alternatives and assesses their applicability to TDPA's project.

### *Throughput and Deficiency Agreements*

Throughput and deficiency agreements, traditional private financing mechanisms, provide for the financing of a transportation project with the backing of shippers' guarantees of usage. Upon signing "T & D" agreements, shippers become part owners of the project, contributing cash in proportion to their participation. Simultaneously, they become obligated to guarantee the debt of the project

> in proportion to their ownership share, either by shipping enough throughput through the pipeline at the tariff rates to generate the revenue to cover all debt service obligations, or by paying to the pipeline any difference in its debt service obligations and its transportation revenues.[5]

Thus, ownership shares and obligations to cover defiiencies are a function of the proportion of throughput the owner-shippers have agreed to ship.

These use guarantees, in turn, are used to back the project's debt on terms much more favorable than if no such guarantees were provided. Investors in corporate bonds are provided greater security because not only do they feel more assurance that the project will experience sufficient demand, but also in the event of a deficiency, owner-shippers will be obligated to make payments to cover such deficiency.

In return for signing a "T & D" agreement, owner-shippers are entitled to receive dividends if the project experiences a profit. In effect, these dividends are returns on the risk of the owner-shipper's investments (equity participation, throughput guarantees, and deficiency obligations).

The use of throughput and deficiency agreements as a financing arrangement has been extremely successful in the past in raising funds for private pipeline projects. However, since there will not be any private owners of this public port, the success of a "T & D" agreement is less assured. Public projects cannot offer shippers ownership shares in return for their throughput guarantees. Without ownership shares, shippers agreeing to ship certain volumes of throughput cannot receive a return on their investment similar to a dividend in private financing. Under these circumstances, private shippers may be reluctant to obligate themselves to an agreement as specific and substantial as a "T & D" agreement without some opportunity to receive a return proportional to their risks (and obligations).

### *Take or Pay Agreements*

Take or pay agreements are financing arrangements which obligate a shipper to provide a specific amount of throughput through a facility in a given time period.[6] A project's ability to market bonds is enhanced when it has the contractual assurances of a number of shippers that those shippers will actually use the project's facilities to a certain, specified extent.

Unlike the "T & D" agreements, a take or pay contract gives shippers neither ownership shares of the project nor an opportunity to receive dividends if the project is profitable. Instead, the signatory of a take or pay agreement obligates itself only to ship a certain amount of throughput. If the shipper provides throughput below that level, it is required to pay an amount equal to the tariffs on the specified volume. However, if a deficiency still should arise after these payments are made, it is the project's owners—not its obligated shippers—which must suffer the losses. Similarly, if the project experiences profits, shippers signing a take or pay contract are not entitled to any return.

Take or pay agreements provide two features which might be helpful to TDPA's attempts to finance its port. First, ownership is not shared with private shippers; second, the obligation of each shipper signing the agreement is specified. Some version of a take or pay agreement—combined with a two-tiered tariff structure—might be applied effectively to TDPA's project.

### *Tax Exempt Financing of a Private Project*

Another mode of financing a deepwater port is the use of a public agency, selling tax exempt bonds, as an intermediary between the bond market and the private proposers of a project. LOOP (Louisiana Offshore Oil Port, Inc.), a privately owned port currently under construction off the coast of Louisiana, provides a recent example. Louisiana Offshore Terminal Authority (LOTA), a state agency, has sold $450 million in tax exempt bonds, the proceeds of which are to be transferred to LOOP as funds are required.

The tax exempt status of the LOTA bonds provides LOOP with less expensive financing than traditional corporate bond alternatives. The bonds are not backed by the State. Instead, they are backed solely by throughput and deficiency agreements executed between LOOP and its owner-shippers. Shippers' obligations, as specified in these agreements, then are assigned to a trustee as security for the bonds.

In the event TDPA's current proposal is not licensed by the Department of Transportation or if its financing plan fails, the State of Texas would be well-advised to investigate this alternative. In addition to interest savings due to the tax exempt status of the bonds, the LOOP example provides an effective way of sharing responsibilities among representatives of the public and private sectors.

### *Government Aid*

Partial financial support might be sought from governmental authorities. Such aid could take the form of loans, grants, loan guarantees, or insurance funds and could be extended by either federal, state, or local governments. Often cited as an example of successful financing with a "use agreement," the Dallas-Fort Worth Airport receives substantial funding from the federal government and thus has been able to lessen its dependence upon the municipal bond market. Federal funds for TDPA's project would afford TDPA a similar opportunity to decrease its dependence upon debt financing and, as a result, its bonds would be viewed more favorably by potential investors.

Additionally, local communities on the Gulf Coast near Freeport might benefit from the increased volumes of imported oil provided to their refineries by the port. Some might find it advantageous to enhance the probability of the port's construction by providing loans, grants, or tax and service benefits to TDPA.

There is no doubt government aid would be helpful to the project. Nevertheless, given that government aid of this sort can only provide partial financing of the port, TDPA must look to other sources as well.

### *Amendment of the Texas Constitution*

One final alternative worthy of discussion is the amending of Article III (Section 49) of the Texas Constitution. If amended to allow the use of the State's credit to back some state agencies' (including TDPA's) bonds, TDPA's ability to market its bonds would be enhanced considerably. Nevertheless, it is likely that some sort of throughput or use guarantees still would be necessary for its bonds to achieve a reasonable interest rate.

### Recommendations

Drawing upon the take or pay arrangement described above, the following changes in TDPA's financing plan should be considered. Taken together, the recommendations address all three problems discussed above.

1. The Port Agreement might well be altered so that the guarantee of port usage provided by a signatory specifies a *range*—i.e., a minimum and maximum—of obligated throughput volumes. A signatory would then

receive the FERC-approved tariff discount on all barrels of throughput shipped through the port up to the maximum. If a signatory did not meet its minimum obligation, the take or pay provision would be activated, requiring the signatory to make an additional payment equal to the discounted tariff times the difference between the minimum guarantee and the actual volume of oil shipped in the relevant period.

2. The *duration* of the use guarantees should be specified in a revised Port Agreement. Signatories should be allowed to sign agreements entailing use obligations for shorter than the proposed thirty-year life of the bonds. Such a lengthy liability may deter many port users from signing the agreement and thereby not only prevent them from gaining the benefits of a lower tariff but, more importantly, reduce the marketability of TDPA bonds. One workable suggestion might be to allow prospective signatories to specify the length of their use obligation and then apportion tariff discounts on a sliding scale, with the magnitude of the discount a direct function of the duration of the guarantee.

3. The *frequency* of port usage might also be specified in the revised Port Agreement. As currently proposed, the Agreement does not specify how often a signatory must ship through the port in order to meet its contractual obligation. A signatory is only financially responsible for deficiencies arising in years in which it has actually used the port. We suggest that signatories be contractually obligated to use the port according to some interval schedule, e.g., at least once a year, every two years, and so on.

4. Finally, the *force majeure* provision could advantageously be clarified so that short periods of nonoperation of the port due to adverse weather conditions (e.g., high wave turbulence) would not be considered situations fitting that provision. This would mean allowance of a certain amount of *downtime* in each accounting period during which the continuing operating expenses still would be apportionable to the users of the port.

In brief, it is desirable that the use guarantee be specified so that risk, financial obligations for deficiencies, and return on risk are less uncertain, and more easily measured and assigned.

*Daniel P. Reingold*

## References

[1]According to James Kerley, Jr. of the First Southwest Company in Dallas, Texas, "coverage" is a "term for a percentage of the principal and interest payments in a given year which is collected in addition to the actual principal and interest requirements on the bonds" to provide additional security for the bondholders. Coverage is often set at 25 percent of principal and interest. See "Verified Statement of James H. Kerley, Jr." submitted as Appendix 7 of Texas Deepwater Port Authority, "Petition for Declaratory Order Approving Inducement Tariff Structure." Federal Energy Regulatory Commission Docket No. OR 79-2, December 7, 1978 (hereafter referred to as "TDPA FERC Petition").

[2]The following two subsections are based upon the "Port Agreement," submitted as Exhibit A of Appendix 7 to the TDPA FERC Petition and as Exhibit E-1 of TDPA, Deepwater Port License Application, August 23, 1978.

[3]The Final Audit Reserve Account will be made up of monies (up to $3 million) generated in years in which a surplus arises in the Final Audit.

[4]It should be noted that this *force majeure* provision is not restricted to time periods exceeding one fiscal year. If a deficiency arises in a period of a year or less and is caused by some act of *force majeure,* the provision of the Port Agreement requiring signatories to pay a Final Audit charge still will not apply.

[5]U.S. Congress. Office of Technology Assessment. *Task Reports: Slurry Coal Pipelines,* Vol. II, Part II, January 1978, p. R-54.

[6]Ibid., p.R-56.

# Chapter 2

# Oil Pollution Liability and Deepwater Ports

## Issue Definition

The presence and operation of a deepwater port off the coast of Texas is closely associated with two issues. Economically a deepwater port will mean cheaper fuel costs for consumers. Environmentally there is the potential danger of oil pollution resulting from usage of the facility.

The problem of oil spillage centers on the environmental and social costs affiliated with pollution, as well as the determination of liable parties. Under recent legislation, provisions have been enacted to delineate and penalize liable parties. But, affixing dollar values to damages incurred by oil pollution has proved more difficult. Environmental factions claim that current penalties are insufficient, while industry advocates insist that existing penalties are excessive and counterproductive.

The issue then becomes whether or not the existing legislation is compatible with the economic intent of a deepwater port.

## Background

Since the passage of the Oil Pollution Act of 1924, the subject of oil pollution has received increasing attention. Subsequent legislation, however, has lacked the necessary foresight and comprehensiveness to address current problems. Past legislators could not envision the prospect of a supertanker spilling hundreds of thousands of barrels of crude oil over a multi-state area.

The wrecks of the tankers *Torrey Canyon* and *Amoco Cadiz* have done much to catalyze legislative thinking and priorities. Until passage of the Trans-Alaska Pipeline Authorization Act and the Deepwater Port Act of 1974, oil pollution liability was directed at vessel discharge and/or vessel owners. However, both of these acts stipulated a federal license to operate pipelines and deepwater ports. Accordingly, licensees were assigned areas of responsibility and liability in the event of oil pollution. Among other things, the Deepwater Port Act requires licensees to have $50 million in liability insurance for potential oil spills.

## Policy Analysis

The absence of an operating deepwater port in the United States confines analysis to that of a speculative exercise. Oil pollution as it is known in the United States is largely a product of vessel discharge or collision. Evaluation of the relative advantages or disadvantages of a deepwater port must therefore be made in this context.

The economic benefits to be derived from a deepwater port are simple and inarguable. In 1970 it cost $10.50 per ton of crude oil shipped from the Persian Gulf to the U.S. North Atlantic in an 80,000 dwt tanker as opposed to $5.70 in a 250,000 dwt ship.[1] A report by the U.S. Army Corps of Engineers estimated that savings through use of supertankers would be $1.7 billion.[2] Since no natural harbors on the Eastern or Gulf Coasts can accommodate tankers of 100,000 dwt or over, a deepwater port facility is necessary to realize tanker economies of scale.

The environmental aspects of a deepwater port also appear favorable. The size of modern supertankers which would be accommodated by the facility would greatly reduce traffic in sealanes. The chance of collision would be commensurately reduced. Furthermore, the location of a facility twenty-six miles off the Texas coast would greatly reduce the possibility of tankers running aground, which happened in both the *Torrey Canyon* and *Amoco Cadiz* spills. An environmental impact study prepared by LOOP estimates that a 10,000 barrel spill might occur at fourteen-year intervals during use of LOOP facilities.[3] Additional estimates of cumulative spillage through use of a deepwater port suggest that spillage is less than with alternative methods of crude oil transport such as lightering and transhipment.

In terms of the environmental advantages of a deepwater port, questions arise concerning the liability stipulations of the Deepwater Port Act. Additional factors to be considered strongly suggest that Section 18 of the Act, which details liability requirements, should be modified on a realistic and representative basis.

Originally the Deepwater Port Act held a licensee liable for spillage occurring within the safety zone of the port. In the case of LOOP, the safety zone describes a 14,400-foot circle around the pumping platform.[4]

Liability for the LOOP port has since been modified. A licensee is now liable only when a vessel is hooked up to the buoy.[5] Modifications of this nature greatly reduce licensee liability, and legislation should reflect this.

Two additional elements should be considered in realistically assessing deepwater port liability requirements.

First, the actual costs arising from pollution damage should be noted. The *Torrey Canyon* disaster resulted in the spilling of twenty-five million gallons of crude oil off the coast of France. Excluding clean-up costs, claims against the vessel owner came to $7.2 million.[6] Settled claims against Union Oil Company for the Santa Barbara oil spill came to $8.2 million. Inflation and clean-up costs today would substantially increase these figures, perhaps double them. Even so, the $50 million licensee liability requirement of the Deepwater Port Act seems adequate to meet the clean up costs of any pollution incident.

A second factor which should have been considered when formulating licensee liability requirements was the existence of private insurance pools. The Tanker Owners Voluntary Agreement Concerning Liability for Oil Pollution (TOVALOP) is subscribed to by tanker owners and extends liability coverage up to $10 million for physical pollution and contamination. Many private oil producers subscribe to the Contract Regarding an Interim Supplement to Tanker Liability for Oil Pollution (CRISTAL), which extends supplemental coverage up to $30 million for third-party damages. Oil Insurance Limited (OIL) provides coverage of up to $100 million to cover catastrophes, property damage, oil pollution, and wild well control both onshore and offshore any place in the world.

The formation of such insurance groups indicates that the private sector is willing to assume its responsibilities rather than leaving the government holding the bag. Acknowledgement of the direction being taken by private enterprise should serve to decrease the financial responsibility imposed by the federal government upon a deepwater port licensee.

## Policy Alternatives

Clearly no amount of legislation can eliminate oil pollution altogether. A consideration of existing circumstances, however, would suggest improvements which would benefit licensees, consumers, and environmentalists.

Recently the United States Congress passed the Port and Tanker Safety Act of 1978. An international agreement of the same order would do much to eliminate oil pollution. Pollution standards stipulated by the U.S. Act could reasonably be initiated under the auspices of the Brussels Civil Liability Convention. Overall reduction of pollution concomitantly reduces the financial responsibilities of other involved parties.

Consumers would be best served by a consolidation of resources by existing insurance pools such as TOVALOP CRISTAL, and OIL. Consolidation of this type should reduce premium payments for a licensee, and subsequently reduce consumer costs.

Because of its public nature, TDPA is excluded from private insurance coverage by companies other than those in the vein of Lloyds of London. Resultant premiums are prohibitively high. Public stature should not inhibit attempts to consolidate the deepwater port liability fund with existing private resources. Again TOVALOP and CRISTAL might be accessible avenues for consolidation. A federal-private merger of this sort could effectively allocate costs in such a way as to reduce costs for licensees, oil producers, ship owners, and most importantly consumers.

Finally, the most effective measure for reducing costs to all parties lies in developing a localized capability for confining oil spills. Coordinated state and local contingency plans provide the most expedient answer for accomplishing this.

*Blake Pittman*

## References

[1]Library of Congress Congressional Research Service. *Deepwater Port Issue Brief*, No. 70450, by James E. Milke (Washington, D.C., 1974) p. 2.

[2]Corps of Engineers, "U.S. Deepwater Port Study", August 1972, Vol. 1, p. 10.

[3]U.S. Department of Transportation, *The Secretary's Decision on the Deepwater Port License Application of L.O.O.P. Inc.* (Washington, D.C., December 17, 1976) p. 13.

[4]Telephone Interview by Blake Pittman with Vincent de Pasqua of L.O.O.P. Inc., April 24, 1979.

[5]Ibid.

[6]U.S. Congress, House, Congressman Jerry Studds addressing the House Subcommittee on Coast Guard and Navigation, 94th Congress, 1st and 2nd sessions, November 12, 1975.

# Chapter 3

# Anti-trust Aspects of the Texas Deepwater Port Proposal

## Issue Definition

The collapse of the Seadock proposal to construct and operate a Texas offshore deepwater port was due, in part, to extensive restrictions on the operation of the facility in the license offered by the Department of Transportation (DOT). The purpose of these limitations was to ensure against anticompetitive operative and administrative practices on the part of Seadock's owners (who were also to have been users of the facility).

After the Seadock venture was abandoned, the State of Texas, operating through the legislatively mandated Texas Deepwater Port Authority (TDPA), filed a new application to develop a publicly owned offshore port. The State believes that public ownership of the facility (which will avoid the problem of owner-shippers) should preclude the imposition of extreme antitrust provisions in the new license offer.

One purpose of this chapter is to analyze the antitrust problems in the original Seadock application as identified by the Department of Justice (DOJ), the Federal Trade Commission (FTC), and DOT, and to review the preventive measures placed in Seadock's license. Second, the study examines the extent to which these antitrust concerns may affect TDPA's efforts to construct and operate a publicly owned facility.

## Background

The Deepwater Port Act of 1974 requires that any application for the construction, operation, or ownership of a deepwater port be submitted to DOJ and FTC for identification and analysis of potential anticompetitive practices. Accordingly, Seadock's application and operating manual were subjected to a year-long scrutiny by the DOJ and FTC antitrust divisions. Their findings, released on December 5, 1976, identified four major areas of concern: (1) the natural monopolistic features of the port; (2) the vertically integrated structure of its ownership; (3) potential restraints on competition among shareholders; and (4) the proposed inland transportation system. The license offered to Seadock by DOT on December 16, 1976 contained extensive "remedies" for each of these potential problem areas.

### *Natural Monopoly*

The Seadock proposal was considered by the federal agencies to be essentially monopolistic in nature. The staggering costs of port construction and the scarcity of suitable port locations (in terms of proximity to both deepwater and mainland processing facilities) were cited as insurmountable entry barriers. A second monopoly characteristic, economies of scale, would have resulted from declining unit costs with increased port use. Finally, a deepwater port's financial advantages over transhipment and conventional transportation contribute to the operator's ability to set prices. (This exercise of monopoly power is limited somewhat by the availability of lightering, which is economically competitive, but at considerable environmental cost.)

The remedies chosen by Secretary of Transportation William T. Coleman, Jr. for the antitrust problems were based on the recommendations of DOJ and FTC. The remedy for Seadock's price-setting potential took the form of Article 13 of the license, which stipulated that the Secretary of Transportation must be a party to any regulatory proceedings involving port tariffs. The Seadock owners were not greatly concerned with this article or its implications; similar conditions are part of most common carrier licenses.

### *Vertical Integration*

The vertically integrated structure of Seadock's owners posed the most serious antitrust concern both to the antitrust agencies (DOJ and FTC), and to Secretary Coleman. Under normal monopolistic circumstances, with the tendency to charge excessive rates curbed by ICC and other regulations, the operator would choose to make his services as attractive and accessible as possible so as to maximize traffic, and thereby, profits. DOT feared, however, that the vertically integrated owner-shippers of Seadock would forego any attempt to realize a profit at the port's turnstile in favor of limiting access to the port — making their profits instead through reduced costs in downstream product markets. Secretary Coleman outlined several potential discriminatory practices that could limit use of the port: minimum tender

requirements, discriminatory scheduling of tanker arrivals, inequitable proration policies, and arbitrary imposition or relaxation of permission conditions for certain carriers.[1]

The majority of the antitrust articles of the deepwater port license dealt with the vertically integrated structure. Article 6 required that every modification of port operations, however minor, be cleared with DOT in advance of its implementation. Seadock owners feared that this provision would deprive their port operators of the flexibility to manage the facility efficiently and safely, particularly under unusual or crisis conditions.

Article 10 required that Seadock accept cargoes tendered from any ship which may "reasonably" be expected to use the port. The vagueness of this article worried Seadock, since the interpretation of "reasonable" was left to DOT.

Article 11 provided a general prohibition against inequitable scheduling practices. It required strict prorationing of port use among all potential shippers should demand for the facility exceed its capacity. It also prohibited special scheduling arrangements for regular users of the port. Seadock owners stressed that preferential scheduling for regular users was an "accepted industry practice" and its prohibition in the case of Seadock was discriminatory.

Article 14 mandated the modification of the facility "from time to time . . . in order to satisfy the express requirements of Articles 10 and 11"[2] This provision was designed to provide incremental changes in the port complex (such as increases in tankage or pumping capacity) and did not pose major problems for Seadock.

Article 15, however, provided for mandatory major expansion of the facility upon the Secretary's determination that there existed (1) continuing and definite need, (2) sufficient technology to render the project practically and environmentally feasible, (3) evidence of sufficient commitments and financial arrangements to complete construction, and (4) evidence that Seadock had had sufficient opportunity to comment on the issue.

Seadock's owners were extremely wary of the fact that it was the Secretary of Transportation who would determine (unilaterally) if the technological, environmental, and financial conditions surrounding the port warranted its expansion. Given the unpredictable nature of the energy supply market (with its extreme sensitivity to political and economic developments) they feared that they would be forced to expand the facility (at a cost of perhaps $500 million) during a period of unusually high demand, only to find themselves unable to utilize the increased capacity should conditions reverse the demand.

### *Restraints on Competition Among Shareholders*

This problem was raised by Secretary Coleman even though the antitrust agencies could not discover any features in Seadock's application that would lead to undue restraints. DOT's concern was that owner participation would present an opportunity for "collusion and sharing of information which could result in market allocation and concerted efforts against nonowners."[3] Article 19 of the license addressed this problem, stipulating that no part of the license could be transferred to any party without the express consent of the Secretary. This article also mandated a period of "open membership" in the consortium of at least six months after the issue of the license and periodic readjustment of ownership shares based on actual throughput.

Seadock considered these provisions to be potentially disastrous. The plans for financing the venture were based on the impeccable credit records of the participating companies. To protect Seadock's credit rating (and thereby the interest rate on the billion dollar debt), the owners had provided strict guidelines for the admission of new members into the consortium: unanimous approval of the other members was one such condition. The open membership and periodic readjustment clauses also served as a disincentive for early investment in the project. Instead of assuming the financial risks of a new venture, Seadock personnel feared that shippers would wait until they were convinced of the project's ultimate success, and then sign on to enjoy the profits of the venture without the initial financial responsibility.

### *Inland Transportation*

DOT's concern in this area was that the policies applied to the ports not be "thwarted intentionally or unintentionally in the connecting system."[4] To guard against this, the license required that Seadock establish "fair and adequate arrangements" with "such common carrier pipelines as are owned or controlled by the Onwers of the license and their affiliates"[5] for the transportation of oil from the port complex to inland refineries. These agreements were to be no more restrictive (in terms of minimum tender requirements, shipment specifications, etc.) than the conditions for the use of the port itself. The license did not specify what constituted "fair and adequate arrangements," so again, the port owners were disturbed by the vagueness of the provision.

In general, Seadock felt that the license offer was far too restrictive and left too many regulatory and policy decisions up to the discretion of the Secretary of Transportation. The oil companies feared that the potential accumulative impact of his day-to-day rulings

would be contrary, if not fatal, to their interests.

## Current Status

After the Seadock consortium folded, the State of Texas assumed the responsibility of trying to facilitate the construction of an offshore port. Seadock's license application was revised to provide for public ownership of the facility; the venture is to be financed from the sale of $1.125 billion in revenue bonds. Since the State of Texas cannot pledge its credit to any bond issue (this practice is prohibited by the state constitution), the financial backing for the bonds must come from contracts for the use of the port, executed between TDPA and potential shippers. To induce these shippers to pledge their credit, a dual rate structure was developed where "signatories" (those who have pledged to use the port) pay one charge (probably 21¢/barrel) while nonsignatories pay a 15 percent surcharge (probably 3¢/barrel, bringing their total to 24¢).

This rate proposal was submitted to the Federal Energy Regulatory Commission (FERC) in the form of a Petition for a Declaratory Order Approving Inducement Tariff Structure, on December 7, 1978. The Port Authority is now awaiting both the decision of FERC on this issue, and the decision of DOT on the license application, which was filed on August 23, 1978.

## Policy Analysis

The federal government must now decide if the Texas Deepwater Port Authority's license application allows for adequate competition in crude oil transportation. The four concerns addressed in the original Seadock license will probably provide a framework for the antitrust review.

TDPA's application retains the characteristics of a natural monopoly (insurmountable entry barriers, economies of scale, and price-setting ability), but these concerns are likely to be mitigated somewhat by the increased use of lightering, despite its relatively large negative impact on the environment. The only monopoly concern likely to be addressed in the new license is the proposed two-tiered tariff structure. The tariff is necessary if the bonds to finance the venture are to be marketable. Private industry, and more specifically, the oil industry, is the only source of the resources necessary to back a venture of this magnitude, particularly since the oil companies have an interest in seeing the port built. They must receive compensation for their risk, however, and this is the reason for the two-tiered structure.

Seadock's license expressly prohibited any variation in tariff structure, but only for a "like and contemporaneous service." TDPA must convince FERC that nonsignatory users will receive a greater service (use of the facility without the financial obligations) than signatories (who assume financial obligations far beyond their payment of tariffs).

Vertical integration was the area in which FTC, DOJ, and DOT had the most concerns in the licensing of Seadock. Most of the license's antitrust "remedies" were aimed at owner-shipper use of the port. The State of Texas operates no oil tankers. The Seadock license conditions have no applicability whatsoever, since the shippers will not control the port.

Restraints on competition among shareholders should not apply to the TDPA project either. There are no ownership shares to be controlled, sold, or readjusted. In addition, a user may switch from nonsignatory to signatory status at any time.

The inland transporation facilities connected to the port facility may cause a problem with the TDPA application. Although the State of Texas owns no connecting pipelines, the antitrust agencies may fear that the oil companies owning the pipelines running to the TDPA storage complex will discriminate against nonsignatory users. TDPA should not be held responsible for this possible practice by its customers, but DOT may want to impose connecting carrier provisions in the license offer. The Port Authority must be prepared to deal with the pipeline issue quickly, because the downstream transportation plan must be firmly established before user commitments can be obtained. Clearly, potential shippers will not commit themselves to the use of a facility if they are unsure how they will move their oil out of it.

The Port Authority has several alternatives. TDPA could contract for the construction of additional carriers, to be operated by the Port Authority. Although TDPA has been authorized to build such pipelines, it has expressed no desire to become involved in the inland carrier business.

Second, the individual shippers could contract with existing privately owned pipelines for transportation from the port. Currently, there is only one existing pipeline - Seaway - running inland from Freeport. It lacks sufficient capacity to service the TDPA port alone. The shippers would have to contract with the private pipeline industry for additional facilities. (These will not be built, however, until a current uncertainty over allowable returns is resolved.) The cost of adequate additional facilities has been estimated at $230 million.

## Policy Alternatives

Much of TDPA's future action on the deepwater port project will result from DOT's ruling on the license application, and FERC's ruling on the proposed two-

tiered tariff structure. Until the rulings are released, however, TDPA should be preparing to deal with the two possible pitfalls in the application: the connecting carrier issue and the tariff issue. In the case of the connecting carriers, the Port Authority should encourage private interests to invest in the construction of adequate inland pipelines. In the event that the private sector fails to do so, TDPA should be prepared to build them. In the case of the tariff issue, TDPA must convince the antitrust agencies that the dual structure is an absolute necessity, and that to disallow it would be to kill the project. Without the incentive, there can be no bonds. Without the bonds, there can be no port.

*Helen "Kathy" Johnson*

## References

[1]Common carrier tariff rules often contain a clause allowing ports to refuse tender under adverse weather or other safety conditions. DOT feared that this clause would be used to "legally" discriminate against non-owners of the port.

[2]U.S. Department of Transportation, *License to Own, Construct, and Operate a Deepwater Port issued to Seadock, Inc.* (Washington, D.C., December 17, 1976) p. 10 (hereinafter referred to as "License").

[3]U.S. Department of Transportation, *The Secretary's Decision on the Deepwater Port License Application of Seadock, Inc.* (Washington, D.C., December 17, 1976) Appendix D, p. 12.

[4]License, p. 13.

[5]Ibid., pp. 10-11.

# Chapter 4

# Air Emission Offset Policy and the Texas Deepwater Port Proposal

## Issue Definition

Texas' energy development, based primarily on the burning of hydrocarbons, will interact with federal clean air policies. One of these, the offset policy, is designed to allow for new emission courses, such as a deepwater port, while maintaining federal clean air standards within the region. The offset policy requires that new emissions be balanced by a reduction of existing emissions; the reduction "offsets" the new emissions.

The Texas Deepwater Port Authority's (TDPA's) compliance with the offset policy presents a number of policy issues to TDPA and the State of Texas. First, there is the issue of the amount of emission reductions required of TDPA. Second, the offset policy is ambiguous concerning which entity — TDPA, the State of Texas, or existing industries — supplies the emission offsets. The federal policy empowers the states to clarify this ambiguity. Third, there is a need for a state policy concerning the possibility that the above entities will fail to supply the offset. Finally, there is the issue of guarantees to ensure that potential emission reductions, due to TDPA's project, occur in the Houston-Galveston area.

## Background

### *Offset Policy*

The Clean Air Act Amendments of 1970 established the National Ambient Air Quality Standards (NAAQS), to be achieved by July 1976 for six pollutants, one of which is hydrocarbons. In 1976 the Environmental Protection Agency (EPA) issued the offset ruling to provide for new emission sources in areas which had not achieved the NAAQS. The current offset policy requires that a new facility's emissions be balanced by at least an equal reduction in existing emissions if:

1) the facility produces one hundred tons or more per year of potential emissions of any of the six pollutants;[1] and
2) the facility is located within an area containing a city of 200,000 or more inhabitants where the air has not attained the NAAQS for a particular pollutant, or within thirty-six-hour wind travel time of such an area.

The Congress adopted the offset policy in the Clean Air Act Amendments of 1977, but did not mandate the inclusion of the policy in the State Implementation Plans (SIP), which govern the permitting of new sources after July 1, 1979. EPA's policy memorandum states that:

> Each 1979 SIP revision must contain... An identification and quantification of an emission growth increment which will be allowed to result from the construction and operation of major or modified stationary sources within the area for which the plan was developed. Alternatively, an emission offset regulation can be adopted to provide for major new source growth.[2]

Thus, the TDPA project's emissions can be offset through an SIP revision which allows for new emissions through stricter state regulation of present emissions while meeting the 1982 deadline. Alternatively, Texas's SIP revision can require TDPA to provide its own offsets.

### *Hondo Decision*

EPA established the precedent in its Hondo decision for applying the Clean Air Act to facilities located in waters beyond the states' legal jurisdiction, as is TDPA's facility. EPA ruled that the Clean Air Act is the law of the United States, and therefore applicable to the Hondo Platform under the Outer Continental Shelf Lands Act's clause which provides that the laws of the United States are applicable to fixed structures on the Outer Continental Shelf. The Deepwater Port Act contains the same clause. Thus, TDPA must comply with the Clean Air Act and the resultant requirements established through Texas's SIP.

### *Air Quality Impact*

TDPA's proposed port will be located twenty-six miles off the coast of Brazoria County, and within thirty-six-hour wind travel time of Harris and Galveston counties.[3] All three counties are currently classified as nonattainment areas (NAA) for photochemical oxidants (hydro-

carbons) by EPA. On the basis of a recent relaxation of the photochemical oxidant standards, the Texas Air Control Board is petitioning EPA to reclassify Brazoria County as an attainment area. Hydrocarbon emissions from TDPA's project are expected to be 1437 tons per year, mostly from the tank farm in Brazoria County.[4] However, this figure assumes that tanker hydrocarbon emissions are eliminated because all tankers will have segregated ballast in compliance with recent U.S. Coast Guard regulations (44 FR 8984).[5] The regulations require that existing tankers over 70,000 dead weight tons have segregated ballast or crude oil washing by 1983. Segregated ballast eliminates the hydrocarbon emissions; crude oil washing does not. If all the tankers which use the deepwater port have crude oil washing rather than segregated ballast, an additional 7800 tons per year of hydrocarbons will be emitted by TDPA's facility.[6]

## Current Status

TDPA filed a permit application with the Texas Air Control Board (TACB) on November 16, 1978. TACB originally decided to require offsets for the onshore tank farm, but is reconsidering this decision in light of the new photochemical oxidant standard. The application for the dock's emissions was sent to EPA. The Port Authority also requested that any required emission offsets be provided by TACB through an SIP emission-growth increment.

Prior to this request, TACB rejected a proposal by which emission reductions would be achieved by replacing the numerous small tankers in the Houston Ship Channel with a lesser number of large tankers, which have lower emission rates, at TDPA's port. This arrangement was rejected as unenforceable because there would be no contract between the Port Authority and the oil companies through which TACB could place liability if the emission reductions did not materialize.

In requesting an SIP-initiated offset, TDPA is asking TACB to promulgate regulations to decrease present emissions enough to allow an emission growth allowance This allowance would be assigned to provide the offset required for TDPA and other new sources. The offset involves no cost to TDPA, requires no agreements with the oil companies, and allows for the pursuit of other offset supply options.

In November 1978 TACB proposed an SIP revision which would have provided this emission growth allowance. According to TACB's legal counsel, this revision was not enacted because industry strongly objected to TACB's control over its property rights (i.e., the right to pollute). It is currently expected that TACB will deny all requests for SIP-initiated offsets in the Houston-Galveston area, forcing the Port Authority to procure an offset elsewhere.

## Policy Analysis

### *Offset Applicability*

TACB will probably require offsets for the 1437 tons per year of hydrocarbons from the tank farm. Offsets should still be required because the tank farm will be within thirty-six-hour wind travel time of the Harris and Galveston counties' NAAs, even though Brazoria County may be reclassified as an attainment area.

Additional offsets will be needed because of hydrocarbon emissions from the deepwater port that will affect the Harris and Galveston County NAAs. Seadock's Final Environmental Impact Statement concludes:

> The offshore site is well within the range of emission locations contributing to petrochemical oxidant formation in the Freeport and Houston - Galveston areas; and the tanker hydrocarbon emissions would contribute to local oxidant problems.[7]

The U.S. Coast Guard regulations on segregated ballasting will reduce the tanker hydrocarbon emissions. However, some tanker owners will choose crude oil washing rather than segregated ballast when complying with these regulations, because segregated ballast reduces the tanker's capacity. Since crude oil washing does not eliminate the hydrocarbon emissions, some emissions will occur at the port, and thus will require offsets.

### *Supply of Offsets: Public*

The State of Pennsylvania changed from using a cutback asphalt in state road-paving operations to an emulsion asphalt which has lower hydrocarbon emissions. The resultant emission reduction was given to Volkswagon of America, Inc. as an offset for their plant in New Scranton, Pennsylvania. Such offset supplies are limited in Texas by the State's inability to impose increasingly stringent emission standards (i.e., Best Available Control Technology) upon existing industrial sources, and by the finite number of state emission-producing operations.

The present "first-come first-served" method of allocating SIP and State-initiated offsets fails to conserve these limited offsets for the firm requesting offsets in the future. The Environmental Defense Fund wrote, "This rule (first-come first served) has no basis in equity and ultimately will be used by the program's opponents to sabotage it."[8]

An alternative approach is to model the potential emission growth within the area and produce a ten-year emission growth allowance. This allowance could be separated into fifths and allotted biannually using the first-come first-served rule. TACB could also allocate this growth allowance to firms in need of offsets based

upon Texas's economic growth priorities. This last option would favor the Port Authority since oil refining is obviously one of Texas's economic priorities.

Both approaches rely upon the fair administrative actions of TACB. While this agency is insulated from gubernatorial control by its method of board member selection, it operates in the political arena in such areas as legislation and appropriations. Therefore, the allocative function would be influenced by political and special interests. This is particularly true of the latter approach, which would give TACB a key role in planning the economic development of the state. Additionally, the informal connections between the two state agencies, TDPA and TACB, might give the Port Authority an advantage over nonpublic competitors for SIP and State-initiated offsets.

### *Supply of Offsets: Private*

A proposal which avoids these problems is for the State to sell its offsets on the market.[9] Here, TDPA would buy the offsets directly from TACB. This approach relies on the market to allocate and establish economic priorities.

For example, TDPA could buy control equipment for another firm's emissions. SOHIO used this approach in offsetting its proposed tanker terminal in Long Beach, California. SOHIO agreed to provide a hydrocarbon emission offset, 7.2 times greater than its project's emissions, by buying control equipment for thirteen dry-cleaning plants at a cost of $4 million. The application of SOHIO's costs to the range of TDPA's potential offset requirements produces offset costs for the Port Authority which range from $3.5 to $142.9 million.[10]

Another method of offset supply is for TDPA to buy "banked" offsets from a firm. "Banked" offsets are gained by reducing emissions and saving the reductions for future expansion or sale, rather than using them as an offset for present expansion. One example would be the previously discussed offset arrangement involving the reduction in small tanker emissions. In this scenario, the oil companies would agree to reduce emissions by limiting the number of tankers which use their docks. The emission reduction would be enforced by a TACB board order and "banked." The "banked" offsets would then be purchased from oil companies by TDPA.

The dynamic of this offset supply depends upon the cost of control equipment relative to the cost of offsets. TDPA will buy offsets when the price of additional emission controls upon its tank farm or port facility exceeds the price of offsets. Firms in the area will supply offsets to TDPA when the price received for the offset is greater than the cost of control equipment for the firm. The supply of offsets is maintained by rising prices, which cause firms with harder-to-clean emissions to supply these emissions to the offset market. The rising price makes the use of increasingly sophisticated and expensive control equipment economically feasible to control these marginal emissions. With perfectly functioning markets, the private supply of offsets will overcome the limited supply problems inherent in the public supply case. However, there may be imperfections in this offset market.

