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THE ECONOMICS OF FEDERAL COAL LEASING AND MARKET DEVELOPMENT

by

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ABSTRACT

The federal coal leasing program, which is currently undergoing regulatory revision by the U.S. Department of Interior, has been a subject of extreme controversy in coal resource management over the last decade. The controversy exists because the public has desired a greater voice in the management of domestic resources, traditionally the role of the Secretary of Interior. The inability of the federal government to design and implement a coal leasing policy acceptable to the many concerned resource management interest groups has resulted in a series of federal coal leasing moratoriums, although federal coal leasing occurred briefly from 1981 to 1983.

This study analyzes the federal coal leasing program with the objective of determining a method for establishing a procedural and regulatory model that would improve federal coal leasing policy. The model is normative in scope and also designed to favorably influence the development of orderly, stable, and healthy coal markets.

The procedural and regulatory model compares current federal coal leasing regulations with normative regulations based on the assumption that improved federal coal leasing will result from a system of concensus building by the

federal government and the diverse interest groups concerned with federal coal leasing policy. Regulatory changes proposed by the Linowes Commission in the Fair Market Value Policy for Federal Coal Leasing are compared with the normative regulatory policies established by this study's model for adequacy and acceptability. Finally, general conclusions are reached on desired changes in some of the federal leasing statutes and regulations.

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Chapter I

INTRODUCTION

This study evaluates current federal coal leasing practices and suggests improvements to promote orderly, stable, and healthy coal markets. To date no analysis exists that effectively reviews how federal coal leasing might influence national coal markets. This thesis researches concepts, theory, and methodology to improve the leasing of federal coal through regulatory changes.

Hypothesis

The federal government's goal in leasing public coal is to supply sufficient amounts of reasonably priced coal to promote the development of stable, orderly, and healthy coal markets subject to statutory laws and regulations. The statutory laws and regulations include (Federal Coal Management Program, 1979):

1. environmental laws and regulations that are related to potential and existing federal coal leases;
2. land use requirements that are imposed by federal surface agencies concerning the authorization of leasing federal coal by various federal agencies and

the qualified private surface owners;

3. regulations that limit leasing of federal coal only to producers with the financial and capital ability to post long-term reclamation bonds and meet mining production requirements on large tracts of federal coal comprising logical mining units;
4. the control of the timing and level of federal coal that is leased and determined by the Federal Coal Management Program and the Secretary of Interior, and
5. the regulation of federal leases, except those that are necessary for continued production, must be sold on a competitive basis.

Since the federal government has monopoly power over vast tracts of western coal reserves, leasing policies can have significant influence on equilibrium prices in the entire coal market. The leasing of federal coal can affect three primary outcomes in the coal market. If insufficient amounts of federal coal are leased and mined to meet market demand, the price of coal will rise causing higher electricity prices for the consumer.

If too much coal is leased and put into production, the net national effect will cause coal prices to fall creating a soft market. Prices for electrical consumers may not fall

accordingly since coal producers in many cases have committed to long-term, large-scale capital investments which must be recovered through coal sales. More importantly, producers with excess mining capacity will sell on the spot market or through short-term contracts. Coal sold on a short-term basis normally is priced less than coal transacted in the long-term contract. When excessive capacity occurs, the long-term contract becomes less negotiable between producer and consumer, resulting in uncertainty and volatility in the market and a fall in revenues for producers, states, and the federal government. Federal leases have a commensurate lower value, and the public is deprived of full fair market value. Furthermore, leases that do not produce are subject to due diligence and a loss of royalties for the government.

The third outcome occurs when federal coal is leased and produced at a level consistent with electrical demand. In this way an equilibrium is created between the supply and demand components of coal markets. The proper amount of federal coal is produced at a time when it is needed. The entire coal market develops in an orderly fashion, and a balance in supply and demand results.

The manner or procedures by which the federal government leases public coal will determine whether or not national

coal markets are disrupted. Since the federal government not only owns the coal but has ultimate legal power in setting coal leasing policies and regulations, federal leasing procedures can and do determine the degree that public coal influences the general welfare of national coal markets. Conceivably the federal government could radically depress or inflate national coal prices depending on how, when, and where federal coal is leased and mined.

Thesis Purpose

The purpose of this study is to analyze current federal coal leasing regulations through the development of a normative regulatory model that best defines a federal coal leasing policy which supports orderly, stable, and healthy coal markets. The study will focus on federal regulations related to coal leasing. Statutory laws from which the regulations are derived will not be altered and will serve as constraints. Further operational recommendations will be offered on how leasing policy can be varied through regulatory changes to improve the general stability, health, and order of coal markets.

Thesis Model

The federal government has a responsibility to lease

coal in a very selective manner that does not cause distortions in the coal market. In order to determine the adequacy of existing federal coal leasing policy, a coal leasing model must be constructed that operationally analyzes how the federal government can favorably maintain an orderly, stable, and healthy coal market through the development of regulatory leasing procedures.

The three fundamental components of an idealized regulatory federal coal leasing model that would best maintain order, stability, and health in coal markets are the rate and amount of federal coal that is leased, the time at which leasing occurs, and the stipulations by which leasing and coal production are conducted. In order to operationalize the model, the components of the leasing model must be analyzed further in the context of the constraints identified in the hypothesis of this thesis.

The leasing model must fulfill the objective of the federal government's role in coal leasing, as identified in the hypothesis statement, and create a process that favorably influences equilibrium in coal markets. The leasing model is based on theoretical economic leasing literature, the limits of supply and demand forecasting theory, and the notion of public consensus in resource allocation. The model further describes leasing procedures in competitive bidding

and how best to conduct sales of leases to maintain equilibrium in the coal market.

Model Purpose

Once the model is fully constructed to depict idealized regulatory federal policy steps necessary to favorably influence a balanced coal market, actual federal coal leasing regulation and methodology will be compared with the hypothetical regulatory coal leasing model. The objective of the comparison is to determine which parts of the existing federal regulatory coal leasing program positively influence the coal market. In like manner, those regulations that tend to distort coal markets will be identified. The coal leasing model will serve as a basis for identifying both the favorable and unfavorable aspects of current leasing regulations and for making recommendations on how current regulations might be changed to improve federal leasing policy.

Model Description

The model is broken down into three primary components:

I. How to lease

II. When to lease

III. Where to lease

Each component is ranked according to importance, and, within each component of the model, existing and potential regulatory constraints are analyzed for acceptability to stable, orderly, and healthy coal market performance. If a leasing regulation is contrary to market performance standards, the regulation will be changed or, in some cases, possibly eliminated. In no case will the existing statutory leasing and surface mining acts be challenged in the analytical sections of this thesis. The statutory leasing laws will serve as the primary unalterable constraints.

Model Components

The basic parts of the thesis model, how, when, and where to lease federal coal, are highly interrelated, and one part, in many cases, will determine the outcome of other parts of the model.

Part I, how to lease, is concerned mainly with environmental, land-use, and competitive leasing requirements of the federal government. Eventually, each facet of Part I directly influences where the federal government leases. Barriers to producer entry concerning scales of economy for optimal coal production are presented in Part I along with how enhanced competition could be achieved through leasing

for optimal production size and the attainment of fair market value.

Part II of the model analyzes the best method for timing lease sales. Various forecasting methods are included to determine the timing and size of a lease sale relative to current and intended market demands. Institutional barriers to entry, such as diligence and advanced royalties, are a necessary aspect of Part II.

Part III develops a theoretical approach to where the government should lease. However, Part III is a result of how the coal is procedurally leased. To some extent, where the coal is leased is determined by when the government actually decides to lease, which directly relates to Part II of the model.

Federal Role in Leasing Coal

Within the context of the coal market, the federal government must satisfy interrelated primary objectives which are currently delineated in federal law and regulation. Federal objectives are at best a measure of how public and private interests can merge to provide coal resources that are publicly owned and privately mined and marketed. The federal government is essentially a landlord who must encourage and promote efficient, profitable, and predictable

private coal development without actually mining the coal itself (Committee on Appropriation, U.S. Congress, 1983).

The first objective of the federal government is to administer a program that provides sufficient amounts of quality steam coal for private mine production to satisfy current and future electrical demand at competitive prices.

The federal program must also provide environmental protection for its leases. Environmental protection includes protection for the physical land actually mined and also protection for the human environment impacted by the production of federal coal. Federal leasing must not unduly disrupt communities in which the land is mined, and all mined lands must be reclaimed. In the process of leasing coal, the federal government must receive a competitive fair market value for its coal. The receipt of a competitive fair market value is based on the expected net present value of in-situ coal. Expected net present value is the residual value of a lease once all taxes, costs, and royalties have been deducted from expected mining revenues and discounted to present value over the life of the mine and lease tract. The competitive fair market value is normally a front-end bonus bid payment offered by the highest lease bidder at federal lease sales. The federal government also collects and shares with producing states 50% of royalties once a

lease is under production. The bonus bid is usually a much smaller dollar value than the production royalties accrued from actual mining.

The last primary objective of the federal government is to promote and enforce conservation of the coal resource. The conservation requirement dictates that federal lease tracts attain maximum economic recovery, meaning that the coal is not high graded, and that valuable federal leases are not mined around because a producer doesn't have a lease to mine the federal coal.

The federal government's role must further ensure that the federal coal leasing is done in a timely fashion with market demands, and that lease selection is conducted in an atmosphere of agreement with producing states. Leasing levels are set by estimates of perceived future coal demand by the federal government. Lease tracts are selected on the basis of economic minability, industry expressions of interest, environmental suitability, surface owner consent, relative distance from rail transportation, and coal quality and quantity. Lease tract selection and agreement is achieved jointly by representatives from producing states and the federal government.

The sale of federal coal leases is done by federal coal leasing economic evaluation teams. The methodology used by

the federal coal leasing teams is based on the comparable sales approach, and the objective is to price and sell federal leases at competitive fair market value. The timing and magnitude of the lease sales are established by the Secretary of Interior.

Role of the Producing States

The role of states in federal coal producing markets is one of partnership with the federal government. Unlike the federal government, the function of the states is not to provide coal for national welfare, but to work closely with the federal government to select leases for sale through regional leasing teams. Representatives from each state work with the federal government in lease tract selection.

The producing states have authority to set production taxes on federal lands in the form of severance taxes. Wyoming and Montana, for example, impose severance taxes of 17% and 30% respectively on the sales contract price per ton of coal mined. The federal government imposes a 12.5% royalty rate on the sales contract price of each ton of coal mined of which 50% is shared with the producing state (Colorado Energy Research Institute, 1984).

Federal leases in producing states are protected by federal environmental laws and also must meet state environ-

mental regulations. In most cases it is the state's role to enforce its laws and in some cases, acting under the authority of the federal government, to uphold federal laws. In many producing states, the federal government has sanctioned state governments to inspect, permit, and control federally required mine land reclamation regulations. The state programs are approved and funded by the federal government through the Office of Surface Mining under the Surface Mining Act of 1977.

One of the primary roles of the producing states is to provide public goods, such as highways and schools, and impact assistance resulting from mine-related activity. In the Powder River Basin, funding needed for public goods is obtained from severance and property taxes imposed on the mines. In short, all mining impacts are the responsibility of each producing state. The federal government is mainly concerned with the on-site environmental impacts concerning reclamation, while the states have responsibility for on-site and community impacts. Both the states and the federal government are responsible for the preparation and issuance of environmental impact statements on federal lands.

Local Government's Role

The role of local government, at a minimum, is to

provide schools, roads, and a forum for the local population. Local governments work with producing states to determine the magnitude of mining impacts and request assistance.

Industry Role

The role of the miner on federally controlled lands is much more limited in scope than is the role of federal or state governments. The basic role of the coal producer is to obtain competitively priced federal coal that can be produced profitably through long-term contracts to meet electrical demand. The producer must further comply with state and federal environmental laws. The producer must also be able to pay bonus bids, royalty payments, severance taxes, lease bonds, reclamation fees, and still retain a fair rate of return on investment.

Chapter II

THE HISTORY OF FEDERAL COAL LEASING AND CURRENT LEASING REGULATIONS

Introduction

Federal coal leasing policy has gone through three basic phases: 1785 to 1920, 1920 to 1970, and 1970 to the present. From 1785 to 1920, federal coal leasing policy vacillated between the sale and leasing of federal coal. During this early period, the United States was too unsettled for the federal government to design, implement, and enforce a long-term policy of federal coal leasing. The period from 1920 to 1970 signified a time when natural resources were withheld for the public good. Coal was to be leased at fair market value, and the revenues from coal lease sales, lease rent, and lease production were to be shared with producing states. Most coal leasing was done on a noncompetitive basis, however, and little interest was shown in western coal leasing until the 1960s.

The last significant period in federal coal leasing policy began in 1970. This period has been marked by stringent environmental regulation of the coal industry, enforcement of competitive bidding for federal leases,

increased revenue sharing with producing states, and the introduction of diverse and often unresolved conflicts in how federal coal should be leased by many different factions in American society. The federal government has been unable to resolve the diverse tensions influencing federal coal leasing and has resorted to long periods of nonleasing of coal through official leasing moratoriums. The existing federal coal management program, established in 1976, evolved from nearly 175 years of changing federal policies that directed and regulated the disposal of federal coal lands. Beginning with the enactment of the Land Ordinance of 1785, it was the policy of the federal government to reserve all mineral lands for sale. However, in 1807, the federal government inaugurated a leasing system providing a 10% royalty on lead-ore lands, although this policy was not actually put into effect until 1822.

Desultory and unsystematic management characterized the period of government policy between 1822 and 1846. While every major land act specifically exempted mineral lands from entry to land sale without specific knowledge of the location and extent of the resource, many acres of valuable mineral land, including coal reserves, were appropriated as "agricultural land." Trespassing and plundering were frequent. As early as 1842, there were 44,117 fraudulent

entries on the mineral lands in southwestern Wisconsin, and the frontier army found itself unable to enforce the early leasing laws (Robbins, 1976).

The Act of July 11, 1846, authorized Congress to abolish the leasing system and to institute a general sales policy. Receipts from sales, however, were again difficult to collect because settlement laws overshadowed minerals acts in the federal government's attempt to populate the interior of the United States.

The new mineral sales land policy of 1846 which authorized proper surveys and resource classification was barely started when the gold rush to California began. Attempts to establish a sales policy in the West, and later in the Rocky Mountains, was futile. As a matter of law, the western lands were a part of the public domain, but in the face of land grabs by individuals, corporations, and newly formed territories and states, the federal government could do little except stand by and wait until westward expansion had settled. While various bills providing for sale, leasing, and taxing of mineral lands were placed before Congress during the 1860s, there was little desire to restrict American freedom and individualism through stringent laws. In 1866, Congress approved a forerunner to the Mining Law of 1872, which made the mineral lands of the

public domain, both surveyed and unsurveyed, free and open to exploration and occupation by all citizens of the United States and to those declaring their intention to become citizens, subject to regulations prescribed by law, and subject also to the local customs or rules of miners in mining districts, so long as the source was not in conflict with laws of the United States (Robbins, 1976). This laissez-faire policy contrasted sharply with advice of the Secretary of the Interior that the mineral land should be sold and not secured by right of possession.

The post-Civil War attitude of the Congress reflected a changing position on the disposition of lands. By this time, much of the prime land had been settled and sold to western settlers. Revenues from prime land sales dwindled, and the federal government began to enforce the selling of coal lands. Additionally, Congress was beginning to recognize the plundering and misuse of public land disposal resulting from the "gold rush" period and saw a need to conserve the nation's mineral resources, including coal.

