

THE NATIONAL COAL COUNCIL

Improving
COAL'S
Image

*A National Energy
Strategy Imperative*

JANUARY 1992

IMPROVING COAL'S IMAGE:
A NATIONAL ENERGY STRATEGY IMPERATIVE

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January 1992

THE NATIONAL COAL COUNCIL

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U.S. DEPARTMENT OF ENERGY

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The National Coal Council is a federal advisory committee to the Secretary of Energy.

The sole purpose of the National Coal Council is to advise, inform, and make recommendations to the Secretary of Energy on any matter requested by the Secretary relating to coal or the coal industry.

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January 28, 1992

The Honorable James D. Watkins
Secretary of Energy
U.S. Department of Energy
Forrestal Building, Room 7A-257
1000 Independence Avenue, SW
Washington, D.C. 20585

Dear Mr. Secretary:

On behalf of the National Coal Council, I am pleased to submit to you a report entitled "Improving Coal's Image: A National Energy Strategy Imperative." This report was prepared in response to your request of November 7, 1991, and was approved by the Council on January 28, 1992. As the title implies, the Council believes coal's negative image impedes sound energy strategy. The solution to the problem lies in educating people about energy generally, and coal in particular.

That coal has a poor image is indisputable. Although it is our most abundant energy fuel, it enjoys little public awareness or appreciation. The first three chapters of this report detail the sources of coal's negative image, explain how coal has met or can meet those concerns, and underscore coal's importance to the economy of the United States.

Chapter IV distinguishes between education and information as remedies to the lack of public awareness. It outlines the appropriate approach, either educational or informational, for reaching a particular audience. Appendix A explores why it is necessary to reach the identified audiences.

Chapter V makes specific recommendations to you as Secretary of Energy and takes the unprecedented step of making suggestions to the coal industry, as well. Detailed recommendations and suggestions are set out in Appendix B. The Council's rationale for using a report to the Secretary of Energy to make suggestions to industry merits explanation.

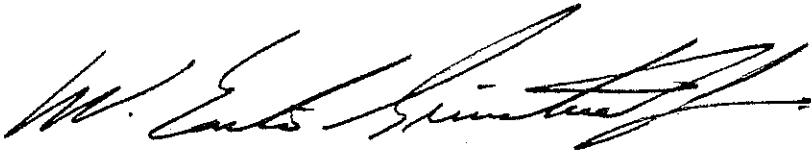
The Council recognizes that the task of improving coal's image cannot be borne successfully by the Department of Energy alone. While the commitment to make coal a cornerstone of energy strategy must be shared by government and industry, financing that commitment is the coal industry's job. By "coal industry", the Council means all coal producers, coal users, coal transporters, and suppliers of equipment and services to each of those sectors.

An Advisory Committee to the Secretary of Energy

If those who benefit directly from coal cannot implement an effective action plan, there are no others who will. A majority of the Council believe we cannot fairly separate our recommendations to the Secretary of Energy for improving coal's image from a description of what we believe the industry needs to do to improve coal's image. The efforts, though distinctly separate, should be complementary and parallel.

In the attached report, the Council makes seven recommendations to the Department of Energy and seven suggestions to the coal industry. All fourteen elements working together can improve coal's image. From a national energy strategy perspective, that is our priority recommendation.

Sincerely,

A handwritten signature in dark ink, appearing to read "W. Carter Grinstead, Jr.", with a stylized, flowing script.

W. Carter Grinstead, Jr.

PREFACE

The National Coal Council is a private, non-profit advisory body, chartered under the Federal Advisory Committee Act.

The mission of the Council is advisory only, providing guidance and recommendations as requested by the Secretary of Energy on general policy matters relating to Coal. The Council is forbidden by law from lobbying or carrying out other such activities. The National Coal Council receives no funds or financial assistance from the Federal Government. It relies solely on the voluntary contributions of the members for the support of its activities.

The members of the National Coal Council are appointed by the Secretary of Energy for their knowledge, expertise, and stature in their respective fields of endeavor. They reflect a wide geographic area of the United States, representing more than 30 states. They reflect a broad spectrum of diverse interests from business, industry, and other such groups as listed below:

Large and Small Coal Producers

Coal Users such as Electric Utilities and Industrial Users

Transportation interests from the Rail, Waterways, and Trucking Industries as well as port Authorities

Academia

Research Organizations

Industrial Equipment Manufacturers

Environmental Interests

State Government, including Governors, Lt. Governors, Legislators, and Public Utility Commissioners

Consumer Groups including special women's organizations

Consultants from scientific, technical, general business, and financial specialty areas

Attorneys

Special interest groups that are regional or state in concentration

Indian tribes

The National Coal Council provides its advice to the Secretary of Energy in the form of reports on subjects requested by the Secretary and at no cost to the Federal Government.

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FOREWORD

In June 1986, in an address to the first meeting of the National Coal Council, former Secretary of Energy John S. Herrington emphasized concerns about the attitudes of the general public toward coal use. Since then, this problem has been highlighted in several past reports prepared by the Council for the Secretary.

In November 1990, Secretary of Energy James Watkins requested and authorized the National Coal Council to conduct a study and make recommendations regarding the following:

"Educating the Public About Coal.

Public perception of coal mining and use is based largely on what coal was before environmental health and safety became important factors in the United States coal industry. The study should identify means of educating the public on the current practice of using coal and on the role of clean coal technologies to further improve the economic and environmental performance of coal-based systems to more freely contribute to solving near-term energy and environmental needs."

That coal has a poor image is indisputable. The importance of coal to our nation's economic and energy future is equally clear. That the majority of people, including those in government, have a poor attitude toward coal based upon misconceptions and a lack of knowledge is unmistakable.

In December 1990, a Work Group composed of members of the National Coal Council was formed to undertake the requested study. In turn, several Sub-Groups were established to develop the background information necessary for this report. These individuals reflect the wide-range of familiarity, judgement, and experience that is present among the National Coal Council representatives and industry representatives at large.

This report explores the background contributing to coal's poor image, emphasizes the importance of coal to our nation's future, enumerates positive accomplishments in the production and use of coal, and outlines measures that can be taken to raise the level of knowledge about coal and make its use more acceptable.

EXECUTIVE SUMMARY

In its 1990 report, *The Long-Range Role of Coal in the Future Energy Strategy of the United States*, the National Coal Council analyzed the future of coal over the next 60 years. That report was optimistic in that it predicted that the United States will utilize its abundant coal reserves in an efficient and environmentally acceptable manner.

The companion study to this report is entitled *The Near-Term Role for Coal*. It examines key coal issues during the decade of the 1990s, including the development of clean coal technology. Both the 1990 report and *The Near-Term Role for Coal* suggest that coal demand will increase well into the 21st century, that America must continue to rely on coal to generate electricity because it doesn't have any viable alternative.

Such reports imply that coal demand is certain to increase because there aren't any alternatives and Americans will accept greater use of coal. Such thinking could prove erroneous. The public's perception of coal — what it is and what it does — is coal's most important future utilization challenge.

Public perception, a critical element in public policy decision-making, will be a most important factor in the future use of coal. The public must accept coal as an important energy source or the future role

of coal in the nation's energy mix will decline. Public concerns, both nationally and internationally, about the perceived threat of global warming could result in premature political action which could severely restrict long-term use of coal. One need only look at nuclear power's problems to appreciate the importance of public perception and acceptance.

This report focuses exclusively on coal's image, a major challenge identified in other National Coal Council reports. **This report finds that:**

- The fact of coal's poor image is indisputable. A majority of people, including those in government at all levels, have poor attitudes toward coal based on misconceptions or lack of knowledge. These are rooted in what people know about early air pollution in London and Pittsburgh, about mining disasters, violent confrontations between labor and management, and about unregulated strip mining. It is reinforced by coal's contribution toward perceived problems of global warming, acid rain, reduced visibility, and soot.
- Coal has an impressive story of achievement and innovation to tell. Well told, this story may help repair damage to coal's image.

- The importance of coal to our nation's economic and energy future is clear, yet it is not well understood or appreciated. Informing the public on these points may enable coal's acceptance over the long-term.

A unified, persistent national public relations campaign strategy is an absolute necessity if the image of coal is to be improved. A fragmented, issue-specific lobbying approach cannot yield the desired result. There must be a fundamental goal: that of fostering a political and economic climate hospitable to coal as America's primary source of domestic energy. Reaching that goal will not be easy. Nor will it be inexpensive.

This campaign can be divided into two parts: one to be carried out by the U.S. Department of Energy, the other by the coal industry. Each part can be divided further into those efforts that will yield immediate or near-term results and those that will have a long-term effect. The emphasis here is upon results, not upon the time-frame of implementation. *Both elements of the campaign require implementation within the first year of the effort, no matter what the time-frame for anticipated results.*

RECOMMENDATIONS TO THE DEPARTMENT OF ENERGY

Because the Council is an advisory body to the Secretary of Energy, the Council's recommendations to the Department of Energy will be addressed first. The Council recognizes that — in the scheme of things — its recommendations to the coal industry are at least as important to

assuring coal's improved image and continued utilization.

The Council recommends the Secretary:

- Sustain the excellent work under the Clean Coal Technology Outreach program and consider its expansion to help assure public acceptance of these environmentally acceptable methods of coal preparation, combustion, and emissions reduction.
- Identify a group of scientific and engineering professionals who are recognized as experts by their peers, and encourage their participation in *ad hoc* task forces or advisory panels to whom the media may turn for the latest in factual information on coal-related subjects.
- Develop a strategy that targets state regulatory officials — both elected and staff — for continuing briefings on energy options available to the United States making certain that coal remains among those options.
- Upon release of this study, convene a meeting of coal industry leaders for the purpose of discussing the study's findings and recommendations, stressing the urgency of getting coal's message across to the public.
- Identify an audience of policymakers within the Executive Branch whom the Department will keep abreast of information concerning fossil fuels, with the purpose of urging that all available options be left open in the interest of maintaining a vigorous economy and national energy security.

Just as opinions among the general public require revision relative to the role coal can play, so too do opinions among policymakers.

By way of long-term results from which coal will benefit, the Council recommends that the Secretary:

- Impress upon education leaders and educational institutions the importance of science and energy education in maintaining an informed public. As coal is America's most abundant domestic energy resource, the Council trusts that coal's message will be part of such an effort. There is much the Department already is doing; yet much more needs to be done.
- Develop a public service outreach program concerning all energy sources available to this nation.

Among all the recommendations, the latter is the only one that is not targeted toward a specific audience, but instead is directed toward the general public through use of radio, television, and printed public service announcements. Again, the Council trusts that an objective public information campaign will include coal's message.

RECOMMENDATIONS TO THE COAL INDUSTRY

It is important for the reader to realize that the term "coal industry" as used in this report includes coal producers, coal transporters, coal users, and firms that supply equipment and services to each. In the Council's view, these are the principal

stakeholders in coal's future — those who are impacted directly by what happens to coal.

Urgent, short-term results are called for if coal's image is to be improved. Therefore the Council recommends that the coal industry:

- Implement a coal industry coalition to change public perception and public acceptance of coal.
- Use the coalition to develop and implement a public information campaign with the goal of improving the image and public acceptance of coal. The campaign should be directed to the public at large and include market research. It should use both electronic and print media. This effort will require sufficient financial resources to have an enduring impact upon public opinion.
- Direct the coalition to develop a strategy for use when called upon to support the licensing of new coal facilities where they are challenged at the state or local level on the basis of environmental externality issues.
- Assist in developing materials which can be readily adapted for use by all entities within the coal industry to provide their individual stakeholders (*e.g.*, employees, shareholders, and retirees) useful information about coal.
- Direct the coalition to develop a strategy for communicating useful information to specific audiences within the business community, media, and government.

IMPROVING COAL'S IMAGE

- Provide sufficient resources to the coal industry coalition for the implementation of a detailed plan of action which assures coal's message will be delivered throughout the education system.
- Carry out a strategy developed by the coalition which targets state regulatory officials — both elected and staff — for continuing information as to coal's role as an option in meeting new energy needs.

CHAPTER I

PERCEPTIONS

INTRODUCTION

Coal has a dismal image. Its supporters view coal as a maligned and misunderstood fuel. Its detractors feel contempt for coal's reputation for dirt, pollution, and human tragedy. Most Americans do not think about coal at all.

Rehabilitation of coal's image depends upon increased general awareness of coal, our economic reliance upon it, and its environmental acceptability. *Education is the key.*

With a collective memory of coal as a disreputable 19th century fuel, people wonder how an efficient and pristine 21st century can tolerate coal use. What is not well understood is coal's current role and recent developments in the mining and use of coal. Education about energy use, in general, and the safe and clean use of coal, in particular, is the recommended bridge between the distant shores of what many perceive coal to be and what it offers generations to come.

First, this report will explain the origin of coal's negative image. Then, it will contrast coal's reputation with its realities highlighting its importance within the economy. Finally, it will suggest how the two — perceptions and realities — must

square with one another to ensure a vigorous future for coal combustion and conversion technologies, and set forth a plan for how this can be accomplished.

HISTORICAL ORIGINS OF COAL'S NEGATIVE IMAGE

Early Air Pollution

Two cities come to mind when the subject of coal's image problem arises: London and Pittsburgh.

A "Great Fog" settled over London in 1952, and intensely polluted air contributed to the deaths of an estimated 4,000 residents. In 1956, after another particularly dreadful fog, a law was passed restricting coal use in certain areas.

Coal smoke also permeates memories of the smog that once was a way of life in Pittsburgh. The coal-fired factories, forges, and hearths that had supported the city's populace since the early 1800s belched forth a shroud of smoke that engulfed the city. Popular folklore held that smoke was really a good thing: soft coal was a cheap and effective home heating fuel; smoke at the mills spelled prosperity; and a little dirt never hurt anyone.

By the 1940s, wartime production pushed Pittsburgh's mills and rail lines to peak capacity. Skies in and around the city became unbearably black. That image still lingers, long after the smoke has cleared. Though few of them actually lived there or saw it at its worst, many people still think of Pittsburgh as a hard, ugly, and grimy city. Pittsburgh's image is well on its way toward rehabilitation. Coal's image is not.

There are more general memories of an era when many cities and towns operated dirty "gas works" that used coal to make gas for cooking. Many older citizens once stoked a furnace to heat their family home. Few who lived when and where coal was burned without particular concern for air quality can be expected to think of coal as anything other than a dirty fuel.

Mine Safety and Labor Relations

Coal mining can expose workers to various hazards. Methane and carbon dioxide can seep from coal seams. Carbon monoxide is a harbinger of fires underground. Coal dust can explode. Underground roofs can fall. Machinery can maim. Without careful and extensive training coupled with continuous attention to safety practices, a coal mine is a dangerous place to work.

Coal mining history is filled with mine disasters and high casualty rates among miners. In 1907, incidents at 18 mines killed 3,242 employees.¹ Into the 1930s, more than 1,000 mineworkers died each year. Since that time there has been a steady decline in fatalities. Since 1985, fatalities have numbered about 60 per

year even as coal production has more than doubled.² The industry continues its vigorous campaign to identify and to eliminate the intrinsic hazards of the coal mine work place. Nonetheless, any mine accident attracts immediate public attention.

Insofar as mine labor relations are concerned, there are those who say the coal industry has earned its miserable reputation.

Considering the history of violent confrontations over working conditions, wages, benefits, and the right to organize, it is difficult to imagine how coal's reputation could be other than it is. The relationship between mine workers and mine owners has been played out on a prominent stage over a very long run. It is chronicled in American folk music and literature.

However, not all the negative image can be traced to such incidents. There is an insidious element, too; a disease of the lungs caused by years of inhaling coal dust and which is called "coal worker pneumoconiosis" or black lung disease. Efforts to eradicate and compensate for the suffering caused by black lung can be expected to draw continued attention.

Unregulated Strip Mining

As surface mining grew in importance, the fact that it remained unregulated for decades helped create coal's negative reputation.

There is no way to beautify a mining operation while overburden is being removed to expose the coal seam. The

coal industry may call it "surface mining" and spend millions of dollars each year restoring mined lands to their original contours, but people will continue to call the process "strip mining" and believe that it will leave behind an undulating, denuded moonscape or decapitated mountains.

People continue to believe that coal mining companies resist reclamation and, given half a chance, will "rape and run." Few ever notice the transition from mining to reclamation and restored use.

Local Apprehension

Coal is mined in relatively few locations, nationwide. More often than not, the activities of the companies that operate local coal mines are directed by corporate officers who do not live in the area. This plays to the image that coal companies are owned by "robber barons," outsiders, city slickers, and investors in big, out-of-state corporations. There is a lingering suspicion that when push comes to shove, the coal companies do not care what happens to the people whose lives and welfare are wrapped up in the workings at a mine and the community that has grown up around it.

THE ENVIRONMENTAL CONTEXT OF COAL'S NEGATIVE IMAGE

Among competing fuels, coal is the indisputable leader in producing electricity. Coal-fired power plants account for more than half of the electricity consumed in the United States. Yet possessing so commanding a market share does not make coal immune to

attack. This is illustrated with a single sentence from *International Wildlife Magazine*. "Coal is the mainstay for electric utilities producing well over half the world's power, but unfortunately, unit-for-unit, a pound of coal can be 100 times as dirty, depending on the pollutant, as oil and natural gas."³

The liabilities of the other fuels that compete for market share are passed over by coal's detractors to score points. In the process, coal's image is hurt and its competitors benefit. A number of recent surveys of public opinion underscore this observation.

According to Cambridge Reports/Research International, three-out-of-four Americans will acknowledge that coal-fired power plants play an important role in meeting their energy needs. They say they know that coal costs less than oil, reduces dependence upon imports, and that the U.S. controls an abundant supply of coal. But they would prefer that coal not be used. Forty-two percent oppose increased use and 60 percent do not want it burned near them. Their most serious concern is air quality.⁴

Booz Allen finds one-fourth of the people surveyed consider coal extremely harmful.⁵

Opinion Dynamics reports that of all the fuels in current use, coal is seen as the worst for the environment.⁶

In that climate, the *Wall Street Journal* reports that eight in ten Americans regard themselves as environmentalists, and strongly so. The Journal/NBC News Poll found that 66 percent of Americans

believe environmental conditions in the U.S. have deteriorated in the last 20 years.⁷

Cambridge Reports states 55 percent of the population believe general environmental quality has worsened in the last 5 years. Almost half believe air quality has gotten worse in the last 3 years.⁸

Polling data gathered by the Information Council on the Environment indicates that more than 60 percent of the adult population think the earth is warming because of man's industrial activities. Half of those want immediate government action to deal with the problem.⁹

Global Warming

The theory of global warming is very simple.

Carbon dioxide (CO₂) — among several gases such as methane, water vapor, and chlorofluorocarbons — is relatively transparent to incoming solar radiation from the sun, but it is considerably less transparent to outgoing thermal radiation from the surface of the earth. This is the "greenhouse effect."

Some scientists suspect increased atmospheric CO₂ content will have little effect on the amount of solar radiation received at the planet's surface, but will significantly reduce the ease with which thermal radiation can escape into space. This, they speculate, will lead to an increase of earth's surface temperature.

Expressed through a number of theoretical models of earth's climate

system, this simple concept of the greenhouse effect predicts that increases of CO₂ and other greenhouse gases may shortly lead to an unprecedented increase in surface temperature.

There are those who are convinced the warming will be so great and so rapid that it could melt significant portions of the polar ice caps, raise sea levels, flood coastal lowlands, and adversely disrupt global agriculture. This, they believe, will lead to the destruction of natural ecosystems and the extinction of numerous species of plants and animals. Humankind's social, economic, and political institutions will be torn apart.

One source of CO₂ is the combustion of fossil fuels. Among fossil fuels, coal emits the most CO₂ relative to the amount of heat produced. Because electric utilities burn more coal than any other industrial source, coal-fired electricity generation has become the primary target in efforts to restrict greenhouse gas emissions.

Acid Rain

The decade-long push for amendment of the Clean Air Act to "take care of the acid rain problem" is a catalyst for much of what is reflected in current public opinion about coal and the environment.

Despite the results of a 560 million dollar government research effort and other evidence to the contrary, three quarters of those surveyed by Cambridge Research/Reports believe acid rain is a serious problem. Eighty-five percent believe the situation has not improved (39 percent) or has gotten worse (46 percent) in the last 5 years.¹⁰

Visibility

Coal combustion has become suspect in questions of impaired visibility at such scenic locations as the Grand Canyon National Monument and Shenandoah National Park. With power plants interspersed within an expanding network of National Park Service, National Forest Service, and Bureau of Land Management designated wilderness and scenic areas, this development heralds an era of renewed policy conflict in which coal-fired generation will be embroiled.

The U.S. Environmental Protection Agency and the National Park Service are supported by environmental groups in their decision to regulate visibility by targeting large industrial facilities and power plants. The thrust of their argument is that "plume blight" contributes to visibility degradation. Yet, studies in the Southwest have shown that more than two-thirds of the haze in the National Parks is derived from natural causes. Of the remaining one-third, contributions to visibility degradation come from urban emissions, smelters, power plants, and other sources. No single industry or source dominates haze production.¹¹

Soot and Particulates

Particulate emissions from coal combustion primarily result from unburned or unburnable material. Often this is incompletely burned carbon or mineral matter called ash.

Particulates at one time affected air quality and visibility in regions near major

coal-burning installations. Whereas only a small portion of such particulates were controlled in the early part of this century, there is nearly complete control today. The seeming visibility problem which remains is not, in fact, related to soot and particulates. It instead involves airborne aerosols, a problem addressed in the context of acid rain remediation.

Acid Mine Drainage

West Virginia and surrounding coal states have developed aggressive tourism promotions and, in the process, inadvertently have given people a reminder of the adverse effects of poor mining practices. For example, West Virginia's Cheat River is a popular white water rafting experience. Outdoor enthusiasts — many of whom would certainly identify themselves as environmentalists — have added "the Cheat" to their must-do list and thousands flock there annually.

One of the most popular stretches of the Cheat is highly contaminated by acid mine drainage from abandoned mine sites. People leave the area recalling a great ride along a beautiful river and angry that it was marred by the coal industry. That experience is replicated time and again along many Appalachian rivers.

Aggregate Effect

The coal industry, as a whole, has worked hard to meet its obligations under the law to meet clean air and water standards, to improve workplace safety, and to reclaim mined land. The industry responds to the patchwork of local, state, and Federal

regulations much as any successful enterprise must do. But the regulatory patchwork changes.

What was at one time acceptable because the benefits of coal use were so apparent in all likelihood became a matter of concern and, later, a reason for regulation. Coal's long history as a primary source of energy exposes any number of practices which were acceptable in the past to the criticism of the being unacceptable today.

Air quality concerns have lain for a long time at the heart of coal's negative image. Concern about soot-filled fogs and begrimed cities gave way to concern about acid rain, which is giving way to concern about carbon dioxide emissions.

When there is a growing technological capability to monitor emissions for minuscule traces of suspicious agents and there is concern about what is in the food people eat, the water they drink, and the air they breath, it is no wonder that the public is wary and confused. Favorite vistas are obscured by haze. The lifestyles of average citizens seemingly supplement a global greenhouse effect and smog. The ozone layer thins because they use refrigerators and air conditioners. They are told that rain and snow laced with acids and heavy metals are denuding forests and poisoning fish. All these air quality issues seem to become confused in the public mind.

With general confusion about coal's role in each new revelation, the simplest approach might seem to stop burning it, period.

Images from Eastern Europe

Now come the televised images from behind what used to be the Iron Curtain. What Americans see is the effect of industrial society run amok, a society largely fueled by coal but absent the environmental safeguards Western economic prosperity affords. What many may mistakenly assume they are seeing is what will happen if the United States increases its reliance upon coal. The images serve as reminders of the "bad old days" in London and Pittsburgh, and as a vision of the kind of an industrialized future in which no one wants to live.

CUMULATIVE IMPACT OF HISTORICAL AND CURRENT PERCEPTIONS

The accumulated reservoir of historical and contemporary negative perceptions about coal, coal mining, and coal use will not soon dissipate. The negatives are so pervasive that they encompass everything from the gut to the globe — from personal perspectives, to local concerns, national issues, and global visions. All are necessary theaters of operation in the rehabilitation of coal's image.