The first imperfection is the possible control of all or a substantial portion of the offset supply by one firm (monopsony). With such power, a firm could bar entry into a geographic area to firms which compete against the monopsonist's products. In this manner, an oil firm could restrict a competitor's access to the locational economies of the Houston-Galveston area. An implication of this is that the Galveston Wharves deepwater port, by buying and holding the offsets necessary for its project, could halt TDPA's project.[11] This is likely only in the extreme case that EPA requires a high offset ratio, because TDPA's offset requirements range from 0.2 to 8.1 percent of the total hydrocarbon emissions in the region.[12]

Another type of market failure would occur if the price of offsets increases, but fails to elicit the socially optimum supply of offsets. This is possible because TDPA's consumption of an offset affects the amount of offsets which can be used by another firm. Additionally, firms may place a future value upon their offsets rather than the lower market price, due to planned plant expansion. The market then fails because it supplies only the amount of offset demanded at the higher price, rather than the socially optimum supply of both amounts of offsets at the higher price.

Both of these cases of market failure require state intervention in the market. In the case of monopsony, TACB could be given mediation and regulatory powers over the monopsonist. The lack of offset supply at high prices might be solved by the sale of state-initiated offsets by TACB. The state sale of offsets may lower the market price. Under these policies, if TDPA could not prove a monopsony situation and still could not purchase offsets on the market, the Port Authority could buy state offsets from TACB.

### *Banking of Offsets*

The "banking" of the emission reductions from the replacement of the small tankers in the Houston Ship Channel is the oil companies' alternative to selling the reductions to TDPA. The oil companies' decision in this matter affects the supply of offsets and price the Port Authority will pay for its offsets.

As explained above, one incentive for this sale is the rising price in the offset market. However, the offset

policy will probably be in effect for future refinery expansions. This may cause the oil companies to place a future value, above the market price, upon these emission reductions. Since such expansion is likely, the oil companies have an incentive to bank the small tanker emission reductions. An additional incentive is that a future SIP revision might mandate the small tanker emission reduction, thereby leaving the oil companies without an offset for future refinery expansion if the small tanker reduction is not banked. However, TACB officials consider such SIP revisions unlikely.

The oil companies can also choose not to submit the emission reductions to a TACB board order, and thereby neither bank nor sell the offset. This option imposes no constraints upon future oil company transportation decisions, while maintaining the companies' control over the potential emission reduction. Additionally, banking of the small tanker emission reductions may not make such reductions immune to future SIP revisions. This criticism by air quality experts is particularly aimed at SIP revisions mandated at the federal level.

Thus, the oil companies will probably choose not to submit the emission reduction for banking. This will lead to a constriction of market supply of offsets, and higher prices for firms such as the Port Authority which must buy offsets.

## Policy Alternatives

The offsets provided by an SIP emission growth allowance may not be available to TDPA. Instead, it might undertake to buy the required offsets from another firm in the Houston-Galveston area. These offsets should be easy to procure at this time due to the small percentage of the area's total hydrocarbon emissions which TDPA will require for offsets. The sole problem raised by the free market supply of offsets for the Port Authority may be the price of offsets, particularly if high offset ratios are required and some tanker ballasting emissions are included.

The State of Texas will encounter problems only if the Texas Air Control Board provides offsets through the State Implementation Plan's growth allowance, and allocates such offsets administratively. Excluding this approach, TACB might provide offsets to the market and mediation services in the event of market failure.

The impact of the Environmental Protection Agency's banking policy would appear to be minimal in this case because of uncertainty surrounding its long-term validity. EPA can clarify this ambiguity by guaranteeing banked offsets against future SIP revisions.

*Thomas M. Flynn*

## References

[1]1000 tons per year or more for carbon monoxide.

[2]U.S., Environmental Protection Agency, Notice of Policy Memorandum, "Criteria for Proposing Approval of Revisions to Plans for Nonattainment Areas", *Federal Register* 43, no. 98, May 19, 1978, p. 21675.

[3]Interview with Dr. Hal B.H. Cooper, Professor of Civil Engineering, University of Texas at Austin, Austin, Texas, February 9, 1979.

[4]U.S., Department of Transportation, *Draft Supplemental to Final Environmental Impact Statement for Seadock Deepwater Port License—Texas Deepwater Port Authority Amendment.* (Washington, D.C., 1979) p. 63.

[5]Segregated ballast provides separate clean tanks into which the tanker takes on ballast water. Without segregated ballast, the cargo tanks are used to hold ballast water. Ballasting into cargo tanks results in the release of hydrocarbons during the offloading of crude because the hydrocarbon gases are displaced by the ballast water. Crude oil washing cleans the cargo tanks prior to using the tanks to hold ballast water.

[6]U.S., Department of Transportation, *Final Environmental Impact Statement: Seadock Deepwater Port License Application* (Washington, D.C., 1976) p. 3.3-11.

[7]Ibid.

[8]Environmental Defense Fund, *Petition for the Initiation of Rulemaking Procedures to Insure Maintenance of the National Ambient Air Quality Standards and the Prevention of Significant Deterioration Increments in the Ohio River Valley,* (mimeograph) July 17, 1978, p. 17.

[9]The selling of SIP offsets is shrouded with legal questions because the State is taking something (i.e. the right to pollute) from existing industries, and selling this right to pollute to new industries. Industry claims that because the State would sell this right, this is the taking of property without just compensation.

[10]These figures were derived by applying SOHIO's cost, $2,500 per ton of hydrocarbon emission offsets, to the range of TDPA's potential offset requirements. This range runs from only offsetting the tank farm emissions at a 1 to 1 ratio, to offsetting the tank farm and the tanker ballasting emissions at a 7.2 to 1 ratio, the ratio applied to SOHIO.

[11]Galveston Wharves proposes to build a deepwater port in Galveston by dredging the channel.

[12]Calculated from data on total hydrocarbon emissions in AQCR 216, provided in Seadock's Final Environmental Impact Statement.

# PART II

# TEXAS STATE ENERGY CONSERVATION PROGRAM

Part II examines the State Energy Conservation Program (SECP) both at the national level and in Texas, and presents an analysis of administration, implementation, programs, and effectiveness.

Between 1965 and the 1973 Arab oil embargo, U.S. energy consumption increased an average of 4.5 percent a year, a rate that would double total consumption every sixteen years. Over the same period, domestic production of all energy supplies was increasing at a much slower rate, and production of oil, the most widely used fuel, actually began to decline. Consequently, our dependence on oil imports increased at a rapid rate, so that by 1973 imports accounted for 35 percent of our total oil demand. In spite of widespread recognition that this dependence on foreign oil has serious economic and strategic consequences, U.S. oil imports have continued to increase since the 1973 embargo to where they now approach 50 percent of total oil demand.

Because of long developmental lead times for new energy resources, unsolved environmental and social problems associated with coal and nuclear energy, rapidly escalating capital costs, and the simple fact that new supplies of oil and gas are becoming increasingly difficult to locate, it appears highly improbable that domestic energy production can be increased sufficiently to meet U.S. energy demand anytime in the near future. This realization has brought increased attention to energy conservation measures which seek to bring supply and demand into balance by means of reducing demand rather than increasing supply. Reducing energy consumption by conservation measures represents the safest, quickest, and in most cases the cheapest means of cutting dependence on foreign energy sources.

While the annual percentage rates involved in reductions of energy growth by conservation methods may seem small, the cumulative savings over even relatively short periods may be enormous. For instance, at the 1978 energy consumption level of 80 quads (quadrillion Btus), a 3 percent annual growth rate would mean a 1990 energy demand of 115 quads. But, if the growth rate were reduced to 1.5 percent a year, the 1990 consumption level would be only 95 quads. This difference of 20 quads a year in 1990 is perhaps more easily understood as being equivalent to nearly 10 million barrels per day of oil, an amount greater than either our current levels of production or our imports of oil.

### *Program Requirements of the SECP*

The first significant national response to the 1973 Arab oil embargo and the subsequent four-fold increase in oil prices came in 1975 with the enactment of the Energy Policy and Conservation Act (EPCA). An important part of this legislation was its creation of the State Energy Conservation Program (SECP). This program, which was further developed in the 1976 Energy Conservation and Production Act (ECPA), was designed to encourage the states through financial and technical assistance to develop state plans that would reduce projected energy consumption for 1980 by at least 5 percent.

The SECP is a voluntary program in which states accept responsibility for formulating and implementing comprehensive state plans — tailored to their unique situations — that will attain a 5 percent energy savings by 1980. States may qualify for funding to develop and implement their SECP under both EPCA and ECPA. To be eligible for financial assistance under EPCA, a state must submit an energy conservation plan (known as a "base" plan) that includes five mandatory program measures:

- lighting efficiency standards for nonfederal public buildings;
- thermal efficiency standards and insulation requirements for new and renovated nonfederal buildings;
- standards and policies relating to energy efficiency for state and local government procurement practices;
- programs to encourage the availability and use of carpools, vanpools, and public transportation; and
- a traffic law or regulation permitting a right turn on red.

Eligibility for financial funding under ECPA requires a state to submit a "supplemental" state energy conservation plan that includes procedures for:

— carrying out a continuing public education program on implementing energy conservation measures;
— insuring effective intergovernmental coordination; and
— promoting and conducting energy audits for buildings and industrial plants.

Additional program measures could also be included in the state plans, and if approved by the Department of Energy (DOE) these can be implemented with federal funds. Because the mandatory program measures will in most cases result in only minimal energy savings, states have been forced to include optional measures in their plans to attain sufficient energy reductions to meet their 1980 goals. These optional program measures vary widely from state to state in both content and means of implementation, differences which probably result from variations in energy consumption patterns, resource bases, and political and institutional factors.

Authorizations for the operation of the SECP have totaled $315 million through fiscal year 1979, including $200 million for the base plans under EPCA and $105 million under ECPA for the supplemental conservation plans. Appropriations to date have been considerably less, totaling through fiscal year 1978 $79,841,000 for the base plans and $36,416,000 for the supplemental plans.

The analysis of State Energy Conservation Program is divided into four parts:

Chapter 5. Administration and Implementation in the United States
Chapter 6. Programs and Effectiveness in the United States
Chapter 7. Administration and Implementation in Texas
Chapter 8. Programs and Effectiveness in Texas

# Chapter 5

# Administration and Implementation in the United States

## Issue Definition

This chapter seeks to identify the advantages and disadvantages that are inherent in the different organizational arrangements employed by the states in adminstering their State Energy Conservation Program plans. Administrative techniques used by states in developing, implementing, and auditing their programs will be examined, and relationships between organizational structure and administrative techniques will be discussed. Finally, the relationship of various state characteristics and attributes to the administration of the SECP will be analyzed.

## Background

Currently, fifty states, four territorial governments, and the District of Columbia are receiving funds for the implementation of energy conservation plans. A major purpose of this chapter is to identify administrative techniques and organizational arrangements used by these participating governments. To insure that the data used would be as current as possible, a questionnaire was mailed to all the states and three territorial governments. The response rate was about 75 percent, with forty of the fifty-three jurisdictions returning the survey.

The survey addressed five major concerns in the administration of the SECP:

(1) In what organizational setting is the office responsible for the SECP located?

(2) How was the SECP developed?

(3) How is the program being audited?

(4) What level of federal aid is each jurisdiction receiving?

(5) How many persons does the office employ in conjunction with the SECP?

The participants were also asked to comment on possible advantages or disadvantages resulting from the particular organizational structure they are using.

### *Survey Responses*

Of the forty state and territorial governments responding to the questionnaire, thirteen reported that the responsibility of administering the SECP rested in an independent agency, fifteen said it was in a division of an agency or department, and twelve indicated it was in a division of the governor's office. On the average, independent agencies employed more persons in conjunction with the SECP—17.8—than did either agency divisions or departments, with an average of 16.3 employees, or governor's offices, which averaged 13.5 employees. There was, however, a wide variation from state to state in the total number of employees administering the SECP. This ranged from three to sixty employees for independent agencies, two to forty for divisions of an agency or department, and four to thirty-eight for governor's offices.

Another interesting conclusion that can be drawn from the survey responses is that the amount of federal aid which a state receives for the SECP has little or no effect on the location of the administering office. States that placed the responsibility of the program in an independent agency received an average of $1,071,909; divisions of an agency or department received an average of $938,247; and governor's offices received an average of $1,114,545 in federal aid. It is interesting to note, however, that the governor's offices, which have the lowest average number of employees, generally receive the largest amount of federal aid. Tables 1-4 give a more complete breakdown of these statistics and provide a compilation of state responses to the other questions contained in the survey.

As Table 4 indicates, in all three organizational arrangements there is a tendency to develop the program entirely in-house, though independent agencies are just as likely to develop the plan exclusively by contract. Only governor's offices are more likely to use a combination of inputs than to contract for all of the program development.

In all three organizational arrangements there is a strong tendency to use a combination of methods in the implementation phase. This may be a result of limited staff and the recognition that existing technical expertise can best be utilized by contract. Because program implementation requires considerably more manpower than does program development, contracting—at least in part—during this phase is more practical.

Other information that might prove useful in

## Table 1
## Means of SECP Administration by States Placing Program in an Independent Agency

| State | Development | Implementation | Audit | Federal Aid | Employees |
|---|---|---|---|---|---|
| Kansas | U | IS, U, C | C | 983,700 | 3 |
| Iowa | C | IS, U, C | P | 817,500 | 3.5 |
| Oklahoma | I, U | IS, U, C | P | 1,010,000 | 9 |
| Illinois | I | IS, U. C | C | 2,500,000 | 60 |
| Arkansas | U | I | I | 582,900 | 22 |
| Nevada | C | IS, U, C | I | — | 7 |
| Virgin Islands | U | I | I | 300,000 | 14 |
| Delaware | I | IS, U, C | P | 376,900 | 15.6 |
| Ohio | I | IS, U, C | I | 2,300,000 | 32 |
| Oregon | I | IS, C | — | 700,000 | 5 |
| Virginia | I | IS | P | 1,150,000 | 20 |
| Wyoming | I | IS, U, C | — | — | — |
| Tennessee | U | I,C | P | 1,070,000 | 23 |

Note: Included in the Independent Agency group is the Tennessee Energy Authority, created by the Tennessee Energy Act of 1977.

I—in-house U—university IS—in-house and other state agencies — did not report
SO—another state office C—private consulting firm P—another public body

## Table 2
## Means of SECP Administration by States Placing Program in a Division of an Agency or Department

| State | Development | Implementation | Audit | Federal Aid | Employees |
|---|---|---|---|---|---|
| Wisconsin | I | IS | P | 1,200,000 | 10.5 |
| Florida | I, SO | IS, U, C | C | 2,206,000 | 30 |
| Louisiana | U | IS, U, C | I | 1,159,700 | 5 |
| Missouri | I | IS, U, C | P | 1,364,600 | 40 |
| Maine | I | IS | C | 470,000 | 8 |
| Hawaii | C | IS, U, C | C | 350,000 | 14 |
| Alabama | I, U | IS, U | C | 8000,000 | 10 |
| Michigan | I | U, C | C | 1,934,700 | 33 |
| Alaska | I | IS, C | P | 333,800 | 8 |
| Nebraska | I | IS, U | C | 700,000 | 20 |
| Maryland | I, C | IS, U, C | I | 1,200,000 | 19 |
| New Mexico | I | IS | C | 484,000 | 35 |
| Montana | SO | IS, U, C | C | 331,900 | 6 |
| Utah | U | IS, U | C | 511,000 | 4 |
| Kentucky | I | IS | P | 1,028,000 | 2 |

I—in-house U—university IS—in-house and other state agencies — did not report
SO—another state office C—private consulting firm P—another public body

## Table 3
## Means of SECP Administration by States Placing Program in a Division of the Governor's Office

| State | Development | Implementation | Audit | Federal Aid | Employees |
|---|---|---|---|---|---|
| Rhode Island | I | IS, U, C | P | 437,000 | 17 |
| Arizona | SO, U, C | IS, U, C | P | 696,000 | 9 |
| Colorado | I | IS, C | C | — | 13 |
| West Virginia | I | IS, U | C | 600,000 | 15 |
| Samoa | I, SO, C | IS, C | C | 274,600 | 6 |
| Idaho | I | IS, U, C | — | 419,000 | 6 |
| Georgia | I, C | U, C | C | 1,400,000 | 5 |
| Pennsylvania | I | I, U, C | — | 2,572,000 | 38 |
| South Carolina | C | IS | I | 750,400 | 7 |
| Puerto Rico | I, C | IS, C | C | 849,000 | 22 |
| North Dakota | I | IS | C | 312,000 | 4 |
| Texas | I, C | IS, U, C | C | 3,950,000 | 20 |

I—in-house
SO—another state office
U—university
C—private consulting firm
IS—in-house and other state agencies
P—another public body
— did not report

## Table 4
## Program Development, Implementation, and Audit by Location and Technique Employed

**Number of offices that developed the plan:**

| | Number of states | Entirely in-house | Exclusively by contracts | By both contracts and in-house input |
|---|---|---|---|---|
| Independent Agencies | 13 | 6 | 6 | 1 |
| Division of Agency or Department | 15 | 8 | 4 | 3 |
| Division of Governor's Office | 12 | 6 | 2 | 4 |
| Total | 40 | 20 | 12 | 8 |

**Number of offices that implement the plan:**

| | Number of states | Entirely in-house | Exclusively by contracts | By both contracts and in-house input |
|---|---|---|---|---|
| Independent Agencies | 13 | 2 | 0 | 11 |
| Division of Agency or Department | 15 | 0 | 1 | 14 |
| Division of Governor's Office | 12 | 0 | 1 | 11 |
| Total | 40 | 2 | 2 | 36 |

**Number of offices that perform the audit:**

| | Number of states | In-house | By contracting with a public body | By contracting with a private concern |
|---|---|---|---|---|
| Independent Agencies | 13 | 5 | 6 | 2 |
| Division of Agency or Department | 15 | 2 | 4 | 9 |
| Division of Governor's Office | 12 | 1 | 2 | 9 |
| Total | 40 | 8 | 12 | 20 |

understanding administrative patterns in the various states can be found when selected state attributes are compared and analyzed. The state attributes which were used in this report include: (1) producing states versus consuming states; (2) innovative states versus states considered to be less innovative;[1] (3) states with centralized decisionmaking processes versus states with decentralized decisionmaking processes;[2] (4) states appearing to have highly cost-effective conservation programs versus states appearing to have less cost-effective conservation programs;[3] (5) states involved in four or five program areas versus states involved in six or seven program areas;[4] and (6) Sun-Belt states versus Frost-Belt states. Different cross-tabulations of these selected attributes produce several interesting patterns, as shown in Table 5.

## Table 5

### Office Location and the Relationship With Program Areas and State Innovation

| Placement of SECP | Percent involved in either six or seven program areas | Percent classified as an innovative state |
|---|---|---|
| Independent agency | 83 | 42 |
| Division of an agency | 73 | 54 |
| Division of the Governor's Office | 40 | 40 |

Source: Generated from survey results and index derived from Jack L. Walker, "The Diffusion of Innovation Among the American States," *American Political Science Review*, Vol. LXIV, no. 3, September 1969, pp. 880-899.

This table reveals that those states which have placed the SECP in an agency setting are generally involved in more program areas and are considered to be more innovative than those states which have placed the SECP in the governor's office.

This corresponds to another finding which reveals that 81 percent of those states considered to be innovative were involved in six or seven program areas, while only 58 percent of the less innovative states were involved in six or seven program areas.

Fifty percent of the oil- and gas-producing states have placed the SECP in independent agencies while 50 percent of the market-demand states have placed the SECP in agency divisions. Sixty-seven percent of the producing states appear to have highly cost-effective programs, while only 43 percent of the consuming states seem highly cost-effective. This can be misleading, however, for as Chapter 6 discusses, many of these highly cost-effective programs may be merely paper savings.

There are also some interesting patterns regarding Sun-Belt versus Frost-Belt states (see Table 6). This table shows Frost-Belt states generally have a more centralized

## Table 6

### Sunbelt V. Frostbelt: Centralization, Innovation, and Program Areas

| | Percent with highly or moderately centralized decision making process | Percent classified as innovative states | Percent involved in any six of seven areas |
|---|---|---|---|
| Frostbelt states | 75 | 64 | 78 |
| Sunbelt states | 50 | 15 | 50 |

Source: Crosstabulation run on Sun and Frostbelt states against indices derived from Walker and Francis. (See Source, Table 5)

decision-making process, are involved in more program areas, and are considered to be more innovative than the Sun-Belt states.

## Policy Analysis

Every organizational arrangement has its advantages and disadvantages. Generally speaking, an independent agency or a division within an agency or department is relatively free from politics when compared to the governor's office. Freedom from a highly political environment can create a greater sense of security and stability for staff members, probably leading to a more technically oriented and professional staff. Also, an independent agency may be more likely to devote a greater amount of attention to the SECP since it can be the major concern of that entity. Having agency or departmental status also could be advantageous in dealing with the state legislatures. Finally, locating the program within an agency that handles other state energy programs can be beneficial in that it provides an opportunity for greater coordination of state energy matters and increases the possibility for a more comprehensive approach to state energy policy.

On the other hand, placing a newly instituted program in an agency setting may not provide the initial visibility that is needed to get the program effectively off the ground. Also, a state faces the possibility of reducing the program's effectiveness if the implementing agency places insufficient emphasis on the program.

Charging the governor's office with the responsibility of administering the program can be quite successful, particularly at the outset. Visibility provided by location in the governor's office can help the conservation program gain much needed recognition. Gubernatorial support may also prove helpful in dealing with state legislatures.

There are also disadvantages in locating the program within the governor's office. Because of the political environment associated with the office, it may prove difficult to assemble and keep a professional staff. The governor's political persuasion can also have a direct bearing on the program, setting limits that can adversely affect program innovation and creativity. Lack of gubernatorial support can also serve to reduce program effectiveness.

Comments from Maryland and Montana, both of which had recently moved the SECP from the governor's office to an agency division, proved especially interesting. Both reported that being in the governor's office had provided much needed clout for the program when it first began, and that there was in the agency setting a layer of bureaucracy with which they had not had to deal when the program was in the governor's office.

But, they said their new position has provided them with two major advantages. First, by being located within an agency, each is now "insulated from political wind." Secondly, because each is located within an agency that handles other state energy matters, the program staff is better able to coordinate its efforts with overall state energy policy. Also associated with their new location is improved communication, access to technical personnel, and less duplication of effort.

Besides the advantages and disadvantages that are associated with the organizational setting in which the programs are found, there are also pros and cons associated with the methodologies employed by these offices in the development, implementation, and audit of the programs. As indicated earlier (see Table 4), three means can be used in program development: (1) develop the program entirely in-house, (2) contract with an outside entity, and (3) combine in-house and contracts.

Developing a program entirely in-house is advantageous in that it allows the administering office directional control from the outset and provides the staff an opportunity to grasp more fully the purpose and scope of the program. It also allows the office an opportunity to determine how the measures will be implemented. These advantages can be negated, however, if there is a high turnover rate in staff members.

Disadvantages of developing the program entirely in-house include the possibility that the office staff may not have sufficient technical expertise to develop the most potentially effective program measures. Without input from a broader spectrum it is also possible that certain potentially effective program measures could be overlooked. By contracting for program development, the administering office may take advantage of existing technical expertise, and the increased input base gives greater assurance that areas with energy savings potential have not been overlooked.

On the other hand, contracting for program development may also have disadvantages. For example, the staff of the administering office may not fully understand the scope of the proposed program or many of the technical aspects which are included in the plan. Also, with any contractual arrangement there is a potential for misunderstandings between the two parties.

By combining the two means of program development, an office may be able to enjoy the benefits and avoid some of the disadvantages that can arise if the program is developed either entirely in-house or entirely through contracts.

In the implementation stage of the SECP, state offices currently use the same alternative approaches that were used to develop their programs. The advantages and disadvantages for each implementation approach are similar to those of the corresponding approaches used in program development.

Implementing the program entirely in-house is advan-

tageous in that the staff has complete control over the program. A competent and skilled staff, therefore, could exert a high degree of positive influence on the program. Exclusive in-house implementation, however, would require a relatively large staff possessing a sufficient technical background. Training personnel or hiring technical personnel can be costly and time consuming. Furthermore, in-house implementation may not take full advantage of existing technical expertise that is available throughout the state.

Contracting for the implementation phase of the program may reduce the control that the office has over the program. Using contracts for this phase also increases the importance of monitoring the program to insure that it is being carried out properly.

Once again, as in the developmental phase, combining the two approaches may afford the greatest benefit. Indeed, as the results of the survey indicate, combining the two techniques during implementation was by far the method most commonly used (see Table 4).

Florida, which administers the program via an agency division, provided the following testimonial:

> It is desirable to organize the SECP the way [we have] done it.... If too much is contracted for, the state will be left without an adequate energy agency. If too little is contracted for, the state will not have the advantage of using professional expertise available throughout the state. The entire SECP should not be in one agency; it should be done in a variety of agencies, although there should be a strong, central, professional energy agency.

The program audit, which is required by DOE, was done by the states in three ways: (1) in-house, (2) by contracting with a public body, and (3) by contracting with a private concern.

Performing the audit in-house requires a staff capable of doing this type of work. If such in-house expertise does not exist, it would prove more effective to contract with a professional auditing entity. Also, the potential exists for bias to enter into an audit conducted in-house, which may reduce both the credibility and the effectiveness of the audit. However, an objective in-house audit can be effective in that the staff's abilities can be used to analyze and report on certain aspects of the program that outsiders might have a difficult time recognizing.

Contracting the audit to a private concern may be beneficial in that a professional third party is evaluating the program and may be able to reveal strengths and weaknesses that an in-house audit would overlook. Furthermore, by contracting this phase of the program to a reputable firm, program credibility can be established.

## Policy Alternatives

There are two major areas in which the states must make decisions regarding the administration of the SECP. Within each of these areas there are several options open to the states. First, each state must choose what organizational structure it prefers to use for the administration of the program. Secondly, the administering office must decide from among several approaches how it will develop, implement, and audit the SECP.

Initially, a state may wish to locate the program in the governor's office in order to take advantage of the visibility and clout associated with the executive department. Once the program is underway, however, it may be preferable to move the program to an agency setting. Although some immediate disruptions might occur due to such a move, the stability and security which an agency provides might offset temporary problems associated with relocation. A move to an agency would "insulate the office from political wind," and therefore could allow a more professional and permanent staff to be assembled. Locating the administering office in an agency or department that deals with other energy matters affords a greater opportunity for coordination of the SECP with other state energy programs. Also, information concerning research and development, planning, and forecasting could be made more readily available to a conservation office. Such information could prove valuable to program development and implementation.

Regardless of the location of the office administering the SECP, options regarding approaches that the office can use for development, implementation, and auditing remain open. The findings of this report suggest that inputs from a variety of entities be solicited during program development; that contracts for program implementation be issued; that the office administering the program be actively involved in both of these phases; that close monitoring of all contracted programs be performed by the administering body; and that objectivity be the primary consideration in determining the audit arrangement to be used.

*Gregg R. Cannady*

## References

[1]A state's "innovativeness" is a measure of the state's quickness in adopting new programs. The more quickly a state adopts new programs, the more innovative the state is considered to be. For a more complete discussion, see Jack L. Walker, "The Diffusion of Innovation Among the American States," *American Political Science Review,* vol. LXIII, no. 3, September 1969, pp. 880-899.

[2]The degree of centralization a state's decision-making processes exhibit is determined by where decisions are generally made. Seen as a continuum, a state is considered to have a centralized decision-making process if decisions are made in the governor's office or in policy committee, while those states in which decisions are made in regular committee meetings or on the floor are considered to have a decentralized decision-making process. For a more thorough discussion, see Wayne L. Francis, *Legislative Issues in the Fifty States: A Comparative Analysis,* American Politics Research Series (Chicago: Rand McNally and Company, 1967), pp. 72-76.

[3]A state-by-state listing of the cost effectiveness of the program, expressed in terms of million Btus saved per dollar spent, appears in Chapter 6 (Table 2).

[4]State program involvement in various energy end-use categories is discussed in Chapter 6 and illustrated by Table 1 in that chapter.

# Chapter 6

# Programs and Effectiveness in the United States

## Issue Definition

This chapter reports on the effectiveness of the State Energy Conservation Program (SECP) in reducing energy demand. In doing this, the program measures employed by the various states to achieve their conservation goals will be evaluated and individual state programs compared so that innovative or highly effective program measures can be identified.

## Background

All fifty states, the District of Columbia, Puerto Rico, Guam, American Samoa, and the Virgin Islands are currently participating in the SECP. Each of these fifty-five jurisdictions has submitted to the Department of Energy (DOE) and had approved both base and supplemental energy conservation plans. Most state programs are financed 90-95 percent with federal funds.

While the overall program goal was to reduce energy consumption by 5 percent or more by 1980, approved goals for the individual states (excluding territories) range from 4.1 percent to almost 10 percent. The projected nationwide savings amount to 6.7 percent, which totals about 5.5 quads when measured against the DOE 1980 baseline projection of about 83 quads.[1] For purposes of comparison, this total savings of about 5.5 quads is equivalent to approximately 2,500,000 barrels per day of oil production, more than twice the current production of Alaska's North Slope.

## Current Status

All fifty-five jursidictions (states and territories) participating in the SECP are in the process of implementing their state plans. Because most state plans were not approved until the summer or fall of 1977, most states spent a good portion of calendar year 1978 gearing up their programs and stimulating public awareness of energy conservation opportunities. Consequently, the validated nationwide energy savings thus far amount to only about one-eighth of the 1980 savings goal of 6.7 percent.[2] Even so, there seems to be widespread agreement that the vast majority of states will be successful in achieving their 1980 goals and that the SECP is proceeding on schedule.[3]

## Policy Analysis

### *SECP Program Measures*

While all of the state energy conservation plans contain program measures that fulfill the legislatively mandated program requirements, there is still considerable variation among the state plans. Plans differ both as to the end-use sectors that are addressed and the implementation strategies employed.

As Table 1 indicates, when the program measures in the individual state plans are categorized as to the energy end-use sections they address, most of the state plans appear to be at least reasonably comprehensive. Seventeen states have in their plans program measures designed to conserve energy in all seven end-use categories. (The seven categories are transportation, government, buildings, industry, agriculture, utilities, and public education, the latter being considered a general end-use category). Twenty-three other jurisdictions have programs measures adressing all but one of the end-use categories. All fifty-five of the participating jurisdictions have measures in the transportation, government, buildings, and education categories since the legislation requires programs in each of these sectors. However, only four states (Arizona, Louisiana, Massachusetts, and West Virginia) and Guam limit their plans to these four sectors where program measures are required.[4]

### *Program Measure Innovation in State Plans*

The energy conservation area differs from many other policy areas in that individual states initiated actions that the federal government later drew upon in its development of the SECP. Many states were actively pursuing some type of energy consevation initiative when the Energy Policy and Conservation Act (EPCA) was enacted in late 1975. Of the five mandatory programs in EPCA, several states had implemented thermal and lighting standards, a great number had enacted a right-turn-on-red law, and some were beginning to employ energy efficiency criteria in government procurement decisions prior to the federal legislation. Only in the public transportation and carpool/vanpool area was there not substantial attention shown at the state level before federal involvement.[5]

# Table 1
## SECP Program Measures by State

| State | Trans. | Govt. | Bldgs. | Educ. | Ind. | Agri. | Util. | Total |
|---|---|---|---|---|---|---|---|---|
| Alabama | X | X | X | X | X | | | 5 |
| Alaska | X | X | X | X | X | X | | 6 |
| Arizona | X | X | X | X | | | | 4 |
| Arkansas | X | X | X | X | X | | X | 6 |
| California | X | X | X | X | X | | X | 6 |
| Colorado | X | X | X | X | X | | | 5 |
| Connecticut | X | X | X | X | X | | | 5 |
| Delaware | X | X | X | X | X | X | X | 7 |
| D.C. | X | X | X | X | X | X | X | 7 |
| Florida | X | X | X | X | X | X | | 6 |
| Georgia | X | X | X | X | X | | | 5 |
| Hawaii | X | X | X | X | X | | | 5 |
| Idaho | X | X | X | X | X | X | | 6 |
| Illinois | X | X | X | X | X | X | X | 7 |
| Indiana | X | X | X | X | X | X | X | 7 |
| Iowa | X | X | X | X | X | X | X | 7 |
| Kansas | X | X | X | X | X | X | X | 7 |
| Kentucky | X | X | X | X | X | X | | 6 |
| Louisiana | X | X | X | X | | | | 4 |
| Maine | X | X | X | X | X | | X | 6 |
| Maryland | X | X | X | X | X | | X | 6 |
| Massachusetts | X | X | X | X | | | | 4 |
| Michigan | X | X | X | X | X | X | X | 7 |
| Minnesota | X | X | X | X | X | X | X | 7 |
| Mississippi | X | X | X | X | X | X | | 6 |
| Missouri | X | X | X | X | X | X | X | 7 |
| Montana | X | X | X | X | | | X | 5 |
| Nebraska | X | X | X | X | | X | X | 6 |
| Nevada | X | X | X | X | X | | X | 6 |
| New Hampshire | X | X | X | X | X | | X | 6 |
| New Jersey | X | X | X | X | X | | X | 6 |
| New Mexico | X | X | X | X | X | | X | 6 |
| New York | X | X | X | X | X | X | X | 7 |
| North Carolina | X | X | X | X | X | X | X | 7 |
| North Dakota | X | X | X | X | X | X | | 6 |
| Ohio | X | X | X | X | X | X | | 6 |
| Oklahoma | X | X | X | X | X | X | | 6 |
| Oregon | X | X | X | X | X | X | X | 7 |
| Pennyslvania | X | X | X | X | X | X | X | 7 |
| Rhode Island | X | X | X | X | X | | | 5 |
| South Carolina | X | X | X | X | X | | | 5 |
| South Dakota | X | X | X | X | X | X | X | 7 |
| Tennessee | X | X | X | X | X | | | 5 |
| Texas | X | X | X | X | X | X | | 6 |
| Utah | X | X | X | X | X | X | | 6 |
| Vermont | X | X | X | X | X | X | X | 7 |
| Virginia | X | X | X | X | | X | X | 6 |
| Washington | X | X | X | X | X | X | | 6 |
| West Virginia | X | X | X | X | | | | 4 |
| Wisconsin | X | X | X | X | X | X | X | 7 |
| Wyoming | X | X | X | X | X | | | 5 |
| Amer. Samoa | X | X | X | X | X | X | X | 7 |
| Guam | X | X | X | X | | | | 4 |
| Puerto Rico | X | X | X | X | X | | | 5 |
| Virgin Is. | X | X | X | X | | X | X | 6 |
| Total | 55 | 55 | 55 | 55 | 46 | 31 | 29 | |

Source: Data drawn from the DOE *State Energy Conservation Program Measure Directory.*

Since most of the initiative for the SECP resulted from innovative state actions, the question naturally arises as to what effect active federal involvement in the state energy conservation area will have on state innovation. On the one hand, the SECP would seem to be the perfect vehicle for individual states to use a portion of their federal financial assistance to develop and implement innovative energy conservation strategies fitting their own particular needs and for the federal government to closely monitor the results and rapidly promote successful initiatives nationwide. At the opposite extreme, the short time frame allowed by the SECP to achieve the state savings goal could mean that states would decide to forsake unproven innovative measures and stick to more conservative program measures.

An examination of the various state plans suggests that innovation is in fact continuing. Although there are numerous plans with little or no innovation (and a very few that seem to be almost entirely public relations efforts), the majority of state plans contain one or more program measures that could fairly be characterized as innovative. These innovative measures are found in plans from all sections of the country and address energy conservation in all of the end-use sectors. A few examples of innovative programs include:

- *Transportation*—A sales tax exemption for fuel efficient automobiles (Maryland)
- *Residential*—Use of infra-red photography to assess insulation needs (Nevada, Oklahoma, and Tennessee)
- *Industrial/ Utilities*—Development and promotion of cogeneration (several states)
- *Agriculture*—Conversion of feedlot waste to methane (Nebraska)

## *Analysis of SECP Energy Savings*

In order to evaluate energy savings resulting from the SECP, it is necessary to realize that the reductions claimed by each state plan represent only "paper" savings. That is, the plans purport to reduce the energy consumption within the state by a certain percentage over what the consumption rate otherwise would have been in 1980. It is obvious that miscalculations either as to what the 1980 consumption rate would be or as to what particular program measures would actually save can lead to an inaccurate savings projection. Because of difficulties in obtaining precise energy consumption data and differences in calculation methodologies, DOE has sought to assure uniformity among state energy savings goals.

The method DOE has employed is to formulate the 1980 consumption projections itself (at the national level) and provide states with uniform methodologies to calculate their energy savings. However, states were not required to use these methodologies, and many employed their own calculations to compute energy savings. Because of this, and the fact that DOE projections tended to be straight-line extrapolations from historical data (and are therefore insensitive to recent factors such as higher energy prices),[6] it would not be too surprising if there were substantial differences between the projected and the actual energy savings.

Given the short duration of the SECP (program implementation taking place only in 1978-1980) and the fact that the required program measures will in most cases save only a small amount of energy, states face considerable pressure in developing and putting into place sufficient optional programs to achieve their 1980 goals. For these reasons, most states rely heavily on public-relations-type measures emphasizing public education campaigns and general information transfer in order to attain the bulk of their savings.[7] This is the case even with many state plans that contain innovative measures, since most innovative or technologically-directed programs will not realize high initial energy savings.