The first significant law to limit the disposal of coal lands, and also generate and enforce federal revenues, was the Coal Act of 1873. Realizing that large corporations had gained control of vast tracts of land during the western expansion era, this federal government provided for disposal

of coal lands by ordinary, private entry, or by preference right based on priority of possession and improvement. To promote conservation and reduce large corporate control of resources, coal tracts were limited to 160 acres for individuals and were $10 per acre if more than fifteen miles from a completed railroad, and $20 if within that distance (Hibbard, 1965).

In the 1890s, after nearly a century of relentless and uncontrollable use of much of America's natural resources, a general move by both Congress and the executive branch of the federal government was to stop private resource depletion. The seeds of conservation, which had been planted decades earlier, became firmly rooted in federal policy. Thomas Donaldson, writing on the relationship of mine owners to the government in 1884, observed that "the difficulties of obtaining patent under existing laws (mining laws) are so great that many mine owners prefer to rely upon their possessory title rather than purchase the fee from the government." In other words, agricultural land settlement, which the federal government had promoted in fundamental land policy, worked against mineral sale policy, since no enforcement distinction existed between agricultural or mineral title acquisition. Between 1866 and 1880, of an estimated 5,528,970 acres of public coal in the United

States, only 10,750 acres had been sold. Although more coal was mined than represented by the coal sales, most of the coal lands were in agricultural title (Robbins, 1976).

By 1900, it had become quite apparent to the federal government that vast tracts of valuable coal lands were being patented under the guise of agricultural entry. Two issues immediately confronted the policy makers in the government: which lands to withdraw from entry, and how to deal with the split-estate or surface and subsurface ownership. Originally, the American land system, based on the English system, lumped the mineral wealth with the surface ownership. In 1906 and 1907, President Roosevelt deviated from the age-old English tradition and withdrew from filing and entry about 66,000,000 acres of land which presumably contained coal deposits. Teddy Roosevelt argued that mineral lands, including coal, should be perceived as "public utilities," with the same status as national forests and navigable streams (Wyant, 1982). The legal and philosophical intent of Roosevelt's coal withdrawal marked a turning point in federal coal ownership, and had a profound influence on America's energy development much later in the twentieth century.

The issue of split-estate between surface and subsurface ownership was partially resolved in an act passed in 1909,

in which the rights of the entry to the surface were retained, and the mineral rights went to the United States (Hibbard, 1965). In 1910, a congressional act resolved the compensation problem in the split-estate situation in which compensational legal provisions stated that the gainers would have to pay the losses in agricultural-coal mining disputes.

Even under the Coal Lands Act of 1873 and the various land withdrawal acts, it was found that only 500,000 acres of public coal lands had been patented by 1909. This small disposition was due to the fact that the land area provided for in the act was in fact too small for economic mining. As a result, corporations continued to gain title to coal lands under title of agricultural operations. Honest homesteaders who reported the discovery of coal deposits were deprived of their patent. The law seemed to reward the dishonest and deprive the honest individual. Legitimate business could not be fostered by laws which did not lend themselves to profitable development. The National Conservation Commission, formed to recommend changes in national resource policy, proposed that the remaining federal coal lands should be leased, reserving the agricultural surface if suitable.

In 1914, Congress passed an act giving the Secretary of

the Interior the authority to lease certain public coal lands in Alaska as an experimental leasing program. The leasing system remained in its experimental state until after World War I. Nonetheless, as long as the federal government planned to keep most of the royalties from leases, the opposition of western states to the leasing prevented federal implementation in these states where most of the western coal was located.

By 1920, western opposition had changed to a position of supporting coal leasing policy. The change was due to the fact that the government had revised its leasing program to provide many benefits to western coal-bearing states. An act approved on February 25, 1920, provided that most of the public mineral lands, including coal, should be open to leasing, and that each state would receive 37.5% of all royalties accruing with its borders; 50% would go into the Federal Reclamation Fund, and the balance into a miscellaneous federal treasury fund (Robbins, 1976). The act passed that year has become the cornerstone of federal leasing policy and is known as the Mineral Leasing Act of 1920.

Under the Mineral Leasing Act of 1920, federal coal was not available for sale. An individual was required to obtain a prospecting permit in areas where no known coal

deposits existed. Lands containing known coal deposits were not subject to prospecting permits. Rather, the lands were divided into leasing tracts, and leases were awarded through competitive private bidding. The competitive leasing system adopted by the Department of Interior was designed to award leases to the highest bidders, and a cash bonus was collected at the time the lease was awarded.

In the fifty years between passage of the acts of 1920 and 1970, however, the Department of Interior issued coal leases on federal land almost automatically to anyone upon request. Lease requests were processed on a case-by-case basis with little, if any, consideration of competitive bidding (Watson, 1981). Additionally, little judgment was given to the total federal coal reserves under lease or the need for additional leasing.

In 1970, the Bureau of Land Management issued a study, Holding and Development of Federal Coal Leasing, which concluded that federal coal acreage under lease had grown from 80,000 acres in 1945 to approximately 788,000 acres in 1970, while federal coal production from the leases had in fact dropped from 10 million tons in 1945 to 7.4 million tons in 1970. Approximately 90% of the total coal acreage under lease was not producing coal (U.S. Department of Interior, 1970). As a result, in 1971 the Secretary of

Interior announced an informal moratorium ordering the Bureau of Land Management to stop issuing federal coal leases and prospecting permits under the requirements of the Mineral Leasing Act of 1920. The informal moratorium continued for the next two years until 1973, when a formal moratorium was placed on long-term coal leasing until a programmatic approach to leasing could be developed. The only leasing that was authorized was a limited coal leasing policy designed to provide needed reserves to continue existing mine operations (Watson, 1981).

During the moratorium, and while the Department of Interior attempted to reorganize its coal leasing program, the federal government came under severe criticism from a variety of sources. A significant study, Leased and Lost, 1974, found that the Department of Interior's leasing policy prior to the 1971 moratorium was flawed with economic, legal, and environmental problems (Council on Economic Priorities, 1974). In summary, the study confirmed the earlier Bureau of Land Management's study, Holding and Development of Federal Coal Leases, that speculation, holding unmined public coal until the price increased, was a common practice. Only 52, or 11% of the 474 federal leases, were in production in 1974. Three hundred twenty-one federal leases had never produced a single ton of coal. In

its 54 years the leasing program had contributed less than 11%, only 242 million tons, to the nation's coal production (Council on Economic Priorities, 1974).

Furthermore, the study suggested that the public had not, in most cases, received fair market value for its coal. Every lease had been issued at industry's request, rather than as a result of the Department of Interior's determination that there was a market demand for the federal coal. In fact, it was not uncommon for the government to hold a lease sale at the request of one applicant. Two hundred forty-seven of the 474 federal leases had been issued at competitive lease sales, but 171 of the leases were granted without competition since one or no bidders appeared. The average winning bid at the 171 lease sales was $2.97 an acre. Another 210 leases were granted by the preference-right-application method which returned no revenue to the government except for the $410.00 filing charge.

The last major issue to be addressed by the study dealt with the reclamation of federal coal leases. It was estimated by the U.S. Geological Survey that only half of the 6,515 acres strip-mined on federal coal leased had in fact been reclaimed. Lease holder attempts to reclaim strip-mined land had not been uniform, and it was difficult

to evaluate the reclamation performance of companies. Some of the companies had mined fewer than ten acres and reclaimed none of them. Other companies had mined hundreds of acres and had reclaimed some of them. No standards or laws existed to ensure the reclamation of federal coal lease properties. Many of the mined federal coal leases were being classified as "National Sacrifice Areas" (Council on Economic Priorities, 1979).

In reaction to public disfavor over the abuses and misuses of publicly leased lands, a series of laws and regulations were enacted during the official federal moratorium on coal leasing. In 1975 the Department of Interior started a new leasing program called the Energy Mineral Activity Recommendation System (EMARS). Instead of the government identifying areas eligible for leasing or offering leases in response to specific sale requests, as was the procedure under the 1920 Mineral Leasing Act, the EMARS process integrated the planning procedures for lease sales which involved annual nominations for coal leasing areas by industry and the public. The EMARS program was opposed by the western governors, agricultural interests, and environmental groups. In 1975, the Natural Resource Defense Council (NRDC) sued the Department of Interior for insufficiently describing the EMARS program and the

potential environmental consequences. In 1978 a federal court, in NRDC vs. Hughes, found the EMARS programmatic Environmental Impact Statement (EIS) inadequate under the National Environmental Policy Act of 1969 (NEPA). The court stopped the federal government from implementing the EMARS program and issuing new leases until the federal government fully complied with requirements of NEPA.

By April, 1979, compliance with NEPA was established. In July 1979, under the Federal Coal Leasing Amendments Act of 1976 (FCLAA), the Federal Land Policy and Management Act of 1976 (FLPMA), and the settlement of NRDC vs. Hughes, the Department of Interior promulgated new regulations implementing a new federal coal leasing program officially designated the 1979 Federal Coal Management Program. The official federal coal leasing moratorium on new lease sales ended in January, 1981, in the Green River-Hams Fork coal region of southern Wyoming (U.S. Congress, 1981).

Although other important laws were passed in the 1970s, such as the Surface Mining Control and Reclamation Act of 1977, (SMCRA), to correct environmental abuses and surface owner conflicts, the most significant statute to govern and control federal coal leasing was the Federal Coal Leasing Amendments Act of 1976 (FCLAA). Provisions in FCLAA attempt to correct past abuses in noncompetitive lease acquisition,

speculation on federal coal leases, and nonproduction of coal leases. Additionally, the noncompetitive preference right leasing system was repealed on the grounds that it did not grant the public a fair market value return. All new leases are to be issued competitively, and no bid can be accepted for less than the fair market value of the lease. Furthermore, FCLAA provides for the consolidation of leases in logical mining units (LMU's) to guarantee maximum economic recovery (MER) of federal coal leases, diligent development and continuous operation on each lease, and preparation of a comprehensive land use plan prior to coal lease sales (U.S. Congress, 1981).

Existing Federal Coal Leasing Regulations

Existing federal coal leasing regulations and subsequent revisions are codified in Title 43 - Public Lands, under the Department of Interior and Bureau of Land Management's subtitle on general coal management. The existing Code of Federal Regulations - 43, Public Lands: Interior, were issued October 1, 1982; however, revisions to the rule making can be found in subsequent issues of the Federal Register. The regulations used as a basis of reference in this thesis are drawn directly from Code of Federal Regulation (CFR), Parts 3400 to 3475.6. Revisions announced

in the Federal Register will be identified and referenced where necessary.

In summary, the existing federal coal leasing regulations are authorized under the following statutory laws which are unchallenged constraints in this thesis (43 CFR 3400.0-3[1982]):

1. The Mineral Leasing Act of February 25, 1920, as amended (30 U.S.C. 181 et seq.).
2. The Mineral Leasing Act for Acquired Lands of August 7, 1947, as amended (30 U.S.C. 351-359 et seq.).
3. The Federal Land Policy and Management Act of 1976, October 21, 1976 (43 U.S.C. 1701 et seq.).
4. The Surface Mining Control and Reclamation Act of 1977, August 3, 1977 (30 U.S.C. 1201 et. seq.).
5. The Multiple Mineral Development Act of August 13, 1954 (30 U.S.C. 521-531 et seq.).
6. The Department of Energy Organization Act of August 4, 1977 (42 U.S.C. 7101 et.seq.).
7. The National Environmental Policy Act of 1969 (42 U.S.C 4321 et seq.).
8. The Federal Coal Leasing Amendments Act of 1976, as amended (90 stat. 1083-1092).
9. The Act of October 30, 1978 (925 stat. 207302075).

Environmental Regulations

Environmental requirements to satisfy the leasing of federal coal lands can be separated into two phases: presale and postsale leasing. Presale requires that potential federal lease tracts must meet the qualifications of unsuitability for surface mining criteria and the preparation of an environmental impact statement. The postsale environmental requirement applies to the reclaimability of the lease tract once the lease is mined.

The meeting of the preleasing environmental requirements occur during land use planning and tract delineation processes conducted by the Bureau of Land Management in consultation with industry, other federal agencies, and state and local governments. As shown in Figure 2.1, the environmental constraints are determined early in the process (U.S. Commission on Fair Market Value).

The environmental screening of potential federal leasing is a mechanism of how the federal government leases coal, but it quickly determines where coal should be leased. Under the General Requirement for Land Use Planning the federal government must prepare an organic land use plan for areas containing minable coal deposits. All lands with leasing potential and leased after July 30, 1982, must meet 20 environmental unsuitability criteria. If any one of

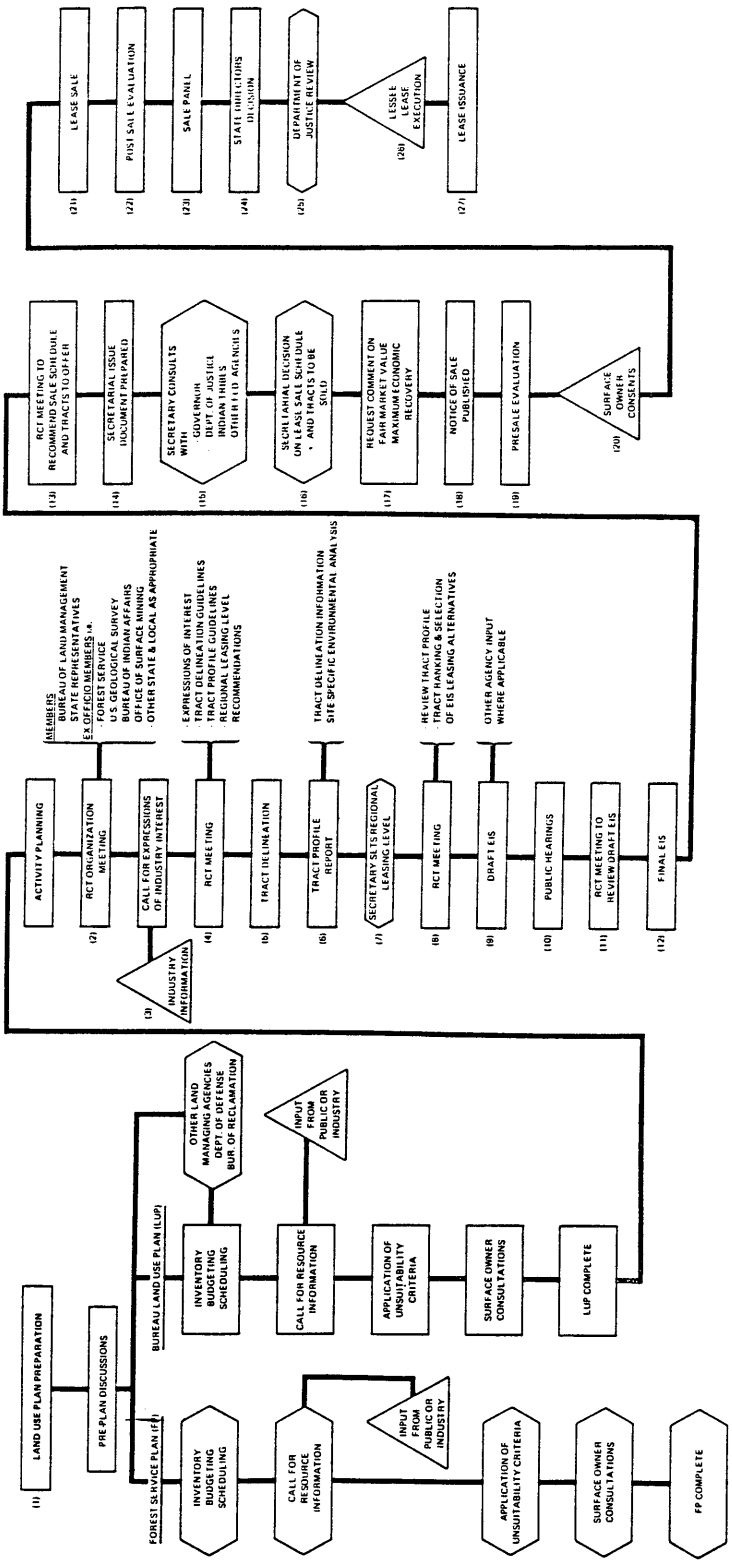

Figure 2.1

Federal Coal Leasing Process

Source: U.S. Commission on Fair Market Value (February, 1984).

the criterion cannot be met or mitigated, the lease area is excluded from the federal coal reserve. The unsuitability criteria are identified in Table 2.1 (43 CFR 3420.1-4).