Efforts to Restrict Coal Use

The proposals may be fewer in number during the first session of the 102nd Congress than they were in the second session of the 101st, but efforts which potentially could restrict coal use are major elements of several important pieces of energy and environmental legislation. There are proposals on the

table to tax fossil fuels according to carbon content and to establish a CO₂ allowance trading system similar to that embodied in the 1990 Clean Air Act Amendments that capped sulfur dioxide and nitrogen oxide emissions.

A United Nations Conference on the Environment and Development (UNCED), scheduled for Rio de Janeiro, Brazil, in June 1992, has become the focus of international efforts to set firm targets and timetables for stabilizing CO₂ emissions worldwide. The United States, as the world's largest emitter of carbon dioxide, is under increasing pressure to commit itself to hammering out the terms of such a treaty so that it can be signed in Rio.

The California Energy Commission's 1992 Electricity Review wants to know how great a CO₂ penalty should be imposed upon utilities in weighing their electric supply options.

Many supporters of the 1990 California environmental initiative dubbed "Big Green" hoped it would lead to a ban on the use of coal and coal-fired electricity in California. Despite its defeat, supporters pursue the goal with legislation designed to develop a plan for achieving "substantial reductions" in CO₂ emissions.

Both California initiatives are rooted in concern that CO₂ emissions from coal combustion contribute to the potential for catastrophic global warming—whether or not the coal is burned in California.

In 1990, the Fresno, California Board of Supervisors proposed an ordinance that would have banned construction of two

coal-fired cogeneration plants elsewhere in the county. Such efforts are not restricted to California. Residents of many areas have begun to "think globally and act locally" when it comes to coal.

A proposed cogeneration plant in New Bedford, Massachusetts sparked an organization called the NO-COALition which professes opposition to all fossil fuel-fired plants. The Massachusetts Legislature's Joint Committee on Energy deliberated a ban on coal-fired power plants in several counties. Heavy community opposition stalled a coal plant proposed for the Pawtucket, Rhode Island area. In Bucksport, Maine outside opposition slowed an independent power producer's plans for the local pulp/paper mill. Tallahassee, Florida rejected clean coal technology in converting an old power plant. New Jersey, New York, Colorado, and Wisconsin are exploring ways to calculate the external environmental costs of coal use.

Environmental externality theory enjoys growing popularity among utility regulators as a thinly-disguised method of steering utility decision-making away from using certain "undesirable" fuels. Some see it as a method of promoting conservation, others as a way of fostering alternative energies. Environmental sensitivity, boosting conservation, and pursuing alternative energy paths lends environmental externality theory particular political potency.

Depiction of Coal Use in Print and Electronic Media

In all likelihood, the "coal story" will never be told in its entirety by the popular

media. The media will never be coal's friend. It is not their job.

The media's role is to determine newsworthy events and, it is hoped, to report the facts in an accurate and balanced manner. The media also see themselves as watchdogs providing a voice for protection of the citizenry against corrupt government and exploitive corporations.

Many in the coal industry believe the media have a bias against coal. This may be true in certain cases, but it would be more useful to recognize that the media have what conservative journalist Ben Wattenberg calls "the bad news bias." Wattenberg points out that from a media perspective, bad news (mine accidents, pollution problems, strikes, or lay-offs) is big news. On the other hand, good news (land reclamation and safety performance) is not really news at all. In other words, corporations cannot expect to receive credit for doing what they are supposed to do.

There is a fundamental difference in how coal producers see themselves and the media's observations. When the industry looks at itself, it sees soaring productivity, improving environmental and safety performance, employment opportunities, enhanced energy security, and a reliable source of fuel for electric power as the backbone of national economic strength. When many in the media look at coal they see environmental degradation, hazardous work conditions and human suffering (all in the name of corporate profit), and a continuing need for improvement.

For the media, the benefits of coal are overshadowed by its social costs. At best, coal is perceived as a necessary evil, an outdated fuel source to be tolerated only until the new renewable energy technologies free humanity from dependence upon fossil fuels altogether. The result is that the media in all likelihood will simply show the public negative aspects of coal.

It should go without saying, but it is good to remember, that the media influence public opinion which, of course, ultimately impacts public policy.

Coal seems destined to continue to play an assigned role as villain in the energy and environmental drama unfolding in the 1990s unless effective actions are taken to alter the public's perception of coal.

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CHAPTER I: PERCEPTIONS

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CHAPTER II

REALITIES

INTRODUCTION

Coal — America's most abundant energy fuel — enjoys little public awareness and scant appreciation. This is typical of economic goods that people do not use directly in their homes. This lack of coal awareness has serious implications in the public policy arena where coal producers and coal consumers face increasing legislative, regulatory, and judicial constraint. Public understanding of coal and its social and economic worth can help provide balance to public consideration and debate on energy, the economy, and the environment.

The following characterizes the essential messages and information about coal that government and industry should present to the public.

The Social and Economic Value of Coal

The U.S. economy and the standard of living it supports depend on coal, mainly in the form of electricity.

Coal is many things. It is a source of heat for industry and commerce, raw material for the steel industry, a feedstock for the chemical industry, and a valuable foreign trade commodity. But first and foremost, coal is the energy backbone of America's electric power industry.

About 85 percent of America's billion-ton per year coal production is committed to the generation of electricity. Coal accounts for about 56 percent of U.S. power generation. A dozen states obtain more than 85 percent of their electricity from coal. Moreover, coal-generated electricity usually is less costly than electricity generated from uranium, gas, and oil. America's coal-fired power plants typically are in base-load service, providing a stable and reliable base for continued electrification of the U.S. economy.

Electrification, the substitution of electricity for other energy inputs, is among the greatest technological achievements of this century. In the U.S., there is about 0.55 kWh of electricity in each dollar of economic activity; more than half of that electricity originates from coal.

Electrification helps make possible continued strides in energy conservation. America already can boast significant progress in energy conservation since 1975. In that year, each (1982) GNP dollar required 26,178 Btu of energy input. By 1989, that had fallen to 19,340 (1982 dollars).

The United States per capita energy consumption in 1989 was exactly what it

had been in 1975, 327 million Btu. Yet, per capita electricity consumption over the same period expanded 26 percent, from 8,881 kWh to 11,170 kWh. The electric power industry in 1989 accounted for 36 percent of all energy consumed in the U.S., up from 29 percent in 1975.

Growth in electricity demand approximates national economic growth. Anything that might disrupt the supply of electricity or drive up its cost would harm economic growth.

For 150 years, coal has provided secure and affordable energy to the nation's expanding industrial economy. Industrialization created vast national wealth, and that wealth has supported technological advance. Coal played a pivotal role.

Because of technology, our use of natural resources is more efficient than ever. Technology begets conservation, safety, environmental protection, and more wealth. Too often, critics of coal and other fossil fuels focus narrowly on the social and environmental costs of energy resource development. Such costs are real, but are more than offset by the social and economic benefits that coal production and coal-generated electricity provide.

Coal is a low-cost, readily available, domestic fuel for electric generation. Imagine the lost opportunities for progress if electricity simply was more expensive, as surely it would be without coal. Only one-third of the electricity we use actually flows through residential electric meters. We use the remaining two-thirds when we buy manufactured goods and when we use

commercial and municipal services. Current spending on electric power in the U.S. amounts to \$720 for every man, woman, and child per year.

Coal accounts for about 23.2 percent of U.S. energy consumption, but only about 12.5 percent of total energy cost. Therein lies coal's greatest value.

Coal and Energy Security

Because of its bounteous coal reserves, the United States is not in danger of running out of energy. Continued development of coal and coal-generated electricity can reduce national dependence on imported energy.

The social and economic shocks of the 1973-1974 oil embargo and the effects of the 1979-1980 Iranian revolution brought a sense of urgency to the idea of U.S. energy independence, that of substantially reducing the need to import energy in the form of petroleum.

In the early 1980s, non-OPEC oil production increased because of higher oil prices. At the same time, higher prices stimulated the United States and the rest of the world to invest heavily in energy conservation; for example, fuel-efficient automobiles and better electric motors. Following a decline in world oil prices, U.S. public concern has turned from the idea of total energy independence toward a more basic goal of energy security.

Is the U.S. running low on domestic energy? No, not at all. Even ignoring the considerable though uncertain potential of nuclear power, this nation has substantial

reserves of oil, gas, and coal. Although proven domestic oil and gas reserves can sustain current production for about 10 years, as yet undiscovered reserves of natural gas could add another 35 to 40 years.¹

Obviously, alternatives to petroleum and natural gas eventually must be developed. Many such alternatives already are technologically feasible, but remain too expensive. These include oil shales, tar sands, biomass, and synthetic gas and liquid fuels from coal. Ultimately, rising oil and gas prices will have two effects: first, energy consumers will invest more heavily in conservation measures and, second, developers will begin production of alternative fuels.

A less obvious way to replace oil and gas is by substituting coal. United States coal reserves exceed those proven for oil and gas together, by a factor of 15. With current coal mining technology, U.S. coal reserves will last more than 250 years at today's production rates.² America's vast coal reserves are like a paid-up insurance policy, promising a minimum outlay of 250 billion tons, as the need arises.

One way coal continues to replace scarcer fuels has been through increased use of electricity together with a growing utility use of coal. As heat pumps replace gas and oil furnaces in homes and offices, and as battery-powered vehicles replace fleets and commuter automobiles in urban areas, coal will assume a larger share of America's energy budget. In the future, technologies that can convert coal into liquid fuels (like methanol or gasoline) may become economically feasible.

The coal industry's essential infrastructure already is in place and is sufficient to sustain growth well into the next century. This includes the vast, characterized reserves; the mining, engineering, and management workforce; and the network of railroads, inland waterways, and coal storage and loading facilities.

Market-driven conservation and advancing energy technologies can work together to ensure that America will have ample energy for its needs. This will be augmented by a developing national conservation ethic, fostered by industrial and governmental education programs.

American Coal: Technological Leadership

Although the American coal industry is long on tradition, it is not old-fashioned. Innovation is a continuing process in America's modern coal industry.

Coal has been commercially important in the United States for more than 150 years. Advanced technology in coal mining and transportation and in related environmental protection have enhanced safety, productivity, and environmental quality.

Modern coal mines more closely resemble high-tech, automated factories than the long-ago, labor-intensive workplaces of popular image. *Technological advances and intense capital investment have made coal miners more productive, and made their jobs much safer.*

Progress in coal mine safety is an industrial success story. In the early

decades of this century, coal mine accidents took a heartbreaking toll on miners and their families. Today, incidence rates for injuries and fatalities are comparable to, and often better than, those of other industrial work.³ Fatalities are declining. Continuous improvements in equipment, training, and supervision have gone a long way toward eliminating the intrinsic hazards of the coal mine work place.⁴

For coal mine management and employees, it is not enough to be an industry leader. Mining and safety engineers, equipment manufacturers and medical practitioners continue their vigorous campaign to identify and to eliminate sources of coal mine accidents, injury, and death.

Today's underground coal mine would seem a strange and wonderful place to a coal miner of the last generation. Longwall mining machines remove blocks of coal up to 1,000 feet wide and more than a mile long at astounding production rates. Modern underground mining offers unique opportunities for automation using computers, fiber optics, and robotics. Continuing progress is being made in that old production bottleneck — underground transportation — with high-capacity conveyor belts supplanting shuttle cars at the production face.

In many of the nation's most important coal fields, surface mining continues to enjoy advantages of productivity and economy because of developing technology and continuing innovation. Surface mining can remove as much as 90 percent of the coal deposit. It accounts

for 60 percent of the total U.S. coal production. Today's advanced surface coal mining and reclamation practices demonstrate the industry's commitment to environmental protection.

Compliance with a comprehensive body of Federal and state laws and regulations, interacting closely with coal industry initiative, have minimized the temporary environmental effects of surface mining on air, land, and water resources, and have ensured that mined land is returned quickly to productive use. Since passage of the 1977 Surface Mining Control and Reclamation Act, the U.S. coal industry has reclaimed more than 2 million acres of mined land, an area larger than the State of Delaware.

Modern coal preparation plants are an intricate network of electric motors, high-capacity belts, rugged equipment, and sophisticated sensors all linked to computers that make instantaneous decisions. The result is more consistent coal quality and greater reliability.

Advances in coal transportation — rail, truck and water — and in coal storage and blending help control the significant costs of delivering the right coal at the right time to the right place.

Because of the American coal industry's aggressive investment in advanced technology, coal is a better energy bargain than ever. Since 1980, real coal prices have fallen considerably, to the benefit of consumers everywhere. With thousands of participants, the coal producing industry is among the most competitive in the United States. This competitive market

environment will continue to drive the industry's established trend toward greater efficiency and economy.

Coal Industry Workforce: Working Smarter

The technological advances that characterize modern coal mining are reflected in the education and training of today's coal mine workforce. The men and women who produce coal are among the most highly trained and skilled industrial workers in America.

The technological changes in the mine workplace are driven by a desire to improve safety and productivity. As a rule, developments that enhance safety also improve productivity. Gains in labor productivity are reflected in mine wage scales, currently higher than those in the steel and automotive industries, and considerably higher than the average U.S. industrial wage.⁵

In today's coal mining environment, the need for manual skills has given way increasingly to demands for knowledge and judgement. As a result, general education and job training are more important than ever. Many experienced coal miners prepare for and pass a professional examination for foreman's certification, allowing them to move into supervisory and management positions.

Consistent with trends in agriculture and manufacturing, employment in coal mining is falling even as production increases. Unfortunately, many people wrongly interpret shrinking coal industry employment as a decline in coal's

economic importance rather than correctly attributing it to improved productivity.

Environmental Progress: Continuing Performance

American coal producers and coal consumers have achieved vastly improved environmental performance. Protection of air, water, and land resources has improved continuously over the past two decades, even as coal production and consumption have soared to record levels. Prospects are excellent that these trends will continue.

Technological innovation does not end with coal production, preparation, and transportation. The coal industry has made vast improvements in its ability to protect the environment. *Advances in water treatment, reclamation, airborne dust control, noise abatement, and subsidence remediation have allowed coal mining operations to be better neighbors.* A noteworthy example of innovation in environmental protection is that of the new wetlands engineered on reclaimed surface-mined lands.

Another example is found in the way industry can deal with surface subsidence above longwall mining. Under older methods of underground mining, pillars of coal were left behind to support the surface. Over time — sometimes amounting to several decades — some of these underground pillars gave way, damaging surface structures.

Using newer longwall mining techniques, subsidence is predictable, and it occurs immediately after mining. This allows coal mine operators to monitor changes to

the surface and to make repairs, as needed, working cooperatively with owners of surface structures. Subsidence after longwall mining is complete within a few months of mining, allowing for permanent repairs where damage happens to occur.

Public concern over the environmental effects of coal combustion are reflected in tough Federal clean air laws. Under the 1970 Clean Air Act and its 1977 amendments, air emissions from coal-fired electric power plants and from other coal-using facilities fell continuously, even as utility coal consumption rose to record levels. Because of stringent standards for new power plants and 1990 amendments affecting older units, this trend is certain to continue.

The Environmental Protection Agency estimates that industry in the United States has spent \$250 billion on clean air since 1970, about \$100 billion going to sulfur dioxide removal alone. Sulfur dioxide results from the burning of fossil fuels containing sulfur. Relative to oil and gas, coal generally contains more sulfur.

The facts reported by the National Acid Precipitation Assessment Program (NAPAP) are as follows:

"There are only 240 critically acidic (pH $\leq$ 5.0) lakes out of over 7,000 northeastern lakes. Only 35,000 out of 200,000,000 acres of eastern lakes are critically acidic. All of the acidic lakes in the Northeastern U.S. can be limed for \$500,000 per year. The average lake is as acidic

as it was prior to the Industrial Era. The amount of acidic water is not changing with time; thousands of additional lakes are not becoming acidic as claimed." ⁶

The 1990 Clean Air Act Amendments bring a new level of control to air emissions from coal combustion. Under the new program, many operators of older coal-fired boilers will invest in modern pollution control equipment or will substitute coal of lesser sulfur content.

The promulgation of rules and regulations by the Environmental Protection Agency should for all intents and purposes be the last chapter and close the book on the acid rain issue.

Since 1977, utility coal use has soared by 80 percent. Yet, total U.S. sulfur dioxide emissions have declined 27.2 percent. ⁷ Emissions of nitrogen oxides and particulate matter also have declined from coal-fired utility boilers. These meaningful improvements in air quality will continue, even as America continues to choose coal to generate most of its electric power. One reason is clean coal technology.

The term, clean coal technology (CCT) describes a growing family of innovative methods that allow us to use our coal resources at less environmental cost. Some CCTs apply to coal preparation. They remove impurities prior to combustion. Other CCTs apply to the combustion process itself. Others work on coal combustion products after combustion is complete. For further information on the potential for CCT, a

report of the National Coal Council entitled *The Near Term Role for Coal* is a recommended reference.

The Federal Clean Coal Technology Demonstration Program provides up to half of the support to commercial demonstration of new coal-use technologies that already have been developed and tested on smaller scales. Private industry provides at least half (and often more) of the funding for CCT commercial demonstration.

There are a great variety of current demonstration projects and the result will be economic choices for utilities and other coal users who must comply with ever stricter clean air standards.

In addition to demonstrating better control of sulfur and nitrogen compounds, the latest CCTs also are more efficient in their use of coal, some by as much as 40 percent. That is, for a given amount of electricity or steam, 40 percent less carbon dioxide is produced because less coal is burned.

Concern about carbon dioxide emissions is rooted in discussions of appropriate policy responses to the prospect of catastrophic climate change. While CCT represents a technological response to the concern, there are two fundamental problems with scenarios of climate disaster caused by global climate change.

First, the theory as it is applied ignores many of the interrelated processes that should be absolutely essential ingredients of any computational scheme designed to predict the climatic consequences of a change in the earth's radiation balance.

Second, this theory of *climate* change fails to acknowledge that it is but one part of a much larger phenomenon of *global environmental* change. Increased atmospheric CO₂ content will have a host of positive biological effects.

Hundreds of laboratory and field experiments demonstrate that a doubling of the current CO₂ content of the earth's atmosphere would increase the growth rates and harvestable yields of most of the world's non-woody crop and horticultural plants by more than a third. Studies also show that increased CO₂ reduces the amount of water such plants lose during respiration. These likely improvements in plant productivity and water use efficiency have not yet been components of either the predictive models or the economic and environmental evaluations of the impact of increased CO₂.

In a long-term study of tree responses to atmospheric CO₂ enrichment at the U.S. Water Conservation Laboratory in Phoenix, Arizona, it has been demonstrated that sour orange trees exposed to double the current atmospheric CO₂ content will actually *triple* their growth rates.⁸

The amplitude of the annual cycle of CO₂ content of the atmosphere, which is caused by the seasonal growth and decay of northern hemisphere terrestrial vegetation, is increasing at a rate that can only be explained if all the world's forests are responding to the rising CO₂ content of the air. It could well be that this degree of CO₂ stimulation ultimately will result in so much CO₂ being removed from the atmosphere and sequestered in soil organic matter that the atmosphere's

CO₂ content never will rise to the level the climate disaster forecasters require for their scenarios.

Thus, continued development and implementation of CCT would seem to be a substantial contribution to any perceived need for carbon dioxide emissions remediation.

American Coal and International Development

Continued development of U.S. coal and related technologies promises significant benefits for a rapidly developing world.

With rapid growth in population and in the degree of industrialization, coal and other energy resources must be assessed within their global context. Each of the past dozen years has been a record year for worldwide coal production and consumption. Since 1980, coal production in China has soared and surpassed that of the United States. Electrification is proceeding faster in developing nations than in the industrialized West.

It is clear that global environmental quality and energy efficiency will be predicated on how rapidly the developed countries can advance the state of energy technologies. When a country industrializes, generally it embraces the latest and most efficient technologies because they tend to be cheaper. Improved coal-related technologies will be a key to meeting the energy and environmental needs of many developing nations.

The current world situation presents an opportunity for great social good in the

form of advanced mining, reclamation, transportation, and combustion technologies. As a leading producer and consumer of coal, the U.S. is in the best position to provide the world with the coal-based technologies that will be essential over the coming years.

In addition to being a source of coal technology, the U.S. already is a major source of coal energy. The United States is the second (after Australia) largest exporter of coal energy, providing more than 2 quadrillion Btu to world markets. The U.S. has enormous capacity to increase coal exports, providing a measure of global energy security.

The Future Potential of Coal

Coal's potential to meet future needs relies upon aligning its image with peoples' expectations of what coal can and must do to be acceptable in the marketplace.

A National Coal Council companion report entitled *The Near Term Role for Coal* explores in-depth the technological innovations that illustrate coal's potential to meet the test of acceptability. That report discusses clean coal technologies, high-efficiency utilization, plus coal applications and coal-derived fuels for transportation, light industrial, commercial, and residential uses.

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CHAPTER III

THE IMPORTANCE OF COAL IN THE U.S. ECONOMY

Coal's relationship to the U.S. economy can be viewed from two perspectives: (1) as a direct provider of production, jobs, and revenues in the mining, transportation, and support industries; and (2) as the nation's primary source of electric power which is the driving force behind America's development, growth, and continued prosperity. As coal is not mined simply to create jobs, the latter perspective deserves primary consideration.

The Benefits of Coal as a Primary Energy Source

In 1973, electricity met 29 percent of America's end-use energy consumption needs. In 1989 the figure was 36 percent. According to the Department of Energy, electricity could reach 45 percent of end-use energy needs by 2010.

By the middle of the 21st century, industrial use of electricity is expected to more than double its current share. Increases also are expected in the residential and commercial sectors. Even though electricity today plays almost no role in the transportation sector, there is potential for its use in mass transit and personal vehicles.

The implications for coal are enormous. Since 1973, coal's share of net U.S. electricity generation has increased from 46 percent to more than 56 percent, by far the largest single portion provided by any single fuel. If oil were used to produce this electricity, America would have to almost double its petroleum imports at an economic cost of more than \$50 billion, based on \$20/barrel oil.

Coal also is used in many industries where it produces steam power, heat, and coke for smelting iron ore. In an era of often turbulent and unstable energy prices, coal's real cost has remained virtually constant over the past decade.

Coal has contributed significantly toward the improved stability of U.S. energy supply, price, and security. At the same time it has helped sustain economic growth even as other energy sources experienced price and/or supply dislocations.

It is no coincidence that while the U.S. economy grew in real terms by over 51 percent since 1973 (an annual average of 2.5 percent), domestic coal use increased by almost 62 percent. At the same time, coal's contribution to total U.S. energy

requirements increased from about 18 percent to 24 percent.¹

Three trends with important ramifications for America's future have become increasingly evident.

- Adequate supplies of reasonably priced, abundant energy are a vital link between national strength, prosperity, and security.
- Although our nation's energy, economic, and environmental objectives are equally important, they are often in conflict. Policies which impact upon any of the three must be kept in careful balance with the other two.
- Achieving energy security is important to our nation's present and future.

United States energy requirements are forecast to increase by an average 1.3 percent per year through 2030. Today's energy consumption of 82 quadrillion Btu (quads) will be over 140 quads by 2030 according to base case estimates of the Department of Energy's National Energy Strategy.²

While it is imperative for the nation to increase the production and use of all its domestic energy resources, as well as increase conservation efforts, the greater use of our vast coal supplies offers the best opportunity for meeting the primary objective of National Energy Strategy legislation introduced in the 102nd Congress:

"...the achievement of energy security for the United States is

essential to the health of the national economy and the maintenance of national security... which can be accomplished with no significant adverse effect on the environment. . . ."³

Because coal is abundant, accessible, and relatively inexpensive, and because it can be used without harming the environment through new technologies, blending, and other techniques, coal will contribute to America's economic growth and future prosperity. This was proved in the 1980s when steadily rising coal consumption and advances in conservation and energy efficiencies paralleled a decade of general economic growth, low inflation, and overall prosperity.

This trend occurred despite often erratic shifts in the price and availability of competing fuels. It took place simultaneously with what the Environmental Protection Agency called "substantial progress in reducing atmospheric levels of our most pervasive pollutants," including sulfur dioxide.

The question is not whether coal can meet the criteria necessary for America's overall progress in the years ahead; in almost every important respect, it already has. The challenge is to take advantage of coal's supply and price assets, ensure its efficient utilization, and employ technologies that guarantee coal's full use with minimal environmental impact.

Likewise, American coal and advanced coal conversion technologies need to find their way into the developing world to help guarantee that the expected substantial increase in worldwide energy

requirements in the years ahead will be met in the most cost effective and environmentally acceptable manner possible.