This point can be dramatically illustrated with the following example: Louisiana in its state plan proposes to spend $81,000 on an industrial energy conservation program to be implemented by holding workshops and preparing literature on energy conservation opportunities for industries in the state. The projected energy savings by 1980 for this measure are 184.2 trillion Btus, for a planned savings of 274.07 million Btus for *each* dollar spent on the program. New Mexico, in its plan, has a program to replace conventional water heaters in existing buildings with solar units, with a proposed budget of $6,257,000. The planned energy savings by 1980 for this program amount to only 0.06 trillion Btus which is a cumulative savings of only 0.01 million Btus per one dollar spent. Compared on this basis, Louisiana's program, which could be characterized as a public relations effort, is an astounding 27,400 times more cost effective than the New Mexico solar water heater program. But, approaches which emphasize new technology may yield energy savings that continue and even increase over time, whereas one-shot workshop efforts may have only short-term effectiveness.

A state-by-state breakdown of the planned 1980 energy savings in millions of Btus per dollar of cumulative program cost is set forth in Table 2. As a means of comparing the cost effectiveness of various state plans, the data have several imperfections. First, the planned SECP budget for each state is not likely to be what is actually spent by each state. Second, the planned budgets of some states seem excessively large because they include funding for certain program measures from sources outside DOE. (For instance, the budgets for Alaska, Colorado, Idaho, Maryland, Montana, New Mexico, North Dakota,

# Table 2
## Planned Million Btus Saved by 1980 Per Dollar Cumulative Cost

| State | Cumulative Planned SECP Budget Through 1980 (Nearest $1,000) | Million Btu Saved 1980 Per $ Cumulative Cost |
|---|---|---|
| Alabama | 3,914 | 25.33 |
| Alaska | 28,869 | 0.41 |
| Arizona | 2,997 | 19.78 |
| Arkansas | 8,001 | 7.80 |
| California | 31,612 | 17.87 |
| Colorado | 38,861 | 1.29 |
| Connecticut | 3,194 | 15.61 |
| Delaware | 1,151 | 15.60 |
| D.C. | 3,264 | 6.2 |
| Florida | 7,207 | 20.90 |
| Georgia | 4,921 | 18.70 |
| Hawaii | 1,861 | 6.37 |
| Idaho | 3,841 | 4.77 |
| Illinois | 11,262 | 28.84 |
| Indiana | 4,376 | 45.69 |
| Iowa | 2,377 | 31.52 |
| Kansas | 4,199 | 22.11 |
| Kentucky | 6,377 | 13.99 |
| Louisiana | 495 | 443.49 |
| Maine | 2,333 | 8.85 |
| Maryland | 15,412 | 5.37 |
| Massachusetts | 5,471 | 26.49 |
| Michigan | 5,417 | 54.35 |
| Minnesota | 3,414 | 26.84 |
| Mississippi | 6,740 | 6.98 |
| Missouri | 6,300 | 12.73 |
| Montana | 7,471 | 2.44 |
| Nebraska | 2,475 | 16.60 |
| Nevada | 2,114 | 8.74 |
| New Hampshire | 665 | 28.17 |
| New Jersey | 1,578 | 81.97 |
| New Mexico | 36,091 | .97 |
| New York | 22,292 | 12.78 |
| North Carolina | 19,666 | 7.36 |
| North Dakota | 5,965 | 1.65 |
| Ohio | 11,259 | 21.89 |
| Oklahoma | 3,901 | 21.72 |
| Oregon | 2,436 | 21.17 |
| Pennsylvania | 47,838 | 6.49 |
| Rhode Island | 2,056 | 6.81 |
| South Carolina | 3,678 | 14.22 |
| South Dakota | 11,571 | .92 |
| Tennessee | 48,996 | 2.03 |
| Texas | 27,238 | 19.60 |
| Utah | 2,615 | 11.54 |
| Vermont | 1,333 | 7.33 |
| Virginia | 9,870 | 12.11 |
| Washington | 3,580 | 22.45 |
| West Virginia | 3,382 | 15.01 |
| Wisconsin | 26,009 | 5.29 |
| Wyoming | 2,764 | 7.32 |
| Amer. Samoa | 1,069 | .11 |
| Guam | 1,098 | .85 |
| Puerto Rico | 3,148 | 7.24 |
| Virgin Is. | 1,394 | .71 |
| TOTAL | 527,418 | 10.56 (Avg. for SECP) |

**Source: Data for the computations drawn from the DOE *State Energy Conservation Program Measure Directory.***

South Dakota, and Tennessee include large amounts for low-income weatherization which will not come from DOE SECP grants). Finally, as the above example of the Louisiana and New Mexico program measures clearly shows, there is a tremendous short-term bias in favor of inexpensive public information programs over measures attempting to directly modify or change technology in terms of 1980 cost effectiveness.

With these imperfections and biases in mind, a comparison of the planned energy savings per dollar of program cost yields several observations. States with very high rates of savings per dollar program cost tend to be those with a heavy reliance on public education measures and with little or no innovation. Comprehensive and innovative state plans, such as those of New Mexico and Tennessee, in turn produce low savings-to-cost ratios. Also, states with a large industrial base in which to extract energy reductions seem for the most part to have more cost-effective plans than do nonindustrial states. This could indicate that industrial energy conservation is more readily attainable at lower costs than are commercial or residential energy savings. Similarly, state plans which focus on quick, one-shot savings are clearly favored in this comparison over plans which will produce only a small amount of savings by 1980 but will continue or increase these savings in the longer run.

In light of these determinations, it seems that a quantitative assessment of the state programs according to their cost effectiveness (expressed in terms of Btus saved per dollar of cost) is not a sufficient mechanism through which to judge the effectiveness of either individual state plans or the entire SECP. Because of the lack of uniformity in the energy savings calculation methods and the absence of validated savings thus far, a more meaningful quantitative evaluation of the SECP is not possible.

## Policy Alternatives

There are three general policy alternatives which present themselves concerning the future course of the State Energy Conservation Program: (1) Congress can discontinue the SECP when its program authorization expires in 1980; (2) the program can be continued after 1980 in much the same form; or (3) the SECP can be strengthened and funded at significantly higher levels.

The first alternative, discontinuing the federally directed SECP, should not be seriously considered. Although it has achieved little validated energy savings thus far, the state plans are just now entering their second year of operation. Effectuating a reduction in energy consumption cannot be accomplished overnight. While a few of the state plans provide little more than public relations strategies, there are a significant number of innovative program measures. The SECP provides the ideal mechanism for testing these innovative measures in that the individual states can receive technical and financial assistance to pursue innovation, and the federal government can readily monitor the programs and is in a position to relay information concerning successful measures to all of the states. The SECP, whether or not it attains its energy savings goal, has been instrumental in developing professional energy conservation offices in each of the fifty-five participating jurisdictions. Without the SECP, it is likely that many of the state offices, along with their state energy conservation programs, would cease to exist.

The second alternative, a continuation of the SECP in its present form, is the very least that should occur. Carrying on with the state plans after 1980 would insure that longer-term savings would be possible and that program measures which address technological improvements or alternate resources would have a fair chance to be shown effective. State plans with a new goal for some time beyond 1980 might be forced to employ more substantive or innovative program measures since the quick one-shot savings opportunities with public information campaigns would have already been utilized.

The final, and most attractive, alternative would be to increase the funding and possibly the scope of the SECP. By increasing the federal research and development effort on conservation technologies and providing greater incentives to the states to include technological program measures in their plans, it should be possible to produce truly substantial long-range energy savings. Individual state plans provide the best means of testing new conservation ideas and of implementing measures that reflect unique state characteristics. The SECP can in this regard play an important role in reducing energy consumption from what it would otherwise be during the 1980s.

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## References

[1]U.S., Department of Energy, *Annual Report to the President and the Congress on the State Energy Conservation Program,* December 1977, p. 30.

[2]Telephone interview with Bill Raup, Department of Energy, Office of State and Local Programs under the Assistant Secretary for Energy Conservation and Solar Applications, Washington, D.C., February 23, 1979.

[3]Ibid.

[4]Data for the computations in Table 1 were compiled from U.S. Department of Energy, *State Energy Conservation Program Measure Directory,* vol. 1-2, July 1978.

[5]Patricia K. Freeman, "The States' Response to the Energy Crisis: An Analysis of Innovation," paper presented at the 1978 Annual Meeting of the Southern Political Science Association, Atlanta, Georgia, November 9-11, 1978.

[6]Interview with Harriet Hahn, Department of Energy, Region VI, Austin, Texas, December 5, 1978.

[7]Ibid.

# Chapter 7

# Administration and Implementation in Texas

## Issue Definition

In January 1977, Governor Briscoe announced that the State of Texas had accepted federal grant funds to develop and implement a State Energy Conservation Plan (SECP) consistent with the Federal Energy Administration guidelines and Energy Policy and Conservation Act and Energy Conservation and Production Act requirements. The grant requirements stipulated the development of a plan to reduce the 1980 projections of energy consumption by at least 5 percent. The Texas plan predicted energy consumption reductions of at least 5.64 percent.

This chapter reviews the evolution of the Texas SECP and its current status. The analysis focuses on administration and implementation of the SECP.

## Background

The Governor's Office assumed initial responsibility for the development of the Texas SECP. Having little or no expertise in energy conservation and policy development areas, the Governor's Budget and Planning Office let a contract for the development of the SECP to a private energy-related consulting firm, Planergy.[1]

Planergy considered federal requirements as well as factors unique to Texas in designing an SECP workplan. Critical concerns focused on three areas: 1) government intervention in the private sector, 2) adequate provisions for monitoring energy conservation programs and calculating actual energy savings, and 3) public involvement in the design of the plan.[2]

The Governor's Office of Energy Resources (GOER) was created as the lead administrative agency for the SECP. Officially, GOER would "provide for the overall management, planning, coordination, monitoring and evaluation function of the State's Energy Conservation Program."[3]

Planergy continued to play a major role in the design of the SECP. Under contract with GOER, Planergy was responsible for the development of a comprehensive organizational system to administer, implement, monitor, and evaluate the SECP.

## Current Status

### *Administration*

As the lead administrative agency for the SECP in Texas, GOER currently employs eighteen professional staff members. Within the SECP, nine composite program areas have been identified:

—Thermal and Lighting Standards
—Ridesharing
—Industrial Processes
—Residential
—Commercial
—Local Government
—Educational Institutions
—Government Purchasing
—Agriculture

Each program area is supervised by at least one GOER staff member, or project coordinator. Contract agents work specifically with designated project coordinators.

### *Implementation*

Implementation of the SECP is a responsibility shared by GOER and by contracting agents from the private and public sectors. All contracts worth over $10,000 are awarded annually by GOER through an open, competitive bidding process.[4]

An essential aspect of the implementation process is that of public awareness and training. Some specific implementation methodologies include workshops, preliminary energy audits and pilot testing, analyses of energy consuming commodities, technical and industrial information exchange, statewide public awareness campaigns, grants to local government units, and energy education courses.[5]

### *Monitoring*

The monitoring effort emphasizes two general concerns: 1) validation of energy savings with respect to compliance factors, and 2) development and/or testing of penetration factors.[6]

Monitoring of energy savings calculations for a specific program area is the responsibility of the designated project coordinator. Duties of each project coordinator include: 1) establishing survey and report standards for contractors, 2) reviewing quarterly reports from contractors, 3) completing independent surveys of compliance and penetration factors to confirm contractor objectivity and accuracy, and 4) calculating annual energy savings for the Department of Energy (DOE).[7]

### *Auditing*

GOER contracted out the task of auditing the SECP on a competitive bidding basis to a private consulting firm, Touche Ross and Co.[8] Thus far, one official audit of the SECP has been completed. The final report, published November 10, 1978, includes an assessment of program objectives, energy savings, calculation methodologies, and analyses and recommendations for individual program areas.

### *Funding*

Financial support for the SECP comes almost exclusively from federal grant funds. The majority of these funds have been made available through EPCA legislation, and are distributed by DOE on an annual basis.[9]

The operational functions of GOER are not restricted to SECP programs. Therefore, state general welfare funds in the amount of $250,000 per annum have been appropriated to GOER for administrative and programmatic duties not directly associated with the SECP.[10]

EPCA grant appropriations for the SECP expire as of fiscal year 1979. GOER is in the process of submitting various grant proposals to secure future funds for the SECP and additional conservation programs.

## Policy Analysis

### *Administration*

The following policy analysis of the SECP administration focuses on three aspects: 1) administering the SECP from the Governor's Office, 2) the relationship between GOER and the contract agents, and 3) the relationship between GOER and other state energy offices.

Administering the SECP through a division of the Governor's Office has several advantages. First, SECP projects have official gubernatorial support. Second, GOER has a high level of visibility in both political and public arenas. Such visibility is essential in successfully establishing voluntary conservation programs dependent on public awareness. However, in some situations location in the Governor's Office could overly politicize the implementing agency and could perhaps make it more difficult to attract professional, technical staff.

The present administrative structure of GOER has several positive aspects. Because many of the technical responsibilities of the SECP are contracted out to external agencies, GOER maintains a small professional staff with two administrators. The nine project coordinators assume total responsibility for their specific program areas. Such an organizational structure frees the administrators for other projects, and encourages the project coordinators to be responsible and creative in their job performance.[11]

A problem with this structure is that of formal coordination and centralization of information. Informal communication and coordination of information are an integral part of performing job duties and may be sufficient for internal GOER needs; yet, a more structured, centralized information resource is necessary in dealing with external sources, such as other energy-oriented parties.

A third aspect of the administration of the SECP is the relationship of GOER to the other state agencies with energy responsibility. It has been thought by some that the separate nature of GOER and other energy agencies, particularly the Texas Energy Advisory Council (TEAC), could lead to a lack of coordination or a duplication of efforts in many energy areas, including conservation. Because of this possiblity, the Texas Legislature enacted and Governor Clements signed a bill combining GOER and TEAC with the Natural Resources Council. This legislation creates, effective September 1, 1979, a new body called the Texas Energy and Natural Resources Advisory Council with responsibility for both state energy analysis and development, and energy conservation.[12] This should ensure greater coordination of state energy policy, although many other agencies still retain important energy functions.

### *Implementation*

The implementation process analysis involves three general policy areas: 1) contracting out projects to private and public organizations, 2) the role of municipal government units, and 3) voluntary versus mandatory enforcement of energy conservation programs.

Distributing the programmatic responsibilities for the SECP between GOER and contract agents has several advantages. GOER requires a smaller staff and therefore can function both cohesively and efficiently. Contracting out various SECP projects allows for utilization of a broad range of expertise in both the public and private sectors. It also stimulates awareness of and interest in the SECP constituent programs. Finally, the competitive

bidding system encourages high quality performance on each contracted project.

Disadvantages incurred from this implementation structure include the lack of centralized program information and the political ramifications from a competitive bidding system on contracts.

*Local Governments Program*

A unique aspect of the Texas supplemental SECP is the local governments program. This program is important to the implementation of the SECP on a voluntary basis. It consists of three parts: 1) workshops for local energy conservation, including training workshops and general workshops held at local government association meetings; 2) grants, at present limited to innovative proposals but soon to be broadened to include grants to councils of government for planning and technical assistance and to a couple of pilot cities for development of comprehensive community energy management programs; and 3) a technology transfer program that is in the process of being implemented.

The cornerstone of the local governments program thus far has been the innovative grants program. The innovative grants program encourages local governments to develop conservation programs pursuant to their own situations and needs. It also helps to increase local participation in the SECP, thereby aiding its effectiveness.

Several alterations in the current innovative grants program could further increase its effectiveness. First, the monitoring of all grant projects for energy savings and program effectiveness should be stepped up. This should be done by the local government unit itself and by GOER. Modifications in the grant agreement and an increase in staffing at GOER might be necessary for adequate monitoring of the innovative grants programs. Second, at least some grants should be awarded for periods greater than the present one-year period. This extension would reflect the time lag which exists between the initial implementation of a program and the point at which the program's effectiveness can be accurately assessed. While GOER judges the success of innovative grants programs on many factors, including commitment, knowledge gain, and transferability, energy savings remains a key component. Under the present format, it is unlikely that many programs will realize energy savings within a one-year period, even though substantial savings might be realized in subsequent years.[13]

A final alteration GOER should undertake in its innovative grants program is to assure that there will be sharing of program ideas and results among local governments.[14] GOER appears to be moving in this direction by establishing a technology transfer program for local governments.

A good structural outline for municipal energy management has been published by the Institute of Urban Studies, The University of Texas at Arlington, in a cooperative effort with the City of Sherman. The publication, *Municipal Energy Management*, elucidates a concept termed TEEMS—Transferable Effective Energy Management Systems. The central idea suggests that implementation of an effective energy management system on the municipal level is strongly dependent upon subjective factors such as cooperation, commitment, and interest displayed by the administration—the city council, the city manager, the city energy management coordinator, as well as all city department directors and their staffs.[15]

*Voluntary vs. Mandatory Implementation*

The Texas SECP is currently implemented primarily on a voluntary basis. An obvious advantage of a voluntary approach is that implementation can begin without the political and time constraints imposed by seeking state legislative action to establish mandatory measures.

Initial implementation of the voluntary SECP programs mainly involved a public awareness campaign. However, GOER has changed its approach from one of almost total public awareness to one combining public awareness with more technical programs that are often directed at specific groups. The types of implementation measures that GOER will increasingly employ in many program areas include: 1) technical presentations at professional conferences, conventions, and meetings; 2) training workshops; and 3) consultations with specific groups or local governments upon request. If continued as a predominantly voluntary plan, it is anticipated that the SECP implementation process will eventually focus on providing technical information and training for what could be considered more concrete conservation measures such as retrofitting existing buildings or employing energy-efficient hardware in new buildings.

It is difficult to predict the effect of implementing various programs on a mandatory basis. Tradeoffs between costs and benefits must be considered. Mandatory conservation measures incur high costs in terms of time, money, and enforcement. However, conservation in specific areas may be greater as a result.

The philosophy of the SECP is to maximize the efficient use of energy in all areas, and to stimulate a commitment to energy conservation in all areas, not just those delineated by the SECP. The optimal policy includes voluntary energy conservation provisions which are more desirable—economically, politically, and socially—than other available alternatives.

## Policy Alternatives

Several policy alternatives are present for various aspects of the administration and implementation of the SECP in Texas. Regardless of the formal structure of the program, attention needs to be given to subjective aspects such as interest, commitment, and dedication to energy conservation at all levels—federal, state, local, and individual. A "State Energy Conservation Plan" is only a plan; the broad concept of energy conservation must be perceived as a viable and essential part of a comprehensive energy program for the United States.

### *Administration*

Administering the SECP in the Governor's Office provides certain advantages, such as high visibility, which may be especially useful in getting the program off the ground. However, the greater political pressures and instability inherent in such a location, and the possible difficulty in attracting professional and technically oriented staff to such a setting, support relocating the Texas SECP into an agency setting. Creating a comprehensive state energy office that would be responsible for transient and long-range policies for conservation, energy research and development, and alternate energy sources has much to recommend it. The recent action of the Legislature in creating the Texas Energy and Natural Resources Advisory Council through combining GOER and TEAC appears to be a step in the right direction toward comprehensive energy management in Texas.

### *Implementation*

Texas should maintain its current policy of implementing the SECP on a shared in-house and outside basis. Suggested changes in implementation techniques include: 1) more detailed program monitoring, 2) a centralized information source of updated programs within GOER, 3) the placing of greater emphasis on information sharing between local government units, and 4) the extension of some innovative grants beyond a one-year period.

*Melanie Martin*

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# Chapter 8

# Programs and Effectiveness in Texas

## Issue Definition

As the largest oil and gas producing state in the nation, Texas historically has placed considerable emphasis on energy production, processing, and sales, while acceptance and utilization of energy conservation measures has been sporadic. Yet there is increasing awareness of the importance of exercising any and every available means to meet growing energy demands. Conservation of current resources and reduction of the rate at which they are consumed is a valuable aid in meeting those demands.

At present there are several energy conservation and energy-related programs in Texas, but the most comprehensive and expensive is the State Energy Conservation Program (SECP), consisting of nine program measures designed to reduce estimated 1980 energy consumption by over five percent of what it otherwise would be. This section examines the background, elements, and effectiveness of that plan.

## Background

In the state of Texas, SECP programs mandated by federal legislation are expected to conserve 8.36 trillion Btus of energy by 1980, which is only 0.08 percent of Texas's 1980 projected consumption. Obviously it was necessary to develop additional programs in order for Texas to achieve its 1980 goal. These optional programs involve commercial and residential users, industrial processes, agriculture, local governments, and the public schools. It is estimated that these provisions, combined with the required measures, will yield a 1980 savings of some 526 trillion Btus, or 5.64 percent of Texas's 1980 projected consumption.[1] The savings and costs of each program measure are outlined in Table 1.

The agency responsible for administering, monitoring, and implementing the plan is the Governor's Office of Energy Resources (GOER). GOER does not necessarily perform all of the tasks involved, however, as contracts are let to public and private organizations, state universities, and other agencies, for a variety of technical and advisory functions.

### *Program Measures*

The thermal and lighting standards program is designed to save 7.91 trillion Btus in 1980 by enforcing efficiency standards and insulation requirements in new and renovated public buildings. As Texas currently does not have a mandatory statewide building code, GOER conducted pilot tests of codes in several cities in an attempt to select or design the best standard for the state. Legislative action is necessary to provide for the statewide adoption of the code that GOER has selected.

The vanpool/carpool measure is projected to conserve 0.42 trillion Btus by expanding on the promotion efforts already underway in municipalities and among large companies, and by conducting workshops and seminars for interested parties. It has evolved, however, into a series of meetings between the program coordinator, the contractor, and appropriate individuals in firms and organizations.

By promoting the procurement of more energy-efficient goods and services for use by state and local governments, it is projected that 0.03 trillion Btus can be conserved by 1980. Government purchasing has historically been based on the lowest competitive bids, but it is now recognized that life-cycle costing would be useful in determining lifetime operational costs as well as initial costs of energy-consuming items. Information on the most energy-intensive and the most commonly purchased items, in addition to life-cycle data, will be distributed by newsletter to state, county, municipal, and school district purchasing offices.

The success of the Texas SECP is largely dependent on the industrial processes component, since it is expected to conserve 283.9 trillion Btus in 1980 by increasing the efficiency of these processes. This figure represents 53 percent of the total 1980 projected savings of the Texas plan. The program relies on two activities: (1) technical information exchange; and (2) direct contact with small and low-technology industries. An Energy Search Center has been established, providing a computerized, nationwide data retrieval service with access to four of the country's major data base systems. In addition, an annual technical conference is held, and workshops and training

## Table 1
## Estimated Savings and Costs of Program Measures

| Program Measure | (Trillion Btus) | (%) | ($ million) | ($/mill. Btus) |
|---|---|---|---|---|
| Thermal and lighting standards | 7.91 | 0.08 | 11.9 | 1.50 |
| Vanpool-carpool | 0.42 | 0.00 | 0.2 | 0.48 |
| Government purchasing | 0.03 | 0.00 | 0.1 | 3.33 |
| Industrial processes | 283.91 | 3.04 | 2.2 | 0.01 |
| New commercial buildings | 10.90 | 0.12 | 0.7 | 0.06 |
| Existing commercial buildings | 56.52 | 0.61 | 1.0 | 0.02 |
| New residential buildings | 10.17 | 0.11 | 0.6 | 0.06 |
| Existing residential buildings | 109.16 | 1.17 | 6.5 | 0.06 |
| Agriculture | 10.94 | 0.12 | 0.4 | 0.04 |
| Local energy conservation | 12.00 | 0.13 | 1.7 | 0.14 |
| Public schools | 24.53 | 0.26 | 1.8 | 0.06 |
| Coordination and monitoring | — | — | 1.2 | — |
| Total savings | 526.49 | 5.64 | 28.3 | 0.05 |

Source: Governor's Office of Energy Resources, *State of Texas Energy Conservation Plan,* as revised, May 1979.

sessions on specific industries, equipment, and processes are conducted.

The new and existing commercial building program is designed to save 67.42 trillion Btus by improving the operation and efficiency of these facilities and associated equipment. Workshops are held to motivate and inform owners/designers/builders to increase a building's profitability in regard to energy conservation design through innovative approaches that exceed the requirements of mandatory standards.

By increasing the efficiency of homes, apartments, and associated equipment, the new and existing residences component is expected to yield a 1980 savings of 119.33 Btus. Workshops and public awareness campaigns are used to provide information to apartment and home builders, buyers, financiers, and utility representatives on energy-efficient techniques and products. Training sessions for home energy auditors are also conducted, and a computerized home energy audit program is just beginning.

The objective of the agriculture measure is to conserve 10.94 trillion Btus of energy by establishing and promoting more effective channels of communication between the Agriculture Extension Service of Texas A&M University and the farmers and ranchers of the state.

By promoting a variety of conservation techniques at the local level, 12.00 trillion Btus are expected to be saved in 1980. The major element of this provision is the innovative grants program, aimed at directly involving local governments in conservation efforts. In the past two years, more than twenty school districts, municipalities, and COGs have received over $440,000 in grant funds. This money has funded a variety of projects ranging from energy audits for water treatment and distribution systems to infrared imagers for heat-loss determination.

Through the promotion of energy management in public school facilities and the development of energy conservation education curricular materials, the public schools provision is projected to yield a savings of 24.53 trillion Btus by 1980. The program includes: (1) on-site audits on a pilot basis; (2) curriculum workshops; (3) teacher training; (4) module development; (5) student workshops; and (6) facility workshops for school administrators.

### Policy Analysis

In November 1978, an evaluation of the Texas SECP was performed by Touche Ross & Co., under contract to the Governor's Office. As part of that evaluation, the firm conducted a survey of more than two hundred people out of approximately twenty-four hundred who had participated in one or more of the programs.

Although the survey indicated a generally favorable

response to the SECP, the achievement of a 5 percent savings by 1980 is not assured. Data from the Touche Ross evaluation indicate that in 1978, energy savings achieved by the SECP totaled about 2 trillion Btus, compared to the 1980 goal of 526 trillion Btus.[2] Only four programs demonstrated any measurable savings in 1978:

| | Estimated Savings (trillion Btus) |
|---|---|
| Existing Commercial Buildings | .02 |
| Existing Residential Building | 1.41 |
| Government Purchasing | .03 |
| Public Schools | .48 |
| Total | 1.94 |

The evaluation emphasized that the low level of savings in 1978 were attributable to the fact that the programs had not been in effect long enough to have had substantial impact. Nevertheless, considering the short length of time that the Texas plan has been in effect, and because it is largely voluntary and implemented through workshops, the potential for conservation and efficiency through application of the SECP remains uncertain.

It is often difficult to attract a significant number of people to conservation workshops, seminars, conferences, etc., particularly in a production-oriented state. Viewed in perspective, however, workshops might be the most appropriate approach for conservation in Texas. In a state that consumed more than seven quadrillion Btus (quads) of energy in 1975, and is projected to consume more than 9.3 quads in 1980, a 5 percent savings is not that substantial.[3] Reducing consumption by 534 trillion Btus in 1980 might simply involve eliminating waste while imposing no great hardships or penalties on the citizens of Texas.

Workshops depend entirely on public participation, and motivating people to attend them is a vital factor in the success of the SECP. Rising energy costs should lead to some increase in the number of people participating, yet it cannot be assumed that higher fuel costs alone will lead to 100 percent citizen participation. Since the program is primarily a public information effort, it is important that the public be aware of what is available, and then be motivated to utilize that information. Although many of the measures include elements designed to increase public awareness of the materials and assistance available, the Touche Ross survey indicated a need for increasing the exposure and penetration of the SECP.

The need for increased public awareness applies to the entire plan, but there are some specific problems concerning individual programs which need to be recognized. In the thermal and lighting standards provision, the workshops were generally successful in clearing up doubts about code interpretation, but adoption is meaningless without enforcement.[4]

Although the Touche Ross report stated that the vanpooling/carpooling program had deviated significantly from the initial plan, it remains a valuable component, and should perhaps be reexamined in regard to its goals and direction.[5] The private firms and organizations perform most of the actual work in implementing vanpools, and GOER's main function is informing them of the social and economic advantages of such an effort.

The major problems associated with vanpools involve insurance and start-up expenses, licensing, and environmental regulations. These problems might be alleviated, and the entire program made more attractive, by favorable legislative considerations. It is also assumed that some type of gas-rationing plan, if implemented, would lead to increased use of vanpools and carpools.

As is the case with measures for implementing thermal and lighting standards, the government procurement program suffers from an absence of legal authorization, which in this case is a cooperative purchasing statute. Such a law would provide Texas cities, counties, and special-purpose districts with an option to participate in state contract prices for energy-efficient items.[6] There are also problems involved in providing accurate specifications, as many items and services do not lend themselves to life-cycle costing analysis.[7]

GOER attempts to coordinate the residential program with a similar program, the Energy Extension Service, which it also administers. Touche Ross surveyed sixteen major utilities serving 90 percent of the state population, and fifteen indicated that some form of residential conservation programs were already available to their customers. Of the sixteen surveyed, fourteen made no change in their programs as a result of attending the workshops. A separate Public Utility Commission survey indicated that 50 percent of the homeowners in Texas have already taken some retrofit actions.[8] The primary target groups for the residential workshops, however, have been financial institutions and contractors.

A major portion of the agricultural program, and one with excellent potential, deals with improving irrigation pump and power unit efficiency—which reduces power requirements and improves water use efficiency, which in turn reduces irrigation system operating time. Considering the number of farms in Texas, however, a comprehensive well test effort would be enormoulsy time-consuming and expensive.[9]

Despite the problems and barriers that exist, officials at GOER are confident that they will meet or surpass the 1980 goal of 5.64 percent energy savings.[10] The lead

agencies, contractors, and supporting agencies have all gained valuable experience in conducting the programs, and most of the measures will have been operational for a sufficient length of time to begin realizing their projected savings. But considering that the reductions claimed by each state represent only "paper savings"—i.e., the plans purport to reduce consumption by a certain percentage over what the consumption is projected to be in 1980—miscalculations are unavoidable. The consumption figures will necessarily be manipulated in calculating energy savings, so it is likely that any estimate on savings will be manipulated upward, making it easier to demonstrate at least a 5 percent reduction.

## Policy Alternatives

More of the appropriate people should be encouraged to attend the workshops, conferences, etc., through increased public service television and radio promotion, and media advertising.[11] Appropriate people might include managers, technicians, building supervisors—people who understand and could immediately apply the techniques displayed in the workshops.

The educational program should provide more specific, technical, and practical information, and less general information. Participants need to be aware of specific products and services applicable to their particular situation. If necessary, the workshops should be designed to address the different technical levels and expertise of the participants.[12]

Increased penetration into the target groups could be achieved by tying the workshops into professional and industry association programs. Mini-workshops could be incorporated into association meetings; newsletters and meetings of these organizations might be used for promotion; and workshop attendance could be recognized for credit in continuing education programs.[13]

Favorable legislation for purchasing vans and implementing vanpools should be considered, and a cooperative purchasing statute should be adopted to allow local governments to purchase under state contract.

Commercial building program workshops should be incorporated into the continuing education requirements of professional societies (e.g., Texas Society of Architects).[14] The workshops might also be tailored to the size and technical level of the participant groups. Workshops for small establishments should be less technical and recommend less technical actions, while workshops for larger establishments could be more technical, and include more expensive proposals.[15]

In the agriculture measure, private well-service companies might be encouraged to provide a well-testing service to help improve pump and power-unit efficiency.[16]

Information regarding the experiences of the cities in the innovative grants program might be incorporated into the local energy conservation workshops. Details and discussion of actual cases should benefit other jurisdictions in their conservation efforts.[17]

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# PART III

# NUCLEAR POWER

As 1980 approaches, some thirty-five years after the nuclear era began, many people in the United States are questioning current nuclear policies. Policymakers in federal, state, and local governments are being forced to contend with what is now a highly sensitive political issue.

The resolution of nuclear issues has increasing importance for Texas as it considers the consequences of nuclear power production and proposed nuclear waste disposal sites in the state.

Many aspects of nuclear power deserve careful analysis at the present time. The nuclear power related energy issues that have been addressed in the present study are the following:

Chapter 9. The continuing federal role in nuclear power production.
Chapter 10. Management and isolation of nuclear wastes.
Chapter 11. The national politics of nuclear power.
Chapter 12. United States' policies affecting international control of nuclear technologies and materials.
Chapter 13. States' rights and radioactive wastes.
Chapter 14. Austin and the South Texas Nuclear Project.
Chapter 15. Economic and regulatory problems of nuclear facilities in Texas.

In evaluating the federal role in nuclear power production, we place the major issues in the national context. A variety of federal policy issues are introduced.

One such issue, that of how ultimately to dispose of nuclear wastes, is now before federal decisionmakers. Our investigation of nuclear waste disposal centers on three basic questions:

(1) Can wastes be safely isolated from the environment?
(2) Is geologic disposal, the choice of many experts and the Carter Administration, the best alternative?
(3) What is the optimal role for federal, state, and local institutions in the management of nuclear wastes?

We turn then to the broader political issues (public health and safety). The safety record of nuclear plants prior to and including the recent incident at Three Mile Island in Harrisburg, Pennsylvania is carefully considered.

Our discussion of national nuclear issues is concluded with a brief look at the international nuclear situation and at the U.S. nuclear policy overseas.

We begin our analysis of implications for Texas with a discussion of states' rights versus the doctrine of federal preemption in the siting of nuclear facilities, especially for waste disposal.

We then consider the case of Austin, Texas as a study in the politics of nuclear power at the local level. Voters in Austin have been to the polls five times in seven years to authorize their city's participation in the South Texas Nuclear Project. A number of factors are identified as significant in their decision.

Finally, we consider some of the economic and regulatory problems facing nuclear power plants under development in Texas.

# Chapter 9

# The Continuing Federal Role in Nuclear Power Production

## Issue Definition

The development of nuclear power was at first exclusively a government effort. Since 1954, the federal government has been regulation and promoting the growth of the nuclear industry, spending billions of dollars on the commercial development of the light-water reactor (LWR) and other nuclear technologies. Despite encouragement and incentives from the government, however, the nuclear industry today is at a standstill. Plants already under construction are being completed, but new orders from electric utilities have not been forthcoming. Rising costs and uncertainty about continued government support for nuclear development have prompted utilities to reevaluate their planned nuclear plant construction. Plans for large numbers of facilities have been cancelled or deferred.

Much confusion about the federal role can be traced to the contradiction between government regulation and promotion of the nuclear industry. In recent years, now that the industry is relatively well established, government has increasingly asserted its regulatory function. The industry blames excessive government regulation and the long licensing process for the obstruction of growth. If nuclear reactor construction is to continue, the federal government will have to come to grips with regulatory and licensing problems. More importantly, government will need to reassert its promotion function and overcome rising public fears about nuclear safety. We are now at crossroads with respect to nuclear development.

Decisions must also be made on the development of advanced nuclear technologies, including reprocessing, the breeder reactors, fusion reactors, and on alternative sources of energy. Increasing U.S. dependence on uncertain and increasingly costly imports demands that government make timely choices and development decisions to insure an adequate energy supply. Failure to do so would severely affect economic growth and stability and U.S. national security.

## Background

### *The Growth of the Industry*

Following the development of nuclear weapons, and after several years under the Atomic Energy Act of 1946 (which maintained exclusive government control over nuclear technology), research and development of nuclear fission progressed to the point where people became excited about its potential peaceful uses, particularly in the generation of electricity. With the aim of bringing private capital and management into the development and commercial application of fission technology, the Congress enacted the Atomic Energy Act of 1954.[2] This legilsation established Atomic Energy Commission (AEC) responsibility for the promotion and regulation of the nuclear industry.[3] Congress also decided to provide insurance protection against nuclear accidents after private firms declined. Under the Price-Anderson Act, the federal government agreed to provide up to $560 million in liability for injury, death, and property damage caused by nuclear mishaps.[4]

With support from the federal government, the nuclear industry grew slowly through its first decade. Electric utilities contracted for just five nuclear reactors through 1964.[5] Demand for reactors then increased rapidly. In 1965 and 1966 utilities contracted for twenty-six nuclear power plants.[6] Experts in the industry and at the AEC expected continued growth at this accelerated rate for the rest of the century. Through the early 1970s, the growth of demand met these epectations. By the end of 1974, there were fifty-five nuclear power plants in operation, seventy-three under construction and 107 on order or announced.[7] In recent years, as plants under construction have been completed and brought on line, nuclear energy has provided an increasing share of total electricity production. The amount of electricity produced from nuclear energy increased by an average of 30 percent per year in the period 1973-1977.[8]

### *The Recent Decline*

In the mid-1970s, the growth of the industry slowed as economic, technological, and safety problems increased construction time and costs dramatically. New orders declined while cancellations and deferrals increased:[9]

**Table 1**

| | New Orders | | Cancelled | Deferred |
|---|---|---|---|---|
| 1973 | 41 | | | |
| 1974 | 26 | 1974 | 9 | 91 |
| 1975-6 | 7 | 1975 | 12 | 86 |
| 1977 | 4 | 1976-7 | 8 | 106 |
| 1978 | 2 | | | |

Source: M.R. Segal, *Nuclear Fission Technology—Non Breeder* (Washington, D.C.: Library of Congress Congressional Research Service, 1978), p.8.

Private investment in the industry has been cut back severely. Firms are currently operating only to fill the diminishing backlog of orders and international demand.[10] Among the factors in the slowdown of reactor construction are: (1) slower electric demand growth than predicted, (2) rising costs and uncertainty about safety, waste management, and waste disposal, (3) construction cost overruns, and (4) vocal opposition to nuclear power plant construction throughout the U.S.

### Current Status

In 1979, nuclear energy accounts for approximately 12.5 percent of U.S. electricity production.[12] Nuclear power may continue to increase its share of the market, but at a much slower pace than previously anticipated by utilities and federal energy planners.