Once a tract has passed the 20 unsuitability criteria and the regional coal team has determined that the coal is marketable, a regional leasing environmental impact statement is prepared by the Bureau of Land Management under the Environmental Policy Act of 1969. Both accumulative and site-specific impacts from each coal tract in the context of the region must be determined to include all positive and negative impacts to the human and physical environments.

If a federal tract passes the land use and tract delineation procedures and the tract is leased, the producers must then meet the requirements of detailed site-specific environmental impact statement of the producer's mine and reclamation plans.

Land Use Regulations

Federal coal leasing land use regulations are strongly interrelated to environmental constraints. However, two distinct features in the area of federal coal leasing are separate from the environmental issues. The two separate issues are the consent to lease by government agencies in charge of the lands overlying or near federal coal and by

Table 2.1

The Unsuitability Criteria

1. Lands in the Federal land preservation system (e.g., National Parks, Wildlife Refuges, Trails, Wild and Scenic Rivers, Recreation Areas, Wilderness Areas)
2. Lands within rights-of-way or easements
3. Lands within 100 feet of cemeteries and rights-of-way for public roads, or within 300 feet of public and residential buildings
4. Wilderness study areas, while under review for wilderness designation
5. Class I scenic areas
6. Lands used for scientific studies involving food or fiber production, natural resources, or technology demonstrations and experiments
7. Publicly owned places on Federal lands which are listed on the National Register of Historic Places
8. Lands designated as natural areas or as National Natural Landmarks
9. Federally designated critical or essential habitat for threatened or endangered plant and animal species
10. Lands containing habitat considered critical or essential for State-designated threatened or endangered plant and animal species
11. Bald or golden eagle nests or sites, including appropriate buffer zones that consider habitat for prey species
12. Bald and golden eagle roost and concentration areas used during migration and wintering
13. Falcon cliff nesting sites and appropriate buffer zones that consider prey species' habitat
14. High-priority habitat for migratory bird species of high Federal interest on a regional or national basis
15. Essential habitat for resident fish and wildlife species of high interest to the State (e.g., active dancing and strutting grounds for sage grouse, sharp-tailed grouse, and prairie chicken; critical winter ranges for deer, antelope, and elk; and migration corridors for elk)
16. Lands in riverine, coastal, and special flood plains (100-year recurrence)
17. Lands committed by the surface management agency to use as municipal watersheds
18. Natural resource waters identified in State water quality management plans and a buffer zone of one-quarter mile from the outer edge of the far banks of the waters
19. Alluvial valley floors (AVFs) considered important for agriculture, or land outside an AVF if mining would materially damage surface or underground water systems that supply the AVF
20. Lands deemed unsuitable by criteria proposed by a State and adopted by the Secretary of the Interior in rulemaking.

Source: 43 CFR 3461.1

private surface owners. Prior to tract delineation, the Bureau of Land Management must obtain consent from the governors of producing states and from other surface management agencies such as the U.S. Forest Service (43 CFR 3420.4-2). If federal coal is to be nominated for leasing, any Indian tribel near the proposed lease tract must also be consulted, although tribal consent is not necessary for leasing (43 CFR 3420.4-4). If producing states or other surface management agencies do not consent to surface mining, the proposed coal lease is withdrawn from leasing.

Because much of the federal coal underlies private surface ownership, a significant problem of split-estate ownership exists in federal coal-producing regions. Qualified surface owners must consent to surface mines prior to leasing federal coal (CFR 3420.1-46). Nonetheless, if no other alternative area of federal coal is available to meet the regional leasing level, the consent of the surface owner may be overridden, and the area will be considered for leasing and development. The provision for private surface owner consent prior to leasing is reevaluated periodically to determine a change in qualified surface owner status (43 CFR 3420.1-4A).

Institutional and Financial Barriers to Coal Producer Market Entry Related to Federal Coal Leases

Holders of federal coal leases must meet lease qualifications requirements under federal regulation (43 CFR 3472.1-1). A federal coal lease can be held only by U.S. citizens, associations organized under U.S. laws, corporations formed under U.S. law, corporations operating a common carrier railroad, and public bodies including municipalities.

Corporations operating a common carrier railroad may hold federal leases if the coal is to be used solely for the operation of the railroad. This regulation allows railroads to utilize federal coal only for the purpose of steam engines. Such railroads are limited to holding no more than 10,240 acres of federal coal on one lease for every 200 miles of mainline track held by the railroad (43 CFR 3472.1-2).

Public corporations such as municipalities may hold federal leases even on military lands if the coal is used to produce electrical energy. The electricity must be for sale to the public in the state in which the lease is held.

Federal lease holding is further restricted by acreage limitations. No person, association, or corporation may control at any one time federal coal leases, lease

modifications applications, or bids on more than 46,680 acres in any one state and no more than 100,000 acres in the United States (43 CFR 3472.1-3).

Persons wishing to explore federal leases must pay file fees of $250.00 for each lease with an additional $10.00 fee for each application. Lease holders must pay $3.00 per acre rental fees for federal tracts, and no rental fee will be accredited against royalty payments for new leases or lease adjustments after August, 1976 (43 CFR 3473.3-1).

Prior to the issuance of a federal lease, lease bonding must be furnished by the lessee. Lease bonds are payable in corporate security bonds, cash, or personal lease bonds secured by negotiable U.S. bonds. If a new lease is acquired within an existing mining unit, the amount of the bond is adjusted to the logical mining unit bond. The amount of the bonds is established by the Bureau of Land Management and is the amount necessary to cover estimated reclamation costs of the federal lands if the lessee defaults (43 CFR 3471.1).

Lease holders must pay a royalty payment on all federal coal produced. After 1976, the royalty on surface coal produced is 12.5% of the contract sale price per unit (43 CFR 3485.2). The Secretary of the Interior, in order to promote development, may reduce the royalty but in no case

shall it be reduced to zero percent.

Federal leases will be issued for an initial period of 20 years and thereafter if the lease is kept in continuous production with certain stipulations. If the stipulations for continuous operation are not met, the lease will be canceled for leases issued after 1976. For leases issued prior to 1976, continuous operation must be met by 1986. The provision for continuous operation may be changed when the mining of federal coal is interrupted by strikes or reasons not attributable to the lessee or when the Secretary determines that the public interest will be served by payment of advanced production royalties (43 CFR 3475.5).

Federal lease holders must meet diligence and maximum economic recovery of federal coal requirements. Unless otherwise authorized by the Secretary of Interior, all producers of federal coal must attain maximum economic recovery of the federal coal when the deposit is mined. Diligence requires that at least one percent of commercial grade coal of total reserves is produced within the duration by the lessee. The lessee is permitted to use as a recoverable reserve basis either federal coal or a logical mining unit. A logical mining unit may consist of one or more federal leases and also include state and private leases. The logical mining unit must be under one mine

operator, and all tracts in the unit must be contiguous. Unless otherwise stipulated, all federal lease holders who do not meet diligence requirements may not acquire additional federal leases (43 CFR 3480.0-5 and 43 CFR 3472.1-2).

Regulations for the Level and Timing of Leasing Federal Coal

The level or quantity of coal leased by the federal government is determined through interactive processes between the Bureau of Land Management, Regional Coal Leasing Teams, the Department of Energy, Indian Tribes, public comment, and expressions of interest from industry. However, once federal coal land has met the environmental qualifications and concurrence from producing states and other surface management agencies, including the Bureau of Indian Affairs, the Secretary of Interior ultimately sets the level of federal coal to be sold (43 CFR 3420.2).

The Secretary of Interior follows the general steps in determining levels (43 CFR 3420.2):

1. advice from producing states through regional coal teams,
2. potential economic, social and environmental effects of leasing on coal regions including Indian areas,

3. expressions of interest from industry and expected demand,
4. expressions of interest from public and small businesses considered for special opportunity lease sales,
5. expected regional production from both federal and nonfederal coal holdings,
6. the level of competition within a coal region and recommendations from the Department of Justice,
7. U.S. coal production and expected demand for federal coal,
8. national energy needs, and
9. other pertinent information.

Leasing levels are established for each region; however, levels for two or more regions can be combined for leasing if the Secretary considers it appropriate. Leasing levels for each region may be stated in a range of values (43 CFR 3420.2).

Once regional levels have been established, tracts that have met the initial land use requirements are selected. A leasing environmental impact statement is prepared reviewing cumulative impacts and site-specific analysis for each tract. Alternative levels of leasing are also analyzed. Additional requests for expressions of interest are

solicited and recommendations for a lease sale schedule are made by the regional leasing teams to the director of the Bureau of Land Management based on (43 CFR 3420.3-4[b][2])

1. the compatibility of coal quality, coal type, and market needs,
2. environmental and socioeconomic impacts,
3. the compatibility of reserve size and demand distribution for tracts,
4. public opinion,
5. avoidance of future emergency lease situations, and
6. special leasing opportunity requirements.

Following the issuance of the regional leasing environmental impact statement and the approval of the governors of the producing states, affected Indian Tribes, and the U.S. Attorney General, the Secretary of Interior can announce the scheduling of lease sales. The Secretary has the authority to revise the list of tracts included in the lease tracts or the sale timing in accordance with alternative levels of leasing considered in the environmental impact statement. Furthermore, any regional lease schedule may be updated or replaced as a result of new regional tract ranking and selection (43 CFR 3420.5-1-2).

Competitive Leasing and Fair Market Value Determination

The final step in the federal coal leasing process after coal tracts has been delineated and a lease sale schedule have been established is to lease the coal at a competitively determined fair market value. All new production federal coal except coal considered for emergency or pass-by leasing at existing mining operations must be sold at a value equal to prevailing competitive market value and no less than $100.00 per acre (43 CFR 3422.1). Fair market value is defined in terms (43 CFR 3400.0-5N)

> of the amount of cash, or on terms reasonably equivalent to cash for which in all probability the coal deposit would be sold or leased by a knowledgeable owner willing but not obligated to sell or lease to a knowledgeable purchaser who desires but is not obligated to buy or lease.

Before a lease sale is conducted, three steps are taken by the Bureau of Land Management. First, public comments are solicited on the fair market value of the coal to be offered. Secondly, the minerals management service prepares a fair market value estimate of the coal offered. This evaluation includes the coal evaluation resource economic value (CREV) based on comparable sales modeling, mining method evaluation, estimated recoverable reserves to indicate maximum economic recovery, coal quality assessment, royalty and lease bond considerations, and an estimate of reclamation costs. An evaluation of the public comments on

fair market value and maximum economic recovery are included in the Mineral Management Service's report (43 CFR 3422.1-1). The CREV model used in Step 2 to determine a tract's reservation price is based on information from comparable tracts in a coal region to make adjustments on proposed federal coal tracts. The adjustments are computed to determine differences in net present value between the comparable tract and proposed tract related to stripping ratios, sulfur content, transportation variations, BTU content, tax effects, reclamation costs, boxcut development costs, production rate economies-of-scale, and bonus payment plans. Each input parameter, such as BTU content, is evaluated ceteris paribus, and when the process is completed, all the parameters are summed and added the comparable sale value. The difference between the CREV model's output and the comparable sale value results in an estimate in dollars of what the federal government selects as a reservation or minimum pre-sale acceptable bid price for a federal cost tract (Cordes and Petrick, 1983).

The third step is the actual notice of sale. It includes the type of sale, bidding method, rental-royalty fees, the minimum bid to be accepted, the quality-quantity of coal offered, and lease terms. It further specifies that the Secretary can reject any or all bids for a variety or

reasons, and reserves the right to offer the lease to the next highest qualified bidder if the successful bidder fails to obtain the lease for any reason (43 CFR 3422.2).

The coal lease sale procedure is divided into two stages: presale and postsale. In the presale stage all bids are submitted in the sealed form. For a bid to qualify, it must equal or exceed the minimum bid published in the sale notice. The sale notice acknowledges that the published minimum does not constitute an acceptable fair market value bid for the lease. The determination of fair market value is made in the postsale stage of the sale once the level of competition, anti-trust considerations, and lease holder qualifications is made by a sale panel (43 CFR 3422.3-2).

In the postsale review made by the sale panel, all bids must meet three additional tests to qualify for the winning bid. Each lease tract and bidder is reviewed by the panel to determine the market competitiveness of the bidder relative to other producers in the area, bidder participation concerning the reasonable bids of two or more bidders, and the competitiveness of high bids on tracts relative to acceptable high bids on comparable tracts in the sale and past sales.

If the high bids are judged by the panel to be uncompetitive, a comparability analysis is performed on

those tracts. The comparability analysis utilizes all the tract delineation information, prior sale and current sale data to make an estimate of a value representative of fair market value for that particular tract.

The postsale comparability test for each tract produces a geometric mean comparable-value for each tract analyzed. This estimate represents the fair market value for the tract, and if the high bid for the tract is above the geometric mean, bids exceeding this value will have met the fair market value requirement.

Figure 2.2 demonstrates how the comparable postsale approach can determine a qualifying bid for a federal tract. If comparable bids are not available for uncompetitive bids, the use or income approach to determining the tract value can be substituted. Further adjustments in the uncompetitive tract can be made for reasons of market changes during the sale procedures, public interest for bypass leases, and uncertainties in the comparabilities of tracts (Federal Register, September 13, 1982).

Winning bids must pay in the form of cash with the bonus divided into five payments. The first payment is due with the bid along with the first year's rental on the lease. The balance of the bonus bid is payable in equal annual

installments on the next four anniversary dates of the lease (43 CFR 3422.4).

The federal coal leasing regulations summarized in this chapter determine how the government leases in an environmentally acceptable manner, when the government leases, and where the government will lease once a competitive fair market value bid has been accepted.

A	B	C
$.04 PER TON	$.07 PER TON	$.05 PER TON
PRIOR SALE	PRIOR SALE	CURRENT SALE

GEOMETRIC MEAN TEST

$$\sqrt[3]{.04x.07x.05} = \$.05 \text{ PER TON}$$

$.06 IS GREATER THAN $.05. THEREFORE, THE BID IS ACCEPTED

Assumptions:

BLM's minimum bid for tract = $400.00 per acre

Bid = $.06/ton or $714.06/acre

Federal tract = 11,901 tons recoverable coal/acre

Figure 2.2

Hypothetical Noncompetitive

Fair Market Value Determination

Chapter III

COAL MARKET DEVELOPMENT AND FEDERAL COAL LEASING

In order to develop a federal coal leasing model that favorably influences orderly, healthy, and stable coal markets, current and projected coal markets must be analyzed. Coal market analysis should concisely describe the history of coal production, shifts in production regions, changes in fuel mixes, producer behavior, and estimated market trends. Once the market is characterized, then the question of how, when, and where to lease federal coal can be addressed.