According to the Office of Technology Assessment, the rate of increase in energy demand in developing countries through 2010 is expected to average 3.8 percent annually, almost three times that of western industrialized nations. By 2010, total world energy requirements will be 71 percent greater than today.⁴ Providing for this sharp increase while continuing to meet domestic energy needs will present the United States, and the developed world in general, with unparalleled challenges.

Competitiveness: A Key to Coal's Price Stability

Because of a number of factors — a large resource base, productive overcapacity, increased productivity, fewer-but-larger companies, increasingly efficient operations, and the incorporation of technological advances — the production of coal in the United States is a highly competitive enterprise.

Competition among coal producers has kept prices low in constant dollars. Although the industry is presently consolidating, the sheer availability and accessibility of coal resources assures ease of entry for new producers should demand grow so dramatically that new production is needed to provide adequate supplies.

This competitiveness, in turn, plays a significant role in maintaining coal's reasonable price in relation to competing fuels, and ultimately in keeping the cost of

electricity low for consumers. As a result, productivity has become a key factor in the economic viability of the individual coal producer.

Over the past decade, productivity has increased at one of the steadiest and most impressive paces to be found anywhere in the economy. In 1989, the coal industry achieved an all-time high of 3.7 tons per miner per hour.⁵ This higher output — the result of modernization, new technology, and a surge in the use of surface and longwall mining technologies — is also a key component in assuring coal's long-term competitiveness in relation to other fuels.

The industry's highly competitive nature is a double-edged sword, however. Those producers who are unable to make adjustments to market pressures often find it necessary to become part of a larger, more diverse company, or even cease operations entirely. This results in a trend toward fewer but stronger companies.

This pattern toward a more constricted, yet efficient, industry is reflected in the number of active coal mines annually producing more than 10,000 tons. During the 1980s, the total number dropped by about 25 percent to under 3,000, yet more coal was produced than ever before. By 1990, about 13 percent of the total number of mines accounted for 70 percent of production.⁶

Delivering Coal to Market

Coal represents the largest single source of business for the nation's Class I railroads, accounting for 38 percent of tonnage and 22 percent of revenues on an

annual basis. Likewise, railroads are the largest carrier of domestic coal, accounting for nearly 60 percent of total shipments.⁷

The nation's rail infrastructure consists of an extensive 220,000-mile track network providing access to all major centers of production and consumption within the lower 48 states. The importance of coal as a freight commodity resulted in railroads spending \$30 billion in total capital expenditures between 1980 and 1988, primarily in an effort to improve coal transportation.⁸

Barge lines now annually carry about 600 million tons of commodities, of which approximately 28 percent is coal shipped to utility and industrial plants in the United States and overseas to customers via Gulf of Mexico ports. Coal is the second largest commodity (after petroleum products) moved by barges on the nation's 11,000 miles of commercially navigable inland waterways.⁹

This volume is likely to increase in the years ahead as expected growth in U.S. coal exports takes place and as river terminals are utilized to blend coals from various mines to meet requirements of the 1990 Clean Air Act Amendments. Consequently, by 2010, total waterway traffic is projected to climb to 770 million tons annually, about 35 percent of which will be coal, according to the U.S. Army Corps of Engineers.¹⁰

Further development of supplemental forms of coal transportation, such as coal slurry pipelines, short distance truck hauls, and use of conveyor systems will play an

important role in coal utilization and pricing in the years ahead.

From Mine to Meter

The economic value of coal is most easily be seen in examining the connection between the mine and the meter. Electric consumers can relate to the cents-per-kilowatt-hour they pay for electricity.

The following use constant dollars and 1982 as a reference year.

In 1975, the price of bituminous coal was 141.5 cents per million Btu. In 1989, that price was 76.4 cents, a decline of about 46 percent.¹¹

In that same time frame, the average price of residential electricity rose from 5.92 cents per kWh to 6.05 cents, an increase of about 2 percent.¹² Why, then, doesn't lower coal cost translate into declining costs for electricity? Fuel is only one cost component among many in the selling price of electricity. The price of electricity is the sum of the costs of fuel, operation and maintenance, capital, and the utility's cost to transmit and distribute electricity, plus general business expense.

As a matter of record, the average generation expense for coal-fired power plants (cost of fuel, operation and maintenance, and capital) was 2.93 cents per kWh in 1989 dollars.¹³ Coal is one of the lowest cost fuels for base-load capacity and remains the option to beat.

Perhaps the best way to see this is to examine the price a consumer pays for electricity in terms of 1989 dollars.

Electricity is sold at a blended cost of all electricity produced and purchased for resale. The lowest cost electricity is usually that with the lowest generation expense. In 1989, the average residential electric bill was \$722.¹⁴ If that electric consumer lived in a region that produced most of its electricity from coal, the electric bill would have been about \$604 dollars.¹⁵

The last 15 years have seen an unprecedented increase in environmental compliance regulations, and it can be argued that the coal industry paid for its environmental achievements through the increased productivity of its coal producers.

Coal's Impact on Gross National Product

The increasing substitution of coal for oil as a generating fuel by utilities, as well as coal generation to meet new demand, has benefitted a series of separate economic inputs which collectively contribute to sustained and long-term GNP growth.

Since the energy shocks of the mid-1970s, electric utility coal use has increased by 85 percent, a rise equivalent to 3.1 million barrels of imported oil a day.¹⁶ In essence, this significant market shift to a plentiful domestic resource achieves several goals, including:

- slowing the nation's growing dependence on imported energy with its accompanying fiscal, balance-of-payments, and national security implications;

- helping ensure the short-term adequacy of electricity supplies;
- stabilizing electric prices via a net decline in coal prices in real terms;
- improving the competitiveness of U.S. manufactured goods; and,
- contributing to an economic climate which promotes jobs and raises the standard of living.

In short, coal was the right fuel, in the right place, at the right time. It helped moderate prices when other forces in the economy were heading toward disarray. It stabilized supply when more energy was needed to spur growth. It provided an increasing degree of reliability and security when international political events exacerbated the danger of depending on foreign sources of energy.

Coal's Overall Economic Impact

According to a Pennsylvania State University study commissioned by the National Coal Association (and based on 1988 data), the production of coal is a \$21 billion per year industry in the United States. It employs some 130,000 miners and, through exports, contributes more than \$4 billion annually to the nation's balance of payments.¹⁷

While coal production is a primary economic force, it stimulates activity elsewhere in the nation's business and commerce. For example:

- The \$21 billion of coal production, investment, and tax payments results in about \$81 billion of production throughout the economy, equivalent to about 1.5 percent of America's \$5.5 trillion Gross National Product (GNP-1990 current dollar estimate).¹⁸
- For every billion dollars of coal produced, there is an ultimate demand in the U.S. economy for almost \$25 billion of electricity, \$10 billion of transportation, and \$27 billion of business services.¹⁹
- Direct coal industry employment stimulates a total of over 1.1 million jobs throughout the economy, as well as \$27 billion in personal income.²⁰
- United States' coal production increases output, income, and employment in every other sector of the nation's economy (including service industries) which are stimulated by the spending of income payments (wages, dividends, etc.) from coal companies.
- On a more local level, the activities of coal companies generate positive "multiplier" economic effects of two to three times that of direct impacts in the states and local communities in which they operate.

Coal's Impact on Jobs

Even during the industry's most labor intensive period earlier in the 20th century, coal mining has never involved a large number of employees nationally, especially when compared with other major industries.

However, because coal production is concentrated regionally, the industry's direct employment impacts are a substantial factor in local communities and states with active coal mines. Direct coal industry employment generates \$8.1 billion in gross personal income, annually.

In many mining areas throughout the U.S., the production of coal is the primary rationale for a community's existence. In such locales, any significant downturn in coal production can lead to a major depression, even if the nation's economy-at-large is in generally good health.

Equally significant is the multiplier effect the existence of each coal job has on employment elsewhere in the economy. According to Penn State economists, this translates into about seven jobs in the economy-at-large for each worker employed in the coal industry. Those economists also note the relatively large employment multiplier for the coal industry reflects its decreasing labor intensity. As labor productivity has steadily increased, the indirect and induced employment stimulated by the coal industry has risen in relation to the industry's direct employment.²¹

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CHAPTER IV

PUBLIC INFORMATION & ENERGY EDUCATION

INTRODUCTION

Energy plays a vital role in nearly every aspect of modern life. It is important that the American public understand and appreciate energy sources and uses and how they affect the economy and the environment. A better understanding of energy, in general, will lead to a better understanding and appreciation for the role of coal, in particular.

The average American knows very little about energy issues and about the role of coal in the economy. In fact, the general public appears to be unaware that coal accounts for a greater share of U.S. energy production than any other fuel.¹ It is noteworthy to point out the emphasis on energy education that has been placed in the "National Energy Strategy" in the section titled "Education: Investing in Human Resources." "The National Energy Strategy cannot be successfully implemented if the public does not understand and support the tradeoffs and choices that must be made."²

The coal industry needs to collaborate with schools, media, business, environmental groups, and government to develop and present education programs designed to

increase the public's understanding of energy and coal.

The information here is a summarization of Appendix A which discusses energy education more extensively.

AUDIENCES & MESSAGES

The primary conclusion to be drawn in this report is that the general public believes coal to be among the least desirable fuel alternatives in the national energy mix. A number of factors contribute to this underlying prejudice.

In general, the public is not aware of coal's important role in national security and the economy. Accordingly, people are unable to judge the impacts of constraints which already have been placed on coal production and use, and cannot weigh the significance of new constraints as they are proposed.

Public concern about global warming buttresses state and Federal legislative and regulatory efforts to tax coal in a way which would quadruple its cost and could double the price of electricity.

According to Kurt Yeager of the Electric Power Research Institute, the cost of

attempting to force reductions in carbon-based greenhouse gas emissions through economic penalties on a global scale follows an exponential trend until at least mid-century.

If implemented to this expected mid-century cost level, the result would be a probable peak depression in global gross domestic product on the order of 25% with the greatest impact in the developing world. It underscores the bankrupt nature of various "carbon tax" and related economic penalties intended to immediately achieve and sustain a reduction in global carbon emissions, let alone stabilize their atmospheric concentrations.³

Political leaders seem either unaware of or unconcerned about the serious nature of the economic impacts which will certainly flow from the Clean Air Act Amendments of 1990 and from some of the environmental control proposals now being considered both here and abroad. Such political nonchalance can only take root when the public is unaware of its stake in an issue.

General Public

There is an important distinction to be made between the roles of the Department of Energy and the coal industry in a program of information for the general public.

The Department only can be expected to provide objective energy information in which coal's message will be embedded because of coal's role in the nation's energy mix. To the coal industry belongs the job of heightening public awareness of coal through an image campaign similar to the

American Gas Association's efforts in behalf of natural gas and the U.S. Council on Energy Awareness advocacy of nuclear power.

Energy Education

1. Energy education is the objective of a wide variety of programs, both local and national in scope. Nevertheless, the individuals being reached comprise only a small fraction of the total population which would benefit from such programs. To enlarge this audience, an intensive and comprehensive effort will be required by some group or organization committed to and funded for this purpose.
2. The effectiveness of existing programs could be enhanced with modest efforts to promote interest in them and to coordinate programs with the current wide range of different sponsors and diverse objectives. The material of existing programs should be reviewed and enhanced with coal information as necessary.
3. The new emphasis on national science education opens a window of opportunity to introduce factual, reasoned energy education into elementary and secondary schools.
4. Since most of the current energy education activities are directed toward students and teachers in elementary schools, special attention is needed to encourage energy education in colleges and vocational/technical schools.
5. As a pilot program, the industry should pinpoint three or four technical/

vocational schools in coal-producing states, and reach out to the engineering community about tailoring their curricula to include appropriate energy and coal information topics. Bringing in industry professionals, who are able to "talk shop" and demonstrate state-of-the-art information, could prove to be effective.

6. Students in American institutions of higher learning must be assured a balanced presentation of energy issues and alternatives.
7. Colleges and graduate schools educate the professionals of the future. There is no more effective way to achieve energy education objectives than by "educating the educators," who educate the students of today, who will be the workers, consumers, voters, and policymakers of tomorrow.
8. A comprehensive, large-scale national effort is needed to make educators aware of the importance of appropriate energy subjects and assure inclusion of appropriate energy subjects in their curricula. Students need to understand more about the world in which they must later function.

Media

1. The broad and rapid dissemination of information has become nearly as important to our society as the availability of food, shelter or energy. Most people accept the generalization that the media of the Free World have no equal in their capability to influence our society and policymakers. It is therefore critical that editors and reporters at radio and television outlets,

newspapers, magazines, wire services, and specialized "trade" publications receive top priority in any coal industry campaign aimed at image enhancement.

2. Coal producers must demonstrate that their goals mirror those of society. They must be prepared to demonstrate this with actions, not just news releases. A good image cannot just be created by effective media relations. Media relations can, however, effectively communicate good company operations, which can lead to a positive image.
3. In attempting to reach coal's various constituents, it must be remembered that coal's image is affected by many factors including the activities of *each and every member* of the coal industry, including so-called "outlaw" operations; that the industry's current public image is the product of a legacy of unfavorable public perceptions and attitudes about coal; and that coal's image cannot be improved overnight — it will take a long-term multi-faceted communications program of which media relations is one.
4. Many coal companies realize the essential need for effective public and media relations, but in efforts to remain competitive and hold down expenses, the media relations/communications function more and more has been divided among various members of management. If the industry is concerned about its image, companies must begin to carefully evaluate their staffing needs for professional public relations counsel.

5. Image enhancement must begin at the grassroots. It cannot be accomplished solely at a national level. Coal operators must begin to communicate their deeds to local media and others in the neighborhoods and communities of every coal company at the same time national media and communications efforts are underway by industry associations.
 - Highlight obstacles and unnecessary regulations/laws that inhibit coal use;
 - Show that coal miners are highly trained, well educated and well paid;
 - Represent coal's contribution to the overall American economy;
 - Communicate that the coal industry is a modern, highly technical, and very competitive industry.
6. The use of third-party spokesmen continues to be one of the best ways to convey our messages and is usually done with more credibility than if the coal industry was out front. This ongoing utilization of outside organizations, scientists, academics and others must be continued and expanded so as to have credible spokespersons outside the industry carrying our message.
7. The coal industry should attempt to communicate certain messages to the media. This should include, but not be limited to such themes as the following.
 - Describe the importance of coal to the nation and national energy security.
 - Increase the awareness that coal can be mined and utilized without damage to the environment.
 - Relate the industry's productivity record.
 - Explain the advances that have been made in protecting workers health and safety.

Business

1. The business community at large depends on energy, particularly electricity, for its survival, but few business consumers of electricity understand how that dependence translates into reliance on coal.
2. Business receives the bulk of its information about energy from normal media channels with all the inherent limitations of that system.
3. There is much that businesses can do with their employees, unions, stockholders, retirees, and trade associations to reach a large segment of the population with appropriate messages on energy and coal.

Environmental Groups

1. Environmental groups are an important audience. Interaction with environmental groups that are receptive to exchanges of information on energy, coal, and the environment could help to ensure that issues can be explored and presented accurately.

Government

1. The Department of Energy is playing an important role in energy education and should continue and expand its activities. The high level of national concern about education creates a significant opportunity for the Secretary of Energy to collaborate with the Secretary of Education in efforts to coordinate these diverse activities so as to make them more effective and avoid unnecessary duplication, and to ensure that appropriate emphasis is given to energy-related elements in new or existing educational programs.

The Department of Energy is encouraged to continue efforts already underway to provide educational materials and programs to the teachers and students in support of energy education. With so much interest emerging across the nation in improving education in science and mathematics, the time and opportunity for including energy education in the scope of emphasis has never been better. The special role of the Secretary of Energy as co-chair of the "Engineers for Education" program provides a good opportunity for the Secretary to ensure that energy education is properly emphasized, and he is urged to take advantage of this opportunity.

2. Federal, state and local governments are the ultimate source of public policy decisions which affect the coal industry. The future of the industry is decided in governmental forums.

3. Government at all levels is responsive to public opinion and constituent pressures.
4. Public opinion seemingly plays a larger role in public policy than does scientific fact.
5. Success in influencing public policy decision making depends upon comprehensive programs dedicated to shaping public opinion and government action.
6. Lobbying efforts by the coal industry tend to be fragmented *or* issue specific in nature rather than designed to represent the whole industry.

The previous conclusions are summarized from Appendix A which contains the supporting information. The reader is encouraged to review this Appendix for further discussions.

SUMMARY

What emerges is a general conclusion that the coal industry has done a poor job of self promotion. Various industry groups have been active in promoting coal, but these efforts have been too limited, narrowly focused and poorly funded. While such efforts focused on energy education and lobbying, very little has been done to improve the image of coal.

The industry now faces an issue that threatens its very survival. Global warming has replaced acid rain as the environmental rallying cry of the 1990s. Unlike acid rain, global warming takes aim at the entire fossil

fuel industry, particularly coal. A universal threat to the industry demands a unified response.

References

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CHAPTER V

RECOMMENDATIONS TO THE SECRETARY & SUGGESTIONS TO INDUSTRY

INTRODUCTION

Americans today are making political decisions that will influence energy policy well into the next century. These decisions will have a profound and lasting effect on economic growth and social stability at home and abroad. While the trend in U.S. policy has been to support domestic energy sources over foreign imports, there have been inconsistent signals from the government on energy questions pertaining to coal and to coal-generated electricity.

The public policy process is driven by *perception* and *opinion*. Opinion surveys consistently show that Americans neither understand nor appreciate coal, not in its current status as our most important domestic energy source, nor in its future potential for economy, reliability, and environmental compatibility.

Americans consistently tell pollsters that the importance of coal is declining and that coal is among the least desirable sources of energy. Indeed, one recent survey of nearly 2,000 Americans showed greater confidence in long-term supplies of natural gas than of coal.

America's leaders in government, education, and mass media are right now deciding the future of coal. Many current legislative and

regulatory proposals would inhibit the continued and orderly development of America's bounteous coal resource. The implications for coal producers and coal consumers are immediate and grave. They demand deliberate and coherent action, not in the form of conferences and white papers, but in the form of specific, funded programs to influence the public and its leaders.

Shifts in public opinion on the scale needed will be expensive to achieve. Resources need to be on a scale comparable to those committed to harming the image and prospects of coal.

The commitment to make coal a cornerstone of energy policy will be shared by government and industry. However, the financial resources to realize that commitment must come from industry — coal producers, coal transporters, and coal consumers. If those who benefit immediately from coal cannot implement an effective action plan, there are no others who will.

Other energy industry sectors, particularly natural gas and nuclear, understand the importance of continued widespread promotion and education. Coal deserves no less attention from its own proponents.

Already the coal industry's failure to act broadly and aggressively has resulted in its public image as a fuel of last resort. This now shows up consistently in Federal, state, and local legislation and regulation. *If the coal industry does not begin today to claim its legitimate share of public attention and appreciation, tomorrow may be too late.*

Appendix B includes discussions of the respective roles of industry participants and government, how to deliver the message, and how to sustain the message. The reader is referred to Appendix B for more information on these items.

CONCLUSIONS

The American public is woefully uninformed and, in some cases, misinformed about coal mining, transportation, and consumption. Few outside of the energy business know that about 56 percent of electrical generation in the United States is from coal. Fewer still understand that although consumption increased, sulfur dioxide emissions declined dramatically. Instead, the public perceives coal as undesirable. Few would favor increased coal use in their area.¹

Through inattention to its image, the coal industry is, in large part, responsible for the public's negative perception. The industry has devoted few resources to public information and education. The same cannot be said of competing fuels.

The nuclear, natural gas, and petroleum industries each spend tens of millions of dollars annually in self promotion. Realistically, an equivalent amount will be necessary to change the image of coal.

The time has come for the coal industry to take responsibility to improve coal's image. The diverse elements of the coal industry must come together and work towards a common goal. Coal must commit significant resources to public information and education to overcome image problems or be at the mercy of opposition and the victim of indifference when public policy decisions are made.

The coal industry is diverse, regional and fragmented. The coal industry also encompasses not only producers, but also users, transporters, equipment manufacturers, and other supporting businesses. Each must contribute ideas, people, time, and funds to improve coal's image.

A unified, persistent national public relations campaign strategy is an absolute necessity if the image of coal is to be improved. The fragmented, issue specific lobbying approach followed by the industry to date may have been effective on special issues but it has failed to produce a positive national image for coal. The failure of the piecemeal strategy is apparent in the conclusions drawn above.

The basic goal of the industry is to foster a political and economic climate that advocates the use of coal as America's primary source of domestic energy. Reaching that goal will not be easy or inexpensive.

Recommendations to the Department of Energy

1. The Secretary of Energy should convene a meeting of coal industry leaders upon

release of this study for the purpose of discussing its findings and recommendations while stressing the urgency of getting coal's message across to the public.

2. The Department of Energy should develop a strategy which targets State regulatory agencies — both elected officials and staff — to receive ongoing information about energy options available to the United States, making certain that coal remains among the options presented for consideration.
3. The Department of Energy should identify an audience of policymakers within the Federal Government whom the Department will keep abreast of information concerning fossil fuels with the purpose of urging that all available options be left open in the interest of national energy security.
4. The Secretary of Energy in concert with the Secretary of Education should impress upon education leaders and educational institutions the importance of energy education in creating an informed public. Because coal is America's most abundant domestic energy resource, the Council trusts that coal's message will be part of such an effort. There is much the Department of Energy already is doing; yet, much more needs to be done. For example:
 - Evaluate existing Federal, state, local, and private energy education programs for content and effectiveness. Coordinate these existing programs to maximize their effectiveness.
 - Promote sharing of proven energy education materials and classroom techniques.
 - Continue to design and provide illustrative visual aids and demonstrations that emphasize and clarify energy-related principles.
 - Sponsor competitive events which stimulate interest in energy fundamentals, for example, science fairs with emphasis on energy, high school or college level essay contests on energy issues, etc.
 - Encourage the creation of academic chairs at leading colleges and universities with emphasis on energy issues in a variety of academic disciplines to illustrate the value of energy-literacy in a well-rounded education.
5. The Secretary of Energy should identify a group of scientific and engineering professionals who are recognized as experts by their peers, and arrange *ad hoc* task forces or advisory panels to whom the media may turn for the latest in factual information on coal-related subjects.
6. The Department of Energy should sustain its excellent work under the Clean Coal Technology Outreach program and consider its expansion to help assure public acceptance of these environmentally acceptable methods of coal combustion.

7. Develop a public service outreach program concerning all energy sources available to this nation, including the role of coal.

Suggestions to the Coal Industry

1. Implement a "Program to Improve the Image of Coal" as outlined in Exhibit B-1, page 71.

2. Implement a "Corporate Action Plan" for an Industry Member Company as outlined in Exhibit B-2, page 73.

3. Participate in the activities of "How to Deliver the Message" as outlined in Exhibit B-3, page 74.

Reference

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Appendix A

Public Information & Energy Education

APPENDIX A

PUBLIC INFORMATION & ENERGY EDUCATION

INTRODUCTION

The discussion in this appendix on public information and energy education supports material in Chapter IV of this report.

Energy plays a vital role in nearly every aspect of modern life. It is important that the American public understand and appreciate energy sources and uses and how they affect the economy and the environment. A better understanding of energy, in general, will lead to a better understanding and appreciation for the role of coal, in particular.

General Public

The average American knows very little about energy issues, and about the role of coal in the economy. In fact, the general public appears to be unaware that coal accounts for a greater share of U.S. energy production than any other fuel.¹ The coal industry needs to collaborate with schools, media, business, environmental groups, and government to develop and present education programs designed to increase the public's understanding of energy and coal. This appendix will discuss what might be done with each of these groups

to convey an educational energy message to the American public.

ENERGY EDUCATION

There are approximately 60 million students, kindergarten through college, in our nation's public and private schools and nearly 3,500,000 professional educators work with them.² Schools provide a direct means to communicate the energy message and are, therefore, an important component of the energy education process. Schools, in fact, offer the most effective way to inform the general public about energy and coal over the long term. This section on schools is divided into two subsections:

- Higher Education - Two-year and Four-year Colleges and Graduate Schools; Technical/ Vocational Schools
- Elementary and Secondary Education

HIGHER EDUCATION - COLLEGES, GRADUATE SCHOOLS; TECHNICAL AND VOCATIONAL SCHOOLS

Appropriate Audience For The Message - Higher Education

Colleges and graduate schools educate the professionals of the future. There is no

more effective way to achieve energy education objectives than by "educating the educators," who educate the students of today, who will be the workers, consumers, voters, and policymakers of tomorrow.