### *The Carter Nuclear Policy*

The Carter Administration's policy on nuclear energy is based on the assumption that nuclear capacity will continue to grow, and will, along with new coal-fired power plants and conservation, help assure adequate base-load generating capacity. Consistent with this, a series of policy proposals has been made:

(1) the federal government should "assume interim and ultimate disposal responsibility for radioactive waste and spent fuel in exchange for a one-time storage fee paid by the utilities."[13]
(2) efforts to solve the problems of waste management and disposal should be undertaken agressively, and pilot studies should be started as soon as possible.[14]
(3) the regulatory and licensing process for nuclear plant construction should be shortened and made simpler and more rational;[15] and
(4) U.S. uranium enrichment capacity should be greatly increased.[16]

Congressional action on the legislation necessary to implement the Carter policy will be an important determinant of future federal nuclear policy. Eliminating regulatory uncertainties, shortening the licensing process, and dealing with the wastes problem are important if there is to be growth in the nuclear industry. An increased uranium enrichment capacity is necessary if the increasing demand for fuel is to be met. It is particularly important in light of President Carter's decision to defer indefinitely commercial reprocessing and the full development of the breeder reactor.[17]

The decision to defer reprocessing and the breeder was made despite the fact that they have long been considered essential to the full development of the nuclear industry.

**Table 2**

**Status of Nuclear Generating Units**

| Status | 1975 | 1976 | April 1977 | April 1978 | Jan. 1979 |
|---|---|---|---|---|---|
| In Operation | 55 | 58 | 65 | 70 | 72 |
| Under Construction | 73 | 87 | 89 | 94 | 95 |
| Planned | 107 | 93 | 78 | 52 | ? |
| Total | 235 | 238 | 232 | 216 | ? |

Source: U.S. House of Representatives, Committee on Government Operations, *Nuclear Power Costs,* 1978, p. 39.

The President's opposition to these plutonium-based technologies was justified primarily on the basis of his overriding concern with nonproliferation as a foreign policy goal. Reprocessing and the breeder would also contribute greatly to the overall waste management and disposal problem. Plutonium is one of the most toxic substances known to man, and with a half-life of 25,000 years, must be isolated from the environment for roughly 250,000 years.[18] Despite strong congressional support for the breeder, development has been slowed significantly.[19]

## Policy Analysis

### *Energy Supply and Demand*

In the United States, electricity is essential for providing services like heating, air conditioning and refrigeration, and communications, as well as for many industrial processes. Electric utilities are currently consuming a large proportion of the conventional fossil fuels consumed annually in the U.S., and "they are the only commercial consumers of nuclear energy."[20] Recent concern about the increasing dependence on foreign oil, and the impending scarcity of oil, mean that utilities must choose between nuclear energy and coal to meet future electric demand.[21]

The time frame for the decision by utilities to build new coal or nuclear plants has been pushed back in recent years by a decreasing demand for electricity. Nuclear critics argue that utilities are now confronted with a sizeable excess of capacity in many regions of the country. It is not clear, however, that this excess will last very long if oil is eliminated as a boiler fuel or if demand for electricity increases.

### *Coal-Nuclear Comparison*

Nuclear power costs are frequently assessed in relation to the costs of the coal alternative. Despite a shortage of data from private and government sources, a consensus has emerged: that nuclear power should contine to enjoy an economic cost advantage over the coal alternative. Specifically, the data suggest that:

(1) the performance of nuclear plants, in terms of availability and capacity factors, is roughly equivalent to that of coal plants[22]; and
(2) the total bus-bar costs of generating nuclear power are significantly less than those of coal-fired production.[23]

However, this may not be the whole picture. Some important costs incurred in the later stages of nuclear power production have not been internalized in the rate structure. Estimates of the eventual costs of waste management waste disposal and plant decommissioning range from more than $90 million to more than $120 million per plant.[24] In addition, a variety of hidden costs in the form of consumer and government subsidies add to the real cost of electricity produced from nuclear power plants:

(1) phantom taxes—under federal law, utilities receive tax credits for investment in new plants and equipment, but are not required to pass on all their tax savings to consumers;[25]
(2) construction work in progress (CWIP)—a device through which utilities include facilities that are under construction in the rate base for regulatory purposes;[26] and
(3) direct federal subsidies—for research, development, demonstration, etc.[27]

It should be noted that while utilities also profit from phantom taxes and CWIP on coal-fired plants, the generally lower capital costs of coal plant construction mean that phantom taxes and CWIP are greater for nuclear plants.[28]

The comparison between nuclear and coal plant costs can be taken a step further by evaluating the environmental and health costs associated with each. "Health impacts of the present nuclear fuel cycle include occupational accidents and radiation-induced disease in workers and the public due both to routine emissions and to accidents."[29] The overall health impact of coal-fired production includes occupational accidents and disease resulting from the coal mining process and from plant emissions. The Nuclear Energy Policy Research Group of the Ford Foundation concluded that "on the average new coal-fired plants meeting new source standards will probably exact a considerably higher cost in life and health than nuclear plants."[30]

A similar conclusion is drawn concerning the environmental effects of coal and nuclear plants:

> The possible impact on global climate appears to be the most serious environmental consequence of greatly increased electric power generation. The thermal output of both coal and nuclear power contribute directly to the long-term heating of the atmosphere. However, a much more serius threat appears to be posed by the carbon dioxide ($CO_2$) produced in fossil fuel combustion. Carbon dioxide, control for which does not appear practical, heats the atmosphere by the greenhouse effect. The heating problem is complicated by the uncertain effects of particulates and other pollutants...With regard to local and more immediate environmental impacts, the situation is somewhat clearer. Except for local thermal pollution where nuclear power has a somewhat more serious effect, the coal cycle generally has more harmful environmental impacts than the nuclear power cycle."[31]

On balance, then, nuclear reactors appear to be an attractive option in many parts of the country. If proponents of nuclear energy are correct, the economic imperative alone will bring about new nuclear reactor construction. As the slack in electricity demand is eliminated by renewed growth, nuclear power will have to be considered on its relative merits by utilities, consumers, and government.

### *The Problem of Nuclear Safety*

Perhaps the most controversial and difficult issue surrounding nuclear power today is nuclear safety. It has taken on new proportions in recent months since the incident at Three Mile Island in Pennsylvania. Even before Harrisburg, there were some danger signals. In January 1979, the Nuclear Regulatory Commission (NRC) renounced the 1975 Rasmussen Report, which had come to be considered as the definitive study used in assuring the public that nuclear power is safe.[32]In March, the NRC closed five reactors in New England as a safety precaution. The nearly catastrophic accident at Three Mile Island has now made safety a highly emotional political issue. While its full effect can not yet be assessed, it will clearly have a tremendous political impact in the short run.

In addition, the accident has introduced a new component to the costs of nuclear power, the payment of damages and the costs of repairs, decontamination, and replacement facilities. Resulting safety precautions being put into effect at many plants now operating or under construction may also increase costs.

It has further become clear that the increasing public concern for safety conflicts with the goal of shortening the regulatory and licensing process. It may be that fears about nuclear safety will inhibit the Congress, keeping it from resolving the pressing regulatory and licensing issues altogether.

## Policy Alternatives and Recommendations

The need to define federal policy is nowhere more acute than in the area of energy supply. A number of important decisions need to be made, not the least of which is whether to promote further nuclear plant construction. Plants ordered today would not be in operation until 1990 by current estimates, but shorter lead times might be possible if the regulatory and licensing process can be shortened. The need to insure safety must of course be weighed carefully in making regulatory changes.

It should also be remembered that in the short run the only alternative to new nuclear reactors is coal-fired plants. The decision to forego or minimize further nuclear construction should fully consider the economic and social costs of the coal alternative.

It is also imperative taht the federal government provide the leadership necessary to find solutions to the problems of waste management and disposal. It should be recognized that we already have a waste problem which would not diminish even if all nuclear power generation were halted today.

Ultimately, because both nuclear power and the coal-fired alternative have serious drawbacks in the long run, the U.S. will have to decide which of the advanced technology alternatives to promote. Reprocessing and the breeder should not be considered as a major new supply source unless we are truly willing to accept the potential hazards of "the plutonium economy." Fusion, solar and coal liquefaction, and gasification technologies will all require significant lead time and investment for development and commercialization. A failure to make timely investment decisions could have disastrous consequences for the United States and the Western World.

*Jonathan J. Cykman*

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# Chapter 10

# Management and Isolation of Nuclear Wastes

## Issue Definition

The National Environmental Policy Act of 1969 stated that it is an important national goal to "fulfill the responsibilities of each generation as trustee of the environment for succeeding generations." Perhaps in no other environmental area is the threat to future generations as persistently hazardous, or the responsibility of the present generations as obligatory, as that of nuclear waste disposal. Many nuclear wastes are long-lived and highly radioactive, and therefore could represent substantial risk to descendent generations if the wastes are not adequately isolated from the biosphere.

Nuclear waste exists in large quantities today as a result of over three decades of nuclear materials production for strategic weapons and from commercial electrical generation. Past mismanagement of radioactive wastes, as well as the lack of any cohesive national policy on their disposal, has led to widespread skepticism of both government's and industry's ability to isolate them effectively. However, the one overriding fact still remains: even if all military and commercial activities which generate radioactive wastes were stopped today, accumulated wastes present a major disposal problem. A broad question thus is raised: Can nuclear wastes be isolated from the environment safely for long periods of time?

## Background

### *The Nuclear Fuel Cycle*

The process of nuclear fuel provision, use, and disposal is known as the nuclear fuel cycle, which is outlined below. Two important points should be made regarding the nuclear fuel cycle: (1) Wastes of varying amounts and radioactivities are generated at each step in the cycle; and (2) the facilities used in the fuel cycle become nuclear waste due to contamination through irradiation.

The several stages in the process as illustrated are as follows:

1. *Uranium Mining.* Ore is mined by conventional or strip mining methods. The major site in Texas is at Falls City in Karnes County.
2. *Uranium Milling.* Ore is milled to obtain uranium oxide, called "yellowcake."
3. *Conversion to Uranium Hexafluoride.* Yellowcake must be converted to uranium hexafluoride before it can be enriched.
4. *Enrichment.* Natural uranium contains only 0.7% of fissile uranium-235. Enrichment raises this concentration to approximately 2-4% for commercial reactors.
5. *Fuel Fabrication.* Uranium hexafluoride is converted to uranium dioxide, which is incorporated into fuel assembles.
6. *Reactor Operation.* Thermal energy, released when uranium fuel reaches critical mass, heats water to drive steam turbines which generate electricity. The uranium fuel is gradually depleted, accompanied by an accumulation of radioactive fission products and structural damage to the fuel assemblies, one-third of which must be replaced each year.
7. *Reprocessing.* This step attempts to recover fissile plutonium and uranium from spent fuel. President Carter eliminated this step from the nuclear fuel cycle in the United States in April 1977.
8. *Waste Isolation.* Radioactive wastes, generated at virtually every step in the nuclear fuel cycle, must be safely segregated from the biosphere for long periods of time.
9. *Decontamination and Decommissioning.* A nuclear powerplant comes to the end of its operating period after thirty to forty years. Irradiated portions of power plants and all other nuclear facilities must be safely dismantled, mothballed, and entombed for hundreds of years.

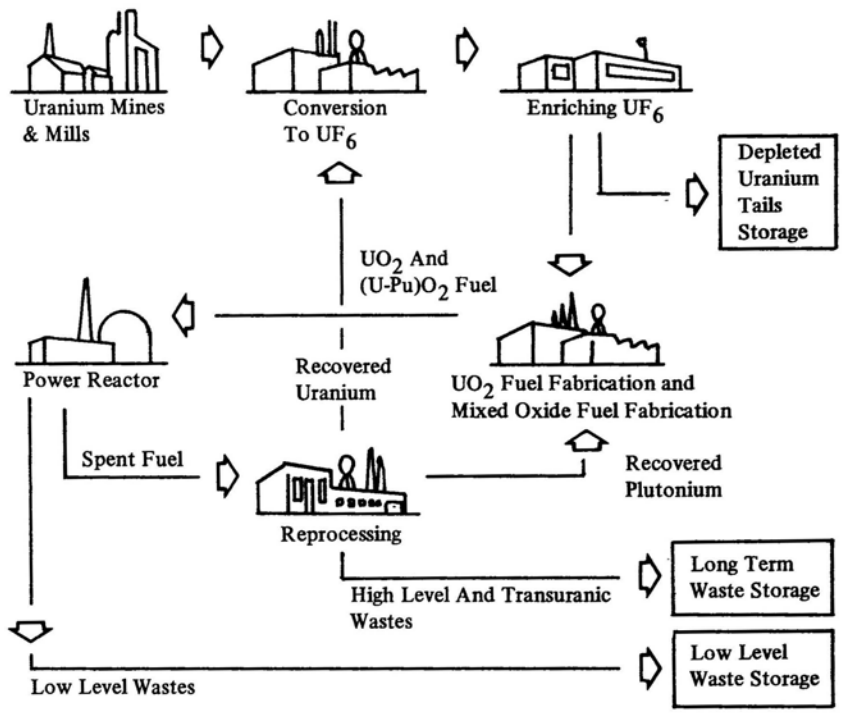
### *Types of Radioactive Wastes*

*Low-Level Wastes.* The major problem consists of some 155 million tons of radioactive mill tailings, which contain uranium, radium, and thorium. If not stabilized, the tailings can be a perpetual source of air and water pollution, emission of radon gas (a carcinogen) and local gamma radiation.[1]

*High-Level Wastes.* These consist of concentrated waste materials from the purification stage of a reprocessing plant. They are originally in liquid form and

**Figure 1**

**Light-Water Reactor Fuel Cycle–Uranium and Plutonium Recycle** [2]




Source: *Nuclear Power Issues and Choices,* (Cambridge, Mass.: Ballinger Publishing Company, 1977), p. 403.

must be solidified for safe management. High-level wastes are characterized by extremely penetrating gamma radiation and high heat production in the shorter term, but they remain toxic due to trace amounts of alpha radiation in the longer term.

*Spent Fuel.* A commercial reactor discharges annually approximately 30-45 tons of spent fuel. Fission products are created when an atom of uranium splits after capturing a stray neutron. The several isotopes of fission products are characterized by intese penetrating radiation and relatively short half-lives (from a few seconds to thirty years). Transuranic elements (fission by-products) are created when a uranium atom absorbs neutrons, producing a heavier isotope, such as plutonium-39. Transuranics emit alpha particles which are too heavy to penetrate the skin but are extremely carcinogenic if inhaled.

*Activation Products.* Neutrons, produced by uranium in fuel rods, pass beyond the rods and into the steel structure which supports the rods and into the steel and concrete vessel holding the reactor core and cooling water. These neutrons are eventually absorbed by atoms of iron, nickel, cobalt, and other elements present in steel, concrete, and water. They are sources of penetrating radiation for long periods of time.[3]

## Current Status

Resolving the problem of radioactive waste disposal requires satisfactory execution of three important policy areas: (1) formulation of general requirements for the protection of the environment and public health; (2) development and operation of disposal technologies and sites; (3) regulation of activities at specific sites to assure

overall safety and protection of the environment and public health. These policy areas are the responsibility of the Environmental Protection Agency, the Department of Energy, and the Nuclear Regulatory Commission, respectively.

President Carter's Interagency Review Group on Nuclear Waste Management (IRG) is a panel of agency officials charged with formulating the Administration's policy on the handling, transportation, and disposal of high-level wastes. In a major conclusion, the IRG draft report states that despite limitations in current knowledge and modeling capability, successful isolation of radioactive wastes from the biosphere through geologic storage "appears technically feasible for periods of thousands of years provided that a systems approach is utilized rigorously."[4]

Part of this approach involves a system of passive multiple barriers[5] to reduce risk to acceptable levels. Such a system calls for immobilization of the waste through solidification, provision of temporary containers, a passive immediate environment, a geologically stable medium, and a minimum water transport system. Although no particular medium is an obvious preference at this time, salt is a likely choice for the first repository, to be developed by 1992 according to the IRG, as the most is known about the engineering aspects of a repository in salt. The Bureau of Economic Geology at the University of Texas is currently under contract with the Department of Energy to conduct evaluations of potential sites in the Permian Basin salt formation in the Panhandle and the Interior Gulf Coast salt domes in Northeast Texas.[6] The IRG also calls for early demonstration of the Waste Isolation Pilot Project (WIPP), proposed salt repository near Carlsbad, New Mexico for storage of military high-level and transuranic wastes and some commercial spent fuel assemblies. The project is designed to generate information and provide expertise on technical and institutional matters.

## Policy Analysis

The IRG position that geologic disposal of radioactive wastes represents the best available solution appears essentially valid if one accepts several premises and ignores several others. The first major premise is that the radioactive waste disposal problem is basically a technical problem to be solved by developing fail-safe technological systems. The second premise is that the waste disposal problem poses an immediate threat both to the safety of the public and to the future health of the nuclear power industry in the U.S. A third important premise involves a ceding of responsibility for radioactive waste management to the federal government and a reliance on the federal bureaucracy to implement various features of a successful waste isolation program.

If one accepts this reasoning, there would appear to be little alternative in the institutional arena to giving high priority to timely completion of federal regulations and standards, and to acculmating the required data base concerning appropriate wasteforms, transport, and subsequent storage of high-level wastes and spent fuel elements.[7] Timely completion of regulations and standards no doubt will involve reducing areas of institutional gaps and overlap, especially concerning the Nuclear Regulatory Commission's responsibilities.

Other areas of federal concern include facilitating an early demonstration of geologic storage in the salt facility at WIPP and development of an effective away-from-reactor (AFR) storage program to alleviate the problem of accumulated spent fuel assemblies exceeding on-site storage capacity at reactors. Unless such an AFR probram is implemented, some older reactors could be forced to shut down in the early 1980s for lack of space in their on-site holding ponds.

## Policy Alternatives

The premise that nuclear waste disposal is purely a technical matter is central to the emphasis on developing fail-safe technological systems to deal with it. But one of the most troubling aspects of the problem is that it is not just a technical matter; it also requires nearly fail-safe performances from all of the people involved in the waste disposal process: construction and operation of processing facilities, transportation and monitoring of wastes, and surveillance to ensure security.[8] Maintenance of a cadre of highly skilled, motivated, and reliable "waste watchers" will be a costly and challenging organizational problem in the near future, and it is a problem that has been largely ignored by traditional waste disposal policymakers. In addition, the costs for the entire radioactive waste processing system—including the obviously substantial capital investment for waste processing facilities, transportation systems, and storage facilities—has not yet been accurately estimated. When added to the expense of decontamination and decommissioning, these costs could render the nuclear option unacceptable.

A second questionable characteristic of current plans is the emphasis on the immediacy of the problem. Without doubt some aspects of the nuclear waste issue demand prompt attention, such as solidification of high-level liquid wastes. But are policy plans for early demonstration of geological storage technology (WIPP) in either the public's interest or the nuclear industry's interest? Should early demonstration of such a facility be emphasized when, as the U.S. Geological Survey points out, there are "gaps" in our knowledge of underground water

transport systems?[9] Can geology, essentially a retrospective science, make valid predictions as to a particular formation's future stability? Should the government be concerned with early demonstration of *any* particular mode of storage when, as recent events in Utah and at Three-Mile Island point out, we need more accurate assessments of the social risks of low-level radioactivity? The controversy over radiation thresholds and the long time factors involved in any manifestation of genetic damage resulting from exposure to low levels of radiation currently render the term "safe" virtually meaningless. Public health, not the health of the nuclear industry, should be the government's primary concern in nuclear waste disposal, and emphasis should be on developing a reliable scientific data base regarding various disposal options rather than early demonstration of any particular option.

In a vaguer respect, if nuclear power is coming to be regarded more and more as an interim option between now and the advent of future technologies, such as fusion and solar energy, why emphasize an ultimate solution to the radioactive waste problem? Interim management of spent fuel assemblies and solidified high-level wastes has proven reliable. Perhaps the emphasis should be on interim management of wastes in above-ground facilities while economic, public health, scientific, and organizational questions can be answered and technological options developed. For example, the neutrons produced as a by-product of fusion cold play a significant role in the transmutation of wastes to relatively stable elements in future years, and spent fuel could become too valuable a resource to be inaccessibly stored underground.

A third characteristic of the nuclear waste disposal issue as it is currently debated in this country is the acceptance of the premise it is a federal responsibility. Clearly in the case of military wastes from the atomic weapons program, this is correct. But in the case of commercially generated waste, surely some responsibility for the wastes lies with the nuclear industry, the utilities and their stockholders, the consumers of nuclear-generated electricity, and the states which have promoted or acquiesed to its use. The problem with relying on the federal government for a solution is that the same solution is being offered today that was first proposed by the Atomic Energy Commission in the mid 1950s. In 1974, the AEC was divided into the Nuclear Regulatory Commission and the Energy Research and Development Administration. However, ERDA and NRC are staffed largely by old AEC veterans. New organizational schemes do not insure new ideas.

There is a serious need for new ideas and innovative thinking in the areas of nuclear waste management and isolation. Public commissions, utilizing the varied scientific community at major universities as well as citizens of different occupations, can be used to generate and investigate alternative methods of radioactive waste management. If the future emphasis of waste disposal is on public health, while the future of nuclear power is decided largely on issues of safety and economics, perhaps such commissions could attract persons of various backgrounds and persuations regarding nuclear power—skeptics often ask more difficult questions and demand clearer answers. As the waste disposal issue is currently framed, those with a healthy fear of nuclear power have lacked incentive to participate in the decisionmaking process, since successful disposal of radioative refuse has been promulgated as the major impediment to the expansion of nuclear power sources.

States such as Texas have an interest in encouraging such attempts at innovation since federal policies could very easily conflict with the states' interests. Texas will have a more difficult time resisting the location of federal nuclear waste repositories within its borders if it has made no efforts to utilize its own resources to offer alternatives to the fedeal policies. Federal nuclear policy, like other phases of the government's energy policies, has been largely reactive and unimaginative. Reliance on such policies by the states, the utilities, and the public (both proponents and critics of nuclear power) is not necessarily in their own best interests.

*Christopher Eakle*

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# Chapter 11

# The National Politics of Nuclear Power

## Issue Definition

From the beginning, nuclear power has been viewed by many as a sort of Faustian bargain, in which abundant electrical generating capacity might be paid for by periodic holocausts. Despite constant assurances from the nuclear industry that its problems were minimal and surmountable, many thoughtful or scared individuals slowly came to see fission power as either a technological monster or an economic albatross. The maturation of this atomic debate came in the early to middle 1970s, when the initial fears of the atom related to the destructive potential of the nuclear arms race between the Soviet Union and the United States were converted into direct political activism against the licensing or continued operation of nuclear power facilities. The new nuclear issues include problems associated with plant safety, waste disposal, health effects of low-level radiation, the economics of fission power, and the possibilities of proliferation of nuclear weapons development and terrorism. At first, the new antinuclear groups tried to gain appropriate state limitations on nuclear licensing, and to fight the building of individual plants through the regulatory process and in the courts. Failing that, they turned to civil disobedience, derived from experience in the anti-Vietnam War movements of the 1960s and early 1970s. Meanwhile, nuclear proponents fought back with a new, well-organized sophistication. Accordingly, the future of nuclear power remains uncertain, especially in light of the accident at Metropolitan Edison's Three Mile Island Unit 2, which promises a flurry of congressional debate and investigation.

## Background

During the period from the end of World War II until about 1970, the U.S. Atomic Energy Commission (AEC) vigorously promoted the concept of civilian nuclear power, while at the same time being charged with regulating the fledgling industry. Most of the AEC scientists were proud of the exotic technology, and accepted the view of Thomas Ayers, President of Chicago's Commonwealth Edison Company, that the reactors "are conservatively designed, with great margins for error at every step. We have built in a whole series of multiple barriers. Also, there are various lines of defense in the safety area—systems of safety in layers."[1] Others, though, felt that the new fire was merely a reflection of the terror of Hiroshima. As Senator Mike Gravel put it, "the Atomic Energy Commission was anxious to assure a broad technological and manpower base for its weapons program. In addition, feelings of guilt over having used atomic weapons impelled many in government to seek a peaceful use for fission power."[2]

Guilt was not the only problem, however. Through 1961, there were four major near-disasters at nuclear power stations—two at Chalk River, Ontario, and one each at Windscale, England and Idaho Falls, Idaho. Each of these incidents involved human error and a snowballing of factors contributing to the crisis.[3] In the midst of these nuclear power birth pangs came a study by the Brookhaven National laboratory, WASH-740, indicating the possible result of a worst case disaster to be 3,400 deaths, 43,000 injuries or radiation poisonings, $7 billion in property damage, and contamination of an area the size of Pennsylvania. Partly as a result, Congress passed the Price-Anderson Act of 1957, limiting liability of nuclear utilities to $560 million, $500 million of which would be provided by the federal government.[4]

In the early 1970s, environmental concerns related to plant siting was probably the major isue, especially after a U.S. Court of Appeals applied the National Environmental Policy Act (NEPA) to the consideration of the Calvert Hills, Maryland reactor in 1970.[5] But plant safety emerged as a major public issue in 1972 when several scientists challenged the adequacy of the Emergency Core Cooling System (ECCS) then in use by most reactors.[6] Nevertheless, amid the growing energy crunch of 1974, President Ford called for the building of six hundred additional reactors by the year 2000 in order to meet future energy demands.[7] Congress responded, though, by splitting the promotion and licensing functions of AEC into the Energy Research and Development Administration (ERDA) and the Nuclear Regulatory Commission (NRC) in early 1975.[8] President Carter, who had called for nuclear power only as a "last

resort," nonetheless recommended an expansion of fission power, though a more modest expansion than that recommended by Ford.[9]

Meanwhile, several groups emerged in opposition to nuclear power. The most influential were probably the Union of Concerned Scientists (UCS), formed by economist Daniel Ford and physicist Henry W. Kendall in 1970, and consumer advocate Ralph Nader's Critical Mass, organized in 1975 with the goal of ending nuclear power by 1980.[10] Opposing these groups was the Atomic Industry Forum (AIF),the industry trade association which surrended its tax-exempt status in 1975 to jump into the fray.[11]

## Policy Analysis

### *Terrorism*

Aside from proliferation, an issue which is analyzed in another chapter in this section, one of the biggest concerns for the security of civilized nations is the possibility of subnational political groups, such as the Palestinian Black September Group, the Italian Red Brigade, or numerous others, getting their hands on materials from which they could fashion a crude nuclear explosive. In 1975 Dr. Theodore Taylor of the Massachusetts Institute of Technology (MIT) showed how easy it would be for the average person to design such a device with limited resources.[12] Groups desiring to obtain the materials might not have a difficult time, according to reports of the General Accounting Office, which indicate that industry security arrangements are not adequate.[13] Further, there is already a record of successful assaults on nuclear plants in both the U.S. and Europe.[14]

Nuclear supporters claim that there are protective processes which can be applied to nuclear operations to ensure security, such as the Civex method of mixing radioactive elements together,[15] but others remain fearful. Perhaps their overriding fear is the effect a rash of nuclear terrorism incidents might have on civil liberties. One NRC report in 1975 suggested that the public would demand that U.S. security agencies be given great power to prevent terrorism, "perhaps employing lie detectors or even torture.[16] Some even hint that society would ultimately have to weigh such tools as torture against the possible killing of millions.

### *Economics*

Much of the concern over nuclear energy centers on the ultimate efficiency of the reactors, not on Armageddon. The crux of this economics debate is the comparison of nuclear power to other forms of energy, principally coal. In 1976, the AIF estimated the average cost of nuclear power was 38.3 mills per kilowatt hour (kwh), while it was 42.0 mills for coal and 55.1 mills for oil. Use of nuclear power, they concluded, would save 55 million tons of coal and 10 billion gallons of oil, amounting to a savings of $2 billion.[18] Countering this is another 1976 study by the Council on Economic Priorities (CEP), a New York public interest group, which stated that the average capacity factor, or amount of time a plant is in operation, is only 59.3 percent, as opposed to 66.9 for coal-fired facilities. Such a difference might make nuclear power less economic than coal or oil. CEP added that much of this loss of capacity has come about with the increasing size of reactors above 800 megawatts.[19]

Nuclear opponents have begun using the economics issue as an indirect means of stopping nuclear power. In a 1976 referendum in Missouri, for example, antinuclear forces worked for the outlawing of such charges as Construction Work in Progress (CWIP), a devise for including in the present rate structure charges against power to be produced in the future.[20]

### *Health*

One of the eeriest problems of any atomic operation is the possibility of radiation poisoning, and most importantly, a long-term raising of cancer rates. Such higher rates have been positively documented for the bombings of Hiroshima and Nagasaki in Japan in 1945, but are only speculated for atomic bomb testing in Nevada from 1946 to 1962.[21 22] Less measurable is the amount of radiation risk resulting directly from nuclear power plant operation. Rosalie Bertell of the Roswell Cancer Research Institute in Buffalo says that the permissible exposure of five rads per year is sufficient to cause cancer.[23] John Gofman of Stanford University echoes this view, stating that the national radiation standard of 170 millirems per year for the general population may also lead to high rates of cancer.[24]

Nuclear supporters scoff at such speculation, noting that a 1970 National Academy of Science review of the 170 millirem standard refused to recommend any change.[25] Further, they note that, as a Ford Foundation-MITRE Corporation report stated in 1977, only one person per year dies from occupational or radiation causes in the nuclear industry, whereas the figure ranges from two to twenty for the coal industry.[26]

### *Safety*

Probably the ultimate fear held by the public about nuclear power is the safety of the plants, as it envisions the scenario of a major disaster involving a massive release of radiation as a result of a core meltdown, the

"China Syndrome," in which molten fuel encounters ground water and forms huge clouds of deadly steam.[27] Nuclear opponents point to numerous "abnormal occurrences" in recent years as evidence that the "China Syndrome" may not be so unthinkable.[28] Nuclear advocates, on the other hand, cite nearly 5,000 reactor years of operations without an actual disaster, a reactor year being the operation of one reactor for one year.[29]

In recent years, a war of numbers has been waged over the actual amount of risk involved in nuclear plant operation. The main strategic point of the war is a report done for AEC and NRC, WASH-1400, the so-called Rasmussen Report, named for project director and MIT nuclear engineering professor Norman Rasmussen. Released on October 30, 1975, the report employed a sophisticated form of fault-tree/event-tree analysis used by the National Aeronautics and Space Administration (NASA) to trace events to affirm that "the risks to the public from potential accidents in nuclear power plants are comparatively small."[30] For example, in the case of one hundred operating reactors, the chance of an accident involving one thousand or more fatalities is once in a million years.[31] NRC readily accepted the findings, but representative Morris Udall (D-Ariz.), chairman of the House Interior and Insular Affairs Committee, commissioned a review of the report by a panel headed by Harold Lewis, a physicist from the University of California at Santa Barbara. In January, 1979, NRC accepted the panel's findings praising Rasmussen's efforts, yet challenging his methodology and attempts to quantify that which may not be quantifiable.[32] Nonetheless, despite UCS assertions to the contrary, NRC insisted WASH-1400 had not been used in any important licensing dcisions.[33]

The government not only lacks a generally accepted risk assessment procedure, but it also does not have a streamlined and acceptable licensing process. The licensing process takes ten to twelve years. Last year, the Carter Administration tried to gain Congressional approval for a streamlined licensing proposal, consisting of early review of construction before building commences, approval of standardized designs, preselection of sites and placement of sites in "site banks," and increased opportunities for use of intervenors in proceedings. However, the bill got nowhere because of strong environmental objections raised during hearings in the House Energy and Power Subcommittee.[34]

## Nuclear Politics Case Studies

### *Detroit*

Professor Rasmussen might not have bothered with his study if all reactors had behaved like the Detroit Edison Enrico Fermi breeder reactor south of Detroit. The project was an economic and technical disaster from the beginning. Much local opposition arose over the supposed "star chamber" approach taken by the AEC in licensing the plant, including a suit by the United Auto Workers to halt construction. The plant ultimately was built, but only functioned for a few weeks in 1966 before it had a near meltdown which was not controlled for several months. Afterward one engineer remarked, "we almost lost Detroit." The event has become a rallying point for antinuclear forces.[35]

### *Diablo Canyon*

In California, the most serious controversy has been the effort to prevent the operation of a plant built on the San Andreas fault. Pacific Gas and Electric, which built the Diablo Canyon reactor, denied U.S. Geological Survey (USGS) reports that earthquakes in the area could be more severe than the plant could withstand. As the controversy dragged on, the site became the focus of several demonstrations by the Abalone Alliance, a group formed to oppose the construction of the plant.[36]

### *Browns Ferry*

Until Three Mile Island, the most serious nuclear accident had taken place in 1975 at the Tennessee Valley Authority's (TVA) Browns Ferry reactor near Decatur, Alabama. Here, a seven-hour fire broke out as a result of routine checks for air leaks in electrical cables. An independent post-mortum investigation for TVA raised the possibility that the plant's management was negligent in not realizing that the cables would burn, and not providing for adequate fire-fighting techniques. The nuclear industry responded that the safety system had in fact worked and prevented a meltdown.[37] Perhaps as a consequence of the incident, NRC has strongly pushed a series of Loss of Fluid tests (LOFT) at the Idaho National Engineering Laboratory, begun in 1978.[38]

### *State Initiatives in 1976*

At the same time that nuclear power became a major campaign issue in 1976, nuclear opponents in several western states tried to mandate atomic curbs by the initiative process. The most celebrated of these initiatives was Proposition 15 in California. The state-wide organization Californians for Nuclear Safeguards gathered enough signatures to place the complicated proposal on the June 1976 ballot. Among its provisions were: (1) a moratorium on licensing unless Congress removed the Price-Anderson Act Liability limits; (2) a requirement for approval by a two-thirds vote of the

legislature for all new plants; (3) a fifteen-member Nuclear Advisory Panel to draw up evacuation plans; and (4) a requirement that existing plants cut back to 60 percent of capacity until the safety and waste issues could be resolved.[39] Governor Edmund G. (Jerry) Brown attempted to head off the initiative by pushing three compromise bills through the legislature. Two of them called for a halt to licensing until the NRC had adopted final rules on waste disposal. A third denied use of land for nuclear sites until the state's Energy Resources Conservation and Development Commission completed a study of the necessity for and effectiveness of putting plants underground or building large containment structures around them.[40]

Polls taken before the vote indicated much confusion over the initiative.[41] Perhaps because of this confusion, nuclear opponents' inability to communicate their positions well, and the heavy campaign spending against the proposal by Pacific Gas and electric ($3 million), the initiative failed by a two-to-one margin.[42] Similar initiatives went down to equal defeats in November in Washington, Oregon, Montana, Colorado, Arizona, and Ohio (Table 1). The only significant difference in provisions was the Oregon "grandfather clause" which would have allowed the Trojan Atomic energy plant in Rainier to keep going. In all those states, as in California, there were conserted efforts by utilities to stop the movements.[43]

### *Seabrook*

After the landslide failure of the initiative route, the antinuclear effort shifted to nonviolent civil disobedience, and the focus of the new strategy became the Public Service Company of New Hampshire plant at Seabrook on the Atlantic coast. Since 1976, there have been three major demonstrations at the plant, all organized by the Clamshell Alliance, a regional umbrella grouping of anti-nuclear forces.[44] The most noteworthy was the May Day 1977 occupation of the site, in which conservative Governor Meldrim Thompson ordered the arrests of fourteen hundred persons for trespassing.[45] At the same time, the Mobilization for Survival, an umbrella for the regional groupings, organized demonstrations throughout the country.[46] The nuclear issue had clearly entered the realm of confrontation politics.

### *Conclusion*

Although the issues involved in nuclear power are highly technical, national political issues regarding its development and regulation are charged with emotion and invective. Nuclear opponents probably have a propoganda advantage because of their position as underdogs exposing environmental and public health goals in the face of big industry, but proponents still have a powerful argument that nuclear energy is perhaps the only abundant energy source close at hand. This energy crisis factor has kept the nuclear option alive in the political wars so far, but, in light of the growing concern over plant safety in the wake of Three Mile Island, Congress and the public must decide whether or not the potential harm outweighs the tangible benefit of fission power. Certainly the accident at Three Mile Island has assured that the nuclear issue will continue to have high visibility.

*Joel R. Campbell*

**Table 1**

**Statewide Votes on Nuclear Moratoriums During 1976**

| State | Date | For Moratorium | Against (For Nuclear) | Percent for |
|---|---|---|---|---|
| Arizona | 11/2 | 207,828 | 486,467 | 30 |
| California | 6/8 | 1,921,791 | 3,988,476 | 33 |
| Colorado | 11/2 | 292,876 | 713,312 | 29 |
| Montana | 11/2 | 120,557 | 175,925 | 41 |
| Oregon | 11/2 | 418,567 | 571,243 | 42 |
| Ohio | 11/2 | 1,143,675 | 2,435,959 | 32 |
| Washington | 11/2 | 414,397 | 838,105 | 33 |

Source: Texas Energy Advisory Council, 1977.

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# Chapter 12

# United States Policies Affecting International Control of Nuclear Technologies And Materials

## Issue Definition

Nuclear energy has become a significant contributor to the electric-generating capability of the United states and of many countries overseas. In the wake of uncertainties over the reliability of supplies of fossil fuels from the petroleum-exporting nations, it is now viewed by some nations as their only hope of achieving any degree of energy self-sufficiency.

Virtually every nation involved in the conduct of a nuclear program has experienced public opposition arising from concern over the environmental, economic, and proliferation risks associated with nuclear power. While economic and environmental concerns are essentially domestic issues, proliferation is clearly international in scope.