History of Market Development

Throughout the first half of the twentieth century, the nation's electrical capacity grew in a steady fashion. Electrical consumption grew rather slowly in the first decades of the twentieth century. Until World War I, the annual electrical growth rate for average residential consumption increased about 1 to 2%. After World War I, as the number and variety of electrical appliances proliferated, electrical growth accelerated rapidly. Since

the mid-1930s, annual growth rate per electric customer has averaged 7 to 9% with the exception of the World War II years. From the beginning of World War I to the late 1970s, total electrical demand doubled every decade.

Although coal's share of most fuel markets in industrial and residential uses declined during the 1920s and 1930s, coal continued to provide fuel for about two-thirds of the electrical power generation in the late 1930s. Hydroelectric generation had dropped to 27.5%, and coal had decreased to about 60% of the market with the introduction of natural gas and oil as a primary energy for electrical generation. By 1970, coal-fired electrical generation decreased to about 45% of the market shares; hydroelectric generation decreased to 17% while natural gas increased to 25%, and residual fuel to about 12.5% of the market share. Nuclear generation accounted for about 1% of the market (Clark, 1975).

From 1970 to 1981, the sources of production of electricity changed dramatically in terms of relative market shares among coal-fired generation, oil and gas generation, nuclear power, and hydropower electric generation. Conventional coal-fired electrical generation commanded the market share by producing 75% of all electricity. Gas and oil electric generation fell to under 1% of the market

share. Nuclear and hydroelectric each maintained about 12% of the market while geothermal and wind contributed to less than 1% of the production of electricity (U.S. Department of Energy, 1982).

The production of coal has increased in direct proportion to the demand for electricity. Historical production of steam coal for electrical generation, which includes bituminous, sub-bituminous, and lignite coals as shown in Figure 3.1, has grown in total volume over the period from 1890 to 1982. However, as the production graph illustrates, coal growth has occurred in irregular cycles. Although accelerated growth in production has occurred around major war years, the greatest period of growth in the history of coal production took place in the 1970s. Since most of the coal production in the 1970s was due to demand for electrical generation, the large coal reserves west of the Mississippi with their large quantities and low sulfur content came into production. In 1952, only about 6% of the total amount of U.S. coal production for steam generation was western coal. By 1981, the western production had increased to nearly 33% of the market. Since nearly 60% of western coal is owned by the federal government, the federal government has become a significant supplier of steam coal in the decades since World War II. Figure 3.1 illustrates

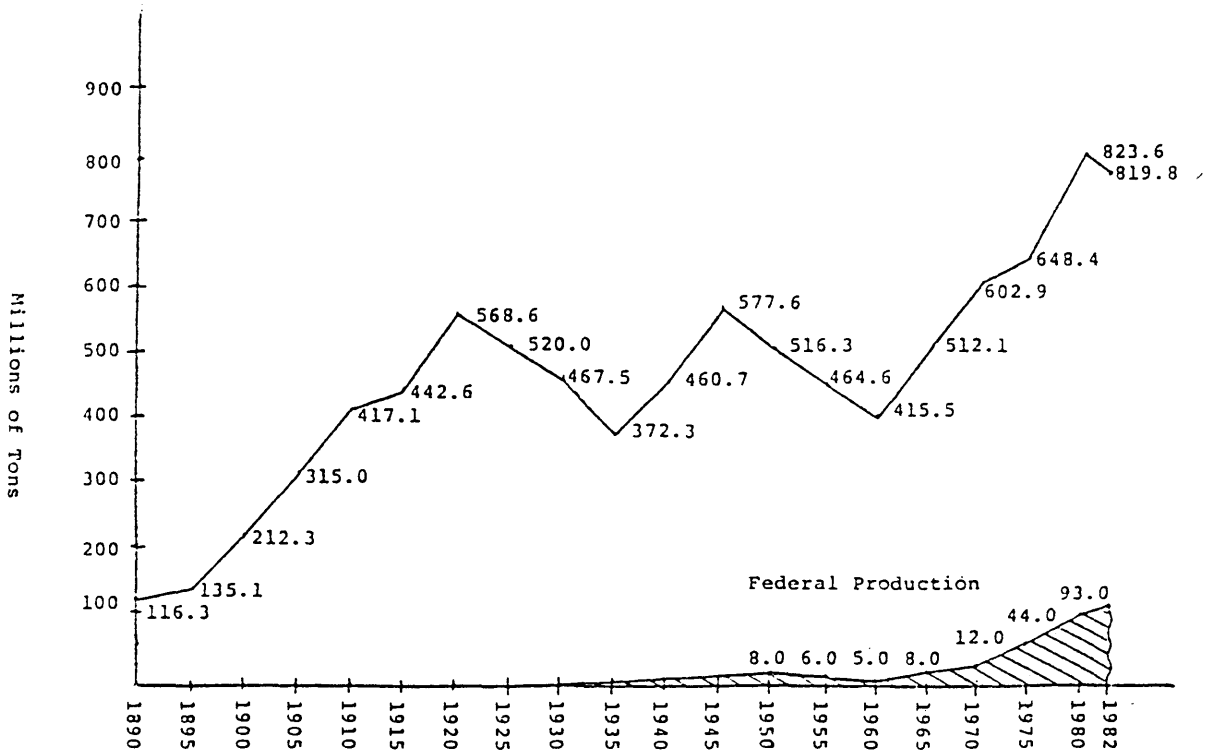

Figure 3.1

Coal Production From 1890 to 1982

the commensurate increases in the production of western federal coal.

Western coal did not play a major role in providing the electrical industry with energy for steam generation until the late 1960s and early 1970s. Due to the long distances from market areas and the low BTU content of the western steam coal per pound, eastern coal was much preferred for electrical generation. With rising energy prices for oil and gas in the 1970s, increasing capital investment and environmental constraints on additional hydroelectric and nuclear capacity, and ever increasing demand for electrical consumption, the vast reserves of low sulfur western coal came under great demand for use in coal-fuel electrical generation.

Unlike eastern coal, western coal provided very little toward the industrialization of the United States. Except for some use of metallurgical coal in Colorado and Utah, early use of remotely located western coal was primarily for fueling existing and expanding railroad systems and for supplying steel smelters in 6 western states, and western wood-scarce settlements.

Coal production from federal lands has also grown dramatically since 1960. In Montana alone federal coal production has increased from 26,000 tons in 1957 to over 10

million tons in 1977. The growth in Wyoming of federal coal production has been more pronounced, increasing from 442,000 tons in 1957 to over 28 million tons in 1977. Since over 60% of the minable coal resources in the Powder River Basin are owned by the federal government, it is understandable that as private coal reserves are exhausted, more federal coal will be mined (U.S. Department of Interior, 1979).

The increased production of western and federal coal can be attributed to two basic factors. The most important is the sharp rise in the price of oil and natural gas. Many new western and eastern power plants are coal-burning and are using coal from mines in the west. Additionally, some plants previously using gas, oil, and nuclear processes, are converting to coal received from western regions.

Another significant factor leading to the large increase in the use of western coal resulted from changes in the Clean Air Act of 1970, in respect to sulfur dioxide emissions from coal-fired electrical generation. Emission standards set for new plants were low enough to prohibit the use of most eastern coal unless utilities invested in pollution abatement equipment. In 1977, however, the Clean Air Act Amendments raised the standards for sulfur dioxide emissions. Most western coal contains enough sulfur to require new coal-burning electrical power plants to use

pollution abatement control equipment. The stricter air quality standards have diminished the economic advantage of western coal over eastern and midwestern coal. Although production of western coal for consumption in western built power plants is not expected to be changed by the new standards, electrical power companies in the east and midwest have begun to use more coal from their own coal-producing regions and import less from the west (U.S. Department of Interior, 1979).

Domestic coal production for steam generation has slowed considerably since 1981. Supply of coal actually fell from 1981 to 1982. In 1981, 597 million short tons were produced; however, in 1982, the production level fell to 594 million short tons. The decline reflected the recessionary behavior of coal demand resulting from a general downturn in the world economy. In 1983, as demand for electrical generation increased and the general economy improved, coal production increased to 625 million short tons. Production in western states continued to decline from 227 million short tons in 1983 to 225 million short tons in 1983 (Westerstom, 1984).

U.S. Coal Producing Regions and Market Differences

Coal deposits are dispersed over much of the United

States; however, five regional areas contain significant coal reserves as identified in Figure 3.2 (U.S. Geological Survey, 1975). For purposes of market analysis, coal production can be divided into eastern and western supply regions, because western and eastern coal regions differ markedly in terms of coal type, distance from electrical markets, and fundamental surface and subsurface property ownership.

The western region contains more than half of U.S. minable reserves. Wyoming, Montana, Colorado, North Dakota, New Mexico, and Utah possess approximately 20.6 million acres of reserves. The western region contains unusually thick deposits located near the surface. The coal seams in the Powder River Basin of Montana and Wyoming range from 30 to 120 feet thick and average about 200,000 tons of coal per acre.

The eastern coal region is located in Appalachian and midwestern states. Kentucky, West Virginia, Pennsylvania, and Illinois contain about 80% of eastern reserves. Two-thirds of eastern reserves are located in thin seams averaging five feet at depths of 200 feet or more. Eastern coal is more suited to underground mining methods while western coal is normally surface mined. About 60% of total U.S. coal production comes from surface mining because

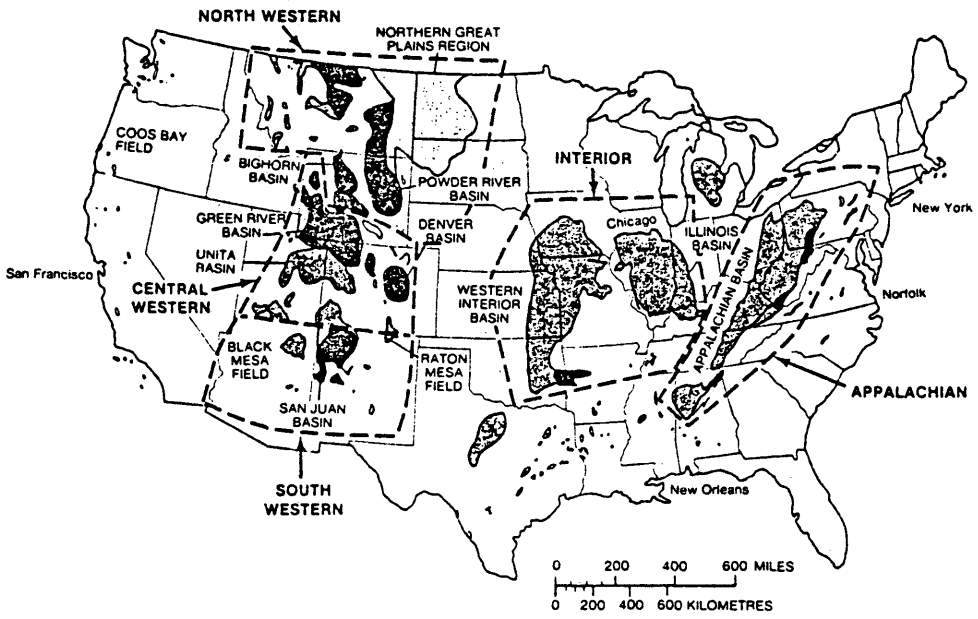

Figure 3.2

Coalfields of the Conterminous United States

Source: P. Averitt, Coal Resources of the United States, January 1, 1974, U.S. Geological Survey Bulletin.

surface mining offers a much higher level of productivity over underground methods. In 1980, the eastern region produced about 70% of the U.S. coal production.

Western and eastern coal types differ both in energy and sulfur content. Eastern bituminous coal is equivalent to approximately four barrels of American crude oil per ton of coal. Western sub-bituminous equals about three barrels of American oil per ton of coal. Western coal contains about 1% sulfur by weight whereas eastern coal ranges from 2 to 4% sulfur by weight (American Petroleum Institute, 1982). Western coal usually has a high moisture content of about 30%.

Western and eastern coal regions differ in transportation of coal. Although about 70% of all coal produced in the U.S. is moved by coal unit trains, most of the rail users have no alternative way to move coal. Western coal regions are particularly dependent on railroads since most western coal must be moved 500 to 1500 miles to market centers with rail rates comprising up to 75% of the delivered price of coal (Atkinson and Kerkuliet, 1984). Eastern coal production is located near electrical markets and relies on rail and truck transportation. As a result, western coal has a major transportation cost disadvantage compared with local eastern coals (Gordon, 1978).

The ownership of surface and subsurface coal resources vary significantly between eastern and western coal producing regions. Government ownership of eastern coal amounts to a very small percentage of the total resource since most coal is privately owned and traded in the market as a free commodity. In contrast western ownership is dominated by the federal government. To complicate ownership, the land is heavily checker-boarded with state, private, and Indian owners holdings parts of federal logical mining units. The nature of land ownership in the west reduces the responsiveness of western coal production compared to the private market oriented eastern production region (Office of Technology Assessment, 1981).

Surface mining in the production of bituminous coal maintains a distinct cost advantage over underground mine operations in terms of labor productivity. Labor productivity in surface mining is about 3 times as great in coal output per worker due to the capital intensity of surface operations. Most coal mined in the western U.S. is highly suited to surface mining application requiring large front-end capital investment and resulting in the use of large tracts of coal reserves for profitable resource extraction.

The scales of economy requirements necessary in the

operation of western surface mining operation has attracted firms into the coal market that have ability to package the investment of expensive capital, acquire large tracts of coal reserves, and sustain operating losses while coal reserves are developed. Coal production in the Powder River Basin is currently dominated by producers owned by large oil, mining, and utility companies. In 1980, with about 30% excessive capacity in all Powder River Basin mines, the average production per mine was over 7 million short tons per year. The three largest producers, the Black Thunder Mine owned by Atlantic Richfield Oil, the Rosebud Mine owned by Montana Power, and Eagle Butte and Belle Ayr owned by Amax, produced over 52% of the coal in the region. The mine plans of each of these companies is further dependent upon a large percentage of federal leases (U.S. Office of Technology Assessment, 1981).

The demonstrated reserve base of bituminous coal in the United States, which supplies coal to electrical generators, is currently in excess of 430 billion short tons, half of which is recoverable by today's surface or underground mining methods. The reserve base is nearly equally divided western coal reserves with western reserves accounting for 72 billion short tons of surface coal and 145 billion short tons of underground coal (U.S. Department of Energy, 1984).

Of the 217 billion short tons of western bituminous recoverable reserves, the federal government controls approximately 60% of the mineral rights. As of April, 1983, the government had leased 18.1 billion tons of which most were leased in western states. Of the 18.1 billion tons leased, approximately 661.3 million tons had been mined leaving about 17.4 billion short tons currently under lease. About 10 billion tons are in existing or pending mine plans with an additional excess of 7 billion tons of outstanding federal coal reserves in private control not committed in mine plans. Most of the uncommitted federal leases were leased prior to 1970, and the amount of early lease acreage for uncommitted reserves declined from 16 billion tons in 1971 to approximately 7 billion in 1983. Although the quantity of the uncommitted federal leases is substantial, uncertainty of coal quality and market ability surrounds the uncommitted federal leases (U.S. Commission on Fair Market Value Policy for Federal Coal Leases, 1984).