College professors are the main source of information for students in higher education; therefore, professors themselves should become high-priority groups to whom the energy message should be conveyed. Of special concern are professors in colleges of education because of the future roles of their students in elementary and secondary education.

Journalists are especially important in molding public opinion about energy issues; so journalism professors and students also should be a high-priority group. Similarly, the business leaders, decision-makers, and politicians of the future will be passing through colleges and universities in liberal arts, humanities, law, and other disciplines that, at present, generally lack even a simple survey course in energy principles and issues.

Education in engineering and the sciences usually is assumed to treat energy-related subjects adequately, but this is not true in all cases. Technical and vocational schools usually have very specific subject areas, but it would be very desirable to include a brief overview of energy principles and technologies in their curricula.

How And By Whom School Audiences Are Being Reached—Higher Education

In general, school populations are not developing a positive view of coal, except in very limited cases.

In 1979, engineering educators organized the Council for the Understanding of Technology in Human Affairs, and in 1982, the Alfred P. Sloan Foundation inaugurated the New Liberal Arts Program to expand the teaching of technology in liberal arts programs. The emphasis in these programs is not on energy, but their concept offers hope of enlargement to include energy. Another example, at the University of Tennessee, finds the Colleges of Engineering and Business collaborating on curriculum development. The extent of attention to energy principles and issues is not clear in this case, but the idea of collaboration between engineering and business offers promise.

The U.S. Department of Energy, through various science and mathematics education programs, has made advances in energy education by conducting teacher workshops, sponsoring teacher internships and supplying educational materials.

What Is Needed—Higher Education

A comprehensive, large-scale national effort is needed to make educators more aware of energy-related content in their curricula and the importance of including

appropriate energy subjects. Students need to understand more about the world in which they must later function.

The objective should be to provide up-to-date, factual, unbiased information on energy, with special emphasis placed on environmental and economic considerations, so that young Americans will be better equipped to make informed choices. Modification of existing curricula is difficult, even within the traditional boundaries of a given academic discipline. Expansion into unfamiliar areas will be very difficult indeed.

Most degree programs already are crowded and implementation of new subject areas, regardless of merit, will be resisted. Therefore, extraordinary effort will be required to motivate faculties and school administrators in the desired direction. One way to inform and motivate teachers would be to set up a speakers' bureau, identifying qualified people who are willing to talk on environmental and energy issues, offering the speakers' services to environmental science department heads.

The growing technical complexity associated with almost every activity in America today offers expanding opportunity for students from technical and vocational schools. Technical and vocational schools are a principal source of trained craftsmen and technicians for industry. In order to prepare these students adequately to fill such needs, there will be a period of transition as curricula in existing schools are modified and expanded and new schools and

programs are established. This period of transition should offer unique opportunities for the introduction of appropriate and highly relevant energy-related courses in the technical training programs.

As a pilot program, the industry should pinpoint three or four technical/vocational schools in coal-producing states, and reach out to the engineering community about tailoring their curricula to include appropriate energy topics. Bringing in industry professionals, who are able to "talk shop" and demonstrate state-of-the-art information, could prove to be effective.

It is unlikely, however, that energy education will receive greater attention in universities, colleges, and technical schools unless there is a well funded, widely publicized, aggressive promotional effort. Perhaps cooperative programs among the Department of Energy, National Science Foundation, the National Academy of Engineering, and others can be organized to address energy education at the college level. The essential ingredient is an organization of advocates who are committed to the importance of improving energy education, who are willing to undertake the task of making it happen, and who can raise the funds needed for implementation.

For a personal perspective on the sort of effort required to assure coal combustion will remain a subject of advanced research, the reader is urged to read the comments of Ohio State University E.G. Bailey professor of energy conversion

Robert H. Essenhigh's comments which appear in Appendix E at page 107.

ELEMENTARY AND SECONDARY EDUCATION

Appropriate Audience For The Message - Elementary and Secondary Education

If a student's interest in science and energy can be captured in elementary school, it likely will be pursued during the ensuing school years. Many elementary teachers are uncomfortable with science and need encouragement to teach it. They also require the tools to do so.

The upper elementary grades are usually the most receptive audiences. Fourth-, fifth- and sixth-grade curricula can accommodate supplementary materials. Students can read well at this age, and the self-contained classroom is conducive to interdisciplinary programs. Once a successful program has been established, it is relatively easy to expand it into new grade levels. For example, the inclusion of the primary grades requires much less work than establishing the initial upper elementary programs or components.

High school teachers who are receptive to the energy message will be willing to accept sponsored educational programs. Industry often focuses on high schools because it feels such an emphasis will produce the most immediate results. This focus for the energy message would be short-sighted unless it is part of a broader science and energy education effort that reaches all levels of pre-college educators. High school alone will be much less effective in providing a firm foundation for understanding energy issues than a science and energy program that begins in elementary school and continues through high school.

Care must be exercised to ensure that such an education program is truly "educational" and that it does not translate into advertising products, or the presentation of a corporate bias or "public relations." The relationship between business and education must be based on sound educational values, serve clear educational purposes, and promote the welfare of students.

The level of state and local control over elementary and secondary education varies from state to state. In some states there are selected textbooks. The teachers must work with whatever materials are available in order to hold down costs. "No cost" supplementary texts and materials may be needed to cover energy topics adequately.

Elementary teachers have more autonomy than secondary school teachers. A school committee that determines whether criteria are being met may exist, but otherwise, what is taught depends on the individual teachers, their expertise, the information at hand, and how much time is available to teach it.

At the secondary level, some schools have strict guidelines, while others follow a basic standard with textbook guidelines. Beyond seventh or eighth grade, everything is done more on a subject-by-subject basis. The state provides guidance and direction, but most control is at the local level. As far as biology, chemistry, and physics are concerned, everything is geared to college admission expectations.

In coal-producing states, the State Department of Education may be involved in producing curriculum materials, various energy booklets, and some coal-related activities. In Pennsylvania, for instance, each district has its own curriculum, but again, a lot of what is taught depends on

the individual instructor. A teacher has to see a teaching unit about coal as attractive, or it will not be pursued. On the local level, there are resource centers for each county cluster (consortium of several counties), whose responsibility it is to make available materials, videos, etc, provided by organizations such as the American Coal Foundation (ACF).

How and Who Is Reaching The Audience - Elementary and Secondary Education

Since 1985, the ACF has been dedicated to developing and implementing education programs and materials on credible, comprehensive coal education programs that are useful to teachers and students.

The ACF is a non-profit organization, support for which comes primarily from the coal industry, but also from electric utilities, unions, suppliers, railroads and industry associations. The ACF's objective is to educate teachers and students about the advantages and potential of coal. Programs include sponsoring teacher workshops, developing classroom materials, producing and distributing films, videos, and slide presentations and providing free or inexpensive general information about the coal industry to the public.

A number of coal companies, electric utilities, and other energy-related companies sponsor teacher workshops. They involve classroom lectures by educators, researchers, and industry representatives on such topics as energy and the environment, energy reserves, production and utilization, transportation, economic impact, and other appropriate topics. Workshops also provide classroom materials, copies of presentations, bibliographies, hands-on activities that will

easily fit into the curricula and tours of modern coal mine facilities, power plants, and reclamation sites. These programs, while beneficial, reach relatively few.

A recognition of the need for greater emphasis on science in education has motivated several new and promising national initiatives in primary and secondary education. The National Science Teachers Association (NSTA) has sponsored a project on the *Scope, Sequence, and Coordination of Secondary School Science* (SS&C).

The NSTA project recommends that all students study science every year for 6 years in carefully sequenced and coordinated instruction in physics, biology, chemistry, and earth/space science. This integrated scope and sequence curriculum will be implemented for the seventh grade in the 1991-1992 school year by the Center for Communication and Educational Technology at the University of Alabama.

Each class hour will include a live, interactive satellite portion, available nationwide to augment efforts of the local classroom teachers. Local teachers will have an orientation program before the classes begin, followed by "for teachers only" satellite sessions to introduce new topics and to review problems and successes in their classrooms. Energy is included as a topic for a segment of instruction.

The American Association for the Advancement of Science (AAAS) also has initiated a program on educational reform called *Project 2061*. During the first phase of this project, leading scientists and educators identified the knowledge and skills they considered essential for well-

rounded science education and the resulting recommendations were adopted by the NSTA as goals for the SS&C.

The National Coalition of Engineering Societies for Pre-College Math and Science Education is yet another extremely important and promising national development that was announced in February 1991 by a coalition of 41 professional societies. The program is sponsored by a coalition called *Engineers for Education*.

The coalition has undertaken the task of identifying more than 100,000 scientists and engineers (at least one for every school in America) to work with teachers, students, and parents to promote excellence for U.S. students by the year 2000. The Secretary of Energy is one of two honorary co-chairpersons of the coalition. The National Association of Elementary School Principals, the National Association of Secondary School Principals, and the NSTA have indicated willingness to work with the engineering societies in order to make this program effective. Further help is coming from the White House through the Office of Science and Technology Policy.

The National Energy Education Development (NEED) Project was launched by Congressional Resolution in 1980, and subsequently supported by a Presidential Proclamation. Its objective is to "introduce or enhance energy education programs in all of our nation's schools." The implementing structure is a national network of students, educators, and community, industry, and government leaders, committed to developing life-long learners who can make effective energy decisions. The network now includes 28

state committees, 175 regional committees, and more than 4000 schools.

The Mineral Information Institute is associated with the American Mining Congress and offers energy education programs which deal with mining, energy, and the environment. Several programs specifically oriented to elementary and secondary education are currently available.

The Lignite Science Education Project attempts to teach middle school students earth science in a way that is relevant to modern society. The project, which is funded by a grant from Phillips Petroleum Company and carried out by Texas A&M University, includes 53 units. Each is composed of a student story, teacher outline, and classroom/laboratory activities built around a unifying theme of the students doing the work necessary to develop a hypothetical mine. In the process of evaluating, planning and designing "the Black Gold Lignite Mine," the students apply their knowledge of earth science.

The program is being pilot tested in four Texas schools in the 1991-92 school year and should be ready for general distribution in the fall of 1992.

The Lignite Energy Council has begun a program to educate the state's teachers about the lignite industry. In the six years since the program started, it's estimated 50,000 students have received lignite education in the classroom through the program's work with 480 educators.

Two 3-day seminars are held each June at Bismarck State College. Teachers receive an academic credit from the University of

North Dakota for attending the seminars and completing lignite education lesson plans.

Titled "Our Lignite Resource: Energy, Economics and Environment," the seminars provide teachers with information and education materials they can use in the classroom to help teach their students about North Dakota's lignite resources and the importance of lignite energy in neighboring states. One day of the seminars is devoted to presentations by lignite industry personnel on various aspects of the industry. The second day is spent touring mining operations and conversion facilities. The final day is devoted to discussion of environmental issues and how to teach lignite education in the classroom.

The program is expanding into Minnesota and South Dakota - two states that rely heavily on lignite-produced electricity.

What Is Needed - Elementary and Secondary Education

Many organizations are engaged in the task of putting energy information in the schools. These organizations are described in *Energy Education Resources-Kindergarten through 12th Grade*.³ Many of these organizations are non-profit and are supported by industry and/or grants. Some of these organizations can be good conduits to convey the energy message. Their material should be reviewed and improved where necessary. New material may be needed to address the energy issues that may be missing or inadequately covered. More could be done by these organizations with greater financial support.

Assuming the program of "educating the educators" is being pursued, the classroom teacher needs industry's support by active participation in the classroom.

It is apparent that there are many resources being mobilized to address objectives for improving science and energy education in the United States. The high level of national concern about education creates a significant opportunity for the Secretary of Energy to collaborate with the Secretary of Education in efforts to coordinate these diverse activities so as to make them more effective and avoid unnecessary duplication, and to ensure that appropriate emphasis is given to energy-related elements in new or existing educational programs.

The Department of Energy is encouraged to continue efforts already underway to provide educational materials and programs to the teachers and students in support of energy education. With so much interest emerging across the nation in improving education in science and mathematics, the time and opportunity for including energy education in the scope of emphasis has never been better. The special role of the Secretary of Energy as co-chair of the *Engineers for Education* program provides a good opportunity for the Secretary to ensure that energy education is properly emphasized. The Secretary is urged to take advantage of this opportunity.

Thus far, the discussion has centered on energy education in the schools. What follows is a discussion of what needs to be done to educate the public.

MEDIA

The pervasive influence and power of the modern news media in the United States can be traced to the earliest days of the Republic.

By providing First Amendment protection for "freedom of speech and of the press," the Founding Fathers created a central role for the media in American society. The "Fourth Estate" assumes responsibility as guardian of the public interest comparable to that of the first three: the Executive, Legislative, and Judicial branches of government. Few people dispute the media's power to influence public policy development by its ability to mold public opinion.

There are nearly 20,000 print publications in the United States. They range from the major daily newspapers to prestigious quarterly magazines and encompass virtually hundreds of assorted papers and periodicals in between.

Daily newspapers number more than 1,600. Newspapers of lesser frequency, but published no less than once a week, total more than 7,300. Periodicals are in excess of 11,250.

On the electronic side, there are more than 11,000 radio stations. There are nearly 5,000 commercial AM radio stations, 4,500 commercial and 1,500 educational FM stations, and a few non-commercial ones.

There are nearly 1,500 television stations. Commercial VHF stations comprise 550 of that number. There are nearly 600 commercial UHF stations. Non-

commercial TV includes about 230 VHF and 125 UHF educational stations. Of all commercial stations nearly 350 are independent.

Television also comes into the home via cable. There are approximately 10,700 operating cable systems in communities across America.

Appropriate Audience for the Message

Never before has there been as much news space devoted to business, energy, and the environment. This presents the coal industry with an excellent opportunity to convey positive messages regarding the modern coal industry. The major challenge for industry is to effectively communicate to these media outlets coal's role as a plentiful, economic, and reliable source of energy that can be safely utilized by all people of the world to meet their basic energy needs and to help economies grow and nations prosper.

Reaching the Media

Every time an item appears on television or in the newspapers, it is appropriate to ask how that story made the news.

It may have been the result of investigative reporting. But many times, someone at the source determined that the information was important and took the initiative to convince the media it was newsworthy.

Deciding if something is "newsworthy" is an inexact science. But, by all accounts, the best definition of newsworthiness is "what editors and reporters think is newsworthy." Therefore, how the story is

presented to the media may have a lot to do with whether or not it is reported.

Merely sending out news releases and attempting to get news coverage is not enough. More is required to cultivate good relations with the media and enhance coal's image.

Anything and everything a company does can be viewed as the public's business or subject to people's right to know. Consider a few of the more familiar examples of how *not* to enhance one's image: the coal producer that refuses ready access and information to the news media regarding a serious accident on company property; the company negotiator who repeatedly has "no comment" during a critical labor dispute; the company spokesperson who provides misleading or inaccurate information in an apparent "cover-up" of facts.

Many journalists know of situations in which business even tried to conceal what amounted to good news, largely because of the notion that it was none of the public's business. Thus, the major stumbling block to news industry trust of business is the refusal of some executives to level with the media.

Who is Reaching the Media

Issues of government related to the economy, the environment, and energy achieve very high visibility in the media. The problem, however, seems to be an imbalance of the coverage.

Environmental groups are highly successful in reaching the media. There are about 20 major environmental groups that collectively carry out grassroots campaigns. They operate in an activist

mode, seeking out perceived transgressions against the environment, focusing media attention on the issue, applying political pressure, intervening in legal processes, and mobilizing for action.

The top ten environmental groups have over 7.7 million members and an annual budget of over \$250 million.⁴ The media devote a substantial part of their time and space to information or materials from these environmental sources.

There are, however, other third-party organizations that are just as effective at reaching the media and actually educating reporters on a variety of issues in a balanced fashion. One example is the Foundation for American Communications (FACS), a private, non-profit education foundation. It provides an interdisciplinary program for journalists, business and academic organizations. The Foundation's journalism education programs teach journalists how to accurately report the scientific, risk, economic, and legal aspects from business and academic organizations. This allows business and academia to become information resources to journalists and to accurately communicate information about environmental issues in an understandable economic, scientific, and legal context.

FACS programs provide journalists with the impartial, academic tools of analysis they need to put important public policy issues in proper perspective for the public. Their environmental programs also cover energy issues.

Another so-called third-party group reaching journalists is The Media Institute and the organization's *Environmental Reporting Forum*. The Media Institute is

a non-profit research foundation that seeks to foster freedom of speech, a competitive communications industry, and excellence in journalism.

The Media Institute sponsors research studies and conducts various seminars and programs related to the First Amendment, media coverage of various issues, and communications policy. It pursues an active program agenda and involves all sectors of the media, ranging from the traditional print and broadcast outlets to newer entrants such as cable, satellite, and electronic data bases.

In February 1991, The Media Institute joined with the Radio-Television News Directors Foundation in creating a program to address radio and television news coverage of the environment. Called the *Environmental Reporting Forum*, it explores significant environmental issues and the unique problems of reporting them on radio and television.

What is Needed

It is quite apparent that for the size of the American coal industry — \$21 billion annual production — coal has not taken seriously its duty to adequately communicate to the public.

Currently the coal industry has but a handful of communications professionals devoted to disseminating the industry's various messages. Most of them are not solely public relations practitioners. They also work on government relations, personnel, employee relations, or other issues, taking time and effort away from public relations activities.

Of the 27 members of the National Coal Association's Public Relations Committee,

17 either have duties in addition to public relations (government relations, environmental affairs, health and safety, employee relations, engineering/regulatory) or are company presidents or state coal association executives without a communications professional on staff.

The cumulative effect of any industry-wide public-media relations activities cannot be taken lightly and must be considered in any assessment of improving coal's public image. The lack of staff at individual companies will likely constrain this cumulative benefit and may mean a larger national program.

One use of third-party support might be to assemble a group of scientists or academics who could be called upon to meet with editorial boards, give speeches in various areas of the country, or testify before congressional committees. Such events might elicit media coverage.

The full range of media relations activities should be used to help achieve goals of an image enhancement program. The tools each coal producer should utilize include, but are not limited to:

- reach out aggressively to reporters on a national basis and in every coal community;
- maintain regular contact with reporters;
- participate in editorial board/reporter meetings;
- provide material on a regular basis to editorial writers — editorial background papers;
- continue conveying industry's accomplishments and "good news";

- hold briefings/tours and other gatherings to expose company operations and executives to the media;
- develop a company media factbook, containing various data;
- train company executives to effectively conduct media interviews; and
- respond to any unfavorable or incorrect news accounts on coal or related energy topics.

BUSINESS

There are millions of businesses in this country, ranging from sole proprietorships

to large corporations. Total private-sector employment in the nation was about 92 million during 1990.⁵ Add to these private-sector employees their dependents, and one can appreciate the size of this audience.

Appropriate Audience For The Message - Business

For purposes of this report, business has been classified into the segments or "beneficiaries" identified in Table A-1, below. They are generally:

- **Coal Stakeholders** - those businesses that play a direct role in mining, handling, and using coal.

TABLE A-1

BUSINESS SEGMENTS

<u>Coal Stakeholders</u>	<u>Energy Beneficiaries</u>	<u>Economic Beneficiaries</u>
Mine owners/operators	Equipment manufacturers	Residential users of electricity
Utilities	Construction unions	Small businesses
Railroads	Limestone suppliers	Manufacturing industries
Barge transporters	Engineering, procurement, and construction companies	Service industries
Independent power producers, non-utility generators	Environmental corporations	
Steel industry		
Cement industry		
Export markets		
Coal labor organizations		

- **Energy Beneficiaries** - those businesses that directly support the coal beneficiaries in their businesses.
- **Economic Beneficiaries** - those businesses that use energy without direct involvement in the energy industry.

The method for delivering the energy message, i.e., the coal message, varies according to the business.

A large portion of the business community is pro-coal out of economic necessity. Their jobs depend on coal. This pro-coal group includes most of the coal stakeholders and energy beneficiaries. These groups will benefit from dissemination of energy information.

The economic beneficiaries (individuals and small businesses) can benefit most from energy information. Few realize that coal can be used in an environmentally acceptable manner, and it is the major energy source for electricity. Because business depends on low-cost electricity, business has an economic stake in the continued viability of coal as an energy source for electricity.

How Audience Is Being Reached - Business

Energy and coal information is relayed to the business community in the same way it is directed to the general public. Some effort has been exerted by the National Coal Association, state coal associations, the energy agencies of coal-producing states and others. A targeted focus is required to reach the business community.

Energy Advocates is an example of efforts to reach the audience in the business, professional and civic communities. This is a group of businessmen associated with the energy industry who each year, since their beginning in 1974, crisscross the country speaking before numerous civic and professional groups and holding on-the-record news briefings for local media representatives. In their presentations, *Energy Advocates* present the facts about our domestic energy supplies and solutions to the country's energy problems.

What Needs To Be Done - Business

The primary responsibility for improving the image of coal lies with the proposed coal coalition — those businesses which stand to profit the most from public acceptance of coal. The coalition needs to prepare a "public relations plan for coal" that includes dissemination of the most current coal-related information to the business community. This process would begin with those holding the most immediate stake and expanding outward to embrace a progressively more diverse group of interests, as illustrated below.

- Corporate boards of directors
- CEOs and business leaders
- Business organizations and associations
 - National Association of Independent Businesses
 - Lions, Rotary, and Optimist Clubs
 - Chambers of Commerce
- Employee groups
- Union meetings
- Stockholder meetings
- Retired employee groups

- Trade associations
- Suppliers of equipment, materials, and services to the coal industry

ENVIRONMENTAL GROUPS

Appropriate Audience For The Message—Environmental Groups

Factual information can be provided to environmental groups that eventually may influence attitudes and opinions. This objective requires a tightly focused and reasoned effort.

How Audiences Are Being Reached - Environmental Groups

The image of coal might be improved by focusing on the membership of the environmental groups and their governing boards rather than their leadership and spokespersons.

Information would present coal as a viable and attractive energy alternative. One way this may be accomplished is through the promotion of clean coal and other advanced technologies that tell a positive story in a positive way.

What Is Needed—Environmental Groups

Various approaches can be used with the directors and membership of environmental groups. For example, advisors and directors can be addressed by presentations, technical papers and direct mailings. The governing and advisory boards of environmental groups usually include industry representatives, political leaders, and scientists who could benefit from balanced data and analyses on environmental issues.

Some environmental and conservation groups already have shown interest in the Department of Energy Clean Coal Technology Program. The coal industry should be forthcoming and try to build bridges that could promote a better understanding of a coal perspective on the issues.

It may be possible to purchase advertisements in environmental organization magazines to reach out to the membership within specific environmental groups.

The general membership can also be reached by employer-provided information, publications, and magazines distributed at public gatherings; by speakers bureau presentations to community organizations; and mine and plant tours.

It should come as no surprise that many employees of organizations tied to the coal industry also belong to environmental and conservation organizations in order to demonstrate their commitment to wildlife, natural resources, and the environment. By providing these employees with factual scientific information about the benefits of using coal and the available means of protecting the environment in the process, they can perhaps influence the direction of the environmental groups to which they belong. Members of coal industry organizations can provide balance within the membership of these environmental organizations during their policy and political decision-making processes.

GOVERNMENT

The government sector (which consists of elected and appointed Federal, state, and

local officials) is among the most important audiences for coal and energy information programs. These officials are the ultimate arbiters of public policy decisions that have impact on the coal industry. The government sector merits special focus, study, and effort in any analysis of coal's current and future image.

Political institutions are heavily influenced by constituent views and concerns. They also reflect them. It also can be said that the political process responds primarily to perceptions of public attitudes and not necessarily, to the facts or to the science surrounding an issue. Consequently, the best opportunity for coal to succeed in changing its image within the government sector lies in a comprehensive information program that addresses public opinion.

Nonetheless, it is imperative that public officials be directly familiar with the energy industry and with coal's role, both in a broad sense and with respect to the facts and analyses surrounding more discrete issues. This educational challenge will never be met fully.

Most public officials have little knowledge of the production, distribution, or utilization of energy — let alone coal. This is true for officials both in decision making positions unrelated to direct coal issues and, often, to those in positions with direct impact on the coal industry. This lack of knowledge is not surprising. Most public officials have educational backgrounds and experiences that did not include familiarity with coal or energy.