As a major supplier of the materials, facilities, and "know-how" which are an integral part of many foreign nuclear programs, the United States has a responsibility to establish policies which are sensitive to proliferation possibilities.

The main issues for consideration are:

1) the role of the U.S. as a reliable supplier of nuclear fuels in discouraging the development of foreign enrichment capabilities which may provide a pathway to weapons manufacture;
2) U.S. efforts which serve to control proliferation possiblities posed by weapons-grade materials present in spent reactor fuel elements; and
3) the role of the U.S. in providing an adequate security environment for its allies in order to discourage these countries from developing their own nuclear weapons capabilities.

## Background

Shortly after the use of atomic weapons against Japan in 1945, the United States, Canada, and Great Britain issued a joint statement proposing a policy to govern the spread of nuclear technology. In this Tripartite Declaration, the three countries agreed that the distribution of information concerning the "industrial" use of nuclear energy should be preceded by a system of international controls and safeguards.

In January of 1946, the United Nations General Assembly adopted a resolution calling for the establishment of an United Nations Atomic Energy Commission to provide for "control of atomic energy to the extent necessary to ensure its use only for peaceful purposes."[1] Shortly thereafter, the U.S. delegate to the Commission, Bernard Baruch, submitted a plan calling for the creation of an "International Nuclear Development Authority" which was to oversee all phases of development and use of atomic energy. In essence, the Baruch Plan would have provided for international ownership of all major nuclear facilities. The proposal failed to receive the necessary support, however.

The U.S. Atomic Energy Act of 1946 echoed many of the major concerns over the spread of nuclear materials and technology which had been expressed in the Tripartite Declaration of 1945. The Act placed rigid restrictions on the dissemination of information on nuclear technology to other nations. These restrictions could be removed only after "Congress declares by a joint resolution that effective and enforceable safeguards against the use of atomic energy for destructive purposes have been established."[2]

U.S. atomic energy policy was modified in 1951 when Congress amended the 1946 Act to allow a limited exchange of restricted information on nuclear technology with other nations. The change was made in response to a request by President Truman that Canada and Great Britain be allowed access to information on technical matters short of that needed to construct an actual nuclear weapon.

With the successful detonation of a Soviet thermonuclear device in 1953, the political environment of negotiations on nuclear technology changed dramatically. Any margin of nuclear superiority enjoyed by the U.S. was slowly but surely diminishing while a seven-year effort to bring atomic energy under international control remained deadlocked. At the same time, there was a growing belief that nuclear energy would be essential in meeting the world's demand for electric power.

On December 8, 1953, President Eisenhower delivered

his famous "Atoms for Peace" address to the United Nations General assembly. Eisenhower acknowledged the impact of a thermonuclear impasse and then went on to suggest the establishment of an International Atomic Energy Agency (IAEA). Under the plan, the governments principally involved in the nuclear arena would contribute some fraction of their stockpile of fissionable materials to the IAEA, which would have responsibility for storage and protection of the contributed materials. Storage facilities were to be located somewhere other than in a country possessing nuclear weapons.

Thus the Atoms for Peace plan embodied limited nonproliferation goals; yet, it represented a significant retreat from the strict controls advocated in the Baruch Plan. At best, it represented a least common denominator from which to work toward future nonproliferation goals.

The Atomic Energy Act of 1954 provided the basic changes in domestic law which were necessary to accommodate the goals of the Atoms for Peace plan. In addition to providing for the domestic development of nuclear energy, the Act also contained provisions for international exchange of nuclear technology. The Act allowed the government to participate in an international "atomic pool" which was to be one of the prerequisites for membership in the IAEA. Furthermore, it authorized the United States to enter into "agreements for cooperation" with other nations regarding the peaceful uses of nuclear energy.

It was 1957 before the International Atomic Energy Agency envisaged in Eisenhower's Atoms for Peace proposal finally came into existence. The original concept of the IAEA as a repository for fissionable materials has never been fully implemented. Instead, its primary role has become the administration of safeguards. A limited safeguards system governing research reactors was established in 1961 and a system applicable to full scale reactors received approval in 1963.[3] The system was expanded in 1966 to cover reprocessing and in 1968 to govern conversion and fuel fabrication plants.[4] Thus, the entire nuclear fuel cycle, with the exception of enrichment, is now subject to IAEA safeguard procedures.

Concern over the spread of nuclear weapons led to a Limited Test Ban Treaty signed in 1963 by the United States, the Soviet Union, and Great Britain. Although the agreement received broad acceptance, it was apparent that a partial limit on nuclear weapons testing would not be sufficient to deter effectively the spread of nuclear weapons. However, the positive momentum which the Test Ban imparted to the arms control movement was an important first step toward the conclusion of a comprehensive nonproliferation treaty.

The Nonproliferation Treaty (NPT) entered into force in March 1970. It seeks to provide a comprehensive framework for worldwide nuclear safeguards. Yet, it protects the "inalienable right" of every signatory to engage in peaceful nuclear activities. The disarmament responsibilities of the signatories are broadly spelled out in Article VI:

> Each of the Parties to the Treaty undertakes to pursue negotiations in good faith on effective measures relating to cessation of the arms race at an early date and to nuclear disarmament, and a Treaty on general and complete disarmament under strict and effective international control.

Under the NPT, the IAEA is charged with responsibility for establishing a safeguards system which will effect "the timely detection of diversion of significant quantities of nuclear materials from peaceful nuclear activities to the manufacture of nuclear weapons... and deterrence of such diversion through the risk of early detection."[5] IAEA measures, however, consist primarily of bookkeeping procedures which offer little or no chance of actually preventing the theft or diversion of nuclear materials. Many critics argue that this represents a major flaw in the current safeguards system.

## Current Status

### *Nuclear Power Countries*

To date, the United States has installed nuclear generating capacity accounting for approximately 12 percent of its current consumption of electricity. Nineteen countries outside the U.S. are presently operating nuclear plants. Table 1 lists the number of reactors operating in both noncommunist and communist nations.[6]

In addition, the following fourteen nations have nuclear power plants in the construction or planning stage, though not yet in operation: Australia, Brazil, Egypt, Hungary, Iran, Korea, Luxembourg, Mexico, Phillipines, Poland, Rumania, South Africa, Taiwan, and Yugoslavia. Four other nations—Australia, Denmark, Israel, and Thailand—are reported to be seriously considering the use of nuclear power.[7]

It has generally been assumed that the principal motive for an interest in nuclear power is the desire for a cheaper source of energy. The economic advantage of nuclear power is now being seriously questioned, however, particularly in smaller developing countries which cannot afford the burden of the large capital-intensive plants associated with nuclear generation. Furthermore, many small countries are unable to utilize the large generating capacity (850-1250 MWe) necessary for nuclear power to achieve economies of scale.

Noneconomic motives have been suggested to lie at the heart of much of the overseas demand for nuclear power

## Table 1

### Nuclear Power Plants Outside the United States

| Noncommunist Countries | No. of Operating Power Plants |
|---|---|
| West Germany | 10 |
| Great Britain | 31 |
| Canada | 7 |
| Japan | 13 |
| Sweden | 6 |
| France | 10 |
| Belgium | 3 |
| Switzerland | 3 |
| Spain | 3 |
| Italy | 3 |
| Netherlands | 2 |
| India | 3 |
| Finland | 1 |
| Pakistan | 1 |
| Argentina | 1 |
| **Communist Countries** | |
| USSR | 16 |
| Bulgaria | 2 |
| Czechoslovakia | 1 |
| East Germany | 3 |

Source: M.R. Segal, *Nuclear Fission Technology–Non Breeder*, (Washington, D.C.: Library of Congress Congressional Research Service, 1978), p.9.

facilities. One such motive is the prestige associated with high technology industrias such as nuclear power generation. Another noneconomic motive is the desire to establish a technological base for nuclear weapons production. Finally, long-term security of energy supplies may cause many nations to pursue nuclear technologies.

Overseas, as in the U.S., nuclear power has been a source of controversy and intense public debate in recent years. One of the most striking examples of public concern over nuclear power was the November 1978 national referendum in Austria. Voters there rejected the start of operations of a completed $530 million nuclear power plant which had taken seven years to complete.[8] In February 1979 a similar referendum was held in Switzerland. The Swiss government narrowly won approval of its nuclear program by a margin of less than 1 percent. An unidentified group of demonstrators who were unhappy with the vote later set off an explosion at a nuclear facility causing an estimated $60 million in damages.[9]

### *Nuclear Weapons Countries*

There are currently six nations which are known to possess nuclear weapons,* and there is suspicion that Israel may also have nuclear capabilities. A nation wishing to acquire nuclear weapons status must have the following:

1) uranium;
2) trained personnel and information to build and operate facilities and to design and fabricate weapons; and
3) facilities to produce highly enriched uranium or plutonium from natural uranium.

A nation operating a nuclear power reactor has essentially satisfied the first and third requirements. A small nuclear device may be fashioned from about ten kilograms of plutonium or about twenty kilograms of uranium enriched to contain 20 percent U-235. Although it has long been maintained that reactor-grade plutonium is not pure enough to produce a nuclear weapon, the ERDA announced in 1977 that it is possible to build a weapon using reactor fuels and that its predecessor, the AEC, successfully detonated such a device "some time ago."[10] The AEC also verified the fact that the lack of trained personnel is not a major barrier to weapons production. Two graduate students hired by the AEC were able to design a workable bomb in less than six months using readily available current literature.[11]

## Policy Analysis

### *Proliferation Concerns*

President Carter addressed proliferation concerns almost immediately after assuming office. On April 7, 1977 he announced that the United States would defer indefinitely the reprocessing and recycling of plutonium, restructure the U.S. breeder program to seek designs not utilizing plutonium, increase U.S. capacity to produce enriched uranium, and continue to embargo the export of enrichment and reprocessing facilities. Although it was acknowledged that the U.S. could not impose this policy on other nations, the President made it clear that he hoped the principles suggested in the plan would be universally followed.

The Carter plan has attracted widespread criticism abroad, particularly in Europe and Japan where advance programs are underway on reprocessing, plutonium recycling, and breeder reactors. Furthermore, many nations have expressed serious doubt over the ability of the U.S. to guarantee supplies of enriched uranium.

*the United States, the Soviet Union, Great Britain, France, India, and China.

In an effort to ease concern over nuclear fuel supplies, Carter has proposed the establishment of an international nuclear fuel bank. Under the plan (which is essentially identical to the fuel bank proposal in the Atoms for Peace plan), a supplier would deposit enriched uranium and other nuclear fuels in a repository which would serve as a buffer supply source for nuclear importers in the event an exporter fails to fulfill the terms of a fuel contract.

A similar proposal has been made for the establishment of an international storage facility for spent reactor fuels which contain weapons grade materials. In the event that such a proposal fails to receive support, President Carter has suggested that the feceral government would buy and store spent reactor fuel from U.S. reactors and from foreign facilities which use American fuel.[12]

Congressional interest in nonproliferation policy subsided after the United States ratified the Nonproliferation Treaty in 1970. Concern was renewed, however, when India exploded a nuclear device in 1974. In 1978, Congress completed work on several pieces of legislation dealing specifically with nonproliferation. The most far-reaching of these measures was the Nonproliferation Act of 1978 (PL 95-242).

The Act requires that the U.S. enter into three simultaneous negotiations:[13]

1) To establish an international stockpile of slightly enriched uranium and, ultimately, establishment of an international nuclear fuel authority to supply nuclear fuel to nations that adhere to certain nonproliferation commitments.
2) To renegotiate all existing agreements for nuclear cooperation with other nations and international organizations.
3) To seek agreements with other nations, or groups of nations, to adhere to certain policies for control of nuclear exports.

The Nonproliferation Act points to a growing realization of the nexus between reliability of supply and effective nonproliferation policy. Furthermore, the Act also recognizes the fact that the U.S. is only one of several nuclear supplier states and that it is therefore not possible for this nation unilaterally to dictate nonproliferation policy.

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Foreign policy decisions which are seemingly unrelated to nuclear energy may actually have far-reaching effects on efforts to contain the spread of nuclear weapons. Of particular importance are policies which affect the security environment in which a nation makes its nuclear decisions. Officials in Turkey, Pakistan, Taiwan, and South Korea have indicated that there might be circumstances under which they would view the acquisition of nuclear weapons to be imperative—e.g., the weakening of U.S. security commitments or the refusal of the U.S. to supply conventional arms.[14]

The recent decision of the United States to recognize the People's Republic China might be an example of a foreign policy which will affect efforts to control proliferation.

> A country with several thousand megawatts capacity in 1985, such as Taiwan, might produce a nuclear device within a year of a decision to do so—if at that time it had its own enrichment or reprocessing capacity. If, on the other hand, such "sensitive" facilities were not available at the outset, the lead time would be lengthened by no more than a couple of years, especially if local personnel had prior experience.... If the country chose to test an early device for political or confidence purposes, the detonation might be the first public notice of a program, since most or all of the preparatory activities could be carried out clandestinely.[15]

It is apparent, therefore, that the pending legislation in Congress to guarantee the security of Taiwan may prove to be essential to nonproliferation objectives.

### *Nuclear Supplier Guidelines*

There is concern among many supplier nations that the existing international agreements do not adequately guard against the possibility of nuclear weapons proliferation. In January 1979, fifteen nuclear supplier nations met to adopt restrictions,* in addition to IAEA-NPT safeguards, to govern transfers of nuclear materials, equipment, and technology. Certain exports were placed on a "trigger" list and made subject to the following safeguards:[16]

1) adequate physical protection for exported items;
2) IAEA safeguards for all transferred items;
3) IAEA safeguards for any replication of sensitive technology;
4) extension of export controls to any retransfer of supplied items, or items derived from them, with supplier's consent required on major items;
5) consent of the supplier nation and notice to the IAEA for the use of transferred technology to produce uranium enriched to more than 20 percent;
6) support for all IAEA safeguards; and

*Agreeing nations were the U.S., the U.S.S.R., Great Britain, Canada, France, West Germany, Japan, Poland, East Germany, Czechoslovakia, the Netherlands, Sweden, and Switzerland.

7) design of equipment to facilitate safeguards.

Recent bilateral agreements from certain suppliers have contained even more stringent restrictions than those listed above.

## Policy Alternatives

Control over the actual materials used to fabricate nuclear weapons is an essential element of any nonproliferation program. The U.S. should, therefore, maintain its position as a reliable supplier of enriched nuclear fuel elements. This will hopefully discourage other nations from developing enrichment capabilities which would enable them to produce weapons-grade materials. As an alternative, the U.S. should promote the concept of an international nuclear fuel bank such as that suggested in the Nonproliferation Act of 1978.

The international fuel repository concept may also provide a solution to the proliferation problems posed by weapons-grade plutonium present in spent fuel assemblies. In the event that an international storage facility fails to come into being, the U.S. should provide for the return of spent fuel assemblies.

Finally, foreign policy decisions—especially those affecting an ally's perception of national security—should be made with a realization of the effect such decisions will have on proliferation objectives.

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# Chapter 13

# States' Rights and Radioactive Wastes

The delay in demonstrating a permanent nuclear waste repository has combined with serious fears about the safety of containment technologies to increase skepticism over federal radioactive waste management policy. More and more states have challenged the federal government's exclusive authority to site and regulate nuclear waste facilities. Eventually, the courts and congress may clear up the conflict between the federal government's jurisdiction over radiological hazards and safety and state powers to impose environmental and land use controls. State concerns will not be abated, however, until the Nuclear Regulatory Commission and the Department of Energy are able to assure the public of a safe, reliable, and timely method of disposal which takes into account local and regional fears and demands.

## Issue Definition

Much of the current opposition to commercial nuclear power centers on the inadequacy of and uncertainties about federal radioactive waste management policy.[1] Thirteen states now ban the siting of nuclear waste repositories within their boundaries. At least eleven other states have considered but not passed such bans this year.

Whether or not states have the authority to impose restrictions on waste repositories is unclear. The federal government claims exclusive jurisdiction over radioactive waste disposal pursuant to the Atomic Energy Act of 1954 as amended. Many states, however, reject the notion that they do not have final appoval over nuclear facility (including waste repository) siting and land usage. The Congressional Research Service notes changing state attitudes:

> [Previous to the energy crisis] Federal preemption was regarded as an adequate and perhaps even compelling excuse for State avoidance. This is no longer the case.[2]

## Background

The exclusiveness of federal law in certain areas is based upon the "supremacy clause" of the United States Constitution.[3] Under what the courts have called the doctrine of preemption, state laws which conflict with or obstruct federal legislation on an exclusive issue ("occupied field") must be declared unconstitutional and void.

In 1972, the Eighth Circuit Court handed down a landmark decision in *Northern States Power Company v. Minnesota.* The decision in this case is the source of the basic definition of federal preemption in nuclear energy. Minnesota's Pollution Control Agency had attempted to set regulations governing the discharge of radioactive effluents. The standards set were stricter than those established by the AEC regulations. The Northern States Power Company which owned the Monticello nuclear plant filed suit to have the state's regulations overturned. The court sided with the power company, stating that "the federal government has exclusive authority under the doctrine of preemption to regulate the construction and operation of nuclear power plants, which necessarily includes regulation of the levels of radioactive effluents discharged from the plant."[4]

No explicit declaration of federal preemption appears in the Atomic Energy Act. Instead, the court inferred an intent to preempt by drawing upon the legislative history of the Atomic Energy Act. The court concluded that the subject matter at hand, cloaked in terms of common defense and national security, demanded uniform regulation.[5]

The court's action gave authority to the belief that the federal government had near total power in the atomic energy field. Of particular interest to the waste issue was the following declaration:

> ... Were the states allowed to impose stricter standards on the level of radioactive waste releases discharged from nuclear power plants, they might conceivably be so overprotective in the area of health and safety as to unnecessarily stultify the industrial development of electric power.[6]

This clearly implies that the promotional objectives of the Atomic Energy Act are deemed important and even superior to state regulations which restrict this objective. Sidestepped was the degree to which nonradiological regulation might interfere with Congressional "objectives," most importantly, with the duty ascribed to the AEC (now the Department of Energy (DOE)) to encourage the development of commerical nuclear power.

Certainly the courts' attitude toward preemption has

not always been so favorable to the federal government. Furthermore, there is reason to believe that future decisions may interpret federal statutes more narrowly.

Following a period of state ascendancy in court conflicts, the first major case to invoke the preemption doctrine in modern times was *Hines v. Davidowitz* in 1941. Even here, however, the court declared:

> Every Act of Congress occupies some field, but we must know the boundaries of that field before we can say that it has precluded a state from the exercise of any power reserved to it by the Constitution. To discover the boundaries we look to the federal statute itself, read in the light of its constitutional setting and its legislative history.[7]

In *Northern California Association v. Public Utilities Commission* (1964), the California Supreme Court found that federal law did not preempt state authority in safety, zoning, and location of atomic reactors, provided that the state did not regulate radiation hazards.[8]

At the highest level, there is some indication that the Burger Court's inclination to invoke preemption may be less encompassing. Catz and Lenard, writing in *Hastings Constitutional Law Quarterly,* note that "recent decisions of the Supreme Court regarding problems of federal preemption have sought to balance state and federal interests."[9]

Summary affirmance by the Supreme Court on the *Northern States* case indicates that Congressional intent to encourage commercial atomic power may not be strong enough to deny some forms of bans on nuclear power plant and waste disposal siting.[10]

It may be further argued that the Energy Reorganization Act of 1974 reduced the scope of federal jurisdiction in atomic energy. This statute split the AEC's functions in two. The promotional objectives contained in the Atomic Energy Act were assigned to the Energy Research and Development administration (now part of DOE), while health and safety issues were placed under jurisdiction of the Nuclear Regulatory Commission (NRC). In regulatory conflicts, therefore, it is conceivable that the promotional objectives will carry less weight in future preemption cases.

Clarification of the scope of federal preemptive authority should be forthcoming. Two suits have been filed in federal court seeking to overturn California's recently passed nuclear safety laws. Among other issues, these statutes impose a prohibition on nuclear reactor construction until the legislature is satisfied that federal radioactive waste management policy is adequate to care for California's spent fuel.

## Current Status

It is possible that Congress may remove some of the ambiguities between federal objectives to regulate and promote nuclear power and state powers to impose environmental and land use regulations. Bills have been introduced to allow states veto power over repositories and to allow greater state authority in licensing procedures.

DOE, however, made it clear on January 25, 1979, that it opposes state veto power over repositories. In fact, the federal bureaucracy may attempt to bolster its already strong position. NRC Chairman Joseph Hendrie recently caled upon the senate to limit further states' powers.[11]

The Carter Administration officially favors a "consultation/concurrence" process in siting waste repositories. The details are as yet uncertain, other than that early warning on site potentials will probably be provided to affected states. Without some kind of judicially acceptable regulatory authority, however, states will not have the final word on repository siting in their boundaries.

## Policy Analysis

How much power do the states have in siting and regulating nuclear waste repositories? According to the preemption doctrine of the courts, the answer is probably "not much." It is important to note, however, that no court case has ever tested a state's right to prohibit waste repositories or to impose regulations outside the realm of radiation hazards.

In a sophisticated analysis of state nuclear power plant siting regulations, David G. Norrell divided "restrictive" state legislation into four categories: 1) absolute prohibition; 2) conditional prohibition; 3) comprehensive regulation; and 4) state approval prior to consideration. Similar categories appear appropriate for anlayzing state legislation on waste repositories.[12]

Absolute prohibitions of waste repositories have been passed by two states. Michigan's law firmly states that "radioactive waste may not be deposited or stored in this state."[13] a conditional prohibition has been enacted by Montana. The Montana statute reserves the right to approve major nuclear facilities provided that several conditions are met (e.g., bonds must be posted to protect the public from loss). The comprehensive regulatory scheme is illustrated by Rhode Island's law which regulates radioactive wastes as pollutants.

The state-approval-prior-to-construction model appears to be the favorite. Vermont is one of seven states which prohibit waste repositories unless approved by the legislature. Additionally, one state (Louisiana) has declared its right to veto a designated "test" of a waste repository if local parish governments or the natural resources committees of the state assembly object to the repository site in writing.

Clearly, the Louisiana model oversteps states' bounds in the field of nuclear energy. State and local vetoes are

not now permitted by DOE or the NRC. The fact that Congress is now considering legislation to allow states a veto over repositories signifies that Congress does not currently recognize such rights. Neither do the courts, as *Boswell v. City of Long Beach* (1960) demonstrated.[14]

Absolute bans on waste repositories such as that in the Michigan law do stand some chance of surviving court challenges, if only for the reason that exercise of land use control has traditionally and expressly been left to the states.[15] Provided that the courts do not see bans on waste repositories as a regulation of radiation hazards, laws like Michigan's stand to be vindicated. Nonetheless, many legal scholars feel that regardless of the language of the statutes, absolute prohibitions actually seek to control radiation hazards, which is the exclusive authority of the NRC. Only a court test, however, will reveal the validity of such bans.

### Table 1

### Restrictions on Radioactive Waste Disposal Imposed by the States (through April 1979)

**Total Bans** (Unconditional Prohibition Model)

Michigan*
Oregon

**Comprehensive Regulatory Schemes Which Preclude Waste Repositories** (Conditional Prohibition)

Montana
California

**Comprehensive Regulation of Radioactive Wastes** (Comprehensive Regulatory Model)

| | | |
|---|---|---|
| Kentucky*** | Minnesota*** | Rhode Island |
| Hawaii*** | Kansas | |

**Bans on Radioactive Waste Repositories Unless Approved by State Legislature** (Prior Approval Model)

| | | |
|---|---|---|
| Vermont | Kentucky** | South Dakota** |
| Alaska | Minnesota | North Dakota |
| Hawaii | | |

**Right to Veto Waste Disposal Sites** (Conditional Approval)

Louisiana

Source: Data derived from several issues of the *Information Report on State Legislation*, 1978-79.

*exempts on-site storage, temporary storage, and storage or disposal or uranium mill tailings

**exempts uranium ore and mill tailings

***though comprehensive regulation of radiation and radioactive wastes are provided for, all three states also ban new nuclear repositories without the approval of their Legislature.

Norrell found that, in power plant siting, the conditional prohibition model (Montana) is also subject to preemption. Here, the penalty prescribed for failure to meet specified conditions (a ban on construction) would be thrown out for the same reasons that the absolute prohibition model might be precluded. Additionally, the federal government or private waste managers (under jurisdiction of the NRC) would be recognizing the supremacy of state regulation which is unfounded and acquiescing to discrimination against the nuclear power industry. In the Montana case, the conditions themselves violate NRC regulations: 1) the right to determine whether nuclear facilities are built or operated is believed to be the exclusive perogative of the NRC; 2) the requirement for "no reasonable chance" of radioactive escape violates the NRC's exclusive jurisdiction in regulating radiation hazards as the *Northern States* case declared; and 3) a utility's waiver of liability limits violates the federal Price-Anderson Act, which precludes states from requiring nuclear facilities to waive liability limits set by the NRC.

The *Northern States* case would serve as a precedent in striking down comprehensive regulatory schemes like Rhode Island's. Regulation of radiation hazards by the states is not permitted. *Train v. Colorado Public Interest Research Group* (1976) reemphasizes this point.

Only Vermont's prior-approval model is likely to survive a preemption test. Perhaps that is why it is the most popular. The purpose of this model will be difficult to detect, either from the language or from the effect of the act. Waste facilities may, after all, be approved, and if not, many reasons may be given; an astute legislature would certainly not include radiation hazards among the reasons cited. Furthermore, this type of statute is firmly rooted in states' land use powers. Finally, this model contains an implicit catch, as Norrell points out: "if the existence of the law deters utilities (or the federal government) from requesting legislative approval, it may also preclude conclusive judicial review of the statute in the near future."[16] In the past, mere political opposition to potential waste sites has been sufficient for DOE to withdraw its consideration (e.g., in Kansas and Michigan).

One point is clear: increasing state concern over waste management policy will not be abated by preemption cases or newly developed guidelines for input. A resourceful, safe, and timely federal policy on waste disposal will be required to quiet state fears. To quell the demands by the states for greater authority may require appeasement legislation allowing for state compensation and/or state veto power. Passage of federally imposed storage fees which include compensation to the states may prove to be an incentive as well as a compromise.

The side effects of further delays in setting U.S. radioactive waste policy could cripple the tarnished

nuclear industry. Off-site storage is needed to avert the unnecessary dangers of a reactor without the capability of full core discharge; and with most reactor pools designed to hold only about one-and-two-thirds full cores, many reactors have lost, or will soon lose, this storage capability. Already five states (Wisconsin, New York, Maine, Iowa, and California) have banned new reactors in their states; a major reason was concern over unresolved radioactive waste management issues. Public confidence must be secured by demonstrating credible and safety-conscious planning, open dealing with the public, and a sensitivity for local and regional fears and demands.

## Policy Alternatives

Two of the sites now being considered for a permanent radioactive waste repository are in Texas—the Gulf Coast salt domes and the Permian Basin salt formations. Regardless of whether Texas is selected at this time, federal policy to pursue several regional disposal centers means that Texas may not be stricken forever from the lists. The state has a variety of options open to it.

The Texas Legislature could pass a resolution encouraging DOE to site a radioactive waste facility in Texas; Nevada is the only state to have done so at this point. The Governor could also assure DOE of Texas' openness to participate in the federal waste disposal program. It is conceivable that as Texas begins to use nuclear power to meet part of its electricity demand, Texans may feel a responsibility to accept some of the risks of radioactive waste disposal.

Governor Clements did, in fact, suggest that Texas might be willing to accept this risk. But, given his hasty retraction, it is more likely that Texans, uncertain of radioactive containment technologies and aware of the large number of recent "leaks" (many at previously unknown sites), may wish to discourage radioactive waste disposal in this state. A ban on permanent radioactive waste facilities could then be instituted statutorily; the Vermont model provides the best assurance against the federal preemption doctrine. Other methods of discouraging state participation include the institution of prohibitive taxes on radioactive wastes (Kentucky has a waste tax, though its rates are far from prohibitive); the implementation of strict radiation pollution guidelines pursuant to the National Environmental Policy Act and the Federal Water Pollution Control Act (subject to federal preemption); and the passage of legislative resolutions asking DOE to withdraw Texas from the list of potential repository sites. The Governor might also communicate this desire. Michigan and Kansas have had their names removed after local citizens and their governors raised protest. Given the number of states which have so recently passed radioactive waste storage bans, however, it is questionable how much longer this policy may remain viable to DOE and to the national interest.

Texas could wait and see which site is selected and then determine whether or not to cooperate. The proposed consultation/concurrence process could afford Texas adequate time to respond to DOE and work out any differences that might exist.

Additionally, there are a few peripheral issues which Texas may desire to pursue as an energy leader. These include compensation to states with nuclear waste repositories; allowing states tax and veto powers; allowing states to set stricter radiation standards than those imposed by the NRC; and encouraging regional equity in site selection. All these issues may eventually affect Texas and, particularly, Texas consumers of nuclear-generated electricity.

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[1]According to recent Harris polls; see Dorothy Zinberg, "The public and nuclear waste management," *The Bulletin of the Atomic Scientists,* 35 (January 1979), p. 35.

[2]Donna S. Kramer, "Nuclear Power Plants: State/Federal Control," Issue Brief Number IB 77035 (Washington, D.C.: Congressional Research Service, July 28, 1978), p. 4.

[3]Article VI, clause 2 of the U.S. Constitution:
"This Constitution, and the Laws of the United States which shall be made in Pursuance thereof; and all Treaties made, or which shall be made, under the Authority of the United States, shall be the supreme Law of the Land; and Judges in every State shall be bound thereby, any Thing in the Constitution or Laws of any State to the Contrary notwithstanding."

[4]Quoted in Richard F. Yates, "Preemption Under the Atomic Energy Act of 1954: Permissible State Regulation of Nuclear Facilities' Location, Transportation of Radioactive Materials and Radioactive Waste Disposal," *Tulsa Law Journal,* 11 (1976), p. 397; see also Kramer, *op. cit.,* p. 3.

[5]Yates, *op. cit.,* p. 403.

[6]J. Michael McGarry III and Troy B. Conner, Jr., "The Nuclear Alternative: An Analysis of Paralysis," *Hastings Law Journal,* 28 (May 1977), p. 1224.

[7]Robert Catz and Howard B. Lenard, "The Demise of the Implied Federal Preemption Doctrine," *Hastings Constitutional Law Quarterly,* 4 (Spring 1977), p. 304.

[8]Howard B. Helman, "Pre-emption: Approaching Federal-State Conflict Over Licensing Nuclear Power Plants," *Marquette Law Review,* 51 (1967), p. 46.

[9]Catz and Lenard, *op. cit.,* p. 307; see also discussion of *Merrill Lynch, Pierce, Fenner & Smith, Inc. v. Ware* (1973), p. 320. For additional reference, see "Slaying the Nuclear Giants: Is California's New Nuclear Power Plant Siting Legislation Shielded Against the Attack of Federal Preemption?" *Pacific Law Journal,* 8 (July 1977), p. 754.

[10]Walter V. Hays, "State Power to Ban Nuclear Power Plants: the California Initiative as a Case in Point," *Environmental Law,* 6 (1976), p. 740. Also see discussion of *Goldstein v. California* (1973) in Catz and Lenard, *op. cit.,* p. 308.

[11]*Energy Users Report* 253 (June 15, 1978), p. 11, and 286 (February 1, 1979), p. 9.

[12]See David G. Norrell, "Application of the Preemption Doctrine to State Laws Affecting Nuclear Power Plants," *Virginia Law Review,* 62 (1976), pp. 738-787.

[13]States used as examples are drawn from descriptions of state legislation printed in several issues of *Information Report on State Legislation.*

[14]"Slaying the Nuclear Giants...," *op. cit.,* p. 767.

[15]Ibid., pp. 742-743.

[16]Norrell, *op. cit.,* p. 786.

# Chapter 14

# Austin and the South Texas Nuclear Project

## Issue Definition

Austin voters have now been to the polls five times in seven years to decide the extent of the City's participation in the South Texas Nuclear Project (STNP). The election of January 20, 1979, left the issues of nuclear power for Austin unresolved; the voters rejected a proposition to sell about one-half of the City's share in the STNP. The most recent election on April 7, 1979 saw voters approve one proposition authorizing the issuance of another $215.85 million in bonds for construction cost overruns and nuclear fuel, while rejecting a proposition to sell the City's entire share in the project. The events of 1979 are but another chapter in the politics of nuclear power in Austin.

This chapter will examine some of the questions about nuclear power as a political issue in Austin. These include the factors that have contributed to the politicization of nuclear power in general; the extent to which these and other factors have affected the politics, and particularly the elections, in Austin; and some concluding observations and recommendations on the future of nuclear power politics in Austin.

## Background

Austin's involvement in the STNP began when the City, along with Houston Light and Power (HLP), Central Power and Light (CPL), City Public Service (CPS) of San Antonio, and the Lower Colorado River Authority (LCRA), signed an Interim Participation Agreement on the project in June 1972. The LCRA withdrew as a participant on September 6, 1971, and voters rejected Austin's participation three days later.[1] The remaining partners continued planning the project and signed a Formal Participation Agreement in July 1973. Austin continued to express an interest in the project, and the City prepared another bond package, including participation in the STNP, for submission to the voters. This package was approved in November 1973, and on December 1, 1973, the Participation Agreement was amended to include the City of Austin with a 16 percent share in the STNP.[2]

Construction of the STNP actually began in August 1975, with an initial cost estimate of $1.126 billion. Prompted by construction cost increases of about $200 million, Austin Mayor Jeff Friedman appointed a study commission in the spring of 1976.[3] When that commission recommended that Austin withdraw from the project on the grounds of cost overruns, the City Council submitted to the voters in August, 1976 a proposition to sell Austin's 16 percent share in the project. That proposition was rejected by a three-to-one margin.

In January 1979, Austin voters were once again asked to vote on participation in the STNP. As a result of continued cost overruns, schedule slippage, and, according to City Council Member Richard Goodman, "the erratic and inaccurate flow of information about the project,"[4] voters were submitted a proposition to sell that portion of the City's share in the project that the already-approved bond issue of $161 million could not finance. The proposition was rejected, however, setting the stage for the April 1979 election. The City Council presented the voters with two separate propositions directly related to the STNP and two which dealt with an alternate electric-generating plant. The first of the STNP-related propositions asked for an additional $215.85 million in bonds to fund construction cost overruns and nuclear fuel; the second proposed to sell all of Austin's 16 percent share in the STNP. Voters approved the issuance of additional bonds and rejected the proposition to sell the City's share. They also rejected the propositions to invest in a coal- or lignite-fired plant.

## Current Status

When the voters approved the issuance of additional bonds, Austin's total investment in the STNP, including construction and nuclear fuel costs, was increased to $385.85 million. Construction on the two 1250 MW reactor units at the project is about 40 percent complete. The latest construction cost estimate is $2.007 billion. The Unit 1 reactor, originally scheduled to be operating commercially in October 1980, will now hopefully begin operating in April 1982. The Unit 2 reactor will begin commercial operation in April 1983 instead of its original date of March 1982.[5]

The current Participation Agreement among the four partners in the STNP shows each participant's share as follows:

| | |
|---|---|
| City of Austin | 16.0 percent |
| Central Power and Light | 25.2 percent |
| City Public Service | 28.0 percent |
| Houston Light and Power | 30.8 percent |

## Policy Analysis

The political course of nuclear power, unlike that of any other fuel source, has been dominated by the characteristics of the fuel. Much of the concern about nuclear power as an electric-generating fuel source can be traced to its emotional roots and the fact that its original use was for the destruction of lives and property. David Davis stated in 1978 that nuclear power generation has come to be a political issue dominated by three major concerns: national security, protection of the environment, and the "energy crisis" of the mid-1970s.[6] To these, one could today add a fourth concern: economics.

Early disputes about nuclear power focused largely on technical issues, but as these debates continued and "experts" disagreed, political questions began to emerge as those central to the debate: The principal issue involved is who is to resolve the controversial questions about the acceptability of risks associated with nuclear power as an electric generating source?

State and local governments as well as a number of interest groups entered the debate, demanding greater participation in the development of nuclear policy in this country. A key development in the politics of nuclear power was its placement on the ballot. Nelkin and Fallows state:

> The most significant turn of events in the nuclear debate, however, was the effort to place the issue on the ballot for direct citizen vote. It was increasingly felt that public attitudes called for the democratization of this issue.[7]

## *The Politics of Nuclear Power in Austin*

The "democratization" of the issue of nuclear power has been especially important in Austin. Other factors have been important as well, but each decision about participation in STNP has been in the context of electoral politics. The electorate has been ultimately responsible for the decision. City Council Member Richard Goodman cited two more *general* factors in the politicization of nuclear power in Austin: general ecological concerns and money.[8]

## *The 1972 Election*

Austin citizens first voiced their choice about participation in the STNP when they rejected a $289.26 million bond issue by 1340 votes in a September 1972 election. This was despite the support of a majority of the City Council, the Mayor, and the Economic Development Council of the Chamber of Commerce. The outcome of the election can be attributed to a number of factors. One was that many criticized the City and campaigned against the proposition on the grounds that participation was being rushed and there had been little planning and consideration of alternatives. The proposition was not formally announced until two months before the election and there had been little citizen participation in its formulation.[9]

A second factor was the group of concerns about the safety, environmental effects, and operational reliability of nuclear power.[10]

Economics also played a role in the defeat of the proposition. Nuclear power as an electric-generating source was still not totally proven and the bond issue was an extremely large investment. Failure of the project would have endangered the City's financial stability.