Market Demand for Coal

Most coal produced, particularly western coal, is used for electrical generation. Since 1950, the consumption of coal has shifted dramatically in terms of end-use by sector. As indicated in Figure 3.3, the end-use of coal in

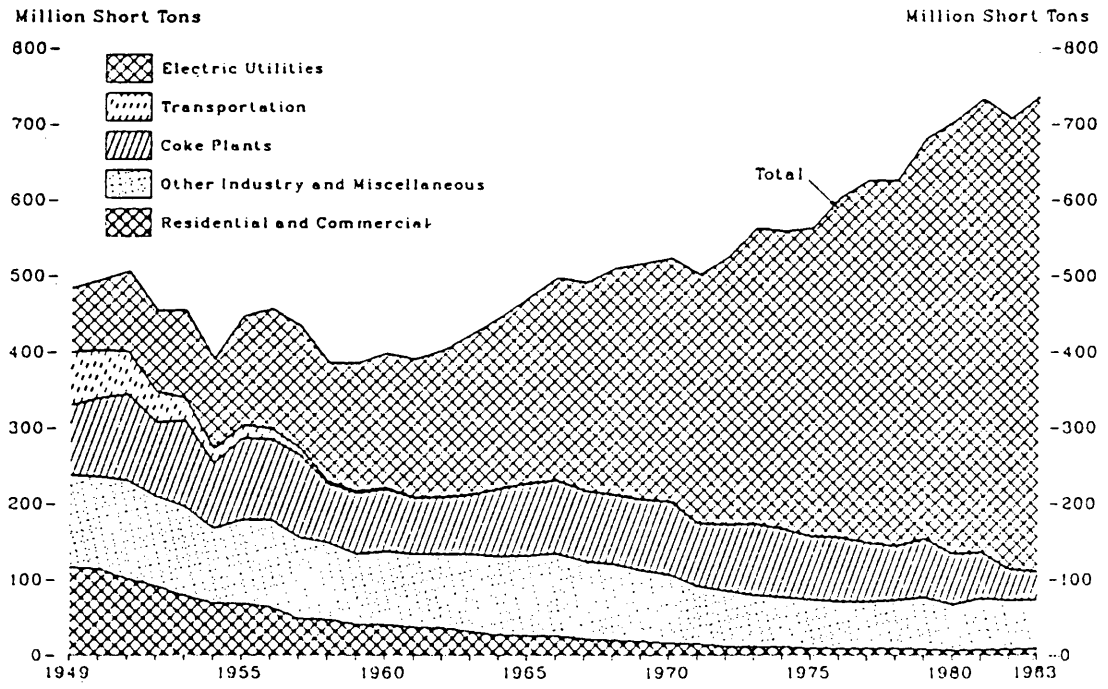

Figure 3.3

Coal Consumption by End-Use Sector

Source: Energy Information Administration, Office of Energy Markets, U.S. Department of Energy, (April 1984), p. 168.

transportation, coking facilities, and direct use in commercial and residential applications, has declined with the direct use of coal. Very little coal is used directly in today's market, and most coal is converted to electricity in large coal-fired generators which benefit from scales of economy (U.S. Department of Energy, 1984).

Since a preponderance of western coal is suitable for electrical generation, the use of federal coal has grown significantly in the last 12 years. In 1970, only 12 million short tons of federal coal were mined; however, by 1982, federal coal provided nearly 130 million short tons of coal (U.S. Department of Energy, 1984).

More importantly, in the mid-1970s due to the fear of shortages of fossil fuels, coal consumers began accumulating large inventories of coal. As a hedge against strikes by both rail and mine workers and possible oil embargos, electrical generating plants began holding in inventory three times as much coal as they did prior to the 1973 oil embargo. With constant growth in electrical generation until the early 1980s, the excessive stocks were a valuable hedge; however, when demand for electricity fell to negative growth in 1982, the supply of coal production fell significantly as electrical generators consumed stocks rather than new coal production. The result was shocks to

coal production and reduced production and downturns at the mining level.

The export of coal from U.S. markets grew steadily throughout the 1960s and 1970s, peaking in 1981, and then falling significantly from a high of 112.5 million short tons to 77.8 million short tons. Most exports from the United States are shipped from eastern coal producing regions to European and Canadian destinations. Western coal is supplied to Pacific Rim countries such as Japan and Korea; however, coal producing countries including Australia and the Republic of South Africa have made significant inroads into the western coal export market due to their higher coal quality and transportation advantage over U.S. coals (U.S. Department of Energy, 1984).

Since 1970, new power plants have taken advantage of economies of scale resulting in electrical capacity usually greater than 500 megawatts. The trend for meeting coal supplies for new large generators has been the establishment of long-term contracts. About 80% of the coal purchased for generation is through long-term contracts. Large new power plants require a substantial amount of coal over their lifetimes, and in order to ensure adequate supplies, they usually buy from a new mine on a long-term basis.

Long-term coal supply contracts are an essential

component between highly capitalized surface mines and large coal-fired generators. Prior to the 1960s, the coal industry suffered serious periods of over-production and resulting depressions. With the advent of the long-term contract serving as a viable marriage between supply and demand in coal-fired electrical generation, necessary stability has been added to the industry. Risk and market uncertainty, both very dangerous and intolerable to the coal-fired electrical industry, are considerably reduced with the introduction of the long-term contract. The contract must be signed before the mine is opened so that financing can be arranged and mine construction can begin (U.S. Department of Energy, 1984).

Projected Coal Markets

The supply of coal for steam coal generation is inextricably dependent upon the demand for electricity since coal producer capacity can far exceed demand. Coal demand projections developed during the 1960s and 1970s assumed a high rate of growth of 7% per annum for electrical consumption. The primary constraint to fulfilling electrical demand was the supply of coal. Increasing demand was assumed, and coal mines were put into production as quickly as possible indicating inelasticity of demand.

Furthermore, given the crisis atmosphere in energy production, it was assumed that coal would be converted to gasoline requiring large quantities of coal particularly in the western region.

In 1981, demand projections from the Department of Energy, ICF Coal Electric Utility Model, and the Office of Technology Assessment predicted medium range forecasts of 523, 426, and 378 million tons per year production respectively for the western coal region for 1990. More recent forecasts from the Department of Energy and the National coal Association indicate a much slower rate of coal production. Western coal production for 1990, assuming no major increases in gasoline prices, is predicted to be 385 million short tons per year by the Department of Energy (U.S. Department of Energy). The National Coal Association forecasts a 2 to 3% growth per annum with expected output of western coal to be 272 million short tons per annum assuming western coal retains its 36% market share of the total coal market (Weir, 1984).

Although electrical demand growth rate is currently assumed to remain low throughout the 1980s, the real demand by electrical generation will depend on the general growth of U.S. GNP, the cost of capital, transportation rates, and competition among coal producers. Coal demand forecasts

have traditionally changed over short periods of time and can be only used as possible ranges of outcomes for planning purposes. However, existing coal mines in the western region, even assuming low growth, will be using more federal coal as private coal becomes exhausted on producing mines. In the Powder River Basin, most mines contain federal reserves, and by 1990, 90% of the coal produced from these mines will be from federal reserves (U.S. Congress, Office of Technology Assessment, 1981).

National Coal Leasing Market Model

A national coal leasing market model should be constructed to correct over capacity and production market distortions in existing and projected coal markets in order to develop federal regulations conducive to orderly, stable, and healthy coal market development. The existing and projected coal market can be described and summarized in the following manner:

1. A market with excess productive capacity in both eastern and western coal regions, and this condition is predicted to persist throughout the 1980s. Significant increases in steam coal production occurred in the 1970s; however, current trends indicate very slow rate of growth in the

1980s. Perceived energy shortages in the 1970s led to inaccurate market demand forecasts and speculation by private and public organizations resulting in current market disequilibrium.

2. The western coal industry must extract coal controlled by public agencies involving longer lead times for producers in the development of coal. Western coal on federal lands must meet and comply with public environmental constraints much greater than eastern producers. Western producing states maintain a high revenue claim on western coal production. Scales of economy are much greater for western surface coal producers, and western coal must be shipped long distances to market under rising monopolistic railroad control. Although western coal production will grow at a rate commensurate with the coal industry, more public federal coal will be used as private western coal becomes depleted.

3. All coal producers are losing export opportunities as foreign competitors gain a larger share of traditionally U.S. export markets. U.S. producers face further import coal competition as foreign coal producers make higher quality and

competitively priced coal available to U.S. steam coal consumers.

A national coal leasing market model is based on three fundamental assumptions that orderly, stable, and healthy markets will first yield the highest return to government revenues, producer profits, and consumer satisfaction when the use of federal coal is carefully managed, and secondly, that the use of a public good such as federal coal can be best undertaken through a fully centralized democratic process of all peoples involved. Thirdly, the leasing of public coal can further enhance the quality of coal markets through a policy that develops public reserves in an orderly predictable manner, helps maintain stability of market prices through rational lease sales and the amount of coal leased into the market, and promotes a fair rate of return to producers by not speculating irresponsibly on future demand, and causing shortages or gluts of public coal.

The first step in establishing a normative national coal leasing market model that promotes market order, health, and stability is the creation of an integrated region and national coal market leasing commission based on majority voting. The primary objective of the commission would be to correct existing and future coal market failures by bringing and keeping market supply and demand into equilibrium and

selecting the best market and environmentally acceptable coal for leasing.

A national coal leasing market model would incorporate a centralized democratic management approach because the use of a public resource, particularly one that is potentially socially and environmentally very destructive such as coal extraction, should have the highest public representation and authority possible. All affected parties including federal, producing state and local governments, coal and electrical industry representatives, land owners, environmentalists, and Indian tribes would form the basis for the management organization structure of the model. At the forefront of the organization would be the national coal leasing commission as part of the existing Department of Interior. As a subset of the national organization each coal producing region would maintain a regional coal leasing team. The national commission would be responsible for ultimate leasing decisions, and the regional teams would make recommendations to the national commission. Regional members would be selected on a non-partisan basis to fill a membership position for each group significantly affected by public coal leasing. Government representatives from Indian Tribes, producing states, and federal surface management agencies would be selected and appointed by their respective

organizations. If a region had more than one Indian reservation in a region significantly affected by federal leasing, then each tribe would have a seat on the regional commission. The same rule would be true for a region that had more than one state involved in a regional coal producing area, such as the Northern Great Plains. Interest groups falling within the category of ranchers and environmental organizations would similarly have a respective seat on a regional basis. National members would be elected by regional members with the exception that at the national level six members would represent the commission. The six members are indicated in Figure 3.4.

Chairpersons would be elected for a four year term by members of the national and regional groups. Representatives for each level of the commission, national and regional, would be selected by the represented groups on an equal basis of numbers so that no one group could dominate the commission. Funding for the commission would come from coal sales, government revenues (federal, state, and local), and industry contributions. All funding sources would be equally divided so that no one source of funding would have an advantage of financial domination. The national commission would prepare annual leasing goals including sales announcements and a general public report on

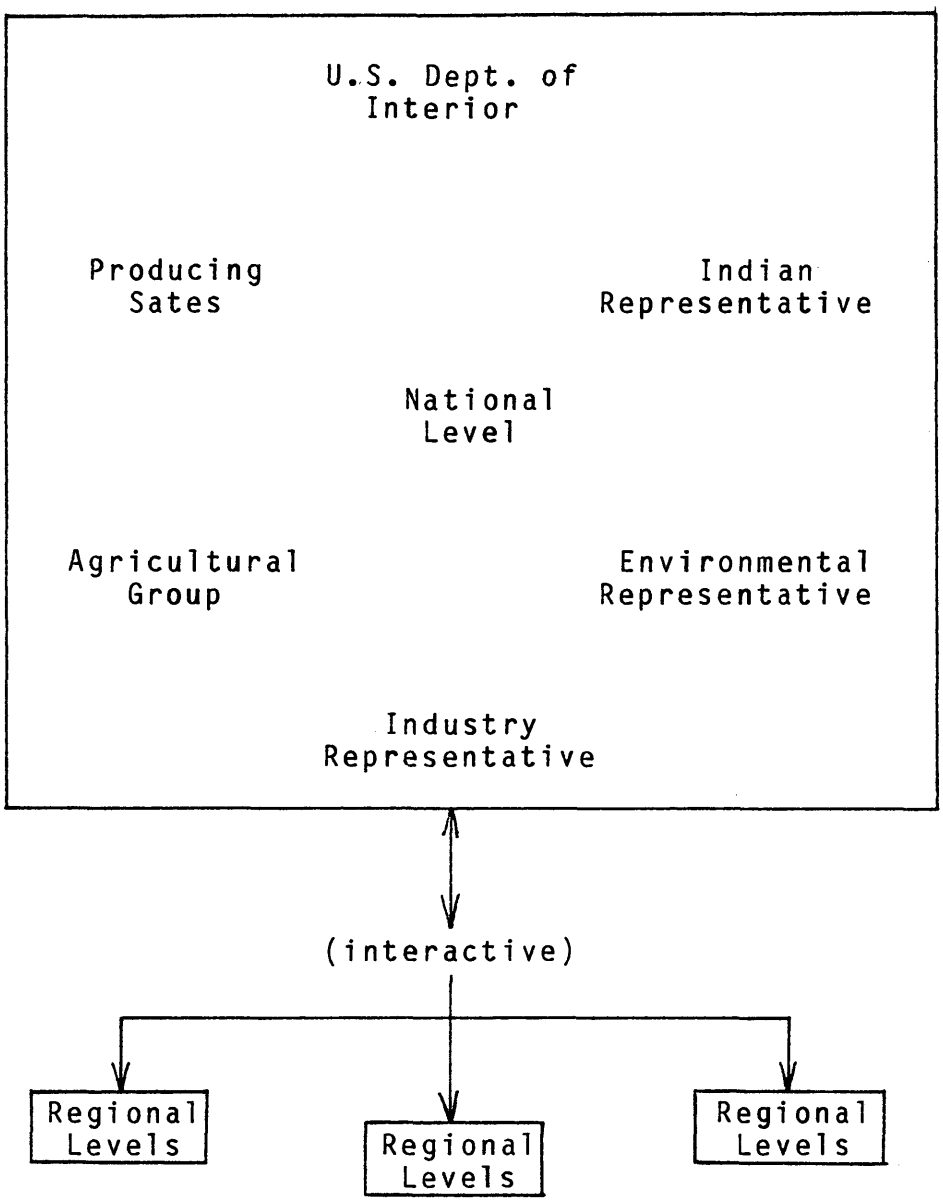

Figure 3.4

National and Regional Coal Market
Leasing Commission Members

the current and intended state of coal leasing. Regional leasing teams would make recommendations to the national commission on a semiannual basis, or more often if necessary. Voting on leasing goals and recommendations would be on a majority basis for both the national and regional levels of the commission.

Figure 3.5 diagrams the organizational relationships of the national coal market leasing commission. Most of the resource evaluation, marketability of coal, and environmental tract delineation would be done at the regional level; however, final decision would be conducted at the national level. Although a management system of this democratic nature would not respond as quickly as a pure market system, the development of public coal resources is a long-term undertaking that requires a collective approach to attain market health. Balance of interest and objectives canbe obtained in a democratic process, and the end result on leasing decisions is defensible by its democratic process.