The ongoing challenge to educate government officials is more acute in some sectors than in others. For example, on average, half of the people who staff

Congress will leave their positions every two years because of changes in Congress and/or because of personal career decisions. A similar problem exists with staff in state legislative bodies.

The turnover of officials within agencies which affect coal is not as severe a problem as within legislative bodies. This may be due to the career nature of agency positions. However, changes in personnel at the higher decision and policy making levels is fairly regular and occurs between Presidential administrations and terms, as well as through normal turnover.

For example, the Office of Surface Mining Reclamation and Enforcement was created in 1978. Its initial 2 years were under a Democratic administration. The following 13 were Republican. In that time it has had 8 Directors. The longest tenure of any Director has been 3 years. Further, each new Director usually brings along new deputies. This type of transition in key governmental positions both at the Federal and state level is more the rule than the exception.

The challenge of keeping public officials informed is exacerbated by the manner in which coal-related issues are presented by the media and through the interest groups which influence both media coverage and general policy issues. A mine fatality is front-page material. A mine with no lost time accidents for a year is written up in its corporate newsletter. An allegation that coal production or transportation has adverse environmental impacts in a specific locality triggers an investigation. The fact that the price of coal has decreased in constant dollars for 15 consecutive years is noted by utility fuels procurement officers and by coal industry managers.

Perhaps the most difficult with which to deal are the continued allegations of adverse impacts from coal production, distribution, and utilization that result in the coal industry being required to prove its innocence in the court of public opinion rather than coal's accusers being required to prove that their allegations are true. This situation is not unique to coal among American businesses, but it perhaps is made more severe because of the costs to society when coal activity is disrupted while matters are resolved through public forums and proceedings.

In this context, there are three levels of interaction among the coal industry and government in the United States: Federal, state, and local. There also is international activity, both in bilateral and multilateral contexts.

Appropriate Audience For the Message - Congress and Federal Agencies

The role of the national government in regulating individual industries has increased sharply in the past 20 years. Adequate supplies of reasonably priced energy are critical to social stability and progress. Coal's large and cost-competitive resource base commands a primary part of the nation's energy mix. As a result, coal producers have become one of the industries most scrutinized and regulated by the Federal government. This situation, in turn, has defined and shaped the major challenge facing the future of the industry: developing a political and economic climate that encourages the use of domestic coal.

An effective communication program involving Federal elected officials and

agencies is vital to coal's future. No matter what else may affect its production and use, coal's image at the Federal level — where policy decisions are made and action taken — is an overriding and pervasive factor in the industry's current and future prospects.

At the same time, it is important to understand that policies emanating from the Federal sector ultimately reflect public opinion. Recent history makes clear that the general public's lack of understanding about coal will likely be reflected in unnecessarily costly laws and regulations issued by Congress and Federal regulatory agencies.

Many Federal agencies can be useful in conveying energy and coal information to their constituencies. For example, the Small Business Administration may be useful in communicating with the more than five million small businesses that employ fewer than 20 people.⁶

How the Federal Audience Is Being Reached

Communicating with the Federal sector ultimately manifests itself in wins or losses with Congress, liaison with agencies charged with carrying out policy, and, sometimes, judicial activity.

The coal industry reaches individual components of the Federal sector in a variety of ways including personal contact with individual lawmakers and regulators; dissemination of printed materials, analyses, and studies outlining industry positions and concerns; participation in national political activities through the use of political action committees (PAC); and

"indirect" lobbying with its focus on grassroots and public information efforts.

A key element within the Federal structure is the congressional committee. Congress uses the committee system to divide its work among individual panels which are responsible for specific issues. Congressional committees and subcommittees have power that often is of overriding significance. This is because the vast majority of legislation is passed primarily in a form reported by committee to the House of Representatives or to the Senate. A committee's power to prevent legislation and to modify the provisions of specific proposals likewise makes communicating with individual committee members and staff a primary focus.

A small minority of coal companies maintain staff in Washington, DC. The industry as a whole pools its efforts in the National Coal Association and affiliated organizations. They monitor the work of committees affecting coal, establish and maintain working relationships with key congressional members and their staff, and keep coal operators informed of potential legislation.

Communication with congressional and regulatory agencies by coal industry representatives involves a wide range of activity.

Industry representatives make personal visits to congressional and agency representatives and staff. They frequently testify before Congress and regulatory agencies and/or submit written statements outlining the coal industry's concerns on issues.

Printed material is directed to Federal officials. It provides an opportunity for more in-depth development of industry concerns, positions, and general information about energy issues. Printed materials come in different forms: letters; background and issue papers directed to key lawmakers, staff, and regulators; formal newsletters, periodicals, and brochures designed to serve dual audiences; and special analyses and studies relating to specific issues or topics.

The coal industry has increasingly emphasized grassroots communications in recent years. At present, these efforts seek to establish a network of coordination and communication among coal groups at the local, state, and national levels. This kind of network facilitates the targeted input of key information into the policy formation process.

Who Is Reaching the Federal Audience

Coal's message to the Federal sector is championed on several fronts through National Coal Association, American Mining Congress, the Bituminous Coal Operators' Association, and the United Mine Workers of America, each with its own particular perspective. Individual coal companies, state and regional coal associations, and other allied organizations or coalitions also speak for coal.

What Needs to Be Done To Inform the Federal Audience

From an industry perspective, the basic mechanical framework for delivering coal's message to the Federal Government already is in place. It works reasonably

well. What is missing is a concerted, long-term, and unified information effort outside that framework which can be used to influence how coal is viewed within the Federal Government and among the general public.

Current industry communications efforts do much to inform Federal regulators and lawmakers about the coal producers' positions on specific issues. They provide relevant data and expert analyses on important energy topics that otherwise might not be available during the policy formation process. But because national policy reflects the broad-based perceptions and expectations of the general public, simultaneous efforts are necessary to recognize, confront, and reverse erroneous, outdated, or widely-held misconceptions about coal.

Since environmental concerns will continue to determine the extent of coal's role, the implications for industry are clear. More effort will be required if the public is to understand that coal can be compatible with protecting the environment. More must be done to inform policymakers, lawmakers, and their constituents about the industry's two decades of steady progress in improving air, land, and water quality and about the prospects for additional environmental benefits using innovative clean coal technologies.

Appropriate Audience For the Message - State Elected Officials and Agencies

Wherever coal is mined or used it helps shape the social, economic, and political life of communities and states.

Before the 1970s, states had the primary role in regulating coal producers' activities. Today's state regulatory and legislative requirements often complement or expand Federal laws and rules. While it is true that officials and governments in states where coal is mined have more familiarity with industry activities than might be true at the Federal level, this does not make any less important the need for continuing information efforts at this level. This is especially true in areas where coal's image might be tarnished by industry abuses in a bygone era.

How the State Audience Is Being Reached: Who is Reaching It

State lobbying and information initiatives most often are conducted by individual companies within particular geographic areas, and/or by state and regional coal associations. In general, they employ many of the same techniques used at the Federal level, including personal contact with legislators, regulators, and their staff; the dissemination of printed materials; political action committee activities; as well as general public and media information efforts.

Occasionally, national organizations become directly involved at the state level, particularly when issues of potential national importance or significance are raised. Under the Regulatory Assistance Program, National Coal Association provides coal companies with technical and legal advice on significant surface and underground coal mining issues as they emerge at the state level.

The implementation of "coal-free zones" in several states demonstrates that coal's

opponents are reaching state and local governments with their story.

What Needs to Be Done At the State Level

Within coal-producing areas there is appreciation of the importance of the industry in terms of jobs, economic impact, energy production, and environmental improvements. In states with no coal industry, coal's image is often tainted by misunderstanding, outdated information and perceptions, and lack of knowledge about coal's role in providing the majority of America's electric power.

There is a need for continued improvement of the link between national, regional, and local entities. The national groups' policy analysis and communications expertise should be coupled with the local knowledge and capabilities of state and regional companies and groups. The result could be an effective network of people, organizations, and information dedicated to improving the image of coal in states where coal is produced.

Appropriate Audience For the Message - Local Elected Officials and Agencies

In coal-producing areas where mining is the principal economic activity, the industry has a great effect on community and institutional life. In such cases, attitudes about coal and its importance are likely to be far more developed and favorable than in a region where coal is not produced. Officials in areas where coal is a crucial part of the local economy are likely to be sensitive, knowledgeable, and concerned about coal's production, transportation, and use at least insofar as

there are effects on the surrounding community.

Conversely, where coal mining is only a part of a more diversified local economy, or it is entirely absent, there is likely to be little understanding and more misconceptions about coal industry activities.

How the Local Audience is Being Reached: Who Is Reaching It

In coal regions, local institutions often have direct and frequent contact with coal producers through community, regulatory, and other functions or activities. Consequently the local coal company is the most common point of contact for reaching the audience.

In regions where no coal is produced and no operating company is present, the local institution is more likely to be touched by information or communication emanating from the national level. It would appear that this is not occurring at present.

What Needs To Be Done At the Local Level

Public information efforts at the local level should distinguish between areas where coal is produced and where it is not. This distinction reflects divergent levels of knowledge and understanding about coal and industry issues. One can assume, however, that local institutions will be affected by any national coal program which seeks to influence public opinion. Ultimately, local institutions react in much the same way as do institutions at the Federal and state level — they reflect the attitudes and perceptions of their public.

Where coal is produced, the producers might be expected to sustain their primary communications function through public and community relations programs, service projects, speakers' bureaus, personal contact with local officials, distribution of relevant printing materials, and advertising.

In areas where coal is not produced but is consumed, it is logical that the coal producers work in cooperation with local consumers to assure that people who are benefitting from coal use understand the role coal plays in their lives.

Where coal is not produced or used, informing local institutions must be a part of a more broad and general national effort to influence public opinions and attitudes about coal.

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Appendix B

Recommendations to the Secretary & Suggestions to the Coal Industry

APPENDIX B

RECOMMENDATIONS TO THE SECRETARY & SUGGESTIONS TO THE COAL INDUSTRY

INTRODUCTION

Material in this Appendix was previously cited in Chapter V of this report.

Americans today are making political decisions that will influence energy policy well into the next century. These decisions will have a profound and lasting effect on economic growth and social stability at home and abroad. While the trend in United States policy has been to support domestic energy sources over foreign imports, there have been inconsistent signals from the government on energy questions pertaining to coal and to coal-generated electricity.

The public policy process is driven by perception and opinion. Opinion surveys consistently show that Americans neither understand nor appreciate coal, not in its current status as our most important domestic energy source, nor in its future potential for economy, reliability, and environmental compatibility.

Americans consistently tell pollsters that the importance of coal is declining and that coal is among the least desirable sources of energy. Indeed, one recent survey of nearly 2,000 Americans showed greater confidence in long-term supplies of natural gas than of coal.

America's leaders in government, education, and mass media are right now deciding the future of coal. Many current legislative and regulatory proposals would inhibit the continued and orderly development of America's bounteous coal resource. The implications for coal producers and coal consumers are immediate and grave. They demand deliberate and coherent action. Not in the form of conferences and white papers, but in the form of specific, funded programs to influence the public and its leaders.

Shifts in public opinion on the scale needed will be expensive to achieve. Resources need to be on a scale comparable to those committed to harming the image and prospects of coal.

The commitment to make coal a cornerstone of energy policy will be shared by government and industry. However, the financial resources to realize that commitment must come from industry—coal producers, coal transporters, and coal consumers. If those who benefit immediately from coal cannot implement an effective action plan, there are no others who will.

Other energy industry sectors, particularly natural gas and nuclear, understand the importance of continued widespread

promotion and education. Coal deserves no less attention from its own proponents.

Already the coal industry's failure to act broadly and aggressively has resulted in its public image as a fuel of last resort. This now shows up consistently in Federal, state, and local legislation and regulation. If the coal industry does not begin today to claim its legitimate share of public attention and appreciation, tomorrow may be too late.

RESPECTIVE ROLES

In Chapter II, several important messages concerning coal were stated which should be part of the energy message. In Appendix A, many large audiences were identified which were critical to reach with the energy message. What is needed is a coalition of organizations that have an interest in coal to initiate a program that can be effective in delivering "coal's side of the story" to the appropriate audiences. *Upon release of this study, the Secretary of Energy should convene a meeting of coal industry leaders for the purpose of discussing its findings and recommendations, stressing the urgency of getting coal's message across to the public.* This could be similar to the July 1989 White House Conference on Coal.

The organizations that produce, transport, and use coal form a large network of businesses that are interdependent on each other for continued operation and success. The coal producers should take the lead in bringing the industry together and initiating a program to improve the image of coal. Industry should assist the coal producers to sustain this 21 billion dollar industry from which they all benefit¹ by actively participating in this program. An Industry Action Plan for a "Program

to Improve the Image of Coal" is presented as Exhibit B-1 at page 79. A Corporate Action Plan for an Industry Member Company is Exhibit B-2 at page 81.

Finally, roles that are appropriate for coal producers may not be appropriate for the organizations that support them or use the product. For example, an electric utility planning a new generating facility must be neutral as to the energy source and demonstrate that the facility selected is in the best interest of the consumer. Similarly, the Department of Energy must be neutral and support many forms of energy simultaneously. Thus, it is essential for the organizations that can take a strong pro-coal stance do so in a very responsible and visible manner.

COAL PRODUCERS' ROLE

Although a number of industry groups have long recognized coal's image problems, there is need for a targeted information effort at the national level.

Coal producers have traditionally devoted only nominal funding and manpower to public information and education activities. The nature and dynamics of the industry have historically limited most activities that don't contribute directly to the bottom line. Now public opinion and policy have such impacts on the future of coal in this country that it is appropriate for it to be seen as a bottom-line issue. However, it is unlikely that the coal producers can singlehandedly act to correct its image deficiencies.

What Should Be Done

Obviously, the limitations on what the coal producers can do are great, but so too is

the need for education and image improvement. When all is said and done, the major responsibility for correcting public perceptions about coal still rests with the coal producers, both individually and collectively, by taking the lead in cooperative efforts with coal users, coal transporters, and those businesses that supply them.

There are a number of programs the coal industry can undertake individually to broaden the effectiveness of any education effort. These include encouraging participation in community affairs; hosting teacher workshops and other interactions with schools; providing knowledgeable speakers for suitable public forums; conducting facility tours for media and public groups; undertaking limited individual company issue-oriented advertising and demonstrating the importance of coal to the local community, the nation, and the world; and through involvement in state, local, and national organizations that represent the coal industry.

At the same time, there is a unique interdependence between coal and various allied industries: the railroads, for which coal is the largest single commodity in terms of tonnage; the electric utilities, who use 8 of every 10 tons of coal consumed domestically; and equipment manufacturers, who supply the machines that make coal's extraction and use possible. Throughout the economy, seven jobs are created for every one in the coal industry.² Clearly, a healthy and thriving coal industry benefits not only the U.S. energy picture, but the various sectors involved in coal mining, transportation, and use.

Consequently, the best way to mount a comprehensive and effective program to enhance coal's image — particularly given the limited resources of the coal producers — is to create a coalition among the various industries and individuals with a concern for coal. This coalition would serve as a forum for action, including the formulation, execution, and funding of a plan to educate America about coal, as well as serve as a clearinghouse for resources.

Under such an arrangement, coal producers should bear the primary responsibilities for getting the coalition underway, but partners who have a vested interest in coal's fortunes should have significant input and participation. Coal producers as a group must be the catalyst for action — the focal point of organization, initial funding, and program implementation.

COAL TRANSPORTERS' ROLE

Railroads

The railroads and the coal industry have been closely linked since their founding. In the early years, the link was a direct one between the coal industry as a fuel supplier and the railroads, a fuel consumer. With the passage of steam engines, the link between the two industries changed. Railroads no longer burned coal directly, but coal was still a major fuel in the economic health of the nation's railroad companies. That relationship continues to grow in importance today.

Class 1 railroads carried 529 million tons of coal in 1990.³ In relative terms, coal represented over 38 percent of total rail

tonnage and 22 percent of total rail revenues (\$6.4 billion coal revenues in 1989). Railroads have a clear stake in a growing market for the nation's coal.

The nation's railroads move coal to a variety of markets including utilities, coke plants, industrial consumers, exports, and residential and commercial users thereby impacting the economies of thousands of small towns in a very tangible way.

The coal moving through small town America touches the lives of millions of people. Railroads pay salaries in those towns to some 308,000 workers (1989 employment), dividends to thousands more shareholders, and property and sales taxes, all of which contribute to the fabric of American life.

Other Coal Transporters

Other coal transporters include barges, ships, tramways, conveyers, slurry pipelines and trucks.

The barge and waterway transportation network is the second largest transporter of United States coal; likewise, coal is the second largest commodity moved on the inland waterway system (after petroleum).⁴ At 143,000 tons, coal accounts for about 28 percent of the total waterway transportation tonnage.⁵

Trucks are important for moving coal over short distances, particularly from mines to power plants or shipping facilities. These other coal transporters are partners in the coal industry and should fully participate in the proposed coal industry coalition.

ELECTRIC UTILITIES' ROLE

The electric utility industry is the largest consumer of coal in the United States. In 1990, it consumed 772 million tons of coal.⁶ In a real sense, today's market for coal is the electric utility industry. Coal generated 56 percent of all the electricity produced in the United States in 1989.⁷ The two industries are tightly bound to each other today and will continue to be so as long as coal remains the most economic form of base-load generation.

In the United States, there are about 450,000 electric utility employees.⁸ Those working within the industry must understand the value and critical role coal provides to their companies and to the economic benefits the communities receive through coal-generated electric service. The electric utility industry can play an important role in improving the image of coal.

The negative image of coal in today's society is based, in part, on practices of the past and current concern for the environment. Therefore, the coal-burning electric utility industry must join hands with the coal industry and other interested parties, as it has done in the Clean Coal Technology Program, to improve the public's image of coal.

NON-UTILITY COAL USERS' ROLE

Non-utility users of coal can be affected by restrictions on coal use in much the same way as are utilities. Non-utility users should be as concerned as others in the coal business about improving coal's

image and ensuring their own prosperity, and perhaps survival, as profit-making businesses.

The majority of non-utility users can be broadly described as:

- Non-utility electricity generators
- Metallurgical coke plant operators
- Other industrial users

Non-utility power generators are a relatively new phenomenon in the United States, but are expected to increase in importance in the 1990s and beyond. In 1990, there were about 34 billion kWh of coal-generated electricity by non-utility companies.⁹ However, the use of coal by non-utility generators is expected to grow from 10 million tons in 1989 to 45 million tons in 2010.¹⁰

Non-utility generators who plan to use coal will have more at stake than most utilities in seeing coal's image improve because they want to build new plants. If coal is viewed as dangerous or polluting, new construction will be more difficult than keeping existing plants in operation. All developers of technology subject to the regulations of the Department of Energy's clean coal program, and the non-utility companies who bid to construct and operate power plants, should be encouraged to work with the proposed coalition to promote a better image for coal.

Metallurgical coke plant operators consumed about 40 million tons of coal in 1990¹¹, but this amount will likely decrease.

Provisions of the Clean Air Act Amendments of 1990 will require substantial capital investment in most

coke-making facilities to allow their continued operation, but many operations will be unable to make those investments. As a result, coke will be imported or the primary metals industry will adopt technology that substitutes other fuels for coke.

The coke making industry that remains in the United States will use coal in a clean, environmentally acceptable manner and should be anxious to present an improved image of coal to the public. They will benefit from coordinating their efforts with others in the proposed coalition.

Other industrial users consumed about 76 million tons of coal in 1990. Six industries consumed 80 percent of this amount.¹² In decreasing order of use, they are:

- Chemical
- Stone (cement), glass, and clay
- Paper
- Primary metals (other than coke making)
- Petroleum
- Food

Individual companies who use small amounts of coal will be reluctant to make significant contributions to improving coal's image by themselves. However, umbrella organizations for these six industries might be persuaded that it is in their collective interest to participate in the activities of the proposed coalition.

ROLE OF SUPPLIERS OF EQUIPMENT, MATERIALS, AND SERVICES TO THE COAL INDUSTRY

Coal industry suppliers are significant beneficiaries of coal. Identification of supplier companies can be obtained from the coal industry's purchasing

departments. These suppliers can greatly extend the reach of coal's message. The supplier company can fulfill any of the roles described in Exhibit B-2, A Corporate Action Plan for an Industry Member Company.

The coal industry suppliers include:

Mining - Suppliers of longwall mining machines, continuous miners, draglines, earthmovers, haul trucks, preparation plant equipment, conveyor and material handling equipment, and mine ventilation equipment.

Coal Transportation - Railroad cars, coal car unloaders, barges, trucks, material handling equipment

Utility - Power plant equipment, boilers, steam turbines, cooling towers, precipitators, SO₂ scrubbers

Service Suppliers - Engineers, consultants, constructors

ROLE OF GOVERNMENT

The government historically has played a role in the development of coal's image. During the oil crises of the 1970's, there were long gasoline lines, thermostats turned down to 65 degrees in the winter and up to 78 degrees in the summer, and holiday seasons without holiday lights. Government policy during this time was to achieve "energy independence" with a commitment reaching "the moral equivalency of war." The cornerstone of this energy policy was "America's Ace in the Hole," the nation's most abundant resource, coal. And, although health and safety laws were updated and a

comprehensive land reclamation law was enacted, there was never a question of government's support for domestic energy production and the role that coal would play in the mix.

Fifteen years later, the government continues to play a major role in the public's image of coal, though now it seems that coal has gone from the fuel of choice to the fuel of last resort. The industry certainly has played a significant role in its poor image, but the government also shares this responsibility.

Government, particularly on the Federal level, is responsible for setting policy, enacting laws, and promulgating regulations that profoundly affect the coal and allied industries.

Congress

Congress is sensitive to the influence of many competing interests. The Department of Energy and the coal industry can provide supporting materials to assist Congress in creating good energy policy. The House Energy and Commerce Committee and the Senate Energy and Natural Resources Committee have primary jurisdiction over coal legislation. Other committees including the Senate Commerce, Science and Transportation; House Science, Space and Technology; House Ways and Means; Senate Environment and Public Works; House Interior and Insular Affairs; and Senate Finance also play influential roles.

Executive Branch

Federal regulatory agencies have enormous impact on the coal industry.

Virtually every aspect of the industry including production, transportation, and utilization of coal are heavily impacted by Federal regulatory policy and oversight.

The Environmental Protection Agency (EPA) implements Federal clean air, water and waste standards that affect both the production and use of coal. The Department of Labor's (DOL) Mine, Safety and Health Administration (MSHA) regulates worker health and safety standards. This agency also manages the Federal black lung disability compensation program.

Agencies that have a role in facilitating or promoting coal use include the Department of Transportation (DOT), the Interstate Commerce Commission (ICC), and the Department of Commerce (DOC). The DOT oversees the construction and maintenance of locks, dams, and port facilities that are critical to the inland water transportation system as well as coal export capabilities. The ICC arbitrates rate disputes between coal handlers and coal shippers. The DOC serves as an aggressive advocate of increased exports of American coal and clean coal technology.

On the regulatory side, the Department of the Interior's (DOI) Office of Surface Mining Reclamation and Enforcement (OSM) oversees strict environmental requirements relating to coal production and land reclamation processes. The Department of Energy also regulates the leasing of coal on Federal lands and other significant land use policies that affect access to public and private coal reserves.

The Department of Energy may have the greatest potential influence on coal because of its role in developing national

energy policy objectives. The Department of Energy does not advocate one energy source over another, but it does have a clear and appropriate role in educating the public and Congress on the role and necessity of coal in a cohesive national energy strategy designed to reduce dependence on imported oil and maximize utilization of domestic energy resources. *The Department of Energy should develop a public service outreach program for all energy sources available to this nation and direct it toward the general public through the use of radio, television, and printed public service announcements.*

In its role of promoting all energy sources, the Department of Energy is fully justified in promoting its \$2.5 billion investment in the Clean Coal Technology Program. With private sector companies providing over half the funding, the DOE's Clean Coal Technology Program is helping the utility industry demonstrate that coal can be used in an environmentally acceptable manner. The DOE Clean Coal Outreach Program is an excellent start but the public needs to know more about these emerging technologies, how they address air quality concerns, improve energy efficiency, and help strengthen important energy security objectives. *The Department of Energy should sustain the excellent work under the Clean Coal Technology Outreach Program and consider its expansion to help ensure public acceptance of these environmentally acceptable methods of coal preparation, combustion, and emissions reduction.*

As an advocate for sound energy policy within the Executive Branch, the Department of Energy must exercise a leadership role in working with other agencies and Congress to achieve a balance between energy and economic

needs and environmental goals. Regulatory proposals designed to protect the environment must be evaluated regarding their cost and potential impact on energy supply. The Department must work closely with the White House and the Office of Management and Budget (OMB) to ensure a coordinated interagency approach to policy developments that affect energy.