Finally, the LCRA's withdrawal as a participant only three days prior to the election was an important factor. The LCRA's Board of Directors unanimously adopted a resolution withdrawing "because of its feelings that nuclear power plants are still in the experimental stage and that the economics of such plants are questionable."[11] Austin voters were thus aware that at least one other participant had doubts about the project.

## *The 1973 Election*

Two days after the 1972 election, the City Council began reconsidering participation in the STNP and formed a committee to study Austin's energy problems.[12] Out of this study and the problems of that winter came the City's Electric Generation Plan. One element of the plan called for participation in the STNP, and on November 17, 1973, Austin voters approved $161 million in revenue bonds for a 16 percent share in the project. The outcome of this election in which the proposition was approved by a slim 722-vote margin was affected by two factors. One was that criticisms about the lack of planning leveled at the City in the previous year's election had been successfully answered.

A more important factor, however, was the experience of the previous winter. The supply of natural gas, the only available fuel for generating electricity in the City's power plants, was curtailed. When the supply was resumed, it was at much higher prices, prompting an effort to diversify fuel sources for the City's power plants. Austin voters were painfully aware of the consequences if alternate sources of fuel could not be found and developed. One of these alternate sources was nuclear power.

### *The 1976 Election*

In August 1976, the City Council ordered a referendum to determine whether Austin should sell its entire 16 percent share in the STNP. Turnout for the election was lower than in the previous two STNP elections, and, as mentioned earlier, the proposition to sell was defeated by a three-to-one margin. In addition to the usual factors of economics and the need for diversification, this election was affected by its timing. Timing had an important impact in at least two ways: the vote was taken in the midst of a period of high utility bills;[13] and, the absence of any significant University of Texas population meant fewer antinuclear votes as well as a scarcity of volunteer workers to conduct an election campaign.[14]

### *The January 1979 Election*

On January 20, 1979, Austin voters rejected a "compromise" proposition to sell the portion of the City's share in the STNP that could not be financed with the already-approved $161 million in bonds. The compromise was an effort to retain some of the City's investment while not having to ask for money to fund cost overruns to avoid going into default. A number of factors affected the outcome of this election. One was the unlikely pro- and antinuclear coalition produced by the wording of the proposition. Pronuclear forces urged the defeat of the proposition because they wanted the City to retain its entire 16 percent share in the project. Antinuclear forces wanted the proposition defeated because it was not "a real choice"[15] and they wanted to force another election to get out of the STNP altogether. It is difficult to tell exactly how many pronuclear votes contributed to the defeat of the proposition. Roger Duncan, an antinuclear group spokesman, said, "I think we picked up a small but significant portion of the pronuclear vote," but that the "overwhelming majority" who voted against the proposition opposed participation in the STNP.[16] City Council Member Lee Cooke, on the other hand, said that although he was not sure how many pronuclear supporters had voted against the proposition, he felt the City was fairly evenly divided over the issue, adding that elections turn on a small number of votes.[17]

A second factor that may have influenced the outcome of the election was the NRC's withdrawal of its endorsement of the Rasmussen Study the day before the election. This study is often cited by proponents of nuclear power to show how safe commercial plants are.[18]

### *The April 1979 Election*

The rejection of the compromise proposition set the stage for the most recent election on Austin's participation in the STNP. On April 7, 1979, voters were submitted two propositions: one asked for an additional $215.85 million in bonds for construction cost overruns and nuclear fuel; the other proposed to sell the City's 16 percent share in the project. Turnout for the election, helped by concurrent Council races, was just over 34 percent, and voters approved the first proposition by a vote of 28,430 to 25,037 and rejected the second by a 26,436 to 25,500 count.[19]

Coming less than two weeks after the nuclear reactor accident at Three Mile Island, many were quite surprised at the election's outcome. Antinuclear forces could now point to a specific incident in which nuclear power posed a serious threat to lives and safety. What factors, then, enabled the pronuclear forces to prevail? The factor that had the greatest effect was economics. The City Council, a majority of which wanted continued participation in the STNP, placed two additional propositions on the ballot. One was to issue almost $434 million in bonds for a coal- or lignite-fired plant (Fayette II) and the other was to use any proceeds from the sale of the City's share in the STNP in financing this replacement plant. This allowed pronuclear forces to compare the costs of continued participation in the STNP, with a price tag of about $386 million, to those of a coal or lignite plant, which would amount to about $434 million. This comparison, which antinuclear forces termed "unfair,"[20] caused Austin voters to consider economics and their pocketbooks and not the more emotional issues of safety and environmental effects.

A second factor was the ability of pronuclear forces to get the support of the "Establishment" in Austin, including the Chamber of Commerce, the *Austin American-Statesman,* the major banks, a majority of the City Council, and Mayor Carole McClellan. They raised almost three times as much money as the antinuclear forces, allowing for an extremely well-run campaign and a massive media effort.[21] McClellan was important because she campaigned extensively and well for participation in the STNP and led the media blitz in the last three days of the campaign.[22] Antinuclear groups simply lacked the credibility that McClellan and pronuclear supporters had and could not compete with them financially or politically.

## Conclusions and Recommendations

In many respects the politics of nuclear power in Austin have been like those found elsewhere. The factors of economics, safety, effect on the environment, and the "proper" diversification of fuel sources for electric-generating plants have all played an important role.

Particularly important in the politics of nuclear power in Austin, however, is the democratization of the issue. The City's participation in the STNP has been decided at the ballot booth, whereas in many places the citizenry has

not had the chance to make its own choices about nuclear power. Has this democratization made a difference in the politics of nuclear power in Austin? David Davis, commenting about decisions on nuclear power in general, offers an appropriate answer:

> Those participants lacking expertise (such as policymakers and the citizenry) generally respond on the basis of ideological commitments to private or public ownership, environmentalism, anti-communism, or faith in technology.[23]

A question for future policymakers is whether the democratization of an issue like nuclear power is appropriate. The answer for at least Austin is yes. The California Senate Committee on Resources, Land Use, and Energy offers an important conclusion about this issue:

> After listening to 120 learned witnesses who could not agree on the... safety of nuclear power, it is clear no objective conclusion can be drawn. The issues are not solely resolvable through the application of scientific expertise. The debate is more the result of differing views of human fallibility and human behavior than anything else. The questions involved require value judgments and the voter is no less equipped to make such a judgment than the most brilliant Nobel Laureate."[24]

It is difficult to make recommendations about the politics of nuclear power, but at least three are offered here. One is to continue the resolution of the issues of nuclear power in an open manner as Austin has done up to this point. More bonding authority may be required sometime in the future for further construction, fuel, disposal, and decommissioning costs. This should be decided through the electoral process, as has been the practice in the past.

A second recommendation is for the City to monitor the project more closely. Construction has not been monitored as it should have been, and the result has been cost overruns, schedule slippage, and a distorted flow of information. The City of Austin now has almost $400 million invested in the project, and it has a responsibility to its citizens to inform them about their investment.

Finally, antinuclear forces should not give up because the issues appear to be resolved. Without their participation, the politics of nuclear power would be one-sided. The questions about nuclear power affect this and future generations. Those questions should be the subject of strict scrutiny and fully open participation.

*Henry N. "Chip" Burgin*

## References


[1]City of Austin, *South Texas Project Assessment* (November 1978), p. 4. For a more detailed history of the planning of the STNP, please see Barbee, et al. *Energy For Austin: An Analysis of the Alternative Solutions to the Future Power Needs of Austin, Texas,* Technical Resport ESL-8 (Austin: College of Engineering, University of Texas, 1972).

[2]Ibid., pp. 4-5.

[3]*Austin American-Statesman,* March 13, 1976.

[4]Interview with Richard Goodman, Council Member, City of Austin, February 7, 1979.

[5]City of Austin, *South Texas Project Assessment,* pp. 5-14.

[6]David Howard Davis, *Energy Politics,* 2nd. ed. (New York: St. Martin's Press, 1978), pp. 208-209.

[7]Dorothy Nelkin and Susan Fallows, "The Evolution of the Nuclear Debate: The Role of Public Participation," in *Annual Review of Energy, Volume 3,* ed. Jack Hollander (Palo Alto, California: Annual Reviews, Inc., 1978), pp. 281-282.

[8]Interview with Richard Goodman.

[9]Barbee, *et al., Energy for Austin,* p. 43.

[10]Ibid.

[11]*Austin American-Statesman,* January 14, 1979, p. B-1.

[12]Barbee, *et al., Energy for Austin,* p. 52.

[13]*Austin American-Statesman,* August 15, 1976, p. B-1.

[14]Ibid.

[15]*Austin American-Statesman,* January 16, 1979, p. B-1, 3.

[16]*Austin American-Statesman,* January 21, 1979, p. A-1.

[17]Interview with Lee Cooke, Council Member, City of Austin February 12, 1979.

[18]*Austin American-Statesman,* January 21, 1979, p. A-1.

[19]*Austin American-Statesman,* April 8, 1979, p. A-1, 11.

[20]Ibid.

[21]Compiled from various editions of the *Austin American-Statesman.*

[22]*Austin American-Statesman,* April 9, 1979, p. A-1, 11.

[23]Davis, *Energy Politics,* p. 210.

[24]As quoted in Nelkin and Fallows, "The Evolution of the Nuclear Debate," p. 282.

# Chapter 15

# Economic and Regulatory Problems Of Nuclear Facilities in Texas

Utilities in Texas were predicting a high demand for electricity in the 1970s, as were most other electric utilities in the United States. Texas, after all, was experiencing the same rise in economic growth as other Sunbelt states during this period. Up to 1971 the total energy requirement of the state had been growing at an average of around 10 percent a year. During this period of predicted peak growth, utilities were also becoming aware of the instability of natural gas as a boiler fuel. The 1970s were, consequently, a period during which utilities would be adding nuclear and coal powerplants to their generating capacity.

The first application for a nuclear powerplant in Texas came in June 1973 from Texas Utilities Company (TU), a holding company owning three utilities in northern Texas. Until 1972, when a lignite-fueled plant came on-line, nearly all TU's power was generated by natural gas or fuel oil. A nuclear plant represented the next logical step in energy development. Texas Utilities' Comanche Peak plant, designed to house two 1150 MW units, was originally estimated to cost $777 million and was scheduled to have one unit on-line in 1980 and another in 1982.

That same June saw the announcement of the South Texas Nuclear Project (STNP) by the major partners in the project: Houston Lighting and Power (HL&P) and Central Power and Light (CP&L). Again, the attractiveness of nuclear power was due to the spiraling costs of fossil fuels, the need to meet a growing demand for electricity, and the need for fuel diversification. The original cost estimate for the STNP was about $1 billion for two 1250 MW units, the first of which was to be on line in 1980 and the second in 1982.

Two other nuclear powerplants were under consideration during this period. HL&P had another nuclear plant planned at Allens Creek in Austin County. Two 1150 MW units were scheduled to be built at the site and brought on line in 1982 and 1984. After the costs of the project jumped from $500-$900 million to $1.8 billion, the project was cancelled. It has since been revived, with current plans calling for one reactor costing around $1.5 billion, scheduled to be on line in 1986.

The other nuclear powerplant that was planned in Texas was the Blue Hills project of Gulf States Utilities (GSU). GSU had planned to construct two units, each with a capacity of 900 MW. The first unit was scheduled to go on line in 1982, the second in 1984. However, GSU cancelled the project in October 1978, after having indefinitely postponed it in 1976.

The 1973 oil embargo and subsequent calls for energy conservation reduced the demand for electricity to levels much lower than predicted. Unexpectedly high rates of inflation in the post embargo period made raising capital difficult. Inflation and the high cost of capital combined to make the large, capital-intensive nuclear powerplants ready targets for cost overruns.

Increased regulation was also to be a problem for nuclear generating utilities. By taking the nuclear option, utilities fell within the regulatory responsibility of the Atomic Energy Commission (predecessor to the Nuclear Regulatory Commission). At the state level, Texas' utilities became subject to the Texas Public Utility Commission which was created in 1975. This regulation served to hamper nuclear construction programs in several ways: by creating cash-flow problems for utilities; by creating uncertainties in the scope of work to be performed; and by creating delays in construction which increased the amount of interest being paid and allowed inflation to exact its toll.

Gulf States Utilities provides an example of what inadequate rate relief will do to a utility's cash-flow. GSU, which sells electricity interstate, had not received a general rate hike from the Louisiana Public Service Commission since 1973.[1] Two months prior to the announcement that the Blue Hills project was postponed, Gulf States had been granted a rate hike by the Texas PUC, but for only half of their request. GSU was asking for greater allowances for construction work in progress (CWIP), that is, the amount of funds currently being used in construction of a facility that can be included in the rate base.[2] Failure to get adequate rate relief prompted the utility to reevaluate its construction program. The Blue Hills units, which had jumped in cost from $400 million to more than $1 billion for each 940 MW unit, were postponed and then cancelled.

Most utilities in Texas are in a period of capital scarcity and excess capacity as a result of the mandated conversion from natural gas as a boiler fuel. For instance,

TU has spent $3.5 billion so far this decade for expansion and conversion to coal and nuclear power. The lag time between expenditures on new facilities and the time the facilities become operable creates a drain on the utilities' financial resources. Two regulatory mechanisms for relieving this problem are AFUDC and CWIP.

> During the period that a utility has funds committed to a project, but the project is not in the rate base, an account called Allowance for Funds Used During Construction (AFUDC) is used to reflect foregone earning on the investment. When the project becomes used and useful, the value of accumulated AFUDC is added to the rate base along with the direct cost of the project. In this way the utility recoups the earnings foregone during the construction period from the customers who benefit from the project. As the electric utility industry has moved to heavier construction budgets with longer time spans before projects become used and useful, AFUDC has become a major portion of earnings. By putting part of CWIP in the rate base and stopping the accumulation of AFUDC, the utility is trading non-cash for cash earnings. Cash flow is obviously improved, reducing the risk borne by investors.[3]

The problem with CWIP is that a ratepayer who bears higher bills today may not be around when the plant becomes operable. Therefore, the policy in Texas has been to allow only the minimum amount of CWIP necessary in the rate base "to ensure financial integrity" for the utility. Utilities feel this allowance of minimal CWIP has seriously hurt their cash-flow. Thus, determinations as to what may be included in the rate base and the size of the rate of return can have a significant impact on a utility's construction program.

The real regulatory scourge of nuclear-owning utilities, in the eyes of many, is the NRC. Regulatory changes, along with inflation, have appreciably increased the cost of the Comanche Peak plant, leaving TU's chairman, Louis Austin, to berate regulation: "Nuclear is one of the biggest areas of overregulation, and we don't intend to build another nuclear powerplant, at least until I retire."[4] He echoes a common complaint when he asserts that regulation has created uncertainties that make reliable estimates of plant costs difficult, and have made licensing impossible.[5] From 1974 when construction of the plant began to August 1978, 110 federal regulations were promulgated that required changes in plant design and procedures.

The Comanche Peak units have, like the other nuclear units in Texas, experienced tremendous cost overruns. The cost estimate for the two units has jumped from $777 million to $1.7 billion and construction has fallen a year behind schedule. All the overruns can't be blamed on overregulation, though. A generous portion of the overruns has resulted from an overly optimistic assessment of what the inflation rate would be. In predicting a 3.5% rate of inflation, TU obviously was far off the mark.[6]

Texas Utilities management concedes that mistakes have been made as to the quantity of materials and manhours needed to complete the project, but they believe they have hired the most qualified people to design and construct the plant, and if their best judgment was incorrect there wasn't much that could be done to have anticipated the problem. Texas Utilities also claims much of the delay has been due to the inability of some suppliers to meet the scheduled times for supplying needed items, a factor which allows inflation and capital costs to add to the overruns.

Additionally, there is a great deal of inefficiency involved in constructing a nuclear plant. The engineering of nuclear powerplants is not completed by the time construction begins and continues long after. For this reason there may be an excess amount of construction done at some point because the engineering design has not yet been completed or even started. This extra construction anticipates what in general needs to be done and, due to lack of exact design, overcompensates so that construction can proceed even though design isn't complete. Another related problem is that nuclear powerplant construction is very inflexible and departures from plant design result in NRC infractions.

A recent victim of regulatory delay is the Allens Creek project of HL&P. Their hope to begin construction at the site was foiled last November when the NRC postponed a prehearing conference for two months. The utility contended that two cost increases would occur as a result of the delay. "As a result of inflation and other factors, the Light Company is expected to incur higher construction and equipment costs if the Allens Creek plant construction is delayed. Another significant cost would be to replace the generation we expect from the Allens Creek plant in 1985 with more expensive fuels. With natural gas at the levels we're projecting, the difference in fuels costs customers would have to pay would be about $9 million a month."[7] The hearing for HL&P's construction permit has since been delayed again.

HL&P's South Texas Nuclear Project has received a great deal of criticism for its cost overruns. Over the past six years the estimated cost of the project has been revised three times: from $1.006 billion in 1973 to $1.126 billion in 1975, to $1.299 billion in 1977, to $2.007 billion in 1978.[8] The overruns have resulted from much the same problems as have affected Comanche Peak: inflation, regulatory delays, additional design requirements, construction errors, and poor planning. The STNP has also had substantial problems with the project management as well.

A special task force was established by HL&P to review the project's schedule and costs. They identified six areas that have impacted the project's cost and schedule:

- an overly optimistic construction schedule.
- an understatement of the material quantities required.
- an understatement of the unit manhours per unit quantity of material.
- a new start from scratch material takeoff was not prepared in conjunction with the 1977 estimate.
- engineering had not progressed to the point that was presumed in the 1977 estimate.
- project controls were weak in the areas of coordinating engineering with procurement and construction.[9]

One result of the task force was a strengthening of project controls and a reorganization of project management.[10]

A review of the project's records by the *American Statesman* pointed to "poor planning, construction errors, and inexperienced management."[11] These were also the findings of Management Analysis Company, a management consulting firm hired by HL&P to review the project's management. The *American Statesman* reported that Brown and Root (the architect/engineers of the project) and HL&P "... not only had problems calculating how much ... they really need for the project, they also have had problems making sure the work was done according to specification."[12] The consulting report done by Management Analysis Co. downplayed the project management's contention that overruns were predominantly the result of inflation and NRC guideline changes, and instead criticized the initial estimates and assumptions made by project officials.

The NRC took exception to HL&P's estimate that the project would be completed in May 1980, and ordered the utility to plan on a fuel loading date between July and December, 1981. One of the primary reasons for the NRC's position was because the STNP was HL&P's first nuclear plant and the first plant that Brown and Root had both engineering and construction responsibility for.[13]

Much of the outcry over the cost of the nuclear plants may have come, not because the plants cost what they do, but because people were originally told that the projects were going to cost half as much. Each overrun has almost necessitated a defense of the overrun and the project itself, at least in the case of the STNP, which has had to be more responsive to public pressure. There has continually been a search for the reason why the cost overruns were so great.

One state nuclear expert feels that the search for such explanations are nonsense, and that there are no economic and regulatory problems. Referring to the STNP he said, "The plant's going to cost what it should have cost. Rather than going back and looking at the first estimate to see if it was reasonable, everybody went running around like a chicken with its head cut off trying to explain why the price doubled."[14] He claimed the error was on the part of the estimators, but asserted that any early estimate of the plant's costs was bound to err as the rate of inflation was unforseeable.[15]

While this opinion may be a little oversimplified, it's a valid observation. The initial estimates should receive a good deal of careful scrutiny. One way to achieve this could be to open up the estimating process so that it includes more than just the "can do" mentality of the engineering and managerial professions. Questions need to be asked and challenges made when they can do the most good, instead of when overruns have begun to occur after the project is underway. While utilities would be reluctant to open up their inner workings to closer scrutiny, they stand to benefit from constructive criticism and estimates based on assumptions that have stood up to challenge.

*Thomas J. Halicki*

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# PART IV

# NATIONAL ENERGY ACTS OF 1978

The Arab Oil Embargo in 1973 and the following fourfold price increases by the OPEC countries intensified the national awareness of the proportions of the "energy crisis." As a result, President Nixon announced "Project Independence," which called for an unrealistic goal of U.S. energy independence by 1980. President Ford followed with proposed programs to increase domestic oil production, encourage energy conservation, and stimulate research and development in new energy forms and processes. What emerged was a rather weak, uncoordinated national energy policy.

The year 1976, when Jimmy Carter was elected President, represented the first year since the oil embargo that U.S. energy consumption increased. One of President Carter's first moves was to put his Administration to work on a national energy policy. In March 1977 he announced his "National Energy Plan," a legislative proposal and a series of executive orders. The plan set out to achieve the following goals:

1. reduce the annual growth of total energy demand to below 2 percent;
2. reduce gasoline consumption 10 percent below its current level;
3. reduce oil imports from a potential level of 16 million barrels per day to 6 million, roughly one-eighth of total energy consumption;
4. increase coal production by two-thirds, to more than 1 billion tons per year;
5. bring 90 percent of existing American homes and all new buildings up to minimum energy efficiency standards; and
6. use solar energy in more than 2½ million homes by 1985.

The National Energy Act was submitted to Congress in April 1977. Although the act's journey through Congress was characterized by intense lobbying and bitter debates, the total energy package gained House approval in the summer of 1977. In the Senate, the tax and natural gas pricing provisions ran into serious trouble. A year of bargaining and compromises among the two houses ensued, with the final product, an extremely complicated package of five acts loosely based on previous legislation, passing on October 15, 1978.

The Natural Gas Policy Act establishes a complicated pricing scheme, employing numerous definitions of natural gas.

The Energy Tax Act encourages energy conservation and increased production of traditional and alternate energy sources through a few taxes and many tax credits.

The National Energy Conservation Policy Act establishes a variety of programs to encourage energy conservation and efficient use of energy.

The Power Plant and Industrial Fuel Use Act requires utilities and industries eventually to convert to coal as a fuel source.

Finally, the Public Utility Regulatory Policies Act requires each state regulatory authority to engage in a review of each utility's rate structure within two years.

The five acts that comprise the National Energy Acts of 1978 (NEA) are ambiguous and complex. Each act contains provisions that require the elaborate formulation of rules and regulations before successful implementation can begin. These regulatory and administrative complexities are the result of the nature of the problems addressed, as well as the political climate that dominated Congress at the time of the NEA's enactment.

Although the full weight of implementing the NEA has not yet been felt, the chapters in this section point out areas in which impact will be greatest.



Since these acts are highly complex and as yet largely untested, the following briefs can only provide a partial and tentative summary. More detailed briefs have been prepared by the several investigators involved, as have

analytical matrices highlighting the content of the several acts. These are available for inspection at the LBJ School of Public Affairs.

# Chapter 16

# Natural Gas Policy Act of 1978

## Issue Definition

A recent article in *Fortune* aptly described the Natural Gas Policy Act of 1978 (NGPA) as "suffocating in its complexity, maddening in its ambiguities."[1] With the passage of the NGPA, natural gas producers, their attorneys, and industry consultants have been trying to clarify the ambiguous sections of the statute. The Federal Energy Regulatory Commission (FERC) formulated interim regulations for areas such as well-head pricing provisions, interstate and intrastate transportation authority, and area rate and indefinite price escalator clauses. The regulations went into effect on December 1, 1978. At that time, FERC braced itself for the additional caseload generated by the NGPA as well as the process of developing final regulations.

Drafted as a series of compromises between those who favored deregulation of prices to foster production and those who wanted to keep prices under regulatory control, the NGPA provides higher prices for natural gas on the interstate market while imposing price ceilings on the previously unregulated intrastate market. Some observers consider this action partial deregulation. The ceiling price for new natural gas was raised from $1.52/MM Btus in November 1978 to $2.16/MM Btus as of April 1979. Until 1985, the maximum lawful price for various categories of gas will increase slowly through a monthly inflation adjustment factor. In that year, certain categories of gas will be deregulated unless the President or Congress reimposes price controls for one eighteen-month period. Price controls on several other categories of gas will be lifted in 1987.

Although FERC bears a weighty responsibility, the measure places the heaviest regulatory burden on the states. Within the states, the burden rests on the shoulders of the state agency with jurisdiction over oil and gas matters. In some states, there is more than one such agency. A natural gas producer must apply to this state agency for a determination of eligibility to collect the new ceiling prices for natural gas. In Texas, the regulatory process is facilitated by the Railroad Commission, which handles the regulation of natural gas production in the state.

The complexity and ambiguity of the NGPA, including the numerous categories of natural gas and the increased reliance on states to implement and enforce federal laws, have prompted some observers to question not only the act's effectiveness but also its legality. These issues concern Texas, as do many others involving the NGPA's impact on the intrastate market.

Since the early 1970s, natural gas dedicated to the interstate market has declined while some observers claim that the amount of gas committed to the intrastate market has steadily risen. William J. Murray, Jr., a petroleum engineering consultant to energy companies and consumers, disagrees with this claim. He says that based on deliverability, natural gas dedicated to the interstate maket has declined approximately 9 percent per year while the amount dedicated to the intrastate market has declined at a much smaller rate. According to Murray, the current surplus on the intrastate market resulted because demand is declining more rapidly than supply in this market.[2]

Today, approximately 65 percent of the gas produced in Texas is committed to the intrastate market. What will be the impact of the NGPA on producers and consumers in Texas? Will the act drive small operators out of the business? What will it cost Texas in lost revenue, implementation expenses, and court fees? How will the current surplus in the intrastate market be resolved? These and other issues confront policymakers in Texas and across the country.

## Background

Natural gas is an inexpensive, clean burning, versatile fuel source. These characteristics combine to make it one of the most attractive fuel sources in the nation, and many consumers are heavily dependent on it. The rate of consumption has outstripped the rate of discovery of new domestic resources, and shortages have occurred across the country.

During the 1970s, bills were introduced in each Congress in an attempt to resolve the problem of shortages. None was successful. In 1977, President Carter's energy bill included a new legislative gas pricing policy to replace the policy set forth in the Natural Gas Act of 1938 (NGA).[3] At the time the NGA was enacted,

natural gas was a surplus by-product of oil production.

The NGPA resulted from compromises between the producing and consuming interests. Although not stated, the purpose of the NGPA was to set up a natural gas pricing scheme, establish a plan for phased deregulation, and eliminate the distinction between the interstate and intrastate markets. An overview of the major provisions is presented below:

(1) Regulation of all categories of natural gas until certain categories are deregulated in 1985 and 1987.
(2) Establishment of price ceilings for all categories of natural gas with many categories adjusted monthly for inflation.
(3) Establishment of an incremental pricing standard.
(4) Delegation of the heaviest regulatory burden to state regulatory agencies.
(5) Emergency authorization of purchase or allocation of natural gas in shortage situations.

## Current Status

The NGPA substantially changes the nature and range of the federal government's regulation of producer sales. Under the NGA, the Federal Power Commission (FPC) used a public utility framework to regulate a limited market. FERC now regulates the prices of an entire national market.[4] FERC's role is primarily that of an appellate body. FERC will review the factual determination by the jurisdictional agency on a "substantial evidence basis." This evidence will focus on "geological information, production history, field records, prior contractural relationships, and information of a similar nature."[5]

Passage of the NGPA means that states have an unprecedented authority to assert themselves in energy policy. In January 1979, the Railroad Commission sought enabling legislation giving it the authority to implement the NGPA, permit interim collections by producers after March 1, 1979, and allow retroactive collections by a producer.[6] The Railroad Commission feels that it must act responsibly in implementing the NGPA or FERC will assume more power and responsibility over the determination process.

The statute authorizes the Railroad Commission to perform three principal duties. First, the Commission is to make determinations of eligibility for four categories of natural gas: (1) new natural gas, NGPA, Section 102(c)(1)(B); (2) new onshore gas, NGPA, Section 102(c)(1)(C); (3) new onshore production wells, NGPA, Section 103; and (4) stripper well gas, NGPA, Section 108. Second, the state regulatory agency may intervene in any proceeding before FERC regarding the determination of certain sales and transportation of natural gas. Third, the Railroad Commission determines what constitutes a surplus supply of gas; that is, it decides if the quantity of gas to be assigned through contractural rights is in excess of the volume available to the intrastate pipeline and needed to satisfy current demand.

FERC has estimated that there will be between 18,000 and 20,000 filings for determination of wellhead pricing categories.[7] The Railroad Commission caseload status is shown in Table 1. The average turnaround time is 104.75 days (including holidays and weekends).[8] The Railroad Commission hopes to reach a turnaround time of thirty-five days from start to transmittal to FERC. This figure is optimistic. In some cases, it could take as long as two hundred days for the operator to receive final determination.[9]

On November 20, 1978, the states of Oklahoma, Louisiana, and Texas filed a complaint against FERC in the U.S. District Court for the Western District of Oklahoma. The complaint states that certain provisions of the NGPA are unconstitutional. First, the states feel that federal regulation of intrastate gas exceeds the power of Congress under the Commerce Clause of the Constitution. Second, the states argue that provisions requiring the enactment of substantial state legislation, assignment of state employees, and use of state funds to implement federal policy are violations of the Tenth Amendment to the Constitution, the constitutional guarantee of a republican form of government, and the Commerce Clause powers of Congress. Third, federal regulation of gas produced from public lands in Texas violates the Tenth Amendment. Fourth, it is contended that provisions requiring mandatory allocation and distribution of intrastate gas to interstate pipelines or distribution companies exceed the regulatory provisions of Congress (Article I, Section 8, Clause 3) and violates both the Fifth Amendment (equal protection and due process) and the Tenth Amendment rights of those states.[10] On February 7, 1979, the Court ordered the states to amend their complaint to provide a more definitive statement. The states filed the amendment on February 16, 1979. At this writing, there has been no further action in the case.[11]

## Policy Analysis

After eighteen months of lengthy debate over the NGPA and another three or four months trying to figure out exactly what the act requires, producers, state regulatory agencies, and the federal government have pieced together an effective and equitable regulatory scheme. Admittedly, problems do exist. Texas, the largest producer of natural gas in the country, faces a number of complex problems in implementing the NGPA. Fortunately, the Railroad Commission with its

## Table 1

### NGPA Caseload Status of Texas Railroad Commission

| Procedural Stage | Applications filed since December 1, 1978 |
|---|---|
| In Process | 6620 |
| Approved by Railroad Commission (Requiring microfilming of Commission order and transmittal to FERC) | 273 |
| Sent to FERC | 322 |
| TOTAL (includes multiple category filing) | 7215 |

Source: Texas Railroad Commission, Oil and Gas Division, 1979.

experience and expertise places Texas ahead of most other states in resolving the problems.

One of the most overwhelming problems is the complexity and ambiguity of the statute. The NGPA itself is sixty-six pages long. The interim regulations implementing the act comprise another 364 pages. Ambiguous sections, fuzzy definitions, and numerous categories of gas result in confusion and uncertainty. The exact number of categories of natural gas established by the legislation is in question. Counts range from seventeen to thirty-nine or more categories. The number depends on the interpretation of "category." In April 1979, prices for each of the various categories ranged from a high of $2.16/MM Btus for new natural gas to a low of $0.35/MM Btus for certain Appalachian Basin gas committed to the interstate market before November 9, 1978. The lowest price established by the legislation is $0.21/mcf for minimum rate gas.[12] The numerous categories and prices are one of the principal sources of confusion for the producers.

FERC has already been asked to make clarifications of the ambiguous sections and fuzzy definitions contained in the regulation. Through continued rule-by-rule clarification, FERC may be able to assuage the uneasiness of producers and state regulatory agencies. Several actions appear necessary:

1. FERC should develop an incremental pricing policy to allay the fears of interstate producers that incremental pricing will encourage their industrial customers to continue to switch from gas to oil and coal.
2. FERC should more specifically designate the person or persons eligible to file for pricing determinations.
3. FERC should clarify and support retroactive collection and refund procedures in the face of consumer challenge in the courts.
4. FERC's ruling on area rate and indefinite price escalator clauses needs to be tested case-by-case to determine which interpretations are consistent with the ruling and the NGPA.
5. FERC should provide a rule to establish which contract clauses provide adequate authorization to receive ceiling prices as well as other contract authorization questions.
6. FERC should refine the definitions of a "first sale" of natural gas and a marker well to remove any confusion by producers.

Another problem that faces Texas and other states is the regulatory burden placed on them by the federal government. No prior legislation has relied so heavily on the states for the enforcement and implementation of federal law. The complaint filed by Oklahoma, Texas, and Louisiana and separate ones filed by New Mexico and Wyoming challenge the constitutionality of this increased regulatory burden as well as other portions of the NGPA. The Texas complaint charges that:

> [t]he regulatory burden imposed on the states violates the Tenth Amendment of the Constitution concerning state sovereignty and immunity and the guarantee of a republican form of government as set forth in Article IV, Section 4 of the Constitution.[13]

For Texas and other producing states, the application of federal regulations to the intrastate market reduces the power of the state regulatory agencies. The states feel that the statute inhibits their ability to function in a federal system of government. The federal government has

usurped the states' power to make policy decisions on matters within the state. By requiring the states to enact legislation, hire additional employees, and spend a substantial amount of state funds, the statute coerces states to implement a federal policy on which they were not consulted, do not agree with, and find contrary to their own regulation of oil and gas matters. More importantly, the states view the federal regulations as depriving them of revenues from and supplies of natural gas.

Under the NGPA, the Texas Railroad Commission and other state regulatory agencies must make not only factual determinations, but also conclusions of state and federal law. For instance, the NGPA requires a factual determination for producers to qualify for ceiling prices of certain categories of natural gas. However, the Railroad Commission must also make determinations of law. Federal law dictates that the state regulatory agency perform marker-well determinations. In addition, conclusions based on state law include well-spacing requirements and prorationing units. There are also actions that involve factual determinations as well as interpretations of state and federal statutes. State and federal laws are not necessarily inclusive. If FERC should reverse or remand a Railroad Commission determination, other related complications would arise. In what court should an appeal be decided? A single determination could be appealed in a state court, with FERC, and in a U.S. Court of Appeals.

The NGPA has a substantial impact on producers and consumers of natural gas in Texas. This is another source of concern for state policymakers. Although the full impact of the act is yet undetermined, producers say that they have little incentive to increase production. If production does not increase, supplies of natural gas will continue to drop. With the demand of residential and commercial users expected to increase, shortages would occur. Factors affecting demand will be: (1) the ability of industrial and utility users to switch to alternate fuels; (2) the price of coal and oil relative to natural gas; (3) weather conditions; and (4) the ability of both the interstate and intrastate pipelines to make interconnections.

The impact of legislation on small natural gas producers is also important. These firms are a significant factor in the exploration and drilling of natural gas. Big producers can manage the additional administrative burden without foregoing operations. Small producers, however, have neither the technical personnel nor the clerical help necessary to compile the data for well applications. In many cases, they will have to rely on outside consultants for assistance, thus increasing their costs of operation. The hardest hit are small producers who have primarily operated on the previously unregulated intrastate market. Many of these producers feel that the uncertainty and administrative burden are too great to warrant staying in the natural gas business. Some are pulling out of the natural gas business and are moving toward the more predictable business of oil.

While the producers are concerned with net revenue or profit, consumers want a reliable supply at a minimum price. Consumers in different regions will be affected differently, thus creating some conflicts within the state over supplies of natural gas. Low-priority industrial consumers would face serious disruptions if there were a shortage in their fuel supply. These disruptions would produce a multiplier effect in the state economy, with a rise in unemployment and a loss of revenue. Low-priority consumers also face higher prices due to the imposition of incremental pricing procedures. These higher prices will be passed through in the form of higher prices for their products. High-priority, nonindustrial consumers (including hospitals, schools, and agricultural or residential users) may face shortages or cutbacks, but they will receive supplies first. The cost of natural gas to them will be less than the cost to industrial consumers.

The effects of the NGPA on consumption of natural gas by the agriculture industry in Texas must also be taken into consideration by policymakers. The elimination of the unregulated intrastate market for natural gas poses a serious problem for agriculture. The regulated price benefits those regions of the state that were paying more than the ceiling figure prior to NGPA's enactment. However, if the lowered prices lead to lessened supplies, Texas agriculture could be severely inpacted. Since gas is estimated to be the most economical source of energy in the State for irrigation, the type of crops grown in Texas might change. Dryland agriculture might increase as the use of irrigation decreases. More farmers might be driven out of agriculture due to declining profits.[14]

Another crucial issue is the surplus of natural gas currently present in the intrastate market. This bubble of gas is estimated at between 800 million to a trillion cubic feet per year by the Department of Energy.[15] The West Central Texas Oil and Gas Association estimates that the present surplus in the Texas intrastate market amounts to 3 billion cubic feet per day or 1.1 trillion cubic feet per year. It is assumed that a similar surplus exists in Louisiana and Oklahoma as well as other states. Major companies and large independent producers feel that the surplus will be drained by interstate pipelines within two or three years.[16] What should be done with this surplus gas? How does such a surplus affect the natural gas producer and consumer?

Former Energy Secretary James Schlesinger expects that the price interstate pipelines can offer intrastate producers will attract the surplus intrastate gas to the

interstate market.[17] other factors also suggest that the surplus intrastate gas will move to the interstate market. First, intrastate pipelines can sell "surplus" gas to interstate pipelines without being subject to FERC's jurisdiction for a renewable two-year period. Second, flowing intrastate gas with a contract price above $1.00 per mcf will be deregulated on January 1, 1985. The deregulation would permit interstate pipelines to offer high prices to the intrastate producer and draw out supplies of natural gas.