How the Commission Would Lease

In an economy with perfect land tenure and few environmental constraints on public coal leasing, the optimal leasing method would be straightforward. Perfect

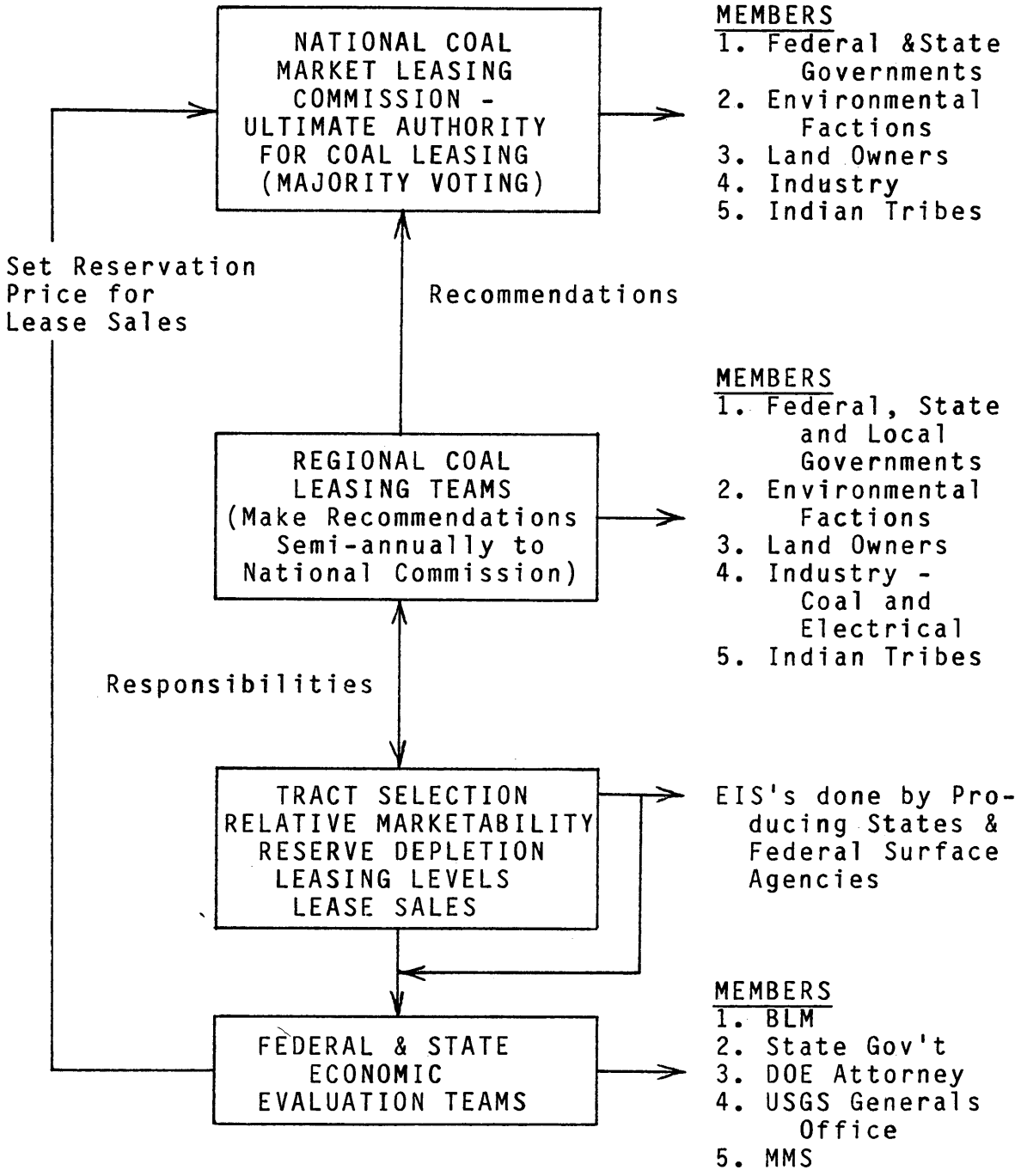

Figure 3.5

National Coal Market Leasing Commission
Organizational Diagram

knowledge would be known about the coal resource, and public coal would be assembled into lease packages that would make available to the market tracts of coal that provided least cost mining. When market signals indicated an increase in demand, the government would simply lease the coal to the highest bidder. The competitive bidder would mine the coal in the most efficient way and, in turn, the public would receive the highest fair market value for its coal. In theory, by mining the least cost coal first, further revenues to the producer and public would be assured, because as the total resource becomes depleted, scarcity of the resource would push the price of the coal up and marginal user cost would be covered for all generations. With higher scarcity resource prices, the producer would profitably mine the more scarce resource with higher mining costs. Profits and resource rents would remain optimal until the resource was substituted by an alternative and less expensive resource, or the resource became completely depleted.

In the real world, land tenure is not perfect, environmental constraints are significant, and perfect knowledge of the coal resource is inconsistent with the theory of least cost tract selection. Western coal leases, given checker boarded private-public surface and subsurface

ownership, cannot follow the perfect least cost tract selection theory, coupled with more fundamental environmental constraints that quickly eliminate the optimal least-cost mining theory. Figure 3.6 illustrates the activity flow chart of the three steps that the national coal market commission would follow in determining how, when, and where to lease public coal.

The first step of how to lease would pick the best tracts through the next best alternative least cost mining tract selection process. The national coal leasing market commission, through the regional leasing teams in order to satisfy environmental and land tenure constraints, must target regional coal producing areas, and through a screening process begin to rank least cost mining tracts that have met both private-public land owner consent to mine and all regulatory environmental demands.

Not only would some semblance of optimal extraction theory begin to take place as alternative best tracts were delineated, but the broad base of the national commission would provide a forum for conflict resolution long before coal lease sales occurred. Furthermore, the diverse member mix of the commission, all having equal representation and voting power, would not put the responsibility on any one faction of the commission for choosing potential lease

HOW TO LEASE:

STEP I (COLLECTIVE PROCESS)

a. Target potential regional lease areas.
b. Screen out private-public unacceptable areas.
c. Rank areas for least-cost mining and further environmental studies.
d. Develop regional least-cost coal leases inventory.

WHEN TO LEASE:

STEP II (COLLECTIVE PROCESS)

a. Develop five-year forecast collective in nature.
b. Develop LMU's for economies-of-scale.
c. Test market for producer capacity.
d. Select leasing level based on market demand and producer capacity.
e. No new production leasing until threshold reserve depletion reached.

WHERE TO LEASE:

STEP III (COLLECTIVE PROCESS)

a. If perceived demand exists for new production above producer capacity and reserve depletion, pick least-cost tracts first for sale and appropriate lease level to satisfy five-year forecast.
b. Write EIS.
c. Determine reservation price.
d. Conduct sale and determine FMV competitive price and where to lease.

Figure 3.6

The National Coal Market Leasing Activity Flow Chart

tracts. Each representative group would also develop an appreciation for each others views and objectives during the early stages of tract selection.

Once a rough estimate of lease tract availability had been established for environmental unsuitability criteria and private-public surface owner acceptability, then more site-specific environmental analysis would be performed by state and federal surface management agencies to discern specific and cumulative environmental impacts including both private and public lands associated with the federal lease tract. If a tract fails the site specific and cumulative environmental analysis, it must be eliminated from the tract least-cost mining ranking inventory of public coal. Private-public surface owner consent must also be granted before a tract can enter into the inventory. All environmental analyses would be collectively reviewed and commented upon by all members of the national and regional members of the commission and by the public at large.

Step 1 would also evaluate all Preference Right Leases (PRLs) that were issued prior to the Federal Coal Leasing Act Amendment of 1976. By analyzing PRLs for environmental and ownership acceptability, outstanding public coal could be added or deleted from the least cost minability inventory. Tracts that did not qualify would be dropped

from the inventory, and the owners would be compensated for their costs at fair market value. Tracts that meet the environmental and surface owner acceptability would be given a preference right putting them first to be leased if they meet the actual least cost mining criteria.

Of the tracts that pass the environmental and owner acceptability, a more detailed analysis would be performed to pick tracts that in fact provide a ranking of least-cost minability based on coal quality, transportation advantage, level of reserves, and developmental advantage including access to labor resources and water availability. Tracts that indicate a high ranking would be drilled for further reserve verification to remove any uncertainty of the coal resource quality and quantity.

After the tracts were evaluated for actual minability, environmental and owner consent, an element of which tracts were most desirable for leasing would materialize into a confirmed least-cost mining inventory. The national coal market commission would then have a permanent data base inventory of all public reserves that could potentially be sold. The tracts would be ranked from the highest to lowest marketability with a consensus of approval among all members of the commission, thus eliminating conflict over property ownership and environmental concerns.

When the Commission Would Lease

Step 2, when to lease, would provide a process of the national and regional commission members collectively selecting the best tracts to lease, and when to lease, according to market trends and existing producer production capacity. In order to reduce disequilibrium between producers and consumers of coal, demand forecasts for production would be developed on a five-year basis by commission members, including government and industry. To date, because government and industry have developed separate supply and demand forecasts, great disparities currently exist in coal markets between potential coal supply and actual electrical demand. Not only is market disequilibrium disruptive and costly for coal-producing regions, it could in the long run reduce producer incentives and create shortfalls of coal production in the future. It would be preferred to keep market equilibrium as closely approximated as possible through the collective approach of industry and government market forecasts.

Market equilibrium would be brought into trim by the commission through a process of withholding new production leases until existing producer production capacity was brought up to optimal levels of production. Existing producers of public coal must meet a threshold level of

productive capacity agreed upon by the commission over the life of the mine before new production leases would be sold by the commission. Existing mine operations, if adjacent to unleased public lands would have emergency lease preference if prolonging optimal existing mine capacity could be achieved without leasing new tracts.

As existing optimal productive capacity mines reach depletion of public and private reserves and a sufficient market demand persists, only then will new production leases be made available by the commission for lease sale. Since mines in coal regions have come on line at different points of time and each have different reserve capacities of coal, lease sales must be scheduled according to current and expanded market demands. Regional commission teams would make semiannual reports and recommendations to the national commission. The national commission would establish the timing of lease sales and level of coal to be leased based on its supply and demand five-year forecasts. Only when threshold producer capacity had been achieved, and producer reserves were reaching supply and demand shortfalls would the commission consider a lease sale.

Once the commission had clearly determined that expected demand exceeded expected supply, and that producers were operating at optimal capacity with a predicted short fall of

producer reserves with no alternative adjacent reserves available, new production tracts would be considered for a sale of public coal. The commission would then, based on regional team recommendations, begin to assemble for potential sale lease tracts that would satisfy projected five-year demand shortfalls. Public coal lease tracts would be assembled into logical mining units or lease packages comprised of federal and possibly state, Indian, and private reserves. Each lease package would be scaled to meet optimal mining technology and economy. Given existing surface mining technology, it is currently estimated that a western surface mining should produce approximately 10 to 15 million tons of coal per annum (Tyner, 1978). The logical mining unit would be determined more by overburden thickness than by absolute acreage size. Total reserves of the logical mining unit would be sized to provide coal to an electrical coal-fired generator for 25 to 30 years, the normal plant life of a generator. The total coal reserve of a logical mining unit package would fall somewhere between a range of 300 to 450 million tons of coal. Federal coal that would not be combined with state, Indian, or private coal to establish the logical mining unit package would be withdrawn from the lease tract inventory.

Only the amount of coal in packaged lease tracts

necessary to satisfy projected demand shortfalls would be eligible for lease sale. The tracts to be sold first would be the least cost minable coal tracts picked from the inventory. The tracts ranking first in the inventory would be the most valuable ones, and the ones that were collectively nominated by the commission to be environmentally satisfactory, sized for market performance, and with no conflicting ownership claims placed on them.

Where the Commission Should Lease

Step III, where to lease, would deviate from Steps I and II by allowing only federal and state governments to determine a reservation price value on the selected leases. The federal and state governments would further prepare site-specific and cumulative environmental impact statements based on the tracts selected for leasing. Once the leasing environment impact statements were completed and accepted by the public and commission, the commission would assign a date for the actual lease sale.

The lease sale schedule and tracts offered would be published well in advance of the sale, and the sale would be conducted by the U.S. Bureau of Land Management and state government land resource agencies. The sale would be based on a competitive front-end bonus bidding system using sealed

bids for the initial pre-sale. All qualifying bids must equal or exceed the government's reservation price which would be published prior to the sale. Because the lease tracts were selected collectively by the commission to meet agreed upon market demand and market performance, the leases should elicit relatively high competition among bidders in order to determine the actual fair market value of the tracts.

The reservation price used in the bidding would be calculated based on an adjusted medium value derived from comparable sales evaluation methods and the income approach for each tract in the sale. The medium value between the income approach and the comparable sales method would equal the reservation price to be used in the sale. The use of a medium reservation price would insure a reliability of calculation if the comparable sales method lacked a significant comparable past sales sample size, or the past sales were outdated relative to current market values.

If more than one bid at a sale equaled or exceeded the reservation price, then the bid would qualify as an acceptable minimum and the highest bidder would qualify as a potential winner of the sale. The highest bidder must then pass requirements established by the U.S. Attorney General's Office to determine that no collusion or antitrust behavior

existed. If approved, the bidder would acquire the lease, and the bid would be considered the fair market value of the lease.

If only one bid qualifies and equals or exceeds the reservation price, then the bid must be analyzed by the governments for competitiveness for fair market value determination. This postsale procedure would be based on comparable past sale tracts from government data, confidential industry information, and the qualifying bid. The information would be averaged to produce a geometric mean, and the qualifying bid must equal or exceed that figure. Because the geometric mean biases the calculation toward comparable tract value, comparable tract values must be tested for reliability before they could be used. For example, if the qualifying bid was $.06 per ton, and the comparable past sales equaled $.05, $.06, and $.04 per ton then the qualifying bid must be equal or greater than $.052 per ton. The qualifying bid is $.06 per ton and, therefore, is equal to the fair market value of the lease if the bidder satisfies the antitrust requirements. If unreliable comparable values existed, the government should use the income approach value with which to compare the single bid. If the bid exceeds the income approach, the bid satisfies

the fair market value requirement and the tract can be leased.

If the bidder passed the antitrust requirements and had the highest bid, the commission would lease the coal on a 30-year basis. The producer must produce at least 1% of the logical mining unit reserves within 10 years and/or pay advance royalties on the necessary 1% production for the next 10 years. Since optimal production life of the logical mining unit package is 30 years, lease life must coincide, and the advance royalty production penalty would prevent speculation and bring market equilibrium into balance. If the lease is not in production according to market demands and production optimality within 20 years, the lease would automatically revert to the lease inventory to be resold either immediately or at a future date.

Royalties on surface coal production would be set at 12.5% per ton of the contract sale price; however, if the commission determined that producer profitability and optimal productivity would be reduced due to unexpected decreases in coal demand, the commission could reduce the royalty rate until demand increased.

The three steps managed by the national coal market commission would be a collectively agreed upon method of maintaining orderly, healthy, and stable coal markets.

Conflict would be resolved among policy makers, and the factions most involved in the coal leasing process would be democratically represented throughout most of the lease procedures. More importantly producers would operate at optimal capacities and changes in demand would be responded to in a timely fashion. Short-term demand forecasts would eliminate much of the long-term market speculation and disequilibrium.

Chapter IV

THE COMPARATIVE ECONOMIC EFFECTS OF CURRENT FEDERAL COAL REGULATIONS AND THE NATIONAL COAL LEASING MARKET MODEL ON STABLE COAL MARKET DEVELOPMENT

Unlike a perfect coal market in which producers and consumers would operate with few market constraints, public coal leasing must satisfy a myriad of constraints before federal coal can be leased. The federal government must carefully select and evaluate lease tracts in a fashion that complies with environmental and land use laws in a timely way that resembles the U.S. agricultural policy of controlled production before orderly, healthy, and stable coal markets can develop. Not too much or too little coal should be leased and synchronized with proper market timing and functions in order for public coal leasing to act as a stabilizing influence on the entire coal market's structure.

A proper comparative evaluation of current and normative leasing policy requires a more detailed description and analyses of what constitutes orderly, healthy, and stable u.s. coal market behavior. Although market order, health, and stability are inextricably interrelated, each concept can be individually defined and characterized to establish

specific market performance criteria to which existing and normative leasing regulation can be compared.