The Department of Energy should identify an audience of policymakers within the Federal Government who should be kept abreast of information concerning fossil fuels with the purpose of urging that all available options be left open in the interest of maintaining a rigorous economy and national energy security. Just as opinion among the general public requires revision relative to the role coal can play, so too does opinion among policymakers.

In the long term, the educators of today are creating the voters of tomorrow. The Secretary of Energy is requested to do what he can to impress upon education leaders and institutions the importance of energy education in maintaining an informed public. The emphasis in education should strike a balance between energy, the economy, and the environment. The role of coal in the energy policy of this country needs to be made clear. There is much the Department of Energy is already doing, but much more needs to be done.

The Department of Energy can provide a useful service to the media and assist in setting the record straight by providing accurate information to the media. The Department of Energy should identify a group of scientific and engineering professionals who are recognized as experts by their peers. The Department should encourage their participation in ad hoc task

forces or advisory panels to whom the media may turn for the latest in factual information on energy and coal-related subjects. The media has an ongoing need to refer to authoritative and independent information sources.

The Council notes with appreciation and encouragement the efforts of the President, the Secretary of Energy, and the Department of Energy to restrain the rush to impose CO₂ emission limitations upon this country and to agree to do so internationally. The scientific evidence is not sufficient to conclude that global warming does exist and is caused by CO₂ being released into the atmosphere.

State Government

Coal is produced in 27 states and distributed to 49 states.¹³ There are 3,620 mines and 1,267 coal burning plants in the United States.¹⁴ Trains and barges carrying coal are networked through 50 states. For all this exposure, coal has a relatively low profile. Reports of public opinion on coal indicate little public knowledge of coal and its use. Much of the public knowledge is erroneous and/or inaccurate. States vary widely in their public posture regarding coal. Some State Energy Offices or Energy Departments are very proactive; others are passive. Still other states are divided within and have what at best could be construed as an inconsistent, lukewarm attitude.

States play three roles in national coal policy: (1) implementing state portions of new Federal energy and environmental legislation; (2) promoting the economic use statewide of coal by industry and consumers; and, (3) influencing new energy policy. States can, through their executive departments or agencies, make

known the importance of coal to their state's economy.

Coal companies operating in states as producers, suppliers, or both must have a high profile with their state's energy officials in order to affect state policies. This includes promoting the licensing of coal facilities, informing the public and state leaders about coal issues, promoting the economic use of coal in the state, and demonstrating that, through sound reclamation policies, they are good neighbors.

The message from the coal industry to state governments is that coal is a dependable fuel that is good for the economy, provides a steady source of domestic energy, and can be produced and consumed in an environmentally sound manner. State policies should encourage the use and siting of domestic, clean burning coal facilities.

Just as the coal industry must cement relationships with Congress and Federal agencies other than the Department of Energy, it must also interact with and keep well informed the Governor's offices, state public utilities commissions, state energy and environmental departments or offices and especially the state legislatures. State energy officials should coordinate all coal-related activities to ensure that coal policy is uniform across the various state agencies, uniting energy, quality of life, and environmental issues.

While most national policies are made at the Federal level, state legislation can serve as a model for national action. Taxation, transportation, and environmental laws enacted in states often

bring Congress' attention to issues. Individual coal companies and state mining and coal associations have the primary role of monitoring regulations and legislation with back-up from the national associations. Any positive state developments should be circulated as a model throughout the industry and to Federal officials.

The Department of Energy should develop a strategy that targets state regulatory officials — both elected and staff — for continuous briefings on energy options available to the United States, making certain that coal remains among the options.

Local Government

The coal message at the local level (municipal and county governments) is the same as the state message: the economic, environmentally sound use of coal and siting of coal facilities should be encouraged. While the coal industry has a direct impact on a relatively small number of communities nationwide, for thousands of other communities, coal is a peripheral issue or a "non-issue." It is to those communities that an education program must be targeted.

HOW TO DELIVER THE MESSAGE

An examination of the various audiences immediately tells us that there must be several methods of delivering the message to the communities or audiences identified. Four primary methods of delivery have been defined: *direct, indirect, educational and broadcast.*

Direct delivery of the message includes a private conduit for communication such as

mailings to employees, billing lists, stockholder lists, lists of retirees, faculty lists, membership lists, etc. Direct delivery is a one-to-one approach to individuals providing energy and coal information. Direct delivery fosters the positive image of coal "at home."

Indirect delivery is controlled delivery to a targeted audience base such as audiences at conferences, association meetings, recipients of association newsletters, etc. Preparation for implementing the indirect method is similar to that for the direct approach. In both direct and indirect delivery, the audiences are defined and specific. Depending on the audience, appropriate, detailed information can be customized or tailored to each group. The institutional and business community audiences, as well as the environmental audience, all can be reached by indirect methods; the "message," however, will be presented differently for each community or audience and be directed specifically to their particular areas of interest.

Educational delivery is devoted predominantly to the targeted audience of schools. Materials should be developed specific to the education system level (elementary, secondary, college, graduate, vocational/technical school). But before materials can effectively be used in a classroom setting, the teachers must be exposed to the information. In this regard, teachers seem to benefit from summer institutes that expose them to coal mining and use. Another effective vehicle is workshops for teachers K-12. Teacher education packets should be developed, tested, and distributed. They should include information geared to the instructor as well as the student. With

sufficient background materials, the teacher can incorporate coal into the curricula.

Broadcast delivery includes media such as television, radio, newspaper, and magazines. This means of delivering the message also includes advertising in addition to feature articles. Broadcasting the message requires either preparation to a general audience or preparation without knowledge of the audience. Broadcasting has great potential to reach countless numbers of people and, in turn, requires a great deal of effort to organize and prepare. Background information must be compiled or developed, and the press must be "educated."

All means of delivering or communicating the messages must be consistent and parallel. In general, the more direct the means of delivering the message, the more effective and the lower the cost will be. Efforts to deliver the message should be proactive and positive rather than trying to sway public opinion. This method contradicts the philosophy that the negative issues should be addressed directly by the coal industry in the press.

Generally, all the programmatic areas can be expected to work together synergistically to create a climate of greater acceptance for coal, coal mining, and coal use. While these concepts are somewhat nebulous they can be quantified throughout the life of the program through periodic polling. The purpose of creating such a climate of acceptance is primarily the advantage of having a better educated and thus less hostile electorate. Our society is geared toward making decisions based on public awareness and public participation.

We must, therefore, make the general public aware of the role coal plays in their lives and make them feel they are full partners in the coal community and the viability of its future.

A concerted effort that sends coal's message to all sectors of society (with appropriate levels of technical information) will help inform the recipient audience of the progress that coal has made and the role that coal will play in electrical generation facilities and industrial boiler installations of the future. But these efforts must begin immediately. Exhibits B-1, B-2, and B-3 list communication initiatives and activities that are designed to reach all audiences.

HOW TO SUSTAIN THE MESSAGE

It is not simply a matter of delivering coal's message once. The message must be repeated and reinforced. Sustaining the message implies a publicly-articulated coal industry position on key issues related to coal production and consumption, including controversial issues such as land reclamation, global warming, and acid rain.

Sustaining the message implies constancy. A program of this type should initially encompass a five-year plan. During that time, the program can be established, results measured, and changes made to improve the program's effectiveness.

Sustaining the message also requires the financial resources necessary to implement the program. The coal industry is already supporting many organizations including the NCA, ACF, AMC, numerous State Coal Associations, and many other organizations involved with energy issues. But the coal mining, transporting and

consuming interests must ally themselves and financially support a program to improve the image of coal.

The challenge to change the image of coal is more than a government challenge. The Secretary of Energy can provide valuable assistance by internalizing advocacy within the Federal Government and continuing to support clean coal programs, education activities, and coal outreach efforts. *But the coal industry itself must do the lion's share of the effort with the public.*

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EXHIBIT B-1

Industry Action Plan for a
"Program to Improve the Image of Coal"

☒ Short-term goals (less than 2 years)

Mission Statement

- ☐ Coordinate the coal industry to improve Coal's image

Make effective use of Coal industry resources to benefit coal

- ☐ Manage the activities that deliver Coal messages to the public
- ☐ Develop and implement action plans to deliver coal messages to schools, businesses, government, environmental groups, and the media

Strategic Plan

- ☒ Establish and maintain a Coal Industry "Program to Improve the Image of Coal"
- ☒ Devise a public relations campaign to improve Coal's image with the public
- ☒ Identify and make strategic associations with key business and other associations that can extend the reach and effectiveness of the coal industry
- ☒ Through its membership, deliver the coal messages to program members and associates
- ☒ Continue and expand educational efforts to assure voters and policymakers are well informed about coal in the future.
- ☒ Through its membership, deliver the coal message to influence key policymakers at all levels of government
- ☒ Do public opinion research

- ☒ Define criteria for measuring impact

- ☐ Measure the impact of the campaign and make course corrections as necessary

- ☐ Perform a sunset review in 5 years

Organizational Approach

- ☐ Bring together coal industry leaders and establish a Coordinating Council
- ☐ Confirm the Mission Statement and Strategic Plan
- ☐ Provide initial organizational support
- ☐ Define implementation plans
- ☐ Define the resources to support the program
- ☐ Coordinate the participating organizations

Membership Recruitment

- ☐ Network through Charter Members
- ☐ Create Chief Executive Officer (CEO) briefings for the following organizations:
- Mining companies
 - Transportation companies
 - Utility companies
 - Other businesses
- ☐ Recruit program members from:
- Coal producers
 - Edison Electric Institute
 - American Public Power Association
 - Rural Electrification Association
 - National Association of Manufacturers

EXHIBIT B-1 cont'd

- American Mining Congress
- American Association of Railroads
- United Mine Workers of America
- AFL - CIO
- National Coal Council
- National Coal Association
- American Coal Foundation
- State Coal Associations
- Independent Power Producers and Non-utility generators
- Utilities
- Railroad companies
- Barge companies
- Clean Coal Technology developers
- Suppliers of equipment, materials, and services to the coal industry

- ☐ Make strategic alliances with the following organizations:

- National Association of Utility Regulators
- United States Chamber of Commerce
- Department of Energy
- Department of Commerce
- Department of the Interior
- State Energy Departments
- Media groups
- Educational associations
- Large groups that are not polarized on energy issues
- Environmental organizations
- Electric Power Research Institute (EPRI)
- Engineering and scientific societies
- Trade Associations
- National Governors Association
- National Conference of State Legislators
- National Conference of Mayors
- National League of Cities

Program Projects

The following Program Projects will be implemented in support of the Industry Action Plan in implementing Exhibit B-3.

Media Projects

- ☐ Create Media Implementation Plans for:
- Television
 - Periodicals
 - Newspapers
 - Radio
 - Books

Education — School Projects

- ☐ Create and implement plans to provide energy and coal information to schools for the following:
- Higher education
 - Technical/vocational
 - Elementary and secondary

Business Projects

- ☐ Customize action plans for different business sectors
- ☐ Pro forma Employee Action Plan
- ☐ Pro forma Stockholder Action Plan
- ☐ Pro forma Retiree Action Plan
- ☐ Pro forma Public Relations Action Plan

Environmental Group Projects

- ☐ Evaluate each environmental group and identify and implement an Action Plan for areas of cooperation
- ☐ Prepare and submit articles to environmental publications

EXHIBIT B-2

**Corporate Action Plan
For An
Industry Member Company**

An "Industry Member Company" can implement many internally directed programs to support the mission of delivering and sustaining Coal's message and thereby improving Coal's image. Through contact with the "Program to Improve the Image of Coal," each member company would receive information which can be used in these internal programs and avoid having to prepare new information. The following programs are recommended.

Employee Programs

Employees are not necessarily committed to the goals of a company unless these goals are communicated convincingly and reinforced periodically.

Employee programs should take advantage of the direct communication channels within an organization to provide energy information and deliver Coal's message in seminars, letters, presentations, and company newsletters.

Once employees have achieved competence in energy and coal topics, they should be encouraged to seek out ways to spread the information they have obtained to schools, government leaders, letters to the editor, friends and business associates. A network of trained and motivated employees may be the most effective way to deliver Coal's message.

Stockholders

The stockholders or equity owners in the company have a vested interest in seeing the company do well. Issues which can impact coal negatively can also impact the company's profit and the stockholders' dividends or distributions. For this reason, stockholders should be willing to support the company efforts to improve Coal's image.

Stockholders are available for direct mailing by a member company. Letters of topical interest from CEOs are appropriate. Newsletters are usually available. Finally, a column in the annual report is a way to reach the stockholders.

Retiree Programs

Company retirees are an audience easily accessible by direct mail. Having worked for the company, they are generally enthusiastic and receptive to the message and could be effective and productive in delivering the message to others by writing letters to editors and members of Congress, and by engaging in volunteer activities that would benefit Coal's image.

Public Relations

Many companies have public relations departments that can assist in an industry media management network. Furthermore, public relations departments are adept at fostering an environment in which their employees, stockholders, and retirees can be encouraged to participate in programs such as:

- Adopt-A-School Program to bring Coal's message to the classroom
- Open houses and facility tours
- Providing local responses to local challenges to coal's message through letters to the editors and local representatives, etc.
- Implementing a high level of corporate citizenship: for example, utilities which are the most successful with the public do that.

EXHIBIT B-3

INDUSTRY ACTION PLAN

How to Deliver the Message-Schools

- | | |
|--|---|
| 1. Provide scholarship awards to promising students with an interest in coal mining and use. | 11. Hold seminars for educators and devise programs for educators to employ in the classroom. |
| 2. Establish co-op employment, apprenticeship programs, or summer jobs for students with an interest in coal. | 12. Provide grants or financial support to existing educational programs which could be more effective but are financially limited. |
| 3. Provide research and development grants for coal mining and use. | 13. Participate in educational association activities to bring energy and coal topics forth in their meetings and publications. |
| 4. Catalog and distribute coal research and development papers. Establish an editing and distribution service for researchers to encourage and facilitate publication. | 14. Review curricula for all educational levels and promote energy and coal topics in the curricula. |
| 5. Develop an information network and companion "expert system" for coal researchers and other interested parties. | 15. Specifically support vocational and technical schools which are a source of craftsmen and technicians for industry. |
| 6. Provide direct mailings of information to educators that will assist in presenting energy and coal information. | 16. Promote the writing and use of factual, balanced textbooks for use at the college and technical school level. |
| 7. Provide an Industry Speakers Bureau to go into the classroom and present energy and coal information. | 17. Gain access to college and university curriculum committees and urge faculties to present balanced coursework to students. |
| 8. Prepare an energy and coal information source directory of available educational material. | 18. Facilitate educational plant tours. |
| 9. Build upon existing or institute new programs to educate America's educators about coal. | 19. Prepare articles for educational newspapers and magazines. |
| 10. Create or improve existing materials for distribution to educators and expand upon the distribution network. | 20. Produce informative and educational TV programs for national television. |
| | 21. Distribute energy and coal educational material gratis to qualified educators who will use the material in the classroom. |
| | 22. Distribute energy and coal educational materials to public libraries and school libraries to provide for broad availability. |

EXHIBIT B-3 cont'd

INDUSTRY ACTION PLAN

How to Deliver the Message—Media

1. Actively inject industry's "good news" into the media. Respond to any bad news that develops. Use press releases for industry news.
2. Provide factual and authoritative responses to inaccurate media programs.
3. Update media companies, organizations, and journalists about the scientific risks and the economic and legal aspects of energy issues, and the role of coal in the energy mix.
4. Through industry membership, communicate the coal messages to media companies and organizations.
5. Develop a list of appropriate media, and submit energy and coal information to identified media. Look for outlets to deliver the message including:
 - General print/electronic media
 - Major print and electronic media in each of the states with utilities that rely on coal
 - Major national consumer publications
 - Major national business publications
 - Major national daily publications
 - Television and radio programs with an interest in the topic on regular broadcast and cable
 - Coal publications
 - Publications aimed at educators, legislators, research community and media
 - Trade shows and seminars
6. Provide an energy and coal information source directory for media.
7. Provide for direct release of energy and coal information to key editors, journalists and TV news anchors.
8. Participate in media association conferences and seminars to provide energy and coal information.
9. Schedule media plant tours and briefings, particularly science and trade reporters.
10. Develop a media kit with the same message all over the country. Cover coal from mining to electricity production.
11. Implement a public relations program that includes the following:
 - Technology advances related to coal
 - Progress to date
 - The economic value of coal to society and its value to society as an energy resource.
 - Opportunities to exhibit progress, for example, the EEI is redeveloping the Smithsonian Electricity Exhibit
 - A grass roots approach, i.e., posters, repetition, reinforcement of ideas
 - Tours of mine facilities
 - Coal industry's efforts at reclamation and waste minimization positioning the industry as a responsible, interested partner in protecting and preserving the environment.
 - How research is working to make a brighter energy picture for the future
12. Expand use of speakers bureaus to make available to the media eminent spokespersons.
13. Through its membership, implement a letters to the editor campaign.
14. Look for opportunities to exhibit clean coal technology and coal information:
 - Industrial trade shows and seminars
 - Establishment of national coal awareness week
15. Network all activities with industry membership and existing organizations such as NCA, ACF, AMC, state coal associations, etc.

EXHIBIT B-3 cont'd

INDUSTRY ACTION PLAN

How to Deliver the Message—Business

1. Through implementation of the Program to Improve the Image of Coal outlined in Exhibit B-1, many businesses will be contacted.
2. Each business that is recruited as a member of the program or an associate can implement, in turn, a Corporate Action Plan outlined in Exhibit B-2.
3. Many of the activities outlined in this exhibit under "Media" will reach the Business Audience.
4. Expand activities such as Information Source Listing and Speakers Bureau specifically for business audiences.
5. Specific initiatives should be undertaken to provide energy and coal information to strategic business associations such as:
 - National Association of Independent Businesses
 - Lions, Rotary, and Optimist Clubs
 - Chambers of Commerce
6. Provide direct mailings of energy and coal information tailored to business.
7. Link coal to electricity and electricity to Gross National Product to drive home the linkage between coal and the economy. All business has a stake in electricity.
8. Facilitate plant tours and briefings for business associations.
9. Establish miner community education program through United Mine Workers of America (UMWA).
 - Determine objectives of program with client prior to initial meeting with UMWA representatives.
 - Investigate the possibility of holding community meetings at union halls in key mining communities to distribute information.
 - Through these meetings, provide an opportunity for the miners and their families to learn about coal issues and the development of clean coal technologies. Representatives from the state, mining companies, and the UMWA and DOE would be invited to speak. These community meetings would provide an excellent opportunity to present a general information slide show.
 - Schedule meetings during the day as well as night to accommodate miners who work at night.
 - Develop proposal for a newsletter to be distributed to miners and their families through the UMWA on a quarterly basis to ensure that miners have current information on clean coal technologies and other related coal issues.
10. Network all the program membership and associates to extend the reach of the coal message as wide and as deep as possible in the business community.

EXHIBIT B-3 cont'd

INDUSTRY ACTION PLAN

How to Deliver the Message—Environmental Groups

1. Sponsor seminars and meetings for CEOs and the elected officers of selected environmental and conservation groups.
2. Sponsor and plan tours of surface mines, underground mines, coal power plants, and reclaimed mine areas for key CEOs and elected officers of environmental and conservation groups.
3. Target advertising to the national magazines published by environmental and conservation groups for their members. Provide logical and accurate information about energy and coal.
4. Enlist employees who are members of environmental and conservation groups for help in delivering energy and coal information to these groups.
5. Prepare and submit articles to environmental publications.

How to Deliver the Message—Government

1. The basic framework for delivering the message to the Federal Government is in place. What is needed is a unified industry effort aimed at some basic but crucial messages relating to the legislative and regulatory climate for coal.
2. Take steps to enlighten lawmakers and regulators who may be misinformed about coal.
3. Through a network of alliance members, bring coal's message to government at all levels. Emphasize the positive role of coal in meeting our nation's expanding energy needs, and the negative consequences if the use of coal is over restricted.
4. At the state and local government levels reemphasize the coal messages and the economic contribution of coal to the local economy particularly as a source of energy for electricity.
5. Provide industry support to the siting of new coal facilities, particularly if the challenge of "coal-free zones" is present.
6. Utilize the resources of State Coal Associations to communicate at the state and local level.

Appendix C

Correspondence Between National Coal Council and Department of Energy



The Secretary of Energy
Washington, DC 20585

August 13, 1990

Mr. William Carr
Chairman
National Coal Council
P.O. Box 17370
Arlington, Virginia 22216-7370

Dear Mr. Carr:

It was a pleasure meeting with you and your National Coal Council colleagues on July 17, 1990. The reports you presented to me will be extremely useful in preparing the National Energy Strategy. I have requested my Assistant Secretary for Fossil Energy ensure that the reports and your letter receive full consideration in the analyses and formulation of policy options currently underway.

Although fully operational for only 5 years, the National Coal Council has made significant contributions to energy policy and programs. Your reports have been timely and have addressed the key coal-related policy issues of the day. In particular, the two most recent reports are well written, focused and full of useful recommendations.

As I mentioned at our meeting, preserving and enhancing the Nation's ability to use coal efficiently and in an environmentally sensitive manner is a key objective of the National Energy Strategy. From an economic perspective, the Nation and the world cannot abandon coal. It powers our electric utility industry. Its use results in reasonably priced energy and a healthy economy. You and others in the coal industry have proven that it can be used in ways that are compatible with our environmental objectives. The advancement of clean coal technologies will ensure that coal will remain an important part of our energy mix well into the twenty-first century.

I have asked my Fossil Energy staff to quickly scope out additional studies for the National Coal Council to conduct. As we discussed, I have a great interest in pursuing two studies: (1) improving the public image of coal, and (2) once again making the U.S. the world's technology leader, with emphasis on coal and coal technologies. It may also be useful to conduct an assessment of how the coal industry will be affected by the Clean Air Act amendments and what additional policy changes should be considered

to help the coal industry successfully meet the challenges posed by the new Clean Air Act. I will be in touch with you soon on this subject.

I remain committed to the National Coal Council and will make every attempt to participate in your November meeting.

Sincerely,

 James D. Watkins
Admiral, U.S. Navy (Retired)



The Deputy Secretary of Energy

Washington, DC 20585

November 7, 1990

Mr. William Carr
Chairman
National Coal Council
P.O. Box 17370
Arlington, Virginia, 22216-7370

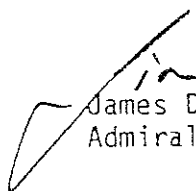
Dear Mr. Carr: *B.H.*

In my letter of August 13, 1990, I indicated I would get back to you regarding studies the Council might conduct. The Fossil Energy staff has had an opportunity to analyze various study areas and has identified two areas of study that would be timely and most beneficial in dealing with this country's energy security. Therefore, I am requesting that you conduct the following two studies:

1. Educating the Public About Coal. Public perception of coal mining and use is based largely on what coal was before environmental, health, and safety became important factors in the United States coal industry. The study should identify means of educating the public on the current practice of using coal and on the role of clean coal technologies to further improve the economic and environmental performance of coal-based systems to more freely contribute to solving near-term energy and environmental needs.
2. The Role Coal Can Play in Meeting Our Energy and Environmental Objectives in the Near Term. A challenge exists for coal and clean coal technology to assist in achieving our environmental goals, balance of trade, our electricity and liquids need, and many other requirements. Therefore, this study should identify public policy and regulatory requirements which could stimulate necessary technological developments and encourage private sector initiative in meeting the challenge.

I appreciate and value the Council's contributions to the Nation's energy well-being and look forward to receiving two more excellent studies.

Sincerely,


James D. Watkins
Admiral, U.S. Navy (Retired)

THE NATIONAL COAL COUNCIL, INC.

Post Office Box 17370, Arlington, Virginia 22216

(703) 527-1191

November 9, 1990

The Honorable James D. Watkins
Admiral, U.S. Navy (Retired)
The Secretary of Energy
United States Department of Energy
Forrestal Building
1000 Independence Avenue, S.W. - Room 7A-257
Washington, D.C. 20585

Dear Mr. Secretary:

On behalf of the members of the Council, I wish to express our very deepest appreciation for the time that you spent with us during our recently completed and highly successful meeting.