Under Section 312 of the NGPA, the Railroad Commission is given authorization to declare a surplus when the pipeline applying for assignment shows that its supply exceeds the current demands on that particular pipeline. FERC then issues an assignment of surplus gas to another piepline which needs the gas to meet its demand. The Railroad Commission has made five determinations of surplus gas involving four different companies since December 1, 1978.[18]

The effects of this surplus on producers and consumers of natural gas in Texas must be considered. As William J. Murray, Jr. points out, the surplus:

> would be available for the interstate market if price conditions prevailing at the time economically compared to the intrastate market. Obviously, if these conditions were not present this excess gas would remain in the state thereby increasing the reserve life of gas dedicated to the intrastate market.[19]

Until the passage of the NGPA, federal law required producers to dedicate the surplus gas permanently to the interstate market if they wished to sell gas outside Texas. Rather than receive a lower price, producers chose to shut down wells or restrict production. A special provision of the NGPA permits gas from previously shutdown wells to be sold on the interstate market for $1.63 per mcf. This price is above the former interstate limit of $1.50 and nearly equal to the average intrastate price in Texas of $1.67.[20]

The producers in west central Texas offer an example of the effect a surplus in the intrastate market has on producers. The surplus has prevented the redetermination clauses from taking effect and increasing prices. Sales are down as are the number of rigs drilling for natural gas. Operating costs are increasing. The price west central Texas producers are receiving for existing intrastate contracts is currently $.50 below the ceiling price. W. N. Tindell, Chairman of the Natural Gas Committee of the West Central Texas Oil and Gas Association, feels that "it is imperative that the current natural gas surplus find a market."[21] If the surplus begins to dissipate, then the redetermination clauses will be triggered and prices will increase to the ceiling price. If the surplus persists, prices will be depressed and the drilling incentives will be further reduced.

Cost is a crucial issue in the implementation of new regulations. Costs to the states include administrative costs and lost revenue. It is too soon to determine how much revenue, if any, Texas will lose as a result of the statute. Lloyd Rollen, in the Planning and Research Division of the Comptroller's Office, compared the quick jump in natural gas prices under the NGPA to price levels prior to the act's passage.[22] He estimates that this price increase will mean additional revenue to the state in the short run. However in the long run, Texas may lose money when the price levels under NGPA are compared to predicted levels under deregulation. In addition to potential loss of revenue to the state, Texas must also bear the cost of administering the act. Administrative costs include the costs of keeping records, holding hearings, and hiring additional personnel. The Railroad Commission received an emergency appropriation to fund the administration of the NGPA. The appropriation is divided over three years: $581,682 through August 31, 1979 (includes some money for the possible implementation of crude oil pricing regulations); $474,367 in FY 1980; and $395,616 in FY 1981.[23] Currently an insignificant cost to Texas is the legal expense of the lawsuit against FERC. This expense could become important if the case goes to the Supreme Court.

The costs of the act to industry include the costs of compliance and the possible loss of profits. Administrative and legal expenses compose other compliance costs. Administrative expenses include the diversion of personnel, the hiring of additional personnel, and additional recordkeeping. Another administrative cost to industry would be the loss of productivity from the man-hours necessary to complete well applications. Legal expenses cover compliance advice, well application advice, and litigation. Julian Martin of the Texas Independent Producers and Royalty Owners Association (TIPRO) says that it is too soon to tell what the costs to producers are.[24] However, some observers believe that producers will experience an increase in profits instead of the predicted loss of revenue as a result of the NGPA. This increase would result from the rise in prices under the NGPA.

## Policy Alternatives

Our analysis has shown a number of natural gas policy areas over which the State of Texas has no control. Responsibility for making the initial policy decisions in connection with the NGPA rests with FERC. FERC must clarify and develop final regulations. In some cases, it is congressional intent that is unclear. Where congressional intent is unclear or unstated, FERC interprets the congressional mandate. Litigation or amending legislation will ultimately resolve the most

troublesome questions. Litigation may come from individual producers and consumers or from the states themselves. Amending legislation will be brought about by consumer, regulatory, and industry pressure on members of Congress. The Railroad Commission and producer associations should encourage operators and producers to seek clarification on problem areas. The State can pursue the complaint filed jointly with Oklahoma and Louisiana through the court system to the Supreme Court to receive a final determination of the constitutionality of the NGPA.

Another policy alternative to be pursued is the search for alternate ways of managing the current surplus of intrastate gas. The Railroad Commission can continue making eligibility determinations and assignment of surplus gas from the intrastate market to the interstate market in order to relieve the surplus. Policymakers must consider the price of gas, the needs of the producer, and the revenue needs of the state. Other considerations include ensuring adequate supply to consumers, keeping curtailments to a minimum, and balancing the needs of consumers in other states with the needs of consumers in Texas.

In addition, the Railroad Commission could pursue an alternate policy action. Through its conservation powers, the Commission could impose limits on current production. This action would mean a higher price for natural gas producers. Outright shutdown of gas production now for future use by the Commission is not permitted. However through this action, the supply of available gas would drop to permit future consumers to compete with present users for natural gas.

*Janet West*

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# Chapter 17

# Energy Tax Act of 1978

## Issue Definition

One approach for avoiding energy shortages in the future is contained in the Energy Tax Act of 1978, which provides incentives for increasing energy conservation and production. This chapter examines the act and offers a brief description of the events that led to its enactment in late 1978.

## Background

### *Previous Energy Tax Legislation*

President Carter was not the first President to introduce energy legislation to Congress using taxes as the prime instrument inducing conservation. In fact, much of what evolved into the Energy Tax Act of 1978 had its origins in previous proposals.

Early in 1975, in response to the energy crisis created by the OPEC oil embargo, President Ford proposed a bill containing many of the same measures that were later incorporated into Carter's legislative proposals, including a standby gasoline tax, an automobile fuel efficiency tax, and energy tax credits for homeowners and businesses. Ford's omnibus energy tax bill, H.R. 6860, was passed in a greatly weakened form by the House, but later died in the Senate Finance Committee. One year later, these same measures were reintroduced in the Senate as a part of H.R. 10612, the Tax Reform Act of 1976, but were subsequently dropped by the conference committee because of concern over their high revenue costs.

In 1976, as a part of the Energy Policy and Conservation Act (EPCA), initial fuel efficiency standards and an excise tax were enacted. The excise tax was designed to apply to fleet fuel economy averages for each automaker and is still in effect today.

### *Shaping the Energy Tax Act of 1978*

President Carter's energy tax proposals were initially outlined before a national television audience and a joint session of Congress on April 20, 1977. When introduced in the House, measures related to taxes and tax credits were given to the Ways and Means committee, where consideration began in early June. Two of the major provisions were deleted from the bill—the standby gasoline tax and the crude oil equalization tax. A weakened version of the gas guzzler tax was accepted, as were provisions for tax credits for energy-conserving homeowners and businesses.

The Senate Finance Committee removed the user tax on industrial consumption of oil and natural gas. In conference, after twelve months of deliberation, approval was given to: tax credits for homeowners installing insulation and solar and wind energy devices; a gas guzzler tax; a tax credit for producing alcohol as an alternative fuel source; investment tax credits for businesses on selected energy-conserving items; and several miscellaneous provisions, most of which concerned tax credits for the drilling and exploration of geothermal deposits.

## Policy Analysis

### *Residential Energy Tax Credit*

The amount of residential energy use varies substantially by region and sources of energy. As a whole, it has been estimated that residential and commerical buildings consume upwards of 34 percent of total energy use in the United States.[1] Given this large volume, it is evident that conservation efforts in this sector could significantly alter the amount of energy used both in the residential sector and overall.

The residential energy tax credit, which will reduce the cost of insulation and thus inrease the rate of return on those materials, will undoubtedly encourage homeowners and renters to make energy-conserving improvements. There has been a great deal of concern, however, over whether in fact the credit is necessary. Many claim that the work it intends to encourage would have been done without government intervention. As a basis for this argument they point out that 9.1 million, or 22 percent, of the occupied single family detached houses had some form of insulating materials added in 1975, when there was no credit for incentive.[2] About 14 percent of such homes added only storm doors, storm windows, or attic

insulation in that year. The increases from 1974 to 1975 were 5.6 percent and 11.1 percent for attic insulation and storm windows, respectively.

These data illustrate the fact that many people were insulating their homes without the credit, and it would seem probable that a substantial number would have continued to do so. A recent Congressional Budget Office study on insulating patterns estimates that because of the long lag that homeowners experience between the recognition of higher fuel costs and the purchase of insulation materials, only a small fraction (about one-third) of the eventual response to the 90 percent fuel price increases since 1974 had been seen before the enactment of the credit.[3] Therefore, an additional 16 million homes could have been expected to be insulated by 1985, even without the credit.

One of the major problems of the credit is that the provision does not reach those who do not have the initial capital to purchase the qualifying materials. In 1975, for example, higher investments in insulation came from the more affluent homeowners than from those in the lower income groups. While the credit may help to offset the difference, it does not go as far as other approaches, and in fact tends to subsidize those homeowners that can best afford the initial outlays, while ignoring those that can afford to insulate the least.

Although the tax credit may not benefit all groups, there are a number of estimates that put the amount of energy savings at a potentially high level.[4] By 1985, normal insulating plans and the stimulus of the credit could result in the reinsulation of up to 70 percent of all owner-occupied homes built before 1975. The energy savings attainable by reinsulating a home and making related improvements are estimated to be 35 percent of the 100 million Btus per year currently used to heat the typical home. This energy savings translates into approximately six barrels of oil per day after the reinsulation occurs, with total energy savings equal to 2.9 billion barrels of oil over twenty-seven years.

### *Solar Energy Equipment Tax Credit*

The potential for energy savings from the widespread use of solar equipment for home space and water heating is enormous. But so is the cost of installing solar equipment. Solar systems are not expected to come into widespread use until fuel prices rise substantially more than current projections, or the cost of such equipment declines.

The Carter Administration has set a goal of equipping 2.5 million homes by 1985 with solar devices in the hope of reaching an annual savings of 9 million barrels of oil (or equivalent). While this would be the level of savings if those homes use solar power only for heating water, the amount saved would be substantially greater if some of the homes also used solar power for space heating.[5]

A goal of 2.5 million homes appears unattainable, for it would require a sales growth in excess of 75 percent annually, or a breakthrough in technology allowing even more rapid growth for the last few years of the credit. It is unlikely that the former will occur, and the breakthrough in technology cannot be counted on.

The Congressional Budget Office has prepared a scenario that might be more realistic in illustrating the amount of energy savings attainable through the use of solar energy.[6] Using a more modest growth rate of 25 percent annually (from sales of 50,000 units in 1978), it was estimated that while initial energy savings will be relatively small under the tax credit, it will increase to approximately 1.6 million barrels of oil saved annually as more solar equipment is installed. The energy savings to consumers from responses to the credit would be high, amounting to a present value of some $240 million.

At present, there are active solar systems for efficient water and space heating, with cost-effective cooling systems as yet not available. Texas will not see maximum utilization of residential solar equipment and the tax credit, since the state's primary use of energy in this sector is for air conditioning.

### *Gas Guzzler Tax*

The impact of the federal excise tax has been estimated to be very significant in terms of energy savings, as automotive gasoline consumption will be reduced by an estimated 215,000 barrels a day.[7] Further, it is predicted that energy savings could reach 450,000 barrels of gasoline a day by 1990 as a result of the tax. This delay can be accounted for because a certain number of years will need to pass before the effect of the tax on driving and gasoline consumption will be fully felt.

The International Trade Commission recently estimated that the impact of the tax on the automobile industry will not be great. The ITC study concluded that the number of domestic automobiles sold in 1985 should not decrease significantly, from 12.5 million without any change in the law, to 12.4 million sold under the gas guzzler tax.[8] As such, employment should remain relatively stable.

Texas is one of the nation's leading states in motor vehicle registrations, with some ten million registered vehicles in 1977.[9] The gas guzzler tax will help to accelerate the implementation of fuel efficiency standards for new cars in the state, but it is doubtful that an immediate and significant savings in gasoline consumption will be realized because of the tax. With the long distances to be traveled in the state, comfort is viewed as being more important than fuel economy, and

as such, many Texans will probably continue to buy larger, less efficient automobiles.

### *Gasohol Tax Credit*

Basically, there are two types of alcohol fuel, ethanol and methanol. Ethanol has received more attention recently from state and federal fuels legislation as it is hoped that it can stimulate the troubled agriculture industry. It is methanol, however, that is cheaper to manufacture, costing thirty to fifty centa a gallon to produce, compared to approximately $1.00 to $1.30 for ethanol.[10]

Experts from the major automobile manufacturers have testified that most engines can operate on gasohol blends of up to nearly 15 percent alcohol before any carbueretor adjustments are needed. The adjustments would be necessary to fight the potential problems of starting in cold weather and vapor loc, a warm-weather condition in which bubbles of vaporized fuel block the flow of fuel in the gas line. Tests on gas mileage showed dramatic differences related to the age of the car. Older, high performance engines tended to get better mileage on gasohol because alcohol contains more oxygen than gasoline, and up to a point, more oxygen in gasoline means better potential mileage.[11]

One of the major arguments against the 10 percent tax credit for alcohol fuels is that they require more energy to produce than they yield.[12] In terms of overall efficiency for fuel, ethanol yields about 35 percent of the energy needed to produce it, while methanol yields about 45 percent. This compares to about 90 percent for gasoline.[13] Because of this high energy cost and the small number of alcohol processors, it is difficult to determine the energy savings this tax credit will have.

### *Business Energy Tax Credits*

Business tax credits, designed primarily to reduce the energy consumption of businesses and promote conversion to alternative fuels, have been criticized for not going far enough. Among the complaints are that they are too small, should not be limited to a portion of the taxpayer's liability, and cannot be counted on as a permanent fixture in the law.

### *Geothermal Provisions*

Geothermal tax incentives will promote significant geothermal exploration along the Texas-Louisiana Gulf Coast. The provision to grant intangible cost deductions for geothermal wells may contribute in the near term to the utilization of the Gulf Coast geopressured-geothermal resources and eventually to the development of geothermal resources along the Rio Grande in West Texas.

*Steven O. Palmer*

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# Chapter 18

# National Energy Conservation Policy Act

## Introduction

Perhaps the cheapest and easiest way to attack the energy dilemma in the immediate future is through a comprehensive energy conservation program. Yet until recently Congress, industry, and the American consumer have been reluctant to take serious steps. The National Energy Conservation Policy Act of 1978 (NECPA) is the latest contribution to energy conservation legislation. Although lengthy and detailed, NECPA's major provisions can be categorized in four areas: (1) residential conservation services, (2) indirect and direct assistance, (3) efficiency standards, labels and targets, and (4) federal agency demonstration projects.

## Background

### *Residential Energy Conservation Service*

Under this program, a public utility (defined as any person, state agency, or federal agency engaged in the sale of natural gas or electricity to a residential consumer) must

- provide information to the consumer on energy conservation,
- perform energy audits, and
- arrange for the financing, installation, and payment of energy conservation measures.

The logic behind the program is to take advantage of a utility's service structure in order to avoid increasing the size of government.

The Residential Energy Conservation Service consists of a five-year program to be implemented by January 1, 1980. The Department of Energy (DOE) will develop guidelines for residential conservation plans and supply states with information and technical assistance. State energy authorities will then prepare a State Residential Energy Conservation Plan to be approved by DOE. Nonregulated utilities and home heating suppliers (of No. 2 heating oil, kerosene, butane, and propane) within a state are also required to submit a plan that meets DOE guidelines. Should a state or a nonregulated utility fail to comply, DOE is authorized to develop a plan of its own that meets the requirements of the act. In the event that a public utility—regulated or nonregulated—refuses to implement a DOE-developed plan, it is subject to a civil penalty of $25,000 a day for each violation.

Under the program there are three important restrictions on what utility companies may do. First, a utility may not cut off a customer's service if he fails to pay his conservation-related bills; second, none of the costs of the utility program can be included in a utility's rate base; and third, with some exceptions, a utility cannot engage in the contracting, installation, or financing of an energy conservation measure.

### *Indirect and Direct Assistance*

*Indirect Assistance.* Three government controlled or sponsored financial institutions are affected by NECPA: the Government National Mortgage Association (GNMA), the Federal National Mortgage Association (FNMA), and the Federal Home Loan Mortgage Corporation (FHLMC).

Two loan programs are mandated by the act to be carried out by the GNMA. The GNMA, part of the Department of Housing and Urban Development (HUD), is directed to purchase, sell, service, or otherwise deal in weatherization loans insured under Title I of the National Housing Act (NHA). Under the first program, only low- and moderate-income families are eligible for loans which may not exceed $2,500. Obligations under the program by the GNMA may not exceed $3 billion unless the Secretary of HUD determines that insufficient credit is available on a national basis for energy-conserving improvements; in such a case, $2 billion more in obligations may be authorized.

The second loan program provides incentives for installation of solar energy systems. GNMA is directed to purchase up to $100 million in loans for owners of one-to-four-family dwelling units; such loans may not exceed $8,000.

Finally, the NHA and the charters of the FNMA and the FHLMC are amended to encourage the securing and packaging of energy conservation loans.

*Direct Assistance.* Direct assistance will come largely in the form of grants to states who then will allocate the money to institutions or individuals. The first

such program is an expansion of the weatherization program established by NECPA. The act broadens eligibility for assistance, expands the limit of assistance to $800, increases appropriations to $200 million through 1980, and attempts to increase the coordination of the program.

A large grant program is established for schools, hospitals, units of local government, and public care institutions. Schools and hospitals are appropriated $25 million for energy audits and $875 million for energy conservation projects through 1980; units of local government and public care institutions are appropriated $15 million for energy audits and $50 million for technical assistance grants. Eligible institutions must qualify under a state plan identifying appropriate energy conservation projects. Even for approved projects, federal assistance can only account for 50 percent of the total cost.

### *Standards, Labels and Targets*

*Housing.* NECPA requires energy performance standards for energy conservation improvements (e.g., those established under the residential energy conservation and weatherization programs). The deadline for the setting of building performance standards, established by previous legislation, is advanced to February 1, 1980. Further, $20 million is appropriated to the states to establish energy performance standards for housing.

*Automobiles.* NECPA strengthens previous legislation concerning fuel economy of automobiles. First, the penalty imposed on manufacturers violating fuel economy standards is increased to not less than $5 and not more than $10 per mile for each violation of a standard; however, this provision will not go into effect until 1982. Second, the definition of an automobile is expanded to include vehicles that weigh less than 8,000 pounds.

*Consumer Products.* NECPA replaces targets with standards for thirteen appliances.* Before, the only incentive to increase the efficiency on a product was a labeling requirement enacted under EPCA. Either DOE or the Federal Trade Commission (FTC) can assess penalties for violation of the standards (penalties are provided under EPCA.

*Industry.* NECPA provides that DOE will conduct energy efficiency evaluations of industrial products, establish test procedures, and set energy efficiency labeling requirements for industrial equipment. Corporations consuming one trillion or more Btus a year must report to DOE on their progress toward energy conservation. Finally, DOE is authorized to set targets for increased energy efficiency by use of recovered materials in the following industries: metals, paper, textiles, and rubber. Beginning January 1, 1980, and annually thereafter, firms selected by the DOE must report their progress toward the targets.

### *Federal Agency Demonstration of Conservation*

Four programs to demonstrate energy conservation in buildings are mandated for federal agencies. First, a ten-year plan, established by EPCA for conserving energy in executive agencies, is strengthened by authorizations of up to $25 million in FY 1979 and $50 million in FY 1980.

Second, DOE will establish a program whereby federal agencies submit proposals for solar equipment in their buildings. DOE will then select the most cost-effective solar systems; $100 million is appropriated through 1980 for this program. Third, each agency must carry out preliminary energy audits on federal buildings, and afterwards select buildings for appropriate retrofit measures. However, agencies must go to Congress to receive funds to install such measures. Fourth, DOE is required to procure up to 30 megawatts of photovoltaics each year for federal buildings. Ninety-eight million dollars is authorized for FY 1979-81 to carry out this program.

## Current Status

### *Residential Energy Conservation Service*

Proposed rules for the program were published in March 1979, and DOE is required to issue final regulations by May 1979. The service should be implemented by January 1, 1980.[1]

### *Indirect and Direct Assistance*

HUD's budget request for FY 1980 did not seek funding for the two GNMA subsidized loan programs; however, Administration officials are considering submitting a supplemental appropriation bill.[2]

DOE proposed amendments to the Weatherization Program in February[3] and in April released final rules for the grant program for schools, hospitals, units of local government, and public care institutions. DOE estimates that it will spend $27.5 million under this program in FY 1979.[4]

*Refrigerators, freezers, dishwashers, dryers, waterheaters, room air conditioners, home heating equipment, television sets, ranges and ovens, clothes washers, humidifiers and dehumidifiers, central air conditioners, and furnaces.

### *Standards, Labels, and Targets*

On January 24, 1979, the FTC announced a labeling requirement for insulation[5] and published an advanced notice of proposed rulemaking regarding the appliance standards program. Standards must be finalized by December 1980 for nine of the appliances and by November 1981 for the other four.[6]

By the end of January 1979, major energy-consuming corporations were to have filed brief reports on their energy consumption. During FY 1979, DOE will identify firms in the four industries (metals, textiles, paper, and rubber), and monitor their efforts to increase the use of recovered materials.[7]

### *Federal Agency Demonstration*

The federal agency demonstration of solar energy program will have $45 million available to it in FY 1979.[8] In addition, the President has ordered all federal agencies to reduce energy use by 5 percent in 1979.

## Policy Analysis

The National Energy Conservation Policy Act's programs are largely voluntary and emphasize a "go slow" approach to energy conservation. Where possible, the act leaves to the private sector the duties of carrying out the programs. In order to understand the implications and possible impacts of NECPA, each programmatic field must be examined.

### *Residential Energy Conservation Service*

According to DOE, around 300 gas and electric utilities will be required to take part in this program and some 7,600 home heating suppliers may also participate. DOE estimates that 65.4 million households will be eligible to take part in the program, with an estimated 7 percent seeking energy audits each year. Around 75 percent of those receiving audits are expected to follow up by installing energy conservation measures.[9] DOE estimates the program will cost states, utilities, and home heating suppliers some $2 billion to develop and administer. Consumers will spend $6.5 billion for energy conservation measures over the five-year period, culminating in a $30 billion savings in energy costs over the life of these measures.[10]

The legislation allows for considerable latitude for those programs operating before the passage of the NEA. According to DOE estimates, seventy utilities had ongoing insulation programs before the energy package passed.

Utilities express four major concerns in operating such a program. First, they will have to deal in ever increasing degrees with state and federal regulatory bodies. Second, there is the threat of legal action (especially liability and antitrust suits). Third, they may face additional complaints from their traditional opponents. Fourth, and probably most important, the program will affect the utilities' normal operations, perhaps reducing revenues more than costs. (Conservation is not valuable, cost-wise, to the utility company unless it reduces peak-load demand.)[11]

From the consumer's standpoint, three problems are associated with the program. First of all, the program will add to consumers' bills. Information dispersal costs will be passed on, as will project manager costs (e.g., a home inspection will cost between $25-$125) if a state energy authority approves it.[12] Second, there is a danger that the utility will not conduct the service in a neutral manner. Finally, many are concerned with aspects of the insulation and home improvement industry. For instance, fiberglass insulation accounts for 80 percent of the residential insulation market but is controlled by just three firms.[13] The home improvement industry is an easy business to enter and relatively free from oversight. One Pennsylvania Regulatory Commissioner claims that the home improvement industry has "ripped off the consumer to a degree that is almost unbelievable."[14]

Yet, a significant savings in energy could result from an effective utility program. According to David Bardin, Administrator of the Energy Regulatory Administration, an effective retrofit program for the existing 74 million houses in the U.S. could attain energy savings equivalent to 520,000 barrels of oil a day by 1985.[15]

### *Indirect and Direct Assistance*

*Indirect.* According to one estimate, weatherizing 90 percent of U.S. homes would require a capital expenditure of between $53.3 and $146.5 billion with a $23 to $67.5 billion cost of borrowed capital.[16] Currently, home improvement loans comprise only 1 percent of all outstanding credit in this country.[17] There have been two barriers in providing loans for residential retrofit measures: first, there are high fixed costs in servicing small improvement loans; and second, banks and savings and loans associations have been unable to package such loans and pass them through to the secondary markets.[18]

The two loan programs are designed to encourage the packaging and selling of energy conservation related loans in the secondary markets through the activities of GNMA.

*Direct.* The enlarged weatherization program, it is projected, will weatherize 1.4 out of the 8.6 million low-income houses through the three-year life of the

program.[19] NECPA provides for some assistance to low-income housing projects, but it largely ignores rental housing. According to DOE, 31 percent of residential energy is consumed in rental housing. Yet, it is difficult to encourage conservation in rental housing for two reasons: the owners are often not responsible for all the fuel bills, and they seek appreciation in the value of the property rather than operating profits.[20]

The nonprofit sector currently accounts for about 10 percent of the nation's total energy consumption.[21] Such institutions have been severely troubled by energy shortages and price increases. For instance, public schools lost forty million pupil-days in the winter of 1977.[22] Nonprofit institutions cannot pass through increases in energy prices as readily as profit-oriented corporations can. Moreover, many do not have the resources to identify conservation-related solutions or raise their half of the matching grant.

### *Standards, Labels, and Targets*

When speaking of standards, labels, and targets, one should keep in mind that it is much cheaper and easier to produce an energy efficient house, a consumer product, or a piece of industrial equipment, than it is to retrofit. Thus, it is inherently both rational and economical to produce more energy-efficient products and processes, especially with regard to long-term investments.

*Housing.* With weatherization as an immediate goal, standards regarding the efficiency and safety of energy conservation measures need to be set immediately. For instance, some types of insulation can give off offensive odors, other can be corrosive or flammable, and others lose their effectiveness over time.

*Transportation Vehicles.* Transportation accounts for 55 percent of total U.S. consumption of petroleum. Automobiles presently account for 72 percent of the antion's consumption in the transportation sector. Trucks use 16 percent. One of the problems with NECPA is that it does not mention trucks or state and local government vehicles. To meet Carter's goal of reducing gasoline consumption by 10 percent in 1985, consumption by trucks cannot increase more than 13 percent.

However, Secretary of Transportation Brock Adams estimates that NECPA efficiency standards will save motorists $60 billion in unnecessary fuel costs, cut oil imports by 15 percent in 1985, and reduce the trade deficit by $7 billion in 1985 and by almost $12 billion in 1990.[23]

The main problem with the transportation sector is it does not have any close fuel substitutes. With the exception of electrically powered mass transit systems, most vehicles run on derivatives of petroleum. It appears that gasoline will be the primary portable fuel for at least the rest of the century.

*Consumer Products.* The thirteen appliances listed under NECPA consume 75 percent of the total energy consumed in the residential sector and eleven percent of total energy consumed. One estimate predicts that an overall savings of two percent of total energy consumption could occur if efficiency standards are in effect after all old appliances have been phased out.[24]

*Industry.* Of the four sectors, industry is the largest consumer of energy (35 percent). U.S. industry currently consumes 10-40 percent more energy per unit of domestic product than does European or Japanese industry.[25] The average thermal efficiency of energy conversion processes is approximately 33 percent. Most of the wasted energy is lost in the form of heat which could be recaptured. There is also an energy savings potential in recycling. For example, processing recycled aluminum requires one-twelfth of the energy required to produce aluminum from ore.[26]

Industry was the only sector to reduce energy consumption during 1977. Their 1 percent savings amounts to 667,000 barrels of oil per day and an annual savings of $3.25 billion.[27] However, a report by the Investor Responsibility Research Center characterized industry efforts thus far as "largely housekeeping measures."[28] Although there is an enormous potential for conservation in industry, any attempt to establish a comprehensive standards program in such a complicated sector would require a huge governmental effort.

### *Federal Agency Demonstration*

The federal demonstration projects are designed not only to decrease energy consumption, but also to show the public and industry the applicability of conservation measures. This is especially true in the solar field. By providing a market for solar products, the federal government will offer industry a chance to try out its products and perhaps realize economies of scale.

The federal government consumed 2.2 percent of the total energy used in 1977. A comprehensive refurbishing (at a cost of $2.67 billion) of all federal buildings could result in a savings of $4 billion by 1990.[29] Some feel that solar energy has an enormous potential as a future energy source. According to Daniel Yergin, author and member of the Energy Research Group at Harvard, the U.S. could derive 20 percent of its energy from solar energy by 1990.[30] In addition, the President's recently ordered Domestic Policy Review takes a more optimistic look at solar energy as a future energy source.

*Augustine T. Smythe*

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# Chapter 19

# Powerplant and Industrial Fuel Use Act of 1978

## Issue Definition

The expanded use of coal by utilities and industry, a main element of the National Energy Act (NEA), is a pivotal issue in successfully decreasing the United States' dependence on an uncertain fuel supply. It is estimated that the nation will save 4.5 million barrels of oil a day under the NEA, and more than half of this saving will be a direct result of increased coal usage. While the supplies of petroleum and natural gas are estimated at only 7 percent of total U.S. energy reserves, coal is estimated to make up 90 percent.[1]

Approximately 60 percent of all natural gas is consumed by utilities and industry in the U.S. In 1976, natural gas accounted for approximately 87 percent of the boiler fuel used by utilities and industry in Texas.[2] Increased prices of oil and natural gas have led utilities and industry toward increased coal usage. The Powerplant and Industrial Fuel Use Act of 1978 (PIFUA), one of the five acts making up the National Energy Acts of 1978, mandates that new powerplants and industrial boilers be built with coal-burning capability and that existing facilities phase out natural gas as a boiler fuel by 1990.

The conversion to coal may not proceed smoothly due to technical, economic, and environmental barriers. In addition, the oil and gas users tax, designed to apply economic pressure for conversion, was stripped from the legislation while it was in Congress.

## Background

Coal-conversion legislation prior to the National Energy Acts of 1978 included the Energy Supply and Environmental Coordination Act (ESECA) and the Energy Policy and Conservation Act (EPCA). ESECA was enacted June 22, 1974, in response to the Arab oil embargo and served as the basis for a coal conversion program. It provided the Federal Energy Administration (FEA) with the authority to prohibit existing facilities from using petroleum or natural gas as a primary energy source. Later the legislation was amended to include major fuel burning installations (MFBIs) as well. FEA was also granted the authority to order new powerplants to be constructed with coal burning capability. In December 1975, the Energy Policy and Conservation Act empowered FEA to require that new MFBIs be constructed with a coal burning capability.

In administering ESECA and EPCA, FEA was required to select existing and new facility candidates on a case-by-case basis, with the burden of proof resting on FEA. Environmental impact statements had to be filed for each candidate, and federal air quality regulations were unclear. The result was that EPCA and ESECA proved to be ineffective for implementing coal conversion.

### *Provisions of the Powerplant and Industrial Fuel Use Act*

As a part of the NEA, the Powerplant and Industrial Fuel Use Act flatly prohibits new electric powerplants or major fuel burning installations built or acquired after April 20, 1977, from using natural gas or petroleum as a primary energy source. Besides boilers, other major fuel burning installations, such as gas turbines and combustion engines, could be prohibited from burning gas or oil by order of the Secretary of Energy.

For both new and existing facilities, temporary exemptions of from five to ten years and permanent exemptions are available. The Secretary may grant exemptions when: an adequate and reliable supply of coal or an alternate fuel is not available; site limitations such as inadequate land, water, waste disposal, or transportation facilities exist; federal or state environmental requirements for air and water pollution or solid waste disposal prohibit conversion; or the public interest would be served by the exemption.

A new facility may be permanently exempted if coal or an alternate source will not be available for the first ten operational years of the facility. Permanent exemptions might also be granted if a new powerplant or MFBI could not meet state or local laws (other than nuisance laws or building codes) that would prevent the construction or operation of a facility using coal or an alternate fuel.

In addition to prohibiting existing powerplants from using natural gas by 1990, conversion to gas is also prohibited to powerplants that did not use gas during

1977. Existing powerplants would also be prohibited from using natural gas in greater amounts than the average used during 1974 through 1976, or if they began operation after January 1, 1974, during their first two years of operation.

The Secretary may order an existing facility to convert if he finds that it has or had the technical capability to burn coal or an alternate source, or could have the capability without substantial modification or reduction in capacity. Conversion, of course, would have to be financially feasible.

Requirements for temporary exemptions for new facilities also apply to existing ones—the availability of coal or an alternate fuel, site limitations, applicable environmental requirements, and the public interest provision. Temporary exemptions may also be granted for innovative technologies, units to be retired, peakload powerplants, and plants needed to maintain reliable service.

Permanent exemptions for existing facilities are similar to those for new facilities, including exemptions for certain state and local laws. In addition, fuel burning installations that use Canadian natural gas are exempted, as are powerplants that use liquified natural gas where the Environmental Protection Agency has certified that burning coal would be in violation of air quality standards.

In addition to the exemptions listed, a system compliance option was included in the PIFUA to assist utilities that are heavily dependent on natural gas or petroleum. Utilities will be considered in compliance with any prohibitions and can burn oil or gas if a compliance plan has been approved by the Secretary of Energy. To be approved, a plan must include agreements not to build any new oil- or gas-fired facilities; not to use any natural gas after January 1, 1995, except in intermediate and peakload plants; and not to use natural gas after January 1, 2000, except for peakload requirements or emergencies. The act strictly states that no exemptions will be available for any powerplants that have ever been covered by a compliance plan.

Among other provisions, the Secretary may ban gas in boilers consuming 300,000 cubic feet of gas or more a day, and may ban gas used for decorative outdoor lighting.

The President may order the allocation and transportation of coal to insure service reliability, prevent unemployment, or protect public health, safety, and welfare.

The PIFUA provides assistance to impacted areas, designated by the governor and approved by the Secretary of Energy, that are adversely affected by increased coal or uranium production.

Authorizations of $400 million each year for fiscal year 1979 and 1980 are made to provide loans to finance the purchase and installation of pollution control equipment for existing powerplants, as determined necessary by the Secretary of Energy.

## Policy Analysis

### *Barriers to Conversion*

Many problems exist in converting new and existing facilities from their presently used energy source to coal. Figure 1 illustrates how conversion decisions may cancel each other out in view of technical, economic, and environmental constraints.

One physical constraint for existing facilities designed to use natural gas is that the spacing of the boiler tubes is too narrow for them to burn coal. Coal use also requires such additional equipment as coal and ash handling equipment, a larger boiler and auxiliary boiler, soot blowers, and an expanded flame zone. Five to twenty times the total plant space is needed for coal storage.[3]

Another consideration is the cost and time involved in converting a facility to coal. For example, conversion of an existing powerplant requires taking it out of service for four years and modifying or replacing the existing boiler.[4] Some industry spokesmen have indicated that it may take seven or eight years to convert their plants. Nationally, the cost of replacing existing gas- or oil-fired boilers is expected to be $50 to $90 billion for electric utilities and $150 to $250 billion for industry. For Texas, conversion is expected to cost $13 to $19 billion for utilities and $37 to $63 billion for industry. In addition, scrubbers, required under the provision that facilities use the best available pollution control technology, are expected to cost $40 to $70 billion nationally and $10 to $15 billion for facilities in Texas.[5]

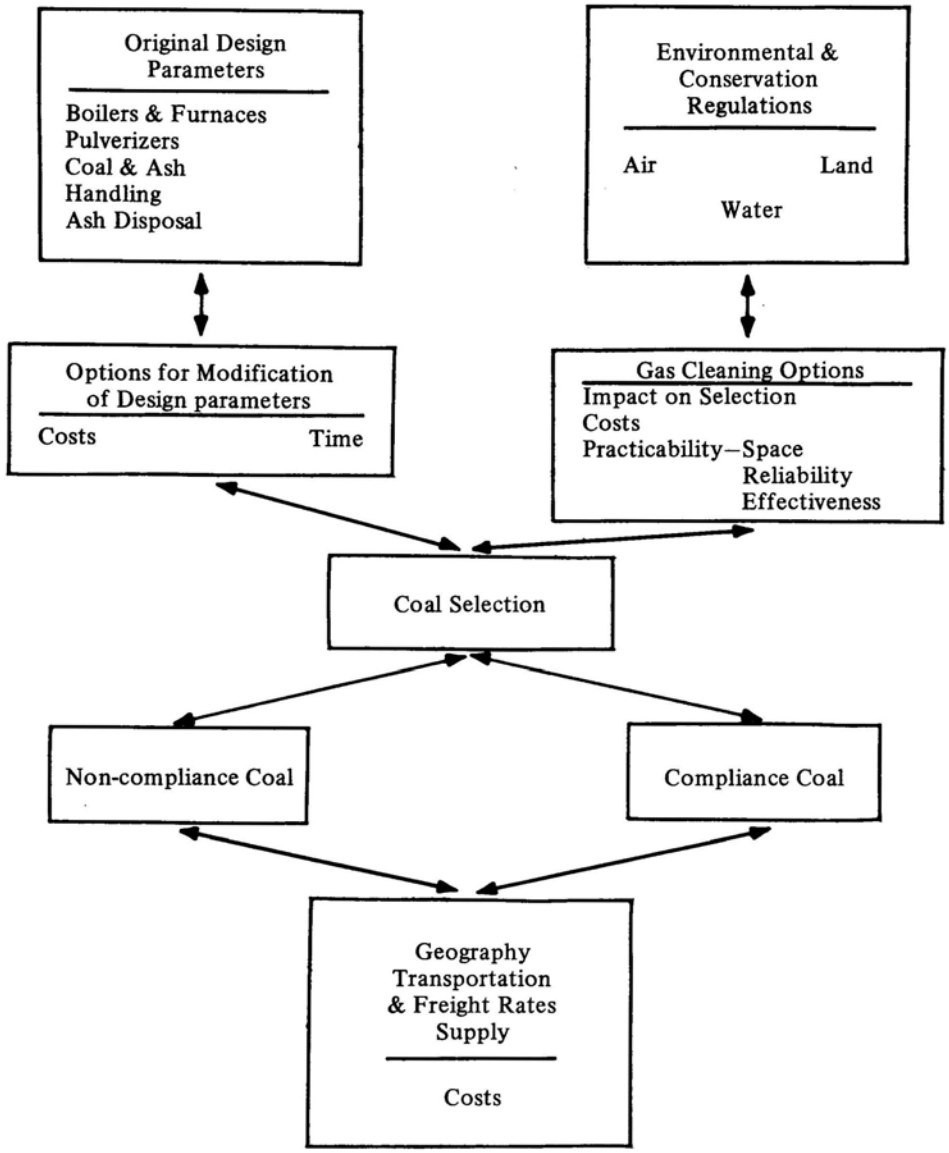
Implementation of PIFUA may create environmental impacts that could interfere with or violate federal environmental regulations. For example, facilities converting to coal may be subject to provisions of the Federal Water Pollution Control Act conversion results in a significant change in pollutant discharges into the nation's waters. Other federal programs that could present environmental barriers to conversion include: the Clear Air Act Amendments, the Safe Drinking Water Act, the Resource Conservation and Recovery Act of 1976, and the Surface Mining Control and Reclamation Act of 1977.[6]

To meet the goals of the act, coal production currently 665 million tons per year will have approximately doubled by 1985.[7]

A possible constraint to increased supply may be a shortage of capital. Eastern coal reserves, which are expected to produce two-thirds of the coal mined by

**Figure 1**

**Decision Matrix for Coal Conversion**




Source: Gregory Gold, "Key Steps to Coal Conversion," *Energy*, Winter, 1978.