It is also important to briefly examine three basic types of potential coal markets that exist in the world economy and which leasing policy best fits the U.S. market for optimal leasing development. The first type is essentially the socialist model in which all mineral properties are owned and controlled by the state. A second model is the mixed economy in which property ownership and mineral extraction are separately owned and operated by state and private organizations respectively. Property can be owned by the state or private concerns; however, the actual extraction process is normally done by the private sector. In a mixed economy with public resource ownership, the public normally has control over which tracts are leased and demands a fair market value return for leasing its resources.

The third type of system is a perfectly competitive economy in which all decisions in the extraction of minerals are determined in the market. Prices, which determine the supply and demand of land and which tracts will be leased or sold, basically determine the fundamental mechanics of the coal allocation in the market. Very few, if any, coal markets occur in the perfectly competitive market system,

and most coal markets in today's world are controlled either by the socialists economic structure or the mixed economy system.

The disposal of coal through leasing or sale in an economy dominated by state control over mineral resources has many of the problems of coal allocation and pricing associated with mixed economies; however, the state has more control over determining market equilibrium conditions. The state can, through its police powers, select the most efficient tracts of land for disposal as suggested by Michael Crommelin and Andrew R. Thompson in Mineral Leasing as an Instrument of Public Policy, 1977. In the state dominated economy, the federal and state governments normally control both supply and demand of coal, and the disposal of coal simply means that the least-cost mining tracts are sized for economies of scale and leased to a state producer, or the highest private bidder as in the case of Canada. Tracts are subject to environmental constraints, but once the tracts are accepted for environmental suitability, the disposal system is not plagued by land owner constraints. The state leases the best tracts first in accordance with how much is demanded.

The U.S. coal market is much different. Coal development is complicated by both private and public

ownership of mineral resources. Furthermore, the ownership patterns vary radically from region to region. In the mixed economic system of the United States the mineral disposal system is a highly quasi-democratic process which precludes a straight forward system of allowing either the government or private industry the advantage of leasing to satisfy the least cost efficiency criterion. All public coal leased must pass a myriad of requirements before it can be privately produced in what is essentially a regulated private electrical market.

Because a preponderance of coal is publicly owned in the western U.S., what conditions constitute and define orderly, healthy, and stable U.S. coal markets in the mixed U.S. economy? Market order can be defined as leasing public coal in a predictable manner in which the timing of sales and the amount of coal leased satisfies existing and anticipated coal demand when existing and projected mine productive capacity is at optimal efficiency indicating that supply capacity will neither exceed or fall short of demand. Before public coal can be leased in an orderly fashion, it must further meet all revenue claims by governments, and receive a fair market value when sold. All environmental restrictions, land tenure, and land use conflicts must be resolved through and approved by individually affected

citizens, private land owners, and involved governments. In essence, market order and the public coal disposal approach to land use problems require detailed environmental screening and good understanding of existing and perceived coal markets by the public and private sectors of the economy. By its very nature, market order in coal leasing involves a long lead time to bring the proper amount of coal at the right time to market, and all phases of market order must be done efficiently and in a speedy fashion as not to create excessive market speculation or short falls in public coal production.

Market health, although strongly related to market order, implies that coal production in the private sector receives, at a minimum, a normal rate of return on both public and private mining operating. Assuming that the supply of public and private coal is kept in a long term equilibrium through market order, potential profits and actual or realized profits are also in balance. Both public and private speculation in coal markets is minimal. The capital goods investment climate is further favorable to coal investment and expansion in market supply when a real demand is perceived and supported by a predictable federal leasing policy.

A healthy coal market also implies the level of public

acceptability over environmental, land use, and revenue capture in the coal market. In a mixed economy coal markets must have a strong acceptance by the public before private investment can occur, and if public acceptance is unfavorable, valuable reserves will be temporarily or permanently withheld from market production causing higher costs for producers and consumers and disruptions in market equilibrium.

Market health is a reflection of how well the public and private sectors can work together to produce the highest reward for everyone. Strategic planning (with a revenue maximizing objective for all peoples) of the extraction of public resources by private firms will be a healthy endeavor when all parties involved are incorporated in the decision-making process. Highly fragmented market planning will result in an unhealthy market with unsatisfactory and disruptive public and private participants.

Stability in coal markets refers to the manner in which government planners and coal producers respond to changes in demand. Each change in demand will induce a related change by governments and producers and create a cycle. A boom will create increases in demand accompanied by increasing production, which forms the boom portion of the cycle. The opposite side of the cycle results in decreases in demand

and production and constitutes the bust portion. The entire cycle can be measured by the amplitudes of the bust/boom portions and the relative duration of the entire cycle. Instability is characterized by relatively high amplitudes either in busting or booming and a relatively short duration in time (Broadus, 1980).

Instability in coal markets could be further identified by periods of over or under capacity in production where a perceived demand either by government or the private sector is miscalculated, and supply and demand are put in disequilibrium. Over capacity relative to demand will last until no new production occurs and existing production reaches an equilibrium supply and demand condition depending on the growth in demand. The result of over supply is below value prices in a buyer's market and reduced investor incentives. Under supply causes higher than equilibrium prices for coal and induces capacity expansion and favorable investor conditions. Both under and oversupply result from poor public and private planning in the case of the U.S. public coal markets.

Stability in coal markets is also a reflection of government leasing policy and private investment strategies. Changing and unstable government policy will lead to unstable coal markets, just as speculation from the private

sector may create disequilibrium situations. If planned development does not equal realized supply and demand conditions over the long run, boom/bust cycles will occur throughout the coal market economic cycles.

Stability will follow from market order and health. In a mixed economy, collective planning for coal development can create stable markets. Because the diversity of interests are so great in coal leasing, the goal of resource planning is to reduce the supply of public coal when the market experiences over capacity and to lease tracts when a known demand is established. The smoothing of peaks and troughs in the coal market business cycle will increase public revenues, stabilize producer profits, and help to guarantee an equilibrium price and supply of coal at the lowest cost to consumers.

The Economic Effects of Existing Federal Leasing Regulations

Existing federal coal leasing regulations on orderly market development relates directly to how and when coal is leased through environmental selection, land use consent, and the timing and magnitude of lease sales. The process of selecting tracts for lease is further based on a complicated fragmented system of actions on behalf of the federal government and reactions from environmental groups, land

owners, producing state representations, a mixture of federal government resource agencies, Indian tribes, coal producers, and the public at large. Final tract selection, the timing and size of lease sales, and reservation pricing is ultimately the decision of the Secretary of Interior.

Meeting the orderly market development of leasing the least-cost mining tracts first is difficult for the government, because environmental and land use constraints can quickly remove superior lease tracts from possible sale. Environmental suitability criteria requires that all lands nominated for possible leasing must pass specific time consuming examination, and each potential lease tract is vulnerable to public unsuitability petition for surface mining, the ungainly federal reactionary process by which tract nomination is based mainly on industry expressions of interest both at the land use and activity planning levels. Because the environmental permitting process requires years of planning, industry interest may change with changing market demands, and little interest may exist once a potential lease tract is sold. Existing regulations demand for the most part an arms length relationship with coal producers, and the government must rely on scattered coal market information voluntarily submitted by industry and its own perceptions of the market.

Nominated tracts, once they have passed environmental screening, may not be the least-cost mining tracts, and the government then has an inventory of potential salable lease tracts that may be the second-best, or higher cost, tracts in a region. The second-best tracts are then subject to surface-owner consent before the tracts can be sold. The remaining tracts that have been selected for sale after the lengthy screening process may well be of inferior quality and not highly demanded by industry.

The sizing of federal leases under current regulations requires that new production tracts are combined into maximum economic recovery logical mining units. Logical mining units require further combining of private and state lands and the approval of the owners to lease. The tracts are not sized to optimize changing mining technologies and scales-of-economy. Logical mining units promote conservation of public coal, but they also may increase the possibility that producers must install too much capacity on large logical mining units relative to market demand.

Existing regulations rely primarily on government calculations to determine the magnitude and timing of new lease sales. To date, most internally generated government projections have over calculated aggregate electrical demand for public and private speculation of projected coal supply.

The Secretary of Interior relies almost entirely on calculations internally generated by government technicians in the Departments of Energy and Interior to determine producer capacity in given regions. No mechanism or threshold standard exists to bring existing procedures up to optimal productive capacity to satisfy shortfalls in demand.

Implicit in federal leasing regulation and, in part, a discretionary philosophy of the Secretary of Interior, is how much coal to lease at what time in the coal market. The Secretary can choose a policy of leasing on demand, or leasing for reserves, or a combination of the two leasing philosophies may be used. Leasing on demand simply implies leasing only enough public coal to satisfy projected demand. Only enough coal is let into the market during lease sales, plus a small additional amount, to fulfill unanticipated emergency increases in demand to compensate for short falls in production. Leasing on demand requires series cooperation between industry, the public, and the government to accurately forecast demand conditions. This type of leasing helps to insure the public a greater control over market conditions and ultimate maximization of public and private revenues derived from coal sales.

Leasing for coal reserves is essentially a privatization process of public coal, and its basic theory is found in

Richard Gordon's Federal Coal Leasing Policy, Competition in the Energy Industries, 1981, in which speculation on public lands by private promoters, as quoted by Gordon, "generally contributes to more efficient coal production." He further believes that private land speculators on public lands can package checkerboard lands more effectively than the government, and competition among producers will be enhanced when the coal is allocated through private market behavior.

It can be suggested that leasing for reserves has been the implicit policy of the Department of Interior in the recent Powder River Basin and Fort Union coal lease sales. Inherently leasing for reserves removes the federal government's control over where coal is brought into production, depresses bonus bidding on federal leases, and allows speculators revenues on leases and transactions between private parties. The public will receive less than fair market value for new productions leases and receive only production royalties from leases sold by private speculators. The net effect on coal markets is to remove public control over where leases should be brought into production at what time and the possibility of speculators increasing the price of public coal above competitive market prices by withholding valuable public coal from the market when a demand exists for it.

Existing federal regulation is currently constrained by statutorily mandated due diligence on all producers holding federal leases attached to mine plans. The law requires that at least 1% of the reserves must be in production within 10 years of lease acquisition, or the producer must relinquish to the government the right to mine the lease. Failure to meet due diligence requirement further disqualifies the producer from acquiring new federal lease holdings.

Due diligence has the effect of exacerbating over supply and capacity during periods of reduced demand and over anticipated supply. Market performance is diminished by creating an artificial supply and driving market prices below equilibrium, reducing expected rents and investor confidence. An opportunity exists for the creation of unstable markets as producers unload excess coal on spot markets creating excessive inventories at fired generators as consumers move to capture excessive productive capacity benefits and introduce unstable spot market pricing rather than rely on long-term contracts.

The government's reliance on competitively determined fair market value to select where leasing will actually occur is predicted on values derived from comparable sales and the use of adjusted value modeling to compensate for

variations in different coal tract value. The comparable sales method is the preferred federal method of setting the reservation price and ultimately determining a competitive fair market value for federal tracts to be sold when a tract only receives one bidder. Since 1920 only 31% of all government lease sales have received two or more bidders for federal leases indicating that most leases have received only one bid (Fair Market Value Policy for Federal Coal Leasing, 1984).

Although the requirement is that the public receive fair market value for its coal, the actual amount of money received is small relative to expected costs and revenues of the lease. The fair market value requirement really determines which tracts at what time and at what quantity will potentially be mined generating corresponding large royalties in terms of production rents.

Currently the preferred comparable sales approach differs in methodology from industry's discounted cash flow income approach to determining not only the reservation price but, ultimately, a competitive fair market value in which only one bid is received for a federal coal tract. Although the government's approach is conceptually and technically acceptable, the government lacks sufficient comparable data to determine statistically sound data that

represent market activity (Cordes, Petrick, 1983). In the Powder River Basin sale conducted in 1982, only two comparable sale representative tracts were used to calculate reservation prices for all the tracts offered. As a result, the government was unable to interpret market trends accurately, and it has been suggested that fair market value was not received for the tracts (U.S. General Accounting Office, 1983).

Inherent in federal leasing comparable sales methodology is the government's inability to judge market trends and lease coal onto the market during periods of downward cyclicality. Misjudgment of periods of trends and cycles can also occur during upward market movements, and the government might lease too little coal or none at all. The net economic effects of the government's current policies with its arms length approach to market forces are that inappropriate amounts of federal coal either leased or withheld from the market will have a negative influence on (1) market order by leasing at inappropriate times, (2) market stability by creating either quasi-positive or quasi-negative rents through disequilibrium in supply and demand of coal, and (3) market health by creating excessive or less than normal rents for producers and producing states (McDonald, 1979).

In summary, existing federal coal leasing regulations can not fulfill market order, health, or stability in a rational manner because they lack

1. an ability to resolve environmental and land owner conflicts in a systematically and timely fashion,
2. a forum of public and industry consensus centering on the timing of lease sales and the amount of coal that should be let onto the market to maintain producer capacity and market supply and demand equilibrium,
3. a system of establishing a least-cost environmentally sound and owner acceptable lands in an inventory to be leased on the basis of ranking, and
4. an evaluation methodology predicated on realistic assumptions consistent with industry evaluation and market trends and values.

The Economic Effects of a Normative National Coal Leasing Market Model

Since the passage of the Minerals Leasing Act of 1920, the political, legal, and economic climate in regard to resource management has undergone drastic changes evidenced by the introduction of a multitude of local, state, and federal economic, political, and environmental laws. Areas

of the United States that were once remote and sparsely populated have become settled mainly by ranchers and recreational communities with legally established claims on the political and economic destinies of public lands. The federal government no longer has absolute authority over the use of remote lands as resource colonies to be exploited in the name of national welfare.

Public lands that were once regulated by the Department of Interior through a system of loosely constructed regulations when little public and private interest existed in public lands and when resources, to a large extent, were imported at very low costs by multinational U.S. mining firms, have in the last 15 years come under great pressure to be mined for domestic consumption. With the closure of access to cheap foreign resources and cartel pricing of foreign fuels, mining companies and the federal government looked to mineral resources, including coal on public lands, as a safe and reliable source of both fuel and nonfuel minerals to satisfy seemingly increasing growth in demand for mineral resources during the 1960s and 1970s.

The secretarial administrative apparatus proven historically effective was administrative discretion by the Department of Interior. Nonetheless, during the 1960s and 1970s, many legal and economic claims were placed on public

lands by diverse groups not excluding Indians, ranchers, producing states, environmentalists, and mining companies. Of these claims, some were mutually exclusive land use practices such as mining and wilderness. During a crisis period of energy shortages of the 1970s, conflicts occurred in which adversary conditions erupted between groups, creating a very disruptive atmosphere for efficient and expeditious federal coal leasing on public lands.

The process of administrative discretion to lease coal prior to the 1970s worked well when little demand existed for western coal, and a national complacency existed for diverse land use in western states. With public demands for a clean environment and a broader desire to preserve public lands from mining development, the process of public land disposal became subjected to fragmented and discontinuous external forces in the form of law suits, public dissension, and enhanced political and fiscal claims from producing states and Indian tribes to control public lands on a regional sovereignty basis. As a result, secretarial administrative discretion, in effect, lost its effectiveness and ability to function in a vertically-integrated process granting the federal government absolute power to control regional resource development. The breakdown of secretarial administrative power is evidenced through the Department of

Interior's impotence to lease coal since the 1970s and has resulted in a series of moratoriums on coal leasing until new methods can be found within the existing political process that best represent the needs of the public, industry, and the federal government.