Your joining us at our reception was greatly welcome and highly beneficial. Many of our members remarked that they were most pleased to have the opportunity to interact with you personally.

The remarks made by you at the Full Council meeting were very warmly received and extremely helpful. Particularly appreciated were your words of support and encouragement of the Council. The many insights that you shared with us were most beneficial.

We wish also to acknowledge receipt of your letter of November 7, 1990, requesting that we undertake two studies. The members voted in favor of proceeding to undertake these efforts. We shall work with the Fossil Energy staff to resolve any concerns or differences which we might have relative to content, approach, titles, etc.

Finally, on a personal note, I want to express my sincere thanks for your most kind and gracious expressions of concern over my recent illness. I cannot tell you adequately how much your support meant to me.

Again, Admiral, it was wonderful visiting with you and we thank you most sincerely.

Very truly yours,



William Carr,
Chairman

Appendix D

Proposed Amendment to Final Report

THE NATIONAL COAL COUNCIL, INC.

Post Office Box 17370, Arlington, Virginia 22216

(703) 527-1191

Attached herewith is new language proposed for insertion in the study report entitled "improving Coal's Image: A National Energy Strategy Imperative."

This language was received in the National Coal Council office on January 29, 1992 and was submitted by a member of the council, Mr. Fredrick D. Palmer, General Manager and CEO, Western Fuels Association, Inc.

(The following amendments are suggested beginning on page 20 of *Improving Coal's Image: A National Energy Strategy Imperative*.)

The Federal Clean Coal Technology Demonstration Program provides up to half of the support to commercial demonstration of new coal-use technologies that already have been developed and tested on smaller scales. Private industry provides at least half (and often more) of the funding for CCT commercial demonstration.

There are a great variety of current demonstration projects and the result will be economic choices for utilities and other coal users who must comply with ever stricter clean air standards.

In addition to demonstrating better control of sulfur and nitrogen compounds, the latest CCTs also are more efficient in their use of coal, some by as much as 40 percent. That is, for a given amount of electricity or steam, 40 percent less carbon dioxide is produced because less coal is burned.

Concern about carbon dioxide emissions is rooted in discussions of appropriate policy responses to the prospect of catastrophic climate change. While CCT represents a technological response to the concern, there are two ~~three~~ fundamental problems with scenarios of climate disaster caused by global climate change.

~~First, the theory as it is applied ignores many of the interrelated processes that should be absolutely essential ingredients of any computational scheme designed to predict the climatic consequences of a~~

~~change in the earth's radiation balance. Second, this theory of climate change fails to acknowledge that it is but one part of a much larger phenomenon of global environmental change. Increased atmospheric CO₂ content will have a host of positive biological effects.~~

First, nothing in the historical climate record suggests that the world's climate will dramatically warm.

The most widely used global surface air temperature data base depicts a century-long linear increase in global temperature of 0.45°C. In that time, equivalent carbon dioxide levels have increased by 40 percent. Fully three-fourths of the warming occurred before the rapid build up of greenhouse gases began. Additionally, recent satellite data compiled by the National Aeronautic and Space Administration indicates there was no warming trend in the 1980s, despite claims that the 1980s were the warmest years on record. Empirical evidence does not support popular perceptions about earth's temperature trend.*

Second, fears of catastrophic global warming are totally driven by the predictions of future climate emanating from general circulation models. The models, as currently constituted, are flawed and are therefore not a basis for setting energy policy.

The reasons the models are unable to "hindcast" the weather are legion. Besides not having the ability to incorporate all features of the global system impacting climate, the models contain incorrect parameters *that are known by the modelers to be incorrect.*

For example, the first highly influential modelling effort artificially increased the output of the model's "sun" by six percent. This is akin to moving earth's orbit about two million miles nearer the sun. Otherwise the model represented current climate as 4-6°C colder than it is, and as immediately presaging an Ice Age. In its latest version, the "solar constant" used to calculate current climate is some 20 watts/square meter *less* than its known value. Since the change in "downwelling radiation" associated with a doubling of atmospheric carbon dioxide is thought to be approximately 2.5 watts/square meter, the *adjustment factor* used to force a simulation of current climate is nearly ten times greater than the *change* the model is theoretically forecasting. **

Finally — and perhaps most important — there are known, discrete, ascertainable, and positive biologic effects from increased atmospheric carbon dioxide content.

Hundreds of laboratory and field experiments demonstrate that a doubling of the current CO₂ content of the earth's atmosphere would increase the growth rates and harvestable yields of most of the world's non-woody crop and horticultural plants by more than a third. Studies also show that increased CO₂ reduces the amount of water such plants lose during respiration. These likely improvements in plant productivity and water use efficiency have not yet been components of either the predictive models or the economic and environmental evaluations of the impact of increased CO₂.

In a long-term study of tree responses to atmospheric CO₂ enrichment at the U.S.

Water Conservation Laboratory in Phoenix, Arizona, it has been demonstrated that sour orange trees exposed to double the current atmospheric CO₂ content will actually *triple* their growth rates.⁸

The amplitude of the annual cycle of CO₂ content of the atmosphere, which is caused by the seasonal growth and decay of northern hemisphere terrestrial vegetation, is increasing at a rate that can only be explained if all the world's forests are responding to the rising CO₂ content of the air. It could well be that this degree of CO₂ stimulation ultimately will result in so much CO₂ being removed from the atmosphere and sequestered in soil organic matter that the atmosphere's CO₂ content never will rise to the level the climate disaster forecasters require for their scenarios.

Thus, continued development and implementation of CCT would seem to be a substantial contribution to any perceived need for carbon dioxide emissions remediation.

* Robert C. Balling, Jr., Director of the Laboratory of Climatology, Arizona State University, in testimony before the California Energy Resources Conservation and Development Commission, Docket No. 90-ER-92, November 19, 1992, pp. 5, 9-11.

** Patrick J. Michaels, Associate Professor Environmental Sciences, and Virginia State Climatologist, in testimony before the California Energy Resources Conservation and Development Commission, Docket No. 90-ER-92, November 19, 1992, pp. 4-5.



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500 South 27th Street
P.O. Box 511
Decatur, IL 62525-1805
Tel 217 424-8326

Wilfred Connell
Vice President

February 6, 1992
WC/92-006

Mr. James F. McAvoy
Executive Director
The National Coal Council, Inc.
P. O. Box 17370
Arlington, VA 22216

WFC
02/12/92

Dear Jim:

Thank you for asking me to review the Fred Palmer proposed addition to the National Coal Council's report on "Improving Coal's Image." I have reviewed it and had it reviewed by some of our more learned environmental personnel. While we are sympathetic to Fred's approach, we would like to dissent from the proposed addition for the following reasons:

- 1) The comments concerning the solar constant are too specific and would require a report revision whenever the modeling input was changed.
- 2) The magnitude of the solar constant problem is not common to the four major global climate models in existence, and
- 3) The statements place a great deal of importance on the solar constant and tend to ignore the models' other problems.

In accordance with NCC policy, substitute language has been developed and is attached to this letter. This language is directed at more generic climate change issues and uncertainties. Also, provided is a more positive statement on the possible vegetative effects of increased CO2 levels.

I hope this is responsive to our needs.

Sincerely,

Wilfred Connell

Wilfred Connell

Attachment

Concern about carbon dioxide emissions is rooted in discussions of appropriate policy responses to the prospect of catastrophic climate change. While CCT represents a technological response to the concern, there are fundamental problems with scenarios of climate disasters.

First, nothing in the historical climate record suggests that the world's climate will dramatically warm as a result of increased CO₂ concentrations in the atmosphere. In fact, ice core data indicate the opposite; that atmospheric CO₂ concentration changes follow temperature changes.

While somewhat suspect due to the influence of urban heating on temperature data, the most widely used global surface air temperature data base depicts a century-long increase in global temperature of 0.45 C. In that time, equivalent carbon dioxide levels have increased by 40 percent. Three-fourths of the warming occurred before the rapid build up of greenhouse gases began. This information leads scientists at the George C. Marshall Institute to believe any warming which may have occurred may be more the effect of nature and less the result of the greenhouse effect.

Additionally, the upward trend in surface temperature data is not supported by satellite data. The National Aeronautic and Space Administration satellite data indicates there was no warming trend in the 1980's, despite claims that the 1980's were the warmest years for the surface records. Empirical evidence does not support popular perceptions about earth's temperature trend.

The science of general circulation modeling remains in the early stages of development. Recognized model deficiencies include their inability to characterize the historical temperature data, their large scale resolution which tends to obscure significant orographic features, and their inability to handle the cooling effects of clouds and other feedback mechanisms which are poorly understood at this time. Until these problems are resolved, the outputs cannot be used for decision-making purposes.

Finally - and perhaps most important - there are known, discrete, ascertainable, and positive biologic effects from increased atmospheric carbon dioxide content. These effects include dramatic increases in forest and crop growth.

DELETE THE FOLLOWING PARAGRAPHS

Second, fears of catastrophic global warming are totally driven by predictions of future climate emanating from general circulations models. The models, as currently constituted, are flawed and are, therefore, not a basis for setting energy policy.

The reasons the models are unable to "hindcast" the weather are legion. Besides not having the ability to incorporate all features of the global system impacting climate, the models contain incorrect parameters that are known by the modelers to be incorrect.

For example, the first highly influential modelling effort artificially increased the output of the model's "sun" by six percent. This is akin to moving earth's orbit about two million miles nearer the sun. Otherwise the model represented current climate a 4-6 C colder than it is, and as immediately presaging an Ice Age. In its latest version, the "solar constant" used to calculate current climate is some 20 watts/square meters less than its known value. Since the change in "downwelling radiation" associated with a doubling of atmospheric carbon dioxide is thought to be approximately 2.5 watts/square meter, the adjustment factor used to force a simulation of current climate is nearly ten times greater than the change the model is theoretically forecasting.

BURLINGTON NORTHERN RAILROAD

NICHOLAS P. MOROS
Vice President Coal Marketing

3700 Continental Plaza
777 Main Street
Ft. Worth, Texas 76102
Telephone (817) 878-2356

February 6, 1992

Jim McAvoy
Executive Director
The National Coal Council
POB 17370
Arlington, Virginia
22216

MM
02/11/92

Dear Jim:

Enclosed is an article from the February 5th issue of "Electric Power Alert" commenting on the NCC's proposed language asserting that increased CO₂ is beneficial.

The article states that the assertion is not universally accepted, and both EPRI and the National Academy of Sciences indicate that there is uncertainty surrounding the issue.

Whatever language is crafted in the Coal Image report should not undo the positive work accomplished to date that has broadened the debate on CO₂. This has caused the environmental and scientific community to examine the uncertainties and consider potential benefits, rather than just focusing on the theoretical negative implications of CO₂.

Yours truly,

NPMoros

Nicholas P. Moros

Global Warming NATIONAL COAL COUNCIL URGES DOE TO CONSIDER POSITIVE EFFECTS OF CO2

A major advisory body to the Secretary of Energy last week took a strong step denouncing doomsday scenarios linked to global warming by agreeing to emphasize the benefits of a major greenhouse gas. The group, in soon-to-be released reports, will argue that the only thing known for sure about increase CO2 in the atmosphere is that it will have a positive effect on agriculture and the growth of plants in general. At a Jan. 28 meeting of the National Coal council, an advisory committee made up largely of coal industry representatives, the group agreed to include language in two new reports that challenges widespread assertions about the negative impacts of increased levels of CO2, a pollutant considered by many to be a major contributor to the greenhouse effect and global warming.

Led by council member Fred Palmer, General Manager and CEO of the Western Fuels Assn., the coal council agreed to include in two new reports on the image and the future of coal (see related story) language challenging popular perceptions of the result of increased CO2 in the atmosphere. Palmer relied in part on the content of a recently released videotape, entitled *The Greening of Planet Earth*, in which a group of scientists, a number of them from the U.S. Dept. of Agriculture, argue that increasing levels of atmospheric CO2 will increase agricultural production and possibly triple the productivity of tropical forests.

Those assertions are by no means universally accepted. A researcher at the utility-funded Electric Power Research Institute said the institute has commissioned a critique of the video by an independent consultant, and suggested that, while increased CO2 can increase plant growth, other possible effects of rising CO2 levels, such as changes in rainfall patterns or drought, may counteract the positive benefits. A recent study of global warming by the National Academy of Sciences also cautioned that the actual results of the fertilization effect on plants due to increased CO2 in the atmosphere would depend on other factors such as temperature, moisture and the nutrients available.

At the council meeting, Palmer called for making three points in the reports to DOE: (1) that there is "nothing in the historical climate record that supports fears of global warming from increased atmospheric CO2 content. . ."; (2) that the sole basis for the vision of catastrophic global warming is coming from computer models that used flawed assumptions; and (3) that the report should highlight "the known demonstrable benefits from increased atmospheric CO2 content to make the overall conclusion that, based on facts as opposed to theory, that one would have to conclude that increased atmospheric CO2 is in fact good for people and good for the earth and not bad."

When asked by a council official whether the position he was advocating might be viewed as too extreme, Palmer responded that the things he had just said "are not subject to scientific challenge. . . In terms of scientific challenge to the three propositions, they are unassailable."

Palmer cautioned that he was not advocating purposely increasing the amount of CO2 in the atmosphere, but he also said that this sort of action is promoted by some scientists. The council charged Palmer with developing exact language on global warming for inclusion in the reports. That language was to be circulated to all members of the council for their review and approval prior to being included in the reports sent to DOE, but at last week's meeting there was no objection made to Palmer's proposal, despite a caution from a council official that the proposal represented "a major change" from the global warming position taken by the council in the past.

THE NATIONAL COAL COUNCIL, INC.

Post Office Box 17370, Arlington, Virginia 22216

February 7, 1992

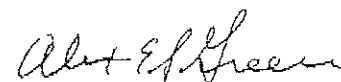
After consideration of the added material I feel I should make the following comments.

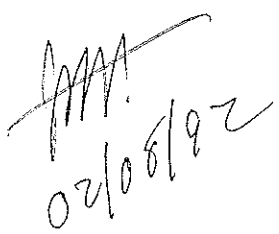
On point (1). The fact that the three quarters of the warming occurred before the rapid build up of CO₂ and other greenhouse gases may not be incompatible with molecular band radiative transfer. As CO₂ builds up its long wave absorption impact naturally decreases from linear to logarithmic or possibly even slower. Indeed this may be the saving grace of the CCT and may set the stage for future emission trading. Thus CO₂ emission increments might be traded internally or internationally for CFC or methane or nitrous oxide decrements to stabilize an overall greenhouse effect.

On point (2). Global warming concerns also rest on our basic understanding of greenhouse phenomena, and the fact that anthropogenic emissions of gases which absorb the earth's longwave emissions are clearly building up is some relationship to global population increase. As to the 20 w/m² error in the solar constant (1370 w/m²) used in some models this probably would not significantly change a calculation of the perturbation caused by a doubling of CO₂ equivalent.

On point (3). The biological benefits of CO₂ are well known to almost all climate change scientists. However, the assumption that this negative feedback will fully counteract the effects of rising CO₂ is somewhat extreme.

In summary, in my opinion the new words are too-one sided and will probably do more harm than good in our effort to improve coal's image.


Alex E. S. Green


An Advisory Committee to the Secretary of Energy



Electric Power
Research Institute

Leadership in Science and Technology

DATE: March 24, 1992
TO: Rhonda
COMPANY: National Coal Council
FROM: Dwain Spencer

Per your phone call to my secretary, following are my comments relative to the prepared new language insertion for the study report "Improving Coal's Image: A National Energy Strategy Imperative":

- 1) Carbon dioxide levels have increased approximately 25% since 1880 (220 ppm to 355 ppm), not 40%.
- 2) I would delete the reference to 3/4's of the warming having occurred prior to greenhouse gas buildup. In my opinion, this correlation is also suspect.
- 3) I would leave out all reference to the increase in the sun's output by six percent. Most of the models do not include this effect and this reduces the effectiveness of the argument.
- 4) I would reference the recent Science article by Charlton, et al which indicates that sulphate aerosols may be causing a cooling effect of approximately -2 watts/square meter, nearly offsetting the estimated warming of 2.5 watts/square meter due to carbon dioxide.

Appendix E

Comments on Draft Report

APPENDIX E

COMMENTS ON DRAFT REPORT

Comments by:
R.H. Essenhight
E.G. Baily Professor of Energy
Conversion
Department of Mechanical
Engineering
The Ohio State University
Columbus, Ohio

This report is very interesting for what it says, putting explicitly on paper things that have long needed saying: to too many people COAL is undoubtedly a four letter word. The poor image of coal is indisputable, and many or most of the factors contributing to that poor image are clearly listed.

I am not sure, however, that the list is complete. One additional element that could be crucial is the extent to which a public image is partly a reflection of self-image. This is a factor that does not appear to have been explored in the Report: the image of coal held by the coal industry and the coal community itself. What exactly is that image?" The Report points out the social and economic benefits of using coal whilst acknowledging faults: and the solution advanced is proclamation of something like *mea culpa*, to be made in education classes and public lectures. So, what comes across in the Report is that it is a

little defensive; but defensive of What? and Why?

What I do not see is presentation of coal as a challenge. The education issue this raises is whether the needed technical training must go through the university or can by-pass it. Thus, how does the coal industry see itself by comparison, for example, with chemicals, or solid state physics, or electronics, or computer science, or aeronautics, or gas turbines and jet engines? What level of education or technical training is required currently or will be required by the leaders in the coal industry and by those developing new technologies for coal that will take the industry successfully into the 21st Century? And what is to be done to revive the graduate programs in coal, especially the coal combustion programs which have been largely eliminated in the last five years? Is it the message that these are no longer needed? That coal no longer matters? That the industry is only a pick-and-shovel activity? Or did this program elimination happen by accident because no one was watching? It matters crucially if there is to be an effective education program because without strong graduate programs for the students to advance into, all the PR in the schools becomes a body without a

head, and will ultimately be derided as false advertising or even deceit.

Response to Dr. Essenhight

This report recognizes the importance of education about coal at several different levels. Exhibit B-3 "Industry Action Plan: How to Deliver the Message - Schools" contains several recommendations which can be applied to higher education. Others are appropriate for elementary, secondary, and vocational-technical education levels.

Among those with the most bearing on the questions raised here are those concerning research and development grants for coal mining and use, an information network for coal researchers and other interested parties, supplying grants and financial support to existing programs, and seeking access to college and university curriculum committees.

(Comments Resume)

This comes back to the real image of coal" What is that image, and how can it be presented as a challenge? In describing coal and its context there are two possible extremes. The first is that the coal industry is a low-tech/no-tech, dig-and-shovel-it operation still in the 19th century with no hope of getting it into the 20th, let alone the 21st century; and that the highest level of training that would ever be required might be high school or Vo-tech at best. The other extreme is that coal is a complex, high-tech sophisticated material that for proper use needs 21st century science-

based technologies that challenge the limits of applied physics, chemistry, mathematics, and engineering. All the evidence of the last 150 years since the start of scientific research by Michael Faraday, in 1844 is that this last alternative is the case; but how many in the coal industry have the remotest idea that this may be so, let alone try to sell it? They have a superb platform to stand on; why don't they use it?

Indeed, this latter view is not even evident to many in the engineering community. I got the clearest statement on this about 30 years ago after presenting a technical paper on combustion of coal at the 1962 ASME Winter Annual meeting. I had described results on experimental measurements, the relevant theory, and the agreement between the two to show that the theory was supported by the experiments and thus could be used in the future for predictions. Following the presentation I was approached by an engineer with the comment:

"Interesting: But you can't treat coal as a scientific material, can you?"

This summarizes in a single sentence the principal problem of image, in my view: that coal is not seen as a "scientific" material that is subject to and therefore describable by the necessary physics and mathematics (and, indeed, it requires mathematics of a high level for the purpose). Since I first got that original comment I have had continuing comments on similar lines from all directions, including my own colleagues who mostly view coal research as a

"second-class citizen" type of activity until they learn some of the details and find that it can be beyond them. If engineers have such misconceptions then it is hardly surprising that there are bigger problems in the world at large.

It is also hardly surprising that the same misconception also exists in the minds of some, at least, in the coal community. This was brought home quite recently in comments on a research proposal submitted by the Ohio Supercomputer Center (OCS) and myself to a certain funding agency (not Federal). This proposal was to greatly extend a mathematical description of the coal flame that we had been developing with the objective of being able to predict SOX and NOX profiles in the flame as an aid, ultimately, in emissions control. This type of supercomputer mathematical description is moving towards the routine for gas turbines, jet engines, and gasoline and diesel engines, for example, as the only way to handle the complex fundamental and practical problems involved. There is even a history of computer attempts to model the coal flame going as far back as the 1950's (using analog computers), and the current Combustion Engineering Center at BYU attempting the same thing is quite well known. However, the proposal was rejected on grounds that included the following comments to which we were told great weight was given

"experimental knowledge of combustion phenomena through the use of the computer is utterly useless"; "the approach is idealistic, abstract, and not

particularly related to coal"; "if successful it will have little impact"; "the proposed methodology is a waste of funds"; "unlikely to be a major success"; "proposal depends heavily on the impression that the name Cray imparts"; "the likelihood of getting a model useful for design of real systems is quite low"; "the risk is the complexity of the analysis which could make the results unverifiable by experiment"; "proposal is highly theoretical and will do little to help current research to meet (funders) objectives in the short term and it's not clear what can be gained that can be of practical value"; "the proposal does not make much sense; it is proposed to make calculations of coal combustion processes: processing of non-data by computer still produces non-data"; "the project is too abstract to be meaningful or to advance the art, and this is a work of which may well model the system exactly only to demonstrate we can't do anything with it"; "at this stage in the improvement of utilization of coal, mathematical simulation of coal combustion is unlikely to be of help"; etc., etc.:

It is astounding to get such comments in the decade in which, for example, the most advanced military planes are now being described as "computer peripherals" because of the degree of computer control routinely incorporated in the plane; and it is even more so when one sees that underground mining

machinery is moving in the same direction of being "computer peripherals". Such comments had to have come from those who are out of touch with scientific developments. Yet these comments came from proposal reviewers who were presumed to be favorably disposed *towards* coal research. Even more incredible was the attitude of the funding agency that took them seriously. With friends like that the coal community will always have more enemies than it can ever cope with. If the coal industry is to move from the 19th to the 21st century, a drastic change is needed in the attitudes or better still in personnel of some or many of those who have command and control over directions of technology development, and particularly the direction or misdirection of necessary research and advanced training. What this suggests is that education is needed *inside* the coal industry and not only outside. There is a form of double jeopardy here: any education program aimed at the general public will fall on its face if it is not supported positively, enthusiastically, knowledgeably, and *with conviction* by the coal community.

One of the puzzles is why advanced research proposals get the responses described above. In part, certainly, it can be skepticism based on past experience that fundamental research can ever do anything for coal, and in some respects there is a point here. A common question I get is: "What has combustion research ever done for boiler design or operation?" and the answer is "Very little". There are two reasons for this: the first is the relatively small resources devoted to the

fundamental problems (almost nothing compared, say, with nuclear physics, or aerodynamics, or solid state science as the underpinnings of nuclear engineering, aircraft, and computer chips). The second is the stunning complexity of the coal flame system coupled with lack of the necessary fundamental knowledge until quite recently. I can best illustrate this last point by comparing the coal boiler with the graphite moderated nuclear reactor (GMNR): these two are chosen because the key basic equation, mathematically, is the same for both; yet the design equations for the GMNR were essentially solved for design purposes nearly 40 years ago. The same equations for the coal boiler have yet to be solved to a level that will satisfy designers. Why?

The answer lies in the complexity of the physics of the problem. The fundamental design equation is the equation for radiation flow or "flux" — this is like a beam of sunlight. In the coal flame case this is thermal radiation or heat flux, and it is neutron flux (flow of neutrons) in the case of the nuclear reactor. Mathematically, this is the same equation for both cases. Physically what then happens is that either heat or neutrons are emitted from either the coal particles in the coal flame case, or from uranium in the nuclear case; and then that radiation is absorbed somewhere else in the reactor by either other coal particles or other uranium atoms, so there are both emitters and absorbers. This means that it is necessary to know the intensity of the radiation in both cases, and then the capture ability (absorption cross-section) of the coal particles or the uranium. (You get warm

when sitting in the sun because of your "capture cross-section"). For the nuclear reactor, the problem was found to be relatively simple once the basic physics had been done because the location of the uranium that was emitting the neutrons was known; the intensity of the emission was also known and only changed very slowly and in a predictable manner, and the capture cross-section of other uranium atoms at other locations in the reactor was also known. Consequently, the equations could be solved and used for design, to predict neutron flux profiles and temperature profiles in the reactor, and to predict quite accurately the power output even before the first power station (Calder Hall) was built. With coal fired boilers, prediction is only possible as the result of decades of empirical experience. The difference is that, in the coal flame, the intensity of the radiation is determined by the particle temperature, which has to be predicted and which depends on the combustion rate (and the combustion rate depends on the temperature!); and the absorption cross-section changes with particle radius which changes with time for the same reason, and changes with location because of the motion of the gases through the boiler (the fluid mechanics). Consequently, the coal flame is orders of magnitude more complex *and more sophisticated* than the GMNR.