1985, are owned by relatively small companies which may have trouble raising needed capital for expansion. Labor problems and decreasing productivity of miners may also hinder supply.

The production of coal-fired boilers and the marketing and transportation of coal may also hinder conversion. It

is estimated that at least 2,500 new coal-fired boilers will be needed by 1985. The availability of these boilers may present a serious barrier to conversion. In addition, coal-fired boilers currently cost three times more than oil-fired boilers.[8]

The marketing problem results from the fact that the most effective means for transporting and marketing coal is in large volume shipments of more than 100,000 tons per year in unit barges or trains. However, the market for coal that will be created under the PIFUA will consist of a large number of widely dispersed users consuming relatively small amounts of coal.[9]

Conversion to coal may create potential environmental impacts at each phase of the coal cycle: mining, transportation, marketing, combustion, and waste disposal. Yet, under the National Energy Acts, it is assumed that the U.S. can double coal production and consumption without sacrificing environmental standards.

Possible adverse effects of coal burning include phenomena known as the "greenhouse effect" and "acid rain." Large-scale burning of coal could result in a long-term greenhouse effect, in which increased carbon dioxide emmisions increase the density of cloud cover, trapping the earth's heat inside and slowly raising the temperature.

Acid rain occurs when sulfur and nitrous oxides, which are released into the atmosphere by burning coal, mix with rainfall and contaminate the earth. Information is currently available showing the impact of increased coal use on air quality (see Tables 1 and 2).

### Table 1

### Increased Air Pollutant Emissions From Coal Combustion in the United States

| Air Pollutant | Emission Rate - Million Tons per Year | | |
|---|---|---|---|
| | 1975 | 1985 | 2000 |
| Particulate Matter | 0.5 | 1.0 | 1.9 |
| Sulfur Oxides | 16.0 | 6.0 | 12.0 |
| | | (57.0) | (115.0) |
| Nitrogen Oxides | 5.0 | 2.0 | 4.0 |
| | | (9.0) | (18.0) |
| Carbon Monoxide | 0.3 | 0.5 | 1.0 |
| Hydrocarbons | 0.1 | 0.2 | 0.3 |

Note: Values in parentheses represent uncontrolled emissions.

Source: Hal B. H. Cooper, Jr., "Analysis of the Environmental Implications of President Carter's Proposed National Energy Plan," in *Preliminary Assessment of the President's National Energy Plan*, (Austin: University of Texas at Austin, 1978).

### Table 2

### Increased Solid Waste Generation From Coal Combustion in the United States

| Solid Waste | Generation Rate - Million Tons per Year | | |
|---|---|---|---|
| | 1975 | 1985 | 2000 |
| Mining Waste | 15 | 24 | 48 |
| Total Ash | 39 | 60 | 120 |
| Scrubber Sludge | 5 | 130 | 195 |
| Total Waste | 59 | 214 | 363 |

Source: Hal B. H. Cooper, Jr., "Analysis of the Environmental Implications of President Carter's Proposed National Energy Plan," in *Preliminary Assessment of the President's National Energy Plan*, (Austin: University of Texas at Austin, 1978).

## *Impacts on Texas*

The impacts of the Powerplant and Industrial Fuel Use Act on Texas could be quite harsh, since oil and gas are commonly used as boiler fuels. Natural gas represented about 87 percent of the energy used as a boiler fuel by utilities and industry in Texas in 1976. Projections indicate that by 1985 about 60 percent of Texas' electrical production will be from coal. Of this amount, 31 percent will be provided from Texas lignite and 29 percent from western coal. Gas will account for only 5 percent of production.

Industry in Texas may also find that conversion to coal will have a severe impact. An important part of the state's heavy industry (refining, heavy metals, pulp and paper) is located in the upper Gulf Coast region. Conversion of these industries, located in marginal or deficient air quality areas, will be technically and economically difficult. Obtaining enough land for coal storage and handling, as well as paying the high cost of coal transportation, will also complicate the conversion process.[11]

The economic impact of conversion heavily depends on the manner in which exemptions are granted. Under the PIFUA, rigid requirements could cost utilities $10-15 billion, with the impact on industry being much greater.[12]

The environmental impacts of coal conversion in Texas could be significant. There will be an increase in particulate matter, sulfur oxides, and nitrogen oxides as a result of increased coal use. This may make further compliance with air quality regulations under the Clean Air Act Amendments increasingly problematic. Therefore, a tradeoff between coal conversion and air quality may be required.[13]

The key to the impacts of the Powerplant and Industrial Fuel Use Act on Texas, as well as on the

nation, rests with the exemptions. There are seventeen allowable exemptions contained in the act, with wide discretion given to the Secretary of Energy in issuing them. Terms such as "in the public interest" and "financially feasible" used in the exemptions must be clearly defined before the impacts of the act can be fully determined.

*James W. Niewald*

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[13]Kaiser and Cooper, "Coal Utilization in Texas," p. 166.

# Chapter 20

# Public Utility Regulatory Policies Act of 1978

## Issue Definition

The Public Utility Regulatory Policies Act (PURPA) of 1978 addresses policies for the conservation of electric energy, improved efficiencies for power generation, and equitable rates for electric consumers. The present discussion deals specifically with Title I, "Retail Regulatory Policies for Electric Utilities" and its implementation in Texas.

Title I establishes federal rate-making standards that state regulatory authorities and nonregulated electric utilities must consider. These standards include: (1) cost of service, (2) declining block rates, (3) time-of-day rates, (4) seasonal rates, (5) interruptible rates, and (6) load management techniques. By November 1981, both groups must decide whether or not it is appropriate to implement each standard as a part of their rate-making activities. Furthermore, both groups must adopt the following additional standards consistent with the purposes of Title I and not in conflict with state law. These include: (1) a prohibition against master metering, (2) procedures to review automatic fuel adjustment clauses, (3) procedures to provide consumer information, (4) procedures to protect consumers from abrupt termination of service, and (5) a prohibition against charging ratepayers for a utility company's advertising. Lifeline rates may also be established once a state regulatory authority or nonregulated electric utility determines that such rates should be implemented.

## Background

As a part of the national energy package which President Jimmy Carter sent to Congress in April 1977, the Public Utility Regulatory Policies Act of 1978 emerged as a conference report on December 1, 1977, after both houses reached a compromise on the bill. Although the House had supported Carter's utility reforms, the Senate rejected the Administration's original proposal because it entailed a radical extension of federal authority over retail electricity rates which traditionally had been set at the state level. The Senate form of the bill (S. 2115) had passed with the following provisions:

1. permission for the federal government to intervent in state rate-making procedures as an advocate, but with no other powers;
2. authorization for a study of natural gas rate-making procedures;
3. a requirement that large nonregulated utilities report to the federal government on their costs of servicing customers;
4. creation of established federal guidelines and exemptions relating to cogenerators and small power producers;
5. authorization for loans to and studies of small hydroelectric projects; and
6. establishment of a research institute to aid state regulatory agencies.

When the conferees from the House and Senate met to reach a compromise, the Senate demands were met, and the following agreements were reached:

1. Wheeling—FERC could order a utility to "wheel" power from one supplier to another, subject to tests of reasonableness.
2. Pooling—FERC would be given a year to report to the President and Congress on the potential advantages of utilities' pooling of resources.
3. Interconnection—FERC could be empowered to order utilities to interconnect their facilities and to exchange energy supplies, subject to tests of reasonableness and judicial review.

The conference report agreed to on December 1, 1977 was filed October 6, 1978. As a part of the revised energy package, it was passed on October 15, 1978.

Title I lists three purposes for establishing the federal standards. They are to encourage "(1) conservation of energy supplied by electric utilities; (2) the optimization of the efficiency of use of facilities and resources by electric utilities; and (3) equitable rates to electricity consumers."[1] Each state regulatory authority is authorized to consider each of the federal standards. The intent of the legislation focuses on how implementation of each standard would affect each utility and its consumers in terms of the three purposes of the act. For example, would implementation encourage energy

conservation by consumers? Would it facilitate the efficient use of resources by utilities? Would it make rates more equitable?[2]

The bill emphasizes that for purposes of consideration and implementation, the mandates do not override state law—they supplement it. In considering each standard, the state authority or nonregulated utility must provide public notice followed by a public hearing. Any subsequent determinations must be made in writing. Although implementation of any of the federal standards is not madatory, the state regulatory authorities and nonregulated utilities must submit a statement to the Secretary of the Department of Energy (DOE) justifying their action, regardless of the decision made.

*Federal Standards.* The federal standards which must be considered include:

1. Cost of service—Rates charged by any electric utility should accurately reflect the cost of providing the electric service.
2. Declining block rates—Congress advocates elimination of rates in which the price charged a customer per unit drops as his consumption increases.
3. Time of day rates—rates charged by any electric utility should reflect the cost of providing the service at different times of the day, i.e., "peak" and "off-peak" periods.
4. Seasonal rates—rates charged by any electric utility should reflect the cost of providing the service at different seasons of the year.
5. Interruptible rates—Large industrial consumers may enjoy reduced rates by agreeing to temporary interruptions in service on short notice.
6. Load management techniques—Cost-effective techniques shall be made available to the consumer.
7. Master metering—The use of a single electricity meter for new buildings should be prohibited.
8. Automatic adjustment clauses—Review procedures should be adopted for automatic rate increases.
9. Information to consumers—All rate schedule information should be transmitted to the electric consumers.
10. Termination of service—Consumers should be protected from abrupt termination of service.
11. Advertising—Electric utilities are prohibited from charging consumers for promotional or political advertising.

Lifeline rates are dealt with separately from the two previous sets of standards. As adopted from the House bill, lifeline rates are authorized as an exception to the cost of service standard. State regulatory authorities and nonregulated utilities are authorized to conduct hearings and determine whether a lifeline rate should be implemented in the particular utility.

## Policy Analysis

*Background.* Prior to the passage of the Public Utility Regulatory Policies Act, the 65th Texas Legislature passed House Concurrent Resolution 27 which "directed PUC to study alternative rate structures and to determine their impact on conservation and costs to the various classes of consumers."[3] Based upon its findings, the Texas Public Utility Commission (PUC) was authorized to implement the rate structure most advantageous to residential consumers.

In response to the legislative mandate, PUC chose to institute a generic rate design study "to consider the effects of rate design on utility systems... and to make recommendations which would continue the policy of applying those recommendations on a company-by-company basis over a reasonable time period."[4] Accordingly, this gradual process would allow PUC time to weigh costs and benefits of applying its recommendations and to choose the appropriate method of application for each utility.

The results of the generic rate design study were compiled by PUC staff in December 1978. Their findings indicate compliance with several of the federal standards. In certain cases, PUC admitted only partial compliance and is making efforts to achieve full compliance. The following is a summary of those findings with respect to the federal standards:[5]

1. Master metering—prohibited in the state of Texas; PUC has substantive rules regarding it.
2. Advertising—PUC has adopted rules and procedures in compliance with the federal standard.
3. Termination of service—PUC is in compliance with this federal standard.
4. Information to consumers on rate schedules—PUC maintains substantive rules to satisfy this standard.
5. Time of day rates and seasonal rates—PUC supports a policy of gradualism in implementing these standards.
6. Cost of service pricing—PUC has gradually moved toward marginal cost pricing and time differentiated rates to reflect true cost of service.
7. Interruptible rates and load management—PUC recommends increased use of interruptible rates and load management techniques to comply with these standards.
8. Prohibition of declining block—PUC has severely limited its use for most residential classes.

Alternatives are being explored for general service and commercial rates.

9. Review of automatic adjustment clauses—PUC is studying the reporting system of utilities' fuel cost. PUC recommends the development of efficiency based fuel adjustment clauses where possible.
10. Lifeline rates—PUC opposes lifeline rates. PUC maintains that time-differentiated rates serve the purpose of lifeline rates and avoid the negative impacts caused by lifeline rates.

## Policy Alternatives

Although PUC conducted the generic rate design study in 1978 with the intention that it would comply with the requirements of Title I of PURPA, DOE will not accept their findings. DOE maintains that because the generic hearings were not evidentiary—i.e., did not have cross-examinations—the generic rate design study does not satisfy the requirements of Title I. The PUC staff did ask "clarifying questions," but there must be provisions for cross-examination. The best alternative for PUC to take in order to hold hearings on the federal standards would be to hold hearings on a company-by-company basis. Hearings are currently being held on time-of-day rates. In the case of nonregulated utilities, the Governor's Office will coordinate compliance with the act.

The cost of the hearings is partly subsidized by DOE. Because DOE can participate in the hearings, PUC is subject to their intervention in the process of complying with PURPA.

The success of this act may not be felt until the fifty states report their findings on the federal standards to DOE in the next two years. Congress was not willing to intervene in state authority beyond the point of requiring the states to consider the standards. Implementation of those standards will remain at the discretion of each state.

*John W. Craddock, Jr.*

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# PART V

# ENERGY-RELATED ISSUES

Numerous factors affect the role of coal and lignite as boiler fuels for industries and electric utilities. Several were addressed in a 1977 report of the LBJ School of Public Affairs entitled *Public Policies Affecting Lignite Development in Texas* and in a 1978 report called *Texas Energy Issues: 1978.*

In the present report, two energy-related issues are treated briefly. These are:

Chapter 21. Water for Texas lignite mining and use
Chapter 22. Freight rates for western coal

# Chapter 21

# Water for Texas Lignite Mining and Use

## Issue Definition

Lignite extraction and use as a boiler means increasing demands on the water resources of Texas. Because Texas is approaching a point where demand for water will soon equal available public water,[1] it is crucial that this issue be examined in light of water needs for lignite development. No longer is it sufficient to be concerned only with water quality issues. The question of water quantity is increasingly important. The problem of availability calls for review of hydrological conditions in Texas, projections of future demand, the extent to which water has been appropriated, and how rights to water use are granted.

## Background

### *Water Requirements for the Mining and Utilization of Lignite*

Water requirements exist at many phases of lignite development. During the strip mining of lignite, water is necessary both for dust control and revegetation. This is a minimal demand, however, relative to that required by the cooling process for power production.

Dust control for a mine producing enough lignite for a 1500-2,000 megawatt power plant—15,000-25,000 tons of lignite per day—requires five-hundred acre-feet of water annually. Revegetation uses two to four thousand acre-feet of water per year. The water consumption of an electric power plant totals 450-850 gallons per ton of lignite.[2]

The problems of meeting these demands for water will vary according to the region of Texas in which lignite is mined and used. The mining of lignite deposits in East Texas is not expected to create problems in meeting water demands. The abundant rainfall in this area will probably meet the revegetation needs.[3] Water for dust control has in the past been provided by the water obtained through the dewatering process. While the needs for lignite use will make definite demands, no shortages of ground or suface water are anticipated in the East Texas lignite area.

The situation in the central and southern sections of the lignite-bearing formations is not quite so favorable for mining and lignite-fired power production. In the central area, much of the existing surface water has already been appropriated. The South Texas region is the most water scarce within the lignite-bearing belts. Despite planned water development projects, surface water deficits are projected by the year 2025.[4] In addition, most of the existing water supplies have been appropriated.[5]

The increased water requirements for lignite mining and use will aggravate already existing water problems and shortages. Ground water depletion, for example, will cause lower well yields and increase the cost of pumping. Heavily pumped aquifers will increase saltwater intrusion. When the mining process calls for dewatering of an area, a lowering of the water table will result. Later when the area is refilled with mining spoil, water permeability will be altered, possibly affecting the transmitting ability of the aquifer.[6]

## Policy Analysis

In view of the approaching water scarcity conditions in Texas, it is important to examine the system of water allocation in terms of several criteria: 1) Does the current administration and legislation encourage the maximum use of resources? 2) Does it prevent the misuse and depletion of existing water supplies? 3) Is the resource allocation equitable?

### *Coordination of Texas Water Use*

The responsibility for the regulation of water use in Texas lies with the Texas Department of Water Resources. The Department is authorized to issue permits for surface water use, plan water development projects, and insure the fairness of water rates in Texas.

While responsible for insuring equitable water rates, the Department has no review system except for the investigation of complaints. Consequently, rates considered extreme have gone unchallenged until brought to the attention of the Department. Certain users suffer fewer disadvantages than others. Industrial users,

for example, can pass on the expense to the consumer. Farmers, however, do not have this option. The net result of this system is the creation of a market benefiting some groups over others, and possibly violating the public interest in some cases.

### *Surface Water Policy*

While both ground and surface water may be used in the many phases of lignite mining and use, surface water is usually less expensive and, therefore, a preferred source. The rights to surface water use vary according to its classification. Surface water within a watercourse is governed both by riparian and appropriation doctrines. Riparian doctrine is the common-law rule granting landowners use of the surface water on their land for domestic purposes, such as household or livestock use. Appropriation doctrine in Texas is governed by statutory regulation and involves a permit process with the Texas Department of Water Resources.[7]

Surface waters which are diffused—those not occurring in a lake, pond, or other watercourse—are not regulated. They are governed by common-law rule. Included in this right to divert water for household needs is a provision allowing the landowner to impound up to two hundred acre-feet of water by building a dam or reservoir.

Presently in Texas there is a move to lower the allowable quantity which can be impounded to ten acre-feet.[8] The argument is that ten acre-feet is more than adequate for livestock and domestic purposes. If this limit were reduced, less water would be lost to evaporation and existing water usage could be maximized.[9]

With regard to surface water which is not diffused, efforts are being made to cancel unused appropriation permits or "paper rights." In 1971 the Texas Supreme Court allowed cancellation of permits which had not been in use for ten years. This move would potentially increase surface water availability. Estimates of potential increase in supply range as great as 25 percent of the current water supply in some basins.[10]

### *Ground Water Policy*

Rights to ground water in Texas are governed by common-law rule. A landowner is allowed the right to any obtainable water under his land. The only existing regulation of ground water is through an underground water conservation district formed on a voluntary basis by landowners with ground water rights.[11]

The common-low allowance for unrestricted pumping of ground water encourages water consumption. No economic incentive exists for conservation and preservation of available supplies. While it has been argued that unrestricted usage encourages economic development, this system ignores the true cost of consuming this resource.

Ground water recharge rates are being ignored and consequently the rate of withdrawal is depleting supplies. Excessive pumpage in various parts of the state has resulted in subsidence, saltwater intrusion, and aquifer mining. The number of wells in an area and their spacing are related elements of the same problem, which is not presently supervised by the state.

Currently, the only ground water control in Texas is in the hands of local agencies. Six underground water conservation districts have been established in Texas and, for the most part, are located in the western portions of the state. Only three of these districts, however, are active. Their responsibilities and powers include the control of well-spacing and waste.[12]

One basic drawback to the successful operation of conservation districts is their reluctance to exercise their power fully. Politically it is difficult to impose pumping regulations and withdrawal limits. This has been the case in West Texas—those that are regulating are also the water users.[13] For this reason the situation seems to dictate the need for centralized regulatory activity. There are problems, however, with a statewide program because it must have different standards and regulations for different sections of the state. Regulatory guidelines must be devised to suit the particular physical and economic conditions of each region.[14]

State water officials have warned that if the present water problems continue without attention from local districts and agencies, state intervention will be mandatory. A revision of the Texas Water Code has been proposed to address this problem. The proposal called for the state to identify critical areas and set aquifer withdrawal limits for them. The citizens of the respective areas would then be given a year to set up an underground conservation district. At the end of this time if no action had been taken, the state would then impose regulation until the cities chose to do so. No action has yet been taken on this proposal. Many political constraints exist in imposing such control as most landowners and legislators are anti-regulation.[15]

There are even more drastic measures that have been adopted by other states and proposed for Texas. These include replacing the common-law rule for ground water. This option does raise futher questions concerning the constitutionality of interfering with property rights.[16]

### *Water Resources Management*

A final issue to be examined is the management of available water resources. The manner in which water

systems are operated can considerably alter supply. Conjunctive use of ground and surface water, for example, can markedly increase water availability. Texas has not yet used several methods that serve to promote conservation and mitigate water scarcity.

Multireservoir operations is one of these techniques. Managing several reservoirs as opposed to a single reservoir can heighten efficiency and possibly even the water yield. Estimates range from a 10-20 percent increase in yield for operation as a system compared to independent operations. This is accomplished by using low evaporation reservoirs for storage and limiting the use of higher evaporation reservoirs.[17]

Another significant tool in water resources management is conjunctive use of surface and ground water. Uncontrolled usage in one hydrological phase affects the conditions of another, and consequently interferes with water rights. The exploitation of ground water, for instance, can alter stream base flow. In the Trans-Pecos region near Fort Stockton, spring flow was disrupted and desiccated as a result of uncontrolled well drilling in the aquifer.

A coordinated water system would facilitate the conservation of drainage water. Water could be stored in mined ground water basins or used to recharge underground reservoirs. One advantage of this system is the reduced water loss through evaporation.[18]

Unfortunately, Texas water policy does not lend itself to the coordination of ground and surface water management. The private law doctrine is poorly suited to conjunctive use of water resources. Texas water law treats ground water as entirely unrelated to other waters. Ground water is regarded as a "mysterious separate blessing."[19] A move by Texas toward conjunctive management would be especially difficult due to the dual recognition of water rights systems.[20]

*Margaret Ann Smith*

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[9]Otis Templer, *Institutional Constraints and Conjunctive Management of Water Resources in West Texas,* technical report prepared for Texas Water Resources Institute, Texas A&M University, College Station, January 1976, p. 95.

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[17]Texas Water Development Board, "Continuing Water Resources," volume 1, pp. II-67.

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# Chapter 22

# Freight Rates for Western Coal

## Issue Definition

The National Energy Acts of 1978 (NEA) requires the use of coal in new power facilities and in new industrial boilers that produce 100 million Btus or more per hour. A major portion of the coal for conversion lies in the western United States, accessible to Texas only by rail. The rates charged for movement of this coal are being investigated by the Interstate Commerce Commission (ICC) in order to set guidelines for rate agreements. The ICC is faced with two conflicting national policies in dealing with the issue of coal train rates: (1) shifting to a more abundant energy resource, thus reducing dependence on oil and natural gas; and (2) revitalizing the nation's railroads through rates that reflect a commodity's contribution to the total costs of a rail carrier's system.

This chapter analyzes the ICC's attempt to achieve these objectives and balance the equity interests of different regions of the country.

## Background

Dependence on expensive foreign oil and gas has created pressure in the U.S. to use alternative fuels. The NEA calls for domestic coal to be a major replacement for oil and gas.

The U.S. also faces a problem with its national transportation system, particularly some of the railroads. The Railroad Revitalization and Regulatory Reform Act of 1976 (4R-Act) was passed to give railroads a chance to improve facilities and financial conditions, in the hope of keeping them a strong private carrier system.

The ICC is currently trying to balance these policies in the movement of western coal to Texas. Western coal lies in a band from Montana to New Mexico, with less sulphuric and lower Btu value per ton coals lying in the upper portion of that area. Unit coal trains are the only feasible method of moving western coal at this time. These trains consist from four to seven locomotives and one hundred to one hundred ten hopper cars, all specially designed for coal movement. By delivering in volume to a single location, such unit coal trains can realize significant rail rate savings. For example, in 1976 the ICC set the unit train rate to San Antonio, Texas at $10.90 per ton while the normal class rate was $30 per ton.[1] Texas utilities and large industrial users of coal would like to see lower rail costs reflected in lower rates and product prices for customers. Railroads would like to take advantage of these savings, and the captive nature of coal movements, by charging rates above actual costs. The profits would be used to upgrade lines and reimburse investors.

The ICC is currently holding an investigative hearing on the reasonableness of freight rates for western coal.[2] A final decision by the ICC will affect unit coal train rates across the nation, and any decision will probably be appealed to the federal courts. A delay in resolving this problem can only harm the railroads, the utilities, consumers in Texas, and ultimately, consumers across the country.

## Policy Analysis

The ICC is reviewing four primary issues in this case: market dominance, long-term contracts, price discrimination, and rate-zones.

### *Market Dominance*

This is based on three standards set up in the 4R-Act, each of which has been met by western coal movements to Texas. Without market dominance, ICC power is limited to review of existing rates. First, Burlington Northern (BN) and related carriers hauled 79 percent of the coal carried by Western District carriers in 1977.[3] Seventy percent is considered a dominant level. Of these carriers, BN is dominant in Texas. Second, rates set at or above variable costs plus 60 percent of variable cost are considered to include all costs of a movement, including a profit. In each case involving unit coal trains to Texas, the freight rates have equalled or exceeded that level. Finally, dominance exists if shippers (users) must make substantial rail-related investments. Table 1 shows that utility investments include unloading facilities, spurs connecting plants to mail lines, and hopper cars. BN does not finance these items.

There is no real competition to rail movement of western coal. Trucks and power lines would not be

economical over the 1000-1500 mile distances involved. Barges are economical, but are limited to the navigable Mississippi-Missouri river system and to East Texas. Slurry pipelines could transport large amounts of western coal if contracts for delivery were set prior to construction. Once in operation line expansion is difficult. Pipelines are not a threat to railroad dominance. They have been unable to obtain the power of eminent domain needed to cross railroad rights-of-way. For social and political reasons, legislatures of the states involved are not likely to give pipeline companies either the power of eminent domain or access to scarce water supplies for coal slurry.[4] Texas has passed a coal-slurry pipeline bill, but the U.S. Congress has not.

Alternative fuels are not expected to reduce significantly use of western coal in Texas. Solar energy is not yet capable of supplying bulk electricity requirements. Nuclear plants are being built, but they face social opposition that could limit their use. Lignite is plentiful in Texas and is a viable alternative to coal use for eastern and southern Texas. It cannot be transported more than 250 miles, however, due to its highly combustible nature, leaving West Texas dependent on western coal.[5] In addition, most Texas lignite is expected to be committed to users by the year 2000, while increasing consumption rates could use up economically available lignite by 2050.[6] Lignite cannot be directly substituted for coal in boilers, so to avoid expensive boiler conversion costs, plants must be built with coal or lignite in mind.[7]

Foreign coals are an economical alternative when freight rates are high, but such use would not reduce the U.S. balance of trade deficit nor would it reduce dependence on foreign energy supplies.[8] Finally, not all western coals can be directly substituted for one another.[9] Since western coal users face large expenses in converting to any alternative fuel source, even if they could escape Burlington Northern's dominance of coal movements, a final solution must then account for this railroad negotiating advantage.

### *Long-term Contracts*

Coal tariff contracts are currently one-sided agreements that commit utilities to minimum shipments of coal, with fallback penalties if minimum levels are not met. Railroads, due to common carrier regulations, are under no obligation to ship those minimum amounts. Railroads must divide their services among all shippers as equitably as possible, as determined by the carriers.

Utilities who use coal seek the minimum cost combination of mine-mouth and rail rates. Once committed to a lengthy mine contract, they cannot afford to lose their only source of transportation. Therefore when railroads raise rates, utilities must accept them or appeal them to the ICC. In either case, stability of utility rates or service is impossible when transportation costs constantly rise. Table 2 shows the current status of contracts for three Texas utilities. In each case, freight rates rose nearly 11 percent in 1978 based on increases authorized by the ICC.

**Table 1**

**Rail-Related and Facility Investments of Selected Texas Utilities**

| Utility | No. Cars | Cost per Car | Rail ($) | Maintenance ($) | Carrier |
|---|---|---|---|---|---|
| LCRA | 485 | $32,000 | 600,000 | 1-1.5 million | BN-MKT |
| | 250 | $27,000 | | | |
| | 235 | $32,000 | | | |
| San Antonio | 819 | $30,000 | 58,000* | 1/ton | BN |
| HP&L | 2500 | $35,000** | 6-7 million** | shop contract no current amount | BN |

Source: Houston Power and Light Company, San Antonio Public Service Board, Lower Colorado River Authority (all LCRA investments are made on a 50-50 basis with Austin City Power, Austin, Texas).

*$11 per foot estimated cost for a 1 mile spur built in 1974.

**1370 hopper cars are on hand with a projected total of 2500 cars by 1983, at an average of $35-40 thousand per car of 105 ton capacity.

The HP&L rail expense is estimated out of $35 million actually spent for coal handling facilities.

## Table 2
## Utility Contracts for Coal

| Utility | Coal Life (yrs) | Source | $/ton | Rail * Life (yrs) | $/ton |
|---|---|---|---|---|---|
| LCRA | unit 1-25 | Mt | 15+ | 3 | 17.01 |
| | unit 2-15 | Wy | - | - | - |
| San Antonio | 20 | Wy | 1.01 | 20 | 17.01 |
| HP&L | unit 1- 3 | Wy | 8+ | 3 | - |
| | unit 2-25 | Mt | - | 25 | 17.11 |

Source: Houston Power and Light Company, San Antonio Public Service Board, Lower Colorado River Authority (all LCRA investments are made on a 50-50 basis with Austin City Power, Austin, Texas).

*Rail contracts are subject to general rate increases after all ICC yearly rate reviews.

Railroads could benefit from legally binding contracts: (1) they would be assured of heavy traffic over the life of their investments if utilities are not driven to other fuel sources; and (2) investors would have more confidence in railroads if they foresaw steady rail use by a high revenue commodity such as coal.

While the ICC has not totally freed railroads to make long-term commitments, they have suggested a relaxation of the rules in a recent hearing.[10] The real need is for a change in laws, such as the 4R-Act, which forbid special contract services along with common carrier service.

### *Price Discrimination*

The coal freight problem centers on the railroad technique of price discrimination: charging more than full costs for the movement of some commodities while charging less for others. Full costs include: a portion of system-wide fixed costs in proportion to use of the system; variable or direct costs of a movement; and a reasonable profit. Although railroads do compete for commodity movements that are not profitable, they are required to make some unprofitable runs by the ICC based on common carrier responsibility to provide a service. Therefore even if railroads competed for only profitable movements, they would be left with some movements that cannot pay a full cost tariff (a rate in which a full share of fixed costs are not recovered). In the long run, a railroad will fail if full costs are not made up, as occurred in the Penn Central bankruptcy in the late 1960s.

In the western United States, long delivery distances have eliminated coal transportation competition. Western coal is then a commodity for which railroads try to charge greater than full costs in order to balance shortfalls on other commodities.[11] Note that coal users benefit from subsidizing other commodities that pay only a portion of their share of fixed costs. Some commodities would be lost by railroads if full cost rates were charged. With the total amount of system-wide fixed costs unchanged when customers are lost, remaining movements would have to bear a larger share of costs for track, stations, and other fixed items.

Price discrimination is accepted by the ICC, federal courts, and the 4R-Act.[12] It is also a well accepted business practice based on elasticity of demand. The problem in this case is a lack of specific accounting data from railroads proving that they are charging as near to full costs as is possible on all commodity movements. Railroads and the ICC are asking coal users to pay rates above full costs merely on the word of rail operators that losses are unavoidable. Railroads should be required to provide more cost data if higher rates are to be justified.

### *Rate-zones*

The ICC has suggested four standards for measuring the reasonableness of rates.[13] First, economic effects on the community are measured. Given the national scope of a final decision on western coal rates, this is too limited. High coal rates could have far-reaching social, political, and economical impacts similar to those of oil and gas prices, rather than simply local economical effects.

Standard two, rate comparison, involves looking at items such as train size, revenue per car, and distance. Since BN market dominance may have distorted Texas rates, true comparison should require data from unit train movements to the Midwest and East.

Standard three calls for recognizing and preserving the inherent advantage of all modes of transportation. This requires a balancing of railroad experience, flexibility,

and availability against the impact high freight rates could have on consumers. Maintaining high rates will hurt railroads if profitable coal movements are lost at the end of existing contracts, as users find alternative boiler fuels. This would defeat the purpose of the 4R-Act and the NEA.

Standard four, concerning the relation of rates to cost of service, has two parts. First, how railroad expenses are to be defined and applied. For example, heavier rail needed for coal trains can be used by other trains, but existing lighter rail would also serve noncoal trains. Are these new rails variable or fixed costs, and who should pay for them? Table 3 shows a small part of the railroad investments for coal that will be affected by these cost decisions. As part of this process railroad financing techniques will be reviewed.

Once costs are defined, the ICC will set zones for coal rates, rather than trying to establish specific rates for each movement. Rate-zones systems are used to create flexibility in rate agreements. The process was included in the 4R-Act and it does not preclude individual rate appeals. Minimum zones usually are the variable costs of a movement. The mid-point or full-cost level is variable cost plus 60 percent of variable cost. The maximum level, which must be high enough to offset losses on other movements without giving unnecessary profits, may be as high as 120 percent of variable costs, assuming that some movements will only pay tariffs covering variable costs. Other pricing mechanisms, such as whatever the market will bear, have been rejected by the ICC for market-dominated situations.[14]

The tedious process of specifying items as variable or fixed costs should be left to a technical body such as the ICC. Elected representatives should set general guidelines as to how high or low rates should go.

## Policy Alternatives

The key to policy alternatives in this case lies in the answer to two questions: (1) what share of the burden for energy self-sufficiency and strong railroads should be borne by citizens who use western coal? and (2) which authority(s) should make that decision?

One alternative is to leave the problem with the ICC, since it is set up to handle rail rate problems. Hearings often take years to be finalized, however, and the process excludes elected policymakers, except as witnesses. In addition, the movement of western coal involves conflicts beyond the transportation issues of the ICC's domain.

A second possibility is for Congress to clarify the intent of conflicting laws for the ICC. Combined with a specific decision deadline and congressional review, this would have the advantages of speeding up the final decision and leaving the ICC free to rule on technical issues. Hearings begun in the House Oversight Subcommittee in April 1979 concerning western coal rates are a first step in this process. Legal barriers to congressional interference in independent agency decisions hinder action along this line.

A final alternative is for Congress to remove the decision from the ICC, except for the most technical details. This would leave Congress in a position to deal with a socially, economically, and politically sensitive issue. The process would also be opened up to state and local officials from affected areas. There is the threat of a strictly political or regional bias in decisions made in this manner, but the solution would at least reflect national preferences rather than those of a regulatory body dominated by the transportation industry. President Carter's Railroad Deregulation Act of 1979 would set the state for congressional resolution of the issue along these very lines.

*Patrick Haar*

### Table 3

### Railroad Investments Related to Unit Coal Train Movements (million dollars)

| Railroad | Years | Locomotives Cabooses | Roadway | Total |
|---|---|---|---|---|
| ATSF | 1979-83 | $150 | $120 | $ 270 |
| Union Pacific | 1979-83 | 250 | 50 | 300 |
| Southern Pacific and Santa Fe | 1978 | 133.2* | 96.4* | 229.6 |
| Missouri Pacific | 1978-83 | 80* | 17 | 97 |
| Burlington Northern | 1978-82 | 341.6 | 837 | 1,178.8 |

Source: *EX Parte No. 347*, Volume I, Western Coal Transportation Association, Opening Statement.

*Includes funds for hopper cars.

## References

[1] *Burlington Northern, Inc. et al, Petitioners,* v. *The United States of America and Interstate Commerce Commission, Respondents,* 555 F.2d 637 (C.A. 1977).

[2] *Western Coal Investigation-Guidelines for Railroad Rate Structure,* I.C.C. Ex Parte No. 347, May 16, 1978. This case was instituted in May 1978 with the intent of reviewing conditions in the movement of western coal. Findings in this case will be applied to similar movements around the country.

[3] Verified Statement of Leroy Peabody, p. 8, Opening Statement of the Western Coal Traffic League, filed August 4, 1978, I.C.C. Docket No. 36 180.

[4] *Public Policies Affecting Lignite Development in Texas,* The Lignite Development Policy Research Project (The University of Texas at Austin: Lyndon B. Johnson School of Public Affairs, 1977), pp. 44-45.

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[10] *Change of Policy Railroad Contract Rates (General Policy Statement,* I.C.C. Ex Parte No. 358-F, November 9, 1978, p. 1.

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[12] *Incentive Rate on Coal—Gallop, New Mexico to Cochise, Arizona,* I.C.C. Docket No. 36 612 (November 28, 1977) :27. 49 U.S.C. Sec. 1 (5) (b).

[13] *San Antonio, Texas Acting By and Through It's City Public Service Board* v. *Burlington Northern, Inc., Et al.,* I.C.C. Docket No. 36 180, October 13, 1976.

[14] *Nationwide Increased Freight Rates and Charges,* I.C.C. Ex Parte No. 343 (1978).