Although the national coal leasing market model deviates from the existing secretarial administrative discretion process of leasing coal, it does present solutions to market disruptions through internalized consensus building mechanisms that, in the long run, rationalize the political economy of coal leasing and lead to orderly, healthy, and stable coal markets.

The national coal leasing model is based on a vertically-oriented system of cooperation derived through a representative body of different interests and consensus building. Consensus building among diverse groups is a difficult process, but consensus building can develop the capacity of federal coal leasing policy to more represent national energy needs through viable coal markets. In order for it to be effective it must follow at least five fundamental steps (deNeufville, 1981):

1. All parties must agree to negotiate.
2. The participants need to know about each other's positions and about the controversy in order to

specify their most desired outcome.

3. The members must be able to identify the technical information necessary for negotiation. Technical information can be classified as costs, legal constraints, forecasts, coal resource information, and any data associated with existing and proposed coal development. Participants must further be able to understand how such information is generated and to agree on its validity.
4. Compromise that allows participants to move closer to each other's positions must be explored. For example, land exchanges that would help both industry and environmentalists establish more wilderness and better coal tracts should be developed.
5. Representative groups both at the regional and national level of the national coal leasing market commission must define a course of action that will force decisions into official policies.

The national coal leasing market model, through its ability to represent in an integrated regional-national majority vote fashion the many diverse groups that have legal claims to public lands involving federal coal, would remove the legal vulnerability that exists in the current

federal leasing system. The federal government, through the Department of Interior, would serve as a forum to determine how, when, and where federal coal could be leased to promote orderly, healthy, and stable coal markets.

Consensus building has definite limitations, and the national coal leasing market commission must be aware of these shortcomings. Some of the limitations are as follows (Church, 1982; deNeufville, 1981):

1. Regional groups with large representation relative to other regions may attempt to expropriate resource rents in favor of the larger region.
2. The costs of attaining a majority vote may be very high.
3. The commission may not be able to respond to a coal crisis in a timely fashion.
4. National interest may be subjugated to regional desires and benefits.
5. If too many groups compete for resource rents generated by federal leasing and coal production, no one group will benefit from the rent which will become dissipated.

Once the national coal leasing market commission was instituted, the technical problems associated with creating a least-cost tract inventory and the appropriate timing for

the amount of coal to be leased to keep coal demand in equilibrium with producer capacity would be resolved. The commission would assure potential coal producers and existing producers a guaranteed market and, in turn, assure producing states a fair market value for their coal.

By leasing on demand, or only leasing the amount of coal necessary to maintain existing optimal producers capacity by leasing new reserves forecasted for five-year periods, much of the long-term coal demand speculation would be removed. Additionally, with an agreed upon level of known demand by all members of the commission, fair market value would be assured through competitive bidding or validation of tracts that best represent a fair market value when only one bid is received for a bid.

Because the national coal leasing market commission would allow a high level of information sharing among its participants, a practical method of efficient forecasting to bring capacity into an optimal level of production would be the use of incentive pricing (Radetzki, 1983). The incentive price is the price necessary to attract investment into the coal industry to assure capacity expansion at just enough to satisfy demand. Although the incentive price is not always a unique price, it can be approximated through a range of estimated average production costs which include a

sufficient rate of return on capital. The inventive price is further assumed to increase over time as the average cost of new projects increases as a result of resource depletion.

The national coal leasing market commission could use incentive pricing as one technique for bringing existing excess coal producer capacity closer to optimal capacity by withholding new coal leasing. As existing producer capacity approximates the inventive price as demand slowly grows, the commission would consider leasing additional reserves commensurate with incentive pricing. The incentive price leasing technique could be used with the short-term five-year demand forecast as a means of introducing more market equilibrium and stability into the leasing process.

The national coal market commission could solve the disruptive economics of the due diligence production law in two ways. First, due diligence could be factored into rational supply demand market equilibrium estimates by counting due diligence coal production into producer long-term supply capacity. When the commission reviewed producer capacity in a region relative to perceived demand, no new leasing would occur unless due diligence was considered as a part of producer capacity and reserve base. The second and more desirable solution to over supply resulting from due diligence is to statutorily remove the

producer imposed production penalty and replace it, as suggested in the national coal leasing market model, with advanced royalty payments equal to the due diligence production requirements. In summary, the national coal leasing market model, although more complicated than the existing federal model of secretarial discretion, will help to promote, in a timely manner, better coal market order, health, and stability. Market order will be achieved because an inventory of ranked least-cost environmentally sound and acceptable land use tracts will be assembled and leased only when an agreed upon demand exists over producer capacity. Market health will be assured because over supply of leases and coal production will be reduced to market equilibrium conditions. More stability will be introduced into the leasing process through an internalized consensus building controlled, democratic planning process eliminating disruptive law suits and unnecessary moratoriums and by planning on a short-term basis allowing for flexibility in a period of rapid energy market changes.

Chapter V

CONCLUSIONS AND RECOMMENDATIONS

The results the study of the inquiry into whether or not federal coal leasing policy supports, in a positive manner, orderly, healthy, and stable coal development, is broken down into three areas of conclusion: history, existing federal regulations, and the normative national coal leasing market model. Since federal coal leasing regulations are proposed to be changed in the near future, a further review will be made in the conclusion to determine whether the proposed changes will contribute to orderly, healthy, and stable coal market development. This chapter will conclude with recommendations on areas of further study necessary to analyze what other changes might assist to lease federal coal and improve viable domestic coal markets.

The historical orientation of this study has been valuable as background material to understand that the U.S. public fuel and nonfuel disposal policy has gone through many changes. These changes have reflected two important characteristics about federal leasing policy relevant to understanding how public coal disposal can improve orderly, healthy, and stable coal markets. The most significant

characteristic is that the public does not wish to sell outright public coal or to totally privatize the national coal resource. The reasons for this are two-fold. First, the public desires to maintain legal and political control over land use development on the public domain remaining in western states. If the land were actually sold, much of the political and legal autonomy established by agricultural and environmental groups would be lost to market forces, resulting in a declining power base for established groups.

The second characteristic in the existing coal leasing policy is that producing states dominated by large public coal reserves would lose autarky over coal development. In states that are extractive in terms of agricultural and mineral activities and which have little manufacturing development, federal coal leasing generates valuable revenues at the local, state, and federal levels. With the decline of copper and uranium industries, it is very important for the welfare of western coal producing states that federal policy lease coal reserves without disrupting existing and expected state mineral revenues by maintaining a rational coal leasing system through healthy coal markets.

Historical perspectives on federal coal disposal further indicate that federal leasing policy must maintain a high degree of flexibility and fairness in face of ever changing

public land use demands and domestic energy needs. Until the 1970s, minimal demand was put on western public coal reserves, and the policy of leasing coal to almost any interested coal producer drew little attention from most critics of federal coal leasing policy. Furthermore, throughout the history of federal mineral and nonmineral policy, domestic reserves were seemingly boundless and would exceed demands by a small population mainly located in urban areas. Since the 1960s and 1970s, both demand for the use of public resources and absolute legal, economic, and political pressures have grown dramatically in determining how federal land should be used.

Federal leasing policies effective prior to the 1970s have not kept pace with a public desire for a more democratic use of national resources or a need to maintain orderly, healthy, and stable domestic coal markets. Federal administrative practices that worked through secretarial discretion have been unable to cope and change with the rapid changes in political and economic pressures of the 1970s and 1980s. The public has lost confidence in the Department of Interior's policy of coal leasing because recent leasing activities, based on obsolete administrative methods and untested technical practices of the Department of Interior, were incongruent with public and private needs

of the 1970s and 1980s. The resulting legal suits and public outcry against the Department of Interior have caused the government to retreat into moratoriums on leasing in an attempt to find ways that best resolve modern leasing problems. To date, the federal government has not presented publicly acceptable policy that resolves the administrative and technical impediments to a rational and stable national coal leasing policy.

The national coal leasing market model presents a solution to the modern complex problem of federal coal leasing that would lead to orderly, healthy, and stable coal markets. The model basically solves the administrative problem of secretarial discretion by allowing a method of conflict resolution and consensus-raising among the diverse groups competing for a voice in how public coal should be leased. Although existing federal coal leasing policy has made attempts to incorporate public involvement through public meetings, the environmental impact statement process, and regional coal leasing teams, the existing system lacks a vertically-oriented process of cooperation among all the diverse groups. The existing process is highly vulnerable to public dissent and legal action because the system does not represent equal voting power among the groups. As a

result, federal leasing can only contribute to instability in coal markets.

Technical solutions in the national coal leasing market model would be easier to resolve because a great deal more data will be available to the national coal leasing market commission on both regional and national levels. A national inventory of environmentally acceptable and least-cost mining tracts suitable for optimum economies of scale would be assembled at the front end process of federal leasing. Disputes over land use and ownership would be internalized through consensus-raising among the members of the commission.

Leasing would occur only when the commission agreed that a real demand existed for additional coal in the market, thus reducing the possibility of flooding the market with leases and coal which would drive down lease values and possibly coal prices. Speculation by both government and private industry would further be eliminated by factoring due diligence into market equilibrium formula, or imposing a royalty prepayment on producers who do not meet due diligence requirements. The economic effect would be to penalize the individual coal producers not meeting due diligence through cost increases. The coal market would not be penalized by injecting or dumping unwanted coal on the

market and driving market prices down and adversely influencing all producers and production royalties for governments.

Oversupply and speculation would further be reduced in the market because the commission would only lease the amount of coal necessary to fulfill additional demand over and above optimal productive capacity. By controlling producers capacity and reducing consumer inventories, the market will seek a better equilibrium level of pricing that would promote stability through the encouragement of long-term contract arrangement rather than unstable spot market pricing.

Though rationalizing the selection of least-cost lease and leasing appropriate amounts of coal at the proper time, the government would enhance competitive bidding and fair market value for leases. With a guaranteed market for the coal leased, bidder participation at lease sales would increase because producers would know that coal tracts could be mined with profitable scales of economy in a market with a known demand level. The possibility of gutting the market with lease tracts and coal would be reduced and a fair market value would be received by the producing states and federal government. The likelihood of bringing the tracts into production would also be increased and expected

revenues for producers and government would be more assured.

Reservation pricing at federal lease sales would rely more on the income approach averaged with comparable sales evaluation because comparable sales information is not readily available to the government, and the income approach is a more widely used practice by industry. If only one bid is received for a lease tract, the commission, through the government, would rely on the income approach to obtain fair market value if comparable sales data were insufficient. Comparable sales data could be used if enough statistically tested data existed to perform a solid fair market value determination.

In conclusion and summary to existing federal lease policy and the proposed national coal leasing market model, the existing federal method both, administratively and technically, can not achieve a leasing climate that promotes orderly, healthy, and stable coal market development. The current federal process lacks the administrative flexibility and technical ability to effect positive influences on coal markets because it has not achieved a process that is attuned to modern public land use needs. The national coal leasing market model, executed through regional and national representation based in the Department of Interior, would present an internalized administrative and technical process

that, in the long run, would work to promote a stabilizing element in the disposal of federal coal lands.

Proposed Changes in Federal Coal Leasing Regulations

As a result of the controversies concerning receipt of fair market value, government impropriety, and the dumping of coal on the market stemming from the 1982 Powder River Basin federal coal lease sale, the Linowes Commission has published a series of proposed recommendations to improve existing federal coal leasing regulations. The proposed recommendations are identified in the Report of the Commission, Fair Market Value Policy for Federal Coal Leasing. Although the Commission enumerated 33 recommendations focusing on improving fair market value, some of the recommendations are significant to orderly, healthy, and stable coal markets and would benefit, in part, the tenets of the national coal leasing market model.

The main objective of the Report of the Commission is to improve existing practices in the attainment of fair market value; little attention is given to maintaining viable coal market through the use of federal coal leasing. Nonetheless, the Commission has proposed that (Report of the Commission on Fair Market Value, 1984)

1. the timing of lease sales become scheduled

according to market conditions;

2. producer-states have more participation in establishing lease level and leasing schedule;
3. the government avoid flooding or withholding federal coal causing market distortions and that federal coal should only be sold at the competitive market price;
4. government should sell coal that is acceptable to land use development and is environmentally sound;
5. preference right leases should be eliminated or added to the federal coal inventory through quick review by the Bureau of Land Management;
6. tracts should be selected in a manner consistent with attaining fair market value;
7. federal coal inventories should be enhanced through cooperative drilling programs with industry;
8. logical mining units should be obtained through cooperative program with current owners;
9. the use of front-end bonus bidding be continued;
10. the use of land exchange programs to increase the availability of quality federal coal tracts be continued and improved;
11. more cooperation exist within industry under confidentiality agreements in determining the

values of comparable sales;

12. tract economic evaluation techniques be consistent with industry;
13. the introduction of accepting preroyalty payments from existing mines rather than forcing mines to meet due diligence production requirements.

Most of the commission's proposed recommendations would be consistent with the national coal leasing market model's objectives except that few administrative changes would occur, and the result, if the recommendations are adopted, would be only a marginal improvement in a system that has not worked well in modern times. The leasing program would still remain subject to legal and political disruptions because it would lack representation and voting power from the diverse groups affected by federal leasing. Furthermore, the Linowes Commission's main thrust was to improve conditions for attaining fair market value; less concern was placed on maintaining healthy coal markets through a system of efficient and equitable leasing practices.

The Commission's report places little emphasis on producer capacity and technical triggers of lease sales. Furthermore, it sidestepped the issue of involving industry and group participation in the leasing process.

Although several of its recommendations, such as negotiated lease sales and intertract bidding, have merit in the existing system, in the national coal leasing market model, front-end planing would avoid the need for such practices except in extreme cases.

By shifting secretarial discretionary authority to a consensus-raising commission at the national and regional level, Department of Interior leasing regulations would be less subject to ideological changes as new secretaries are appointed by changing presidents. The economic philosophy of leasing for reserves by leasing large amounts of coal into the coal market significantly reduces the federal government's ability to regulate fair market value, and the timing and amount of coal that should be sold to maintain orderly, healthy, and stable coal markets. Not only are bonus bids lost as private firms transact outstanding leases in the assignment market, but the government has little knowledge of how much coal is planned for market entry by private firms. The government further loses its ability to inventory lease tract dollar values once the tracts become privatized.

Regulations consistent with modern land use and diverse group representations must be incorporated into a highly rational approach to leasing in order to receive fair market

value as a public objective. By regulating the amount of coal consistent with producer capacity, short term projections, and public consensus including industry, can the government through the Department of Interior begin to create coal markets that do, in fact, maximize private and public satisfaction in a consistent and predictable manner.

Topics for Further Research

Four areas of further research:

1. What are the effects of foreign competition on market areas currently using western and federal coal? Gulf states are becoming market areas for coal mined and exported from South American countries. To what extent will imported coal influence existing western coal markets, and how should federal leasing factor into possible market shifts?
2. What administrative changes are necessary in the Department of Interior to create a commission that would assume much of the secretary's authority existing under current laws and regulations? Could a commission, as described in this thesis, serve more as an adjunct to the secretary with leasing regulations consistent with leasing on demand, or should the secretary's current authority be relinquished?
3. If U.S. coal producers are facing competition from foreign coal suppliers, what kinds of policies, if any, should be enacted to protect the U.S. coal industry? How would leasing policy play a role in developing a more competitive coal industry to

protect a domestic industry if protection is deemed desirable?

4. What steps can the federal government take in expectation of anticipated changes in acid rain legislation to improve its leasing program? Undoubtedly changes in acid rain legislation will have regional effects on coal development. How can the government best prepare for different perceived changes that might affect the timing and amount of federal leasing relative to new legislation?

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