The problem is so complicated that in a research proposal currently being completed by the Ohio Supercomputer Center for submission to DOE on exactly this problem, the conclusion is that solution is beyond the capabilities of the existing linear processing

supercomputers and algorithms, and new advanced algorithms must be used (the development of this use is the target of the proposal). The point here is that the past acknowledged lack of contributions of fundamental research to the practical engineering problem, jointly with the lack until recently of the basic knowledge of the coal combustion mechanism, and lack of the necessary (parallel processing) computer architecture needed to handle the problem.

The research community is finally in a position to start making practical contributions to the myriad coal use problems in a way that is routine in so many other industries except that in the coal combustion area at least, there is so little research community left. Funding of coal combustion fundamentals by DOE (and before that by ERDA and OCR) has always been somewhat marginal, and particularly so considering so considering the central place of the combustion process in determining subsequent behavior of ash, and of SOX and NOX production; but in the last 5 years it has virtually vanished so far as university support is concerned. The money has been going increasingly into industry, and with the arguable exception of BYU, university research programs have been effectively eliminated. This is having the following significant effects. First, the message to students is that coal is not important. Second, the few students left in marginal programs are becoming discouraged and are planning to move to other areas; in such cases I cannot see they will ever return to coal. Third, the flow of up-to-date trained manpower (MS and Ph.D.)

needed by industry will be drying up. I expect that industry will discover this in about 5 years time, and there will then be virtually no base left to revive from: courses will have been eliminated; all the in-house corporate memory of techniques, concepts, objectives, etc., will have vanished; the equipment will have been dismantled, and the space will have been re-allocated. Finally, some university administrators are giving coal programs, courses, and the like decreasing support because it is not perceived as being important in the modern world. In taking this position they are only reflecting what they interpret in their reading of the tea leaves to be attitudes and needs based on the flow of funding.

The question of public education programs such as that outlined in the Report then becomes almost irrelevant.

If the coal industry and community continues to see coal use and development as a technique (needing only Vo-Tech training at its highest level) rather than a science-based engineering technology, the industry will remain a dig-and-shovel industry always being pushed to the sidelines or ignored. No amount of "educating" in the high school, or of the teachers, or the media will ever change that. If high school students *do* happen to get interested there are so few programs left of any substance they will see little future in coal. Without strong graduate programs — which means research — the subject doesn't exist. The equivalent in, say, aeronautics, would be saying that all we

need today is the people who build the planes and fly them (very necessary to be sure) — but there is no further need for aerodynamicists. In that context I have difficulty in understanding the suggestion for establishing university chairs on energy issues in a variety of non-engineering discipline. I don't see what this would achieve except peripherally. It can't steer students into university technical programs that don't exist, and it won't have any relevance to lower level Vo-Tech programs. Surely, if there is money available for Chairs, why not establish Chairs on coal programs in the engineering and science departments. This would be putting the money where the mouth ought to be.

In the proposed education programs, why not focus on the story of coal itself? Coal is, in fact, one of the most complex *sophisticated* naturally-occurring materials (or man made, for that matter), and it requires correspondingly sophisticated approaches in research and in science-based engineering to understand it to be able to make best practical use of it. The scientific base can be spelled out in very considerable detail. The proposed education program outlined in the Report has some valuable ideas but it does not present the sort of challenge that the best students are likely to respond to. Surely the direct challenge is like to be far more telling and arresting: like the Marines: "Coal is looking for a few good men: you need command of physics, chemistry, mathematics, and engineering; if you don't have these, you haven't got what it takes in coal"... And here are the problems...etc:.

As I see it the coal industry is very much at a cross-road. It can take the low-tech road, and gradually die because it can't meet the challenges of image and environmentalism; or it can take the high-tech road, showing that the problems are dif-

ficult, challenging, but solvable given the necessary facilities and backing, and worthwhile as a career. If the industry gets its own house in order, much of what is needed for the public image will follow.

**Comments of
Edward S. Rubin
Alumni Professor of Environmental
Engineering and Science
Director, Center for Energy and
Environmental Studies
Department of Engineering and
Public Policy
Carnegie Mellon University
Pittsburgh, Pennsylvania**

Thank you for the opportunity to review the National Coal Council's draft report on, "Coal -- Today's Image." I found the report to contain a lot of useful recommendations which, if implemented, could make important contributions to improving the Nation's awareness of energy issues and the role of coal as a key energy source. The Work Group is to be commended on the thought and effort put into these recommendations.

Since you also asked me to be "very open and candid" in my observations, let me also offer some comments on several weaknesses you may want to address.

To begin, the title of the report should be reconsidered. Your cover letter of October 4th refers to it as "Coal: The Image," which is closer to the mark than the title on the draft.

I also must say that in a number of places the tone of the report seems to reflect a biased rather than balanced point of view, which detracts from the report's overall credibility. For example, in Chapter I, the discussion of acid rain seems to imply that coal-fired power plants aren't really "the single largest

emitters of the pollutants which are the precursors to acid rain" (page 1-5). Is that what NAPAP said? What exactly is meant by, "despite scientific evidence" and "evidence to the contrary" referred to in this discussion? These and other statements later in the report suggest that the half billion dollar NAPAP study vindicated the coal industry, which I don't believe is the case.

There's a similar problem in the discussion of global warming (page 1-4). It is portrayed as a purely theoretical problem, and only the most extreme views of its potential impacts are portrayed. Nothing is said about more moderate views or the cautions expressed by reputable groups such as the National Academy of Sciences (e.g., *Policy Implications of Greenhouse Warming*, 1991). In general, the draft report seems to be trying too hard to play down or deny coal's role in environmental impacts. A more credible approach might be to emphasize the measures being taken to address legitimate concerns.

The title of Chapter II might be changed to "The Message" or something along those lines. That's really what the chapter seems to be about. ("Realities" is too open ended.) Again, Chapter II also could use a bit more balance. Strong statements are made that must be documented if the report is to be credible. For example, on page 2-2, paragraph 4 claims that the negative social and environmental costs of coal are "dwarfed" by the benefits that coal provides. There is no evidence or support for that statement, even though it is fundamental to the credibility of the

messages about coal. Nor is much said about how things have changed over time. The tone of the chapter seems a bit defensive and again prone to characterizing only extreme situations. Why, for example, is it relevant to think about replacing all of today's coal with petroleum to generate electricity? Is anyone suggesting this? What's the point?

What really needs elaboration and more examples is the claim on page 2-4 that the industry is "forward looking and committed to innovation." I would doubt that most people view the coal industry in these terms. People see the electronics industry as innovative, the telecommunications industry as innovative, and perhaps even the automotive industry is viewed as innovative by many Americans. With this kind of competition, you really need to work hard to make the case that the coal industry also deserves the adjective. It's the *pace* of innovation that matters; the argument needs to be made that coal technology today is changing at a pace faster than at any time in its history. Lumping the last 150 years in with what's happening today strikes me as sending the wrong message.

Chapter III on "Energy Education" is very important and could use a little more

elaboration (e.g., using some of the material now in the appendices). For example, elaborate on what you mean by "energy-related deficiencies" in Item 8, page 3-2. Clarify whether energy education also includes energy demand issues like ways to improve end-use efficiency. And avoid putting up red flags like the last sentence in Item 6 on page 3-2, and the long parenthetical statement about acid rain in Item 5, page 3-3.

Finally, Chapter IV might take a stab at trying to flesh out exactly who would lead the charge on implementing many of the worthwhile recommendations contained in the report. As it stands, most of the work seems relegated to the Secretary of Energy, who is likely to respond by telling you about all of the good things DOE is already doing, and how tight the budget situation so they can't really do too much more. How would you respond to this? Is there a more aggressive industry-led initiative that can be brought to bear? Who exactly would implement it?

I hope these comments are of some help to you and the Work Group. I have also enclosed copies of two recent papers which might be of interest. I would welcome a copy of the final report when it's completed.

**Comments of
Philip T. Cavanaugh
Manager - Government Affairs
Chevron Corporation
San Francisco, California**

In your letter of October 4, 1991 you requested comments on The National Coal Council's draft document titled "Coal - Today's Image." I hope that comments are still timely. My overall impression is that, while the document creates a good strategy for public education, public education is, at best, an incomplete goal.

I believe that the industry's reputation, good or bad, is earned based on the industry's performance measured against society's expectations. As outline clearly in Chapter 1 of the document, the coal industry has earned its poor reputation. I feel free to say that because I work in two other industries which have earned similarly poor reputations.

The oil and petrochemical industries have worked for years to improve their image, and have had little success. This failure is in part because the oil and petrochemical industries have attempted public relations campaigns without eliminating the underlying environmental, health and safety performance problems.

The good news is that recently these industries have charted a new course. I'm referring to the Chemical Manufacturers Association's Responsible Care Program and the Environmental Excellence Program of the American Petroleum Institute. The goal of these efforts is to improve the environmental, health and safety performance of the oil and petrochemical industries. These programs are based on action, accomplishment and accountability. These programs are not public relations campaigns.

For your information I have attached a copy of the Guiding Principles of the Responsible Care Program. As you can see, communication is an important aspect of Responsible Care but the communication is two way, not a one way public relations campaign.

My thoughts are that the coal industry should focus on improving their environmental health and safety performance before trying to educate the public. The areas of needed improvement are itemized clearly in Chapter 1 -- mine safety, labor relations, strip mining, global warming, acid rain, particulates.

Thank you for the opportunity to comment. Your task is monumental and important. I hope my input is useful.



Sun Company, Inc.
100 Matsonford Road
Radnor PA 19087-4537
215 293 6507

October 31, 1991

[Handwritten signature]
11/06/91

Mr. James F. McAvoy
Executive Director
The National Coal Council, Inc.
P. O. Box 17370
Arlington, VA 22216

Dear Jim:

At our Coal Policy Committee meeting in Washington last week, you asked us to send you in writing the comments each of us made during the discussions. The following are my comments:

- (1) It is important for the coal industry to realize that while educating the public with facts is essential, the negative image of coal is more political than it is factual. For example, the acid rain debate was decided politically and legislatively before the facts were in. Political issues require political solutions.
- (2) The coal industry needs to emphasize grass roots programs as it pursues the mission of improving the image of coal. The industry has a better chance of improving its image if it has a strong grass roots effort involving numerous people at the local level.

Sincerely,

[Handwritten signature of Richard W. Ince]

Richard W. Ince

RWI:ceb

rwi/1

Appendix F

Description of the National Coal Council

APPENDIX F

DESCRIPTION OF THE NATIONAL COAL COUNCIL

Recognizing the valuable contribution of the industry advice provided over the years to the Executive Branch by the National Petroleum Council and the extremely critical importance of the role of coal to America and the world's energy mix for the future, the idea of a similar advisory group for the coal industry was put forward in 1984 by the White House Conference on Coal. The opportunity for the coal industry to have an objective window into the Executive Branch drew overwhelming support.

In the fall of 1984, the National Coal Council was chartered and in June, 1985, the Council became fully operational. This action was based on the conviction that such an industry advisory council could make a vital contribution to America's energy security by providing information that could help shape policies leading to the decreased dependence on other, less abundant, more costly, and less secure sources of energy.

The Council is chartered by the Secretary of Energy under the Federal Advisory Committee Act. The purpose of the National Coal Council is to provide advice and to make recommendations on general policy matters relating to coal and the coal industry on a continuing basis as requested by the Secretary of Energy.

The National Coal Council is not a trade association nor does it engage in any of the usual trade association activities. It specifically does not undertake any lobbying efforts. The Council does not represent any one segment of the coal or coal-related industry nor the views of any one particular part of the country. It is instead a broad-based, objective advisory body whose approach is national in scope.

Matters which the Secretary of Energy would like to have considered by the Council are submitted as a request in the form of a letter outlining the nature and scope of the study. The request is then referred to the Coal Policy Committee which makes a recommendation to the Full Council. The Council reserves the right to decide whether or not it will consider any matter referred to it.

The members of the Council may also present to the Secretary issues which they believe warrant study. If the Secretary concurs, the Council may then proceed.

Upon completion and approval of a study by the members a report of the findings is presented to the Secretary. These reports are given very extensive distribution throughout the Executive Branch of the Federal Government, the Congress, State and local governments, the academic community, as well as a broad segment of the coal and coal-related industries. The reports are also widely circulated to the media.

The accompanying presents a list of the reports of the National Coal Council presented to the Secretary of Energy from 1985 to present.

The mission of the National Coal Council is to enable the coal industry to objectively advise, inform, and make recommendations to the Secretary of Energy of the United States with respect to any policy matter relating to coal, in order to aid in achieving economic and energy security. The goal of the National Coal Council is to accomplish this mission in an objective, expeditious, thorough and highly credible manner.

REPORTS OF STUDIES COMPLETED BY THE NATIONAL COAL COUNCIL

In 1986	*	<i>Coal Conversion</i>
	*	<i>Clean Coal Technology</i>
	*	<i>Interstate Transmission of Electricity</i>
	*	<i>Report on Industrial Boiler New Source Performance Standards</i>
In 1987	*	<i>Coal Reserve Data Base</i>
	*	<i>International Competitiveness of U.S. Coal and Coal Technologies</i>
In 1988	*	<i>The Use of Coal in the Industrial, Commercial, Residential, and Transportation Sectors</i>
	*	<i>Innovative Clean Coal Technology Deployment</i>
In 1990	*	<i>The Long-Range Role of Coal in the Future Energy Strategy of the United States</i>
	*	<i>Industrial Use of Coal and Clean Coal Technology - Addendum Report</i>
In 1992	*	<i>The Near Term Role of Coal in the Future Energy Strategy of the United States</i>
	*	<i>Improving the Image of Coal: A National Energy Strategy Imperative</i>

CHAIRMEN OF THE NATIONAL COAL COUNCIL

<i>June 1985 - June 1986</i>	<i>The Honorable John N. Dalton (Deceased) Attorney at Law. McGuire, Woods & Battle Former Governor of Virginia</i>
<i>January 1986 - June 1986</i>	<i>(ACTING) B.R. Brown, President CONSOL Inc.</i>
<i>June 1986 - June 1987</i>	<i>James McGlothlin, President and CEO The United Companies</i>
<i>June 1987 - June 1989</i>	<i>James G. Randolph Former President, Kerr-McGee Coal Corporation (Current, 1992 - Assistant Secretary for Fossil Energy, U.S. Department of Energy)</i>
<i>June 1989 - May 1991</i>	<i>William Carr, President and CEO Jim Walter Resources</i>
<i>May 1991 - Present (Jan. 1992)</i>	<i>W. Carter Grinstead, Jr., Vice-President Exxon Coal and Minerals Company</i>

Appendix G

The National Coal Council Membership Roster — 1992

APPENDIX G

THE NATIONAL COAL COUNCIL MEMBERSHIP ROSTER — 1992

DR. SY ALI *

Manager
Industrial Engine Technology
Allison Gas Turbine Division
General Motors Corporation

MR. JOHN ARLIDGE *

Senior Vice President
Government Affairs
Nevada Power Company

MR. CHARLES J. BAIRD

Baird and Baird

THE HON. GERALD BALILES

Hunton & Williams

MR. JOHN BARKER, P.E. *

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Group President
Caterpillar, Inc.

MR. DANIEL BEAM

Commercial Fuels, Inc.

MR. WILLIAM W. BERRY *

Chairman of the Board
Dominion Resources

MS. JACQUELINE F. BIRD

Director, Ohio Coal Development Office
Ohio Department of Development

MR. GERALD BLACKMORE *

DR. SANDRA BLACKSTONE *

Natural Resources Attorney/Consultant

MR. THOMAS H. BRAND, JR.

BBI Environmental

DR. ROBERT W. BROCKSEN

R.W. Brocksen, Inc.

MR. BOBBY R. BROWN *

Chairman/CEO
CONSOL, Inc.

MR. DONALD P. BROWN *

President
Cyprus Coal Company

MR. THOMAS BROWN

Representative
Eastern Conference of Teamsters

DR. DONALD CARLTON *

President
Radian Corporation

MR. WILLIAM CARR *

President
Jim Walter Resources, Inc.

MR. FRED CLAYTON

Chairman and CEO
Shand Mining, Inc.

MR. WILFRED CONNELL
Vice President
Illinois Power Company

MR. ROBERT P. COOPER *
Executive Vice President
Farrell-Cooper Mining Company

MR. JOSEPH W. CRAFT, III *
President
MAPCO Coal, Inc.

MR. JAMES B. CRAWFORD
Chairman and CEO
James River Coal

MR. DAVID C. CRIKELAIR
Vice President
Texaco

DR. H. DOUGLAS DAHL
President and Chief Operating Officer
Drummond Company, Inc.

MR. ROBERT G. DAWSON
Vice President, Fuel Services
Southern Company Services

MR. JOHN DWYER *
President
Lignite Energy Council

MR. IRL F. ENGELHARDT
President and CEO
Peabody Holding Company, Inc.

DR. ROBERT H. ESSENHIGH
Professor of Mechanical Engineering
Department of Mechanical Engineering
The Ohio State University

THE HON. GEORGE EVANS
Secretary
Kentucky Energy Cabinet

MR. JACK R. FAIRCHILD
Chairman/CEO
Fairchild International

MR. JOHN FALTIS
President and CEO
Anker Energy Corporation

MR. JOHN C. FAY, JR.
President
McWane Coal Co., Inc.

MR. MASON FOERTSCH
President
Foertsch Construction Company

MR. JOSEPH A. FRANK
President
Centralia Coal Sales Company

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Professor of Law and Director of
the National Energy Law and
Policy Institute
The College of Law

MR. GEORGE FUMICH, JR.
George Fumich Associates, Inc.

MR. PETER M. GARSON
President
PMG Advisory Group

MS. SONDRA J. GILLICE
Vice President of Sales and Marketing
Guest Services, Inc.

DR. ALEX E.S. GREEN *
Graduate Research Professor
University of Florida

MR. W. CARTER GRINSTEAD, JR. *
Vice President
Exxon Coal and Minerals Company

MR. JOHN GRISHAM
President
Industrial Mining Company

DR. BILL HARRISON *

MR. J. BRETT HARVEY
Vice President - Fuels Resources
PacifiCorp

MR. H. RICHARD HORNER *

THE HON. STANLEY W. HULETT
Consultant

MR. RICHARD W. INCE *

MR. JOHN JANAK *
Executive Vice President and
General Manager
Texas Utilities Mining Company

MR. WILLIAM M. KELCE *
President
Alabama Coal Association

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Vice President, Production
Valley Camp Coal Company

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Director, Solid Resources
Alternative Feedstock Development
Dept.
Amoco Corporation

MR. WILLIAM W. LYONS *
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NERCO, Inc.

MR. J.L. MAHAFFEY *

MR. WILLIAM B. MARX *
President
Council of Industrial Boiler Owners

DR. CHRISTOPHER MATHEWSON
Director, Center for Engineering
Geosciences
Texas A&M University

MR. BARRY G. McGRATH
President and Chairman
The Pittsburg & Midway
Coal Mining Company

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Chairman
Norfolk Southern Corporation

MR. WILLIAM H. MELLOR, III
Institute for Justice

MR. CLIFFORD R. MIERCORT *
President & Chief Executive Officer
The North American Coal Corporation

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Elgin National Industries
Roberts & Schaefer Company

MR. JAMES MOCKLER *
Executive Director
Montana Coal Council

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Pacific Coast Coal Company

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Pen Holdings, Inc.

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Burlington Northern Railroad

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President & Chief Operating Officer
Western Energy Company

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Chairman, President & CEO
Kentucky Utilities Company

MR. GEORGE NICOLOZAKES *
President
Marietta Coal Company

MR. MICHAEL R. NIGGLI *
Vice President
Fuels Management
Entergy Services

MR. J. NATHAN NOLAND
Director, Indiana Coal Council

MR. JAMES J. O'CONNOR
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Commonwealth Edison Company

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President/CEO
Lake Shore International, Ltd.

MR. JERRY J. OLIVER *
President
Handex of Florida

MR. LOUIS PAGNOTTI, III
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MR. FREDRICK D. PALMER *
General Manager & CEO
Western Fuels Association, Inc.

MR. DAVID PETERSON *
CEO/President
NRG Energy, Inc.
A Subsidiary of Northern States
Power Company

MR. ABE PHILLIPS *
President
Coors Energy Company

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Corporation

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MR. JIM ROSE
President
Interstate Coal Company, Inc.

MR. STEPHEN G. SALAY
Vice President
Cincinnati Gas & Electric Company

MR. ROBERT C. SCHARP
President
Kerr-McGee Coal Corporation

MS. DEBBIE SCHUMACHER *
Women In Mining

MR. J. J. SHACKLEFORD
President
TECO Coal Corporation

MR. F. KENNETH SMITH *
President
Utility Fuels, Inc.

MR. H. KERNER SMITH, JR.
President & CEO
Riley Stoker Corporation

MR. JOHN W. SNOW
President/CEO
CSX Corporation

MR. DWAIN F. SPENCER
Vice President, Commercialization
and Business Development
Electric Power Research Institute

MR. JOE J. STEWART *
Executive Vice President and
Group Executive
Power Generation Group
Babcock & Wilcox

THE HON. WILLIAM R. STRONG
House of Representatives
State of Kentucky

THE HON. MIKE SULLIVAN
Governor of Wyoming

MR. ROSS O. SWIMMER, ESQ.
Hall Estill Hardwick Gable
Golden & Nelson, P.C.

MR. L.A. THAXTON
Vice President
Field Operations
Dresser Industries

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Winston & Strawn

MR. PAUL M. THOMPSON
President
Phillips Coal Company

MR. NEAL S. TOSTENSON *
President
Ohio Mining & Reclamation Association

MR. RICHARD TRUMKA
President
United Mine Workers of America

MR. MITCH USIBELLI
Vice President, Engineering
Usibelli Coal Mine, Inc.

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General Partner
K-Fuel Partnership

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Alabama State Senator
Healthsouth Rehabilitation Corp.

MR. WILLIAM R. WAHL *

Vice President

AMAX Inc.

MR. GERALD D. WALTZ *

Senior Vice President

Engineering and Operations

Indianapolis Power and Light Company

MR. JOHN D. WARD

Buchanan Ingersoll, P.C.

MR. BILL W. WAYCASTER

Vice President and General Manager

Hydrocarbons Department

DOW Chemical USA

MR. W.S. WHITE, JR. *

MR. MARC F. WRAY

Chairman, President & CEO

Joy Technologies

MR. ALAN D. WRIGHT

Partner

Porter Wright Morris & Arthur

MR. TAY YOSHITANI

Deputy Executive Director

Maritime Affairs

Port of Los Angeles

* Denotes member of Coal Policy Committee

Appendix H

The National Coal Council Study Group for the Report *Improving Coal's Image: A National Strategy Imperative*

APPENDIX H

THE NATIONAL COAL COUNCIL STUDY GROUP FOR THE REPORT *IMPROVING COAL'S IMAGE:* *A NATIONAL ENERGY STRATEGY IMPERATIVE*

WILLIAM R. WAHL *
Chairman - Coal Policy Committee
Vice President
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General Manager & CEO
Western Fuels Association, Inc.

JOSEPH J.M. PLANTE *
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Vice President & Senior
Engineering Manager
Stone & Webster Engineering
Corporation

NED LEONARD
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DAVID BURGER
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Amoco Corporation

GERALD T. McPHEE

Director, Government Relations

Island Creek Corporation

WALTER PURDY

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Deputy Assistant Secretary for Coal

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PRODUCTION/SPECIALIST ASSISTANTS

RHONDA CASH

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Editorial Consultant

JANICE GRISHMAN

Personal Assistant to the Director

National Coal Council

* Denotes member of National Coal